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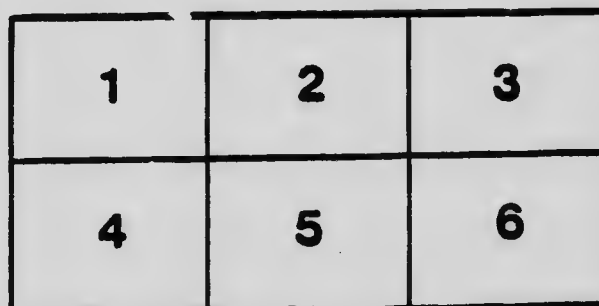
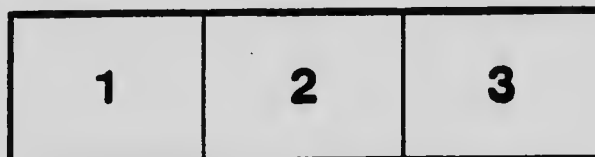
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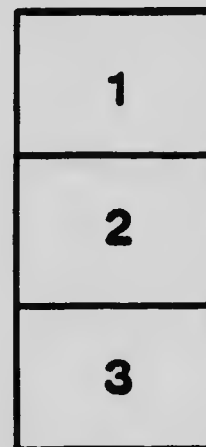
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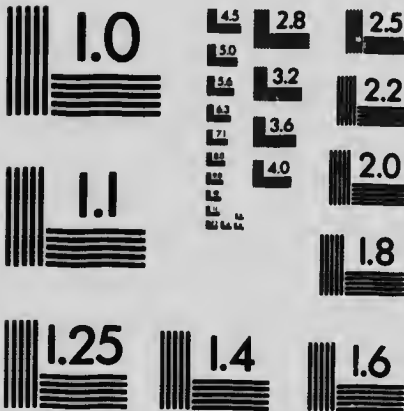
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# MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)





AMERICAN TREE LEAVES, FLOWERS AND FRUITS

1. Black oak. 2. White ash (seven leaflets more common than 5). 3. White oak. 4. White elm.  
5. Magnolia 6. Tulip tree. 7. Sycamore or Buttonwood. 8. White, or Silver maple. 9. Red cedar.  
10. Sweet or Red gum.

**COMPLETE**

**AUTHORITATIVE**

**PRACTICAL**

# **THE UNIVERSAL ENCYCLOPEDIA**

**A COMPREHENSIVE  
REFERENCE BOOK**

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**In Six Volumes**

**ILLUSTRATED WITH COLORED PLATES  
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**TORONTO**

**THE JOHN C. WINSTON COMPANY, LIMITED**

**1920**

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## KEY TO PRONUNCIATION

Three methods are used to indicate the pronunciation of the words forming the headings of the separate articles:

(1) By dividing the word into syllables, and indicating the syllable or syllables to be accented. This method is followed where the pronunciation is entirely obvious. Where accent marks are omitted, the omission indicates that all syllables are given substantially the same value.

(2) Where the pronunciation differs from the spelling, the word is re-spelled phonetically, in addition to the accentuation.

(3) Where the sound values of the vowels are not sufficiently indicated merely by an attempt at phonetic spelling, the following system of diacritical marks is additionally employed to approximate the proper sounds as closely as may be done:

ā, as in fate, or in bare.  
 ã, as in alma, Fr. âme, Ger. Bahn=ā of Indian names.  
 â, the same sound short or medium, as in Fr. bal, Ger. Mann.  
 a, as in fat.  
 a, as in fall.  
 a, obscure, as in rural, similar to a in but, é in her: common in Indian names.  
 ê, as in me=i in machine.  
 e, as in met.  
 é, as in her.  
 I, as in pine, or as ei in Ger. Mein.  
 i, as in pin, also used for the short sound corresponding to ê, as in French and Italian words.

eu, a long sound as in Fr. jeûne, = Ger. long ö, as in Söhne, Göthe (Goethe).  
 eu, corresponding sound short or medium, as in Fr. peu=Ger. ö short.  
 ô, as in note, moon.  
 o, as in not, frog—that is, short or medium.  
 ô, as in move, two.  
 û, as in tube.  
 u, as in tub: similar to é and also to a.  
 u, as in bull.  
 ü, as in Sc abune=Fr. ü as in dü, Ger. ü long as in grün, Bühne.  
 v, the corresponding short or medium sound, as in Fr. but, Ger. Müller.  
 oi, as in oil.  
 ou, as in pound; or as ou in Ger. Haus.

The consonants, b, d, f, h, j, k, l, m, n, ng, p, sh, t, v, and z, when printed in Roman type, are always given their common English values in the transliteration of foreign words. The letter c is indicated by s or k, as the case may be. For the remaining consonant sounds the following symbols are employed:

ch is always as in rich.  
 ð, nearly as th in this = Sp. ð in Madrid, etc.  
 g is always hard, as in go.  
 h represents the guttural in Scotch loch, Ger. nach, also other similar gutturals.  
 u. Fr. nasal u as in bou.  
 r represents both English r, and r in foreign words, in which it is gen-

erally much more strongly trilled.  
 s, always as in so.  
 th, as th in thin.  
 th, as th in this.  
 w always consonantal, as in we.  
 x = ks, which are used instead.  
 y always consonantal, as in yea (Fr. ligne would be re-written lëny).  
 zh, as s in pleasure = Fr. j.





## VOLUME VI

**Secularization** (sek-ŭ-lar-i-zā'shun), in its most general sense, is the conversion of objects from a religious or spiritual to a common or secular use; specifically, it is the act of rendering secular the property of the clergy. Secularization took place in Germany in 1648, and again in 1801; in England under Henry VIII; in Italy in 1866, and again in 1873; and in France during the Revolution.

**Secunderabad** (sē-kun-der-ā-bād'), or SIKANDARABAD (Alexander's Town), a British military cantonment in India, in the Nizam's Dominion, 6 miles northeast of Hyderabad. It is the largest military station in India, covering a total area of 19 square miles, including many interspersed villages, and forms the headquarters of the Hyderabad subsidiary force, which constitutes a division of the Madras army. Pop. 83,550.

**Secundra** a town in the United Provinces, India. Pop. 18,200.

**Sedaine** (sé-dān), MICHEL JEAN, a French dramatist, born at Paris in 1719; died in 1797. He is regarded as the founder of comic opera. Two of his comedies, *Le Philosophe sans le Savoir* and *La Gageure Imprévue*, still hold the stage, and are ranked among the best French plays.

**Sedalia** (sé-dā'li-a), a city, capital of Pettis county, Missouri, 189 miles west of St. Louis, is a railroad center and has extensive railroad shops, iron-foundries, meat and poultry packing establishments, breweries, woolen mills, etc. Coal, lead and zinc are abundant in the vicinity. Pop. 17,822.

**Sedan** (sé-dān), a town in France, department of Ardennes, on the Meuse, on the frontiers of Luxemburg. The staple industry is the manufacture of fine black cloth. There are also flour mills and factories for machinery. Here, on September 2, 1870, Napoleon III and his army of 100,000 men surrendered to the Germans in the Franco-German war (q. v.). In 1918, the closing year of the European war (q. v.), American troops, after an irresistible advance, gained the heights above Sedan and were ready to march into the historic town on the day the armistice was signed, November 11, 1918, bringing the great war to an end. The Sedan of 1870 marked the birth of

German militarism. The Sedan of 1918 marked its death. In the advance on Sedan the first and second divisions of the American First Army led the way. The famous Rainbow division made the most savage thrust of the action, pursuing the foe for ten miles and sweeping the Freya Hills clear of machine-gun nests and German artillery. The last action of the war for the Americans followed immediately on the heels of the battle of Sedan. It was the taking of the town of Stenay. General Pershing in his report described the action as 'an impetuous onslaught that could not be stayed.' Sedan had a population of 19,520 in 1914.

**Sedan** (se-dan'), SEDAN-CHAIR, a covered chair for carrying one person, borne on poles by two men, and differing from the litter or palanquin in that the traveler was carried in a sitting posture. It is said to have taken its name from the town of Sedan in France.

**Sedative** (sed'a-tiv), a medicine that moderates the excessive action of an organ or organic system. Digitalis, for example, is a sedative of the action of the heart and the circulatory system; and gum-resins are sedatives that act on the nervous system. Besides these aconite, chloroform, conium, carbonic acid and prussic acid are among the principal sedatives.

**Sedge** (sedj. *Carex*; nat. order, Cyperaceæ), an extensive genus of grass-like plants, containing thousands of species, mostly inhabiting the northern and temperate parts of the globe. The greater proportion of the species are marsh plants. The stems are usually triangular, without joints. The sedges in general are but of little utility to man. They furnish coarse fodder, which is rejected by most of the domestic quadrupeds. The decomposed roots and leaves contribute largely to turn the soil of marshes into peat.

**Sedgemoor** (sedj'mör), a marshy tract in Somersetshire, England, about 5 miles southeast of Bridgwater. In 1685 it was the scene of the battle in which the Duke of Monmouth was defeated by the troops of James II.

**Sedge-warbler** (*Salicaria phragmitis*), a species of insectivorous birds of the warbler family, which frequent the sedgy banks of rivers.

More than fifty species of warblers are found in the United States.

**Sedgley** (sej'li), **URREA**, a town of Staffordshire, England, 3 miles s. of Wolverhampton, of which it is practically a suburb. It has extensive collieries and iron-works, with manufactures of rivets, nails, chains, fire-irons, locks, safes, etc. Pop. 16,520.

**Sedgwick** (sej'wik), **ADAM**, an English geologist, born at Dent, Yorkshire, in 1785; died at Trinity College, Cambridge, January 27, 1873. He was educated at Sedbergh and Trinity College, Cambridge, and in 1818 was appointed Woodwardian professor of geology in his own university, and this chair he held till within a short time of his death. His chief services to geology consisted in the determination of the geological relations of the palaeozoic strata of Devon and Cornwall, and of those strata afterwards called Permian in the northeast and northwest of England, in the explanation of the geological character of North Wales, and not less in the enlargement of the geological museum at Cambridge. The only considerable work of Professor Sedgwick's in a *Discourse on the Studies of the University of Cambridge*, which had a wide circulation.

**Sedgwick**, **CATHERINE MARIA**, an American writer, was born at Stockbridge, Massachusetts, in 1789; died in 1867. She conducted a private school for the education of young ladies for fifty years. She published her first work of fiction, *A New England Tale*, in 1822, and two years later brought out *Redwood*, which was compared favorably with the novels of Cooper and translated into several European languages. Other works of hers were: *The Traveller*, *Hope Leslie*, *Clarence*, *The Story of Le Bossu*, *The Linwoods*, *Letters from Abroad*, *Historical Sketches of the Old Painters*, etc. She was a prolific writer, and contributed much to the annuals and magazines.

**Sedia** (se-di'a), in architecture, stone seats in the south wall of the chancel of many cathedrals and churches. They are usually three in number, for the use of the priest, the deacon, and subdeacon during part of the service of high mass.

**Sedimentary Rocks**, rocks which have been formed by materials deposited from a state of suspension in water. See *Geology*.

**Sedition** (se-di'shun), a term in English law including all offenses against the crown and government

which do not amount to treason, are not capital, as seditious libels, seditious meetings, seditious conspiracies. The offenses classed under the head of sedition are of the same general character with those called treason, but without the overt acts which are essential to the latter. The punishment of sedition in Great Britain, formerly arbitrary, is now restricted to fine and imprisonment. The term *sedition* has scarcely a place in the law language of the United States. It is in use in statutes in connection with army and navy regulations, naming sedition as a military offense.

**Sedley** (sed'li), **SIR CHARLES**, one of the wits of the Restoration period, and a great favorite with Charles II, was born at Aylesford, Kent, 1639; died in 1701. He was educated at Oxford. He wrote comedies and songs of the latter one or two are still popular, but the former are not equal to his reputation. His first comedy, *The Merry Garden*, was published in 1668. In later life he entered parliament, and took an active part in politics. He uniformly opposed the unconstitutional policy of James II, and was one of the chief promoters of the Revolution.

**Seduction** (se-duk'shun), in law, the act of persuading a female, by flattery or deception, to surrender her chastity. English law does not give a right of action either to the woman seduced or to her parents or guardians; it only gives a right of action for seduction as occasioning loss of service; but the word 'service' is interpreted with the greatest liberality, and damages are estimated not only with reference to the loss of service, but also to the distress and dishonor brought upon the woman's family by her seducer. By the law of Scotland an action for seduction is competent to a husband against the seducer of his wife, and to an unmarried woman against her own seducer, but she must show that deceit was used towards her. In neither country is seduction a criminal offense. The statutory rule which prevails widely in the United States rests both the right and remedy where the wrong is inflicted, in the family and parental relations. The action is therefore brought in the case of an unmarried woman by the parent (or guardian) as the head of the family, and in the case of a married woman by the husband.

**Sedum** (se'dum), a genus of plants, nat. order Crassulaceae. It comprises about 120 species, chiefly found in Europe and Asia and mostly per-

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ennial herbs, erect or prostrate, with succulent leaves of varied form, but never compound, and with flowers usually cymose, and of a white, yellow, or pink color. They are natives of the north temperate, and cold regions, and are often found on rocks, walls, and dry banks, where nothing else will grow, many of the species being remarkable for prolonged vitality under adverse circumstances. The British species are known by the common name of *stonecrop*. Of these the most striking are *S. Telephium* and *S. album* (white stonecrop), both used formerly in medicine, and eaten cooked or as a salad, and *S. acre* (biting stonecrop or wall-pepper), also used formerly in medicine. *S. telephioides* and *S. ternatum* are American species.

**See** (sē), a word derived (through the French) from the Latin *sedes*, a seat, and properly 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. **See** *Diocese*.

**See**, THOMAS JEFFERSON JACKSON, astronomer, born near Montgomery City, Missouri, in 1860. He was graduated from the University of Missouri in 1880 and from Berlin in 1892. He has been engaged in astronomical work since 1887, was connected with the Yerkes and the Lowell observatories, and in 1890 became professor of mathematics in the Naval Academy and took charge of the 26-inch telescope in the Naval Observatory. Since 1903 he has been at the Naval Observatory, Mare Island, Cal. His astronomical work has been of much importance, and he has published many papers and books on the subject.

**Seed** (sēd), the impregnated ovule of a plant. It consists essentially of two parts, namely, the nucleus or kernel, and the integuments. The latter consists of two seed-coats—the outer named the *episperm* or *testa*, the inner the *tegmen* or *endopleura*; and the two together are sometimes termed the *spermoderm*. The testa of some seeds is furnished with hairs, which cover the entire surface, as in various species of *Gossypium*, where they constitute the material called cotton; or they may be confined to certain points of the surface, as in willow, *Ephedra*, etc.; while in the pine the testa forms a wing. On the outside of the integument of the seed there is sometimes an additional partial covering, which has received the name of *aril*, and in the nutmeg forms the mac-

The nucleus or kernel of the seed is the fully developed central portion of the ovule. It consists either of the embryo alone, as in the wall-flower, or of the embryo along with a separate deposit of nourishing matter called albumen, as in the cocoa-nut, wheat, etc. The embryo is the young plant contained in the seed, and is the part to the development of which all the reproductive organs contribute. It consists of a general axis, one part of which is destined to form the root, the other to form the stem. The axial portion is provided with fleshy



Various forms of Seeds magnified.

- 1, *Eschscholtzia californica*. 2, Corn Blue-bottle (*Centaurea Cydonia*). 3, *Oxalis rosea*. 4, Opium Poppy (*Papaver somniferum*). 5, *Stellaria media*. 6, Sweet-william (*Dianthus barbatus*). 7, Foxglove (*Digitalis purpurea*). 8, *Saponaria calabrica*.

organs called cotyledons or seed-leaves, which serve to nurse the young plant before the appearance of the true leaves. Plants possessing one cotyledon are termed monocotyledonous, those having two are denominated dicotyledonous, and plants having only a cellular embryo, as in the cryptogamic or flowerless plants, are called acotyledonous. When seeds are contained in an ovary, as is usually the case, the plants are called *angiospermous*; when the seeds are not contained in a true ovary, with a style or stigma, the plants are called *gymnospermous*, as conifers. **See** *Botany*.

**Seed Lac.** **See** *Lac*.

**Seeland.** **See** *Zealand*.

**Seeley** (sē'll), JOHN ROBERT, an English scholar and writer, was born in 1834 in London, where his father was a publisher, and was educated at the City of London School and at Christ's College, Cambridge. In 1863 he was appointed professor of Latin in University College, London; and in 1869 he succeeded Charles Kingsley in the chair of modern history at Cambridge. In 1865 appeared a work, *Ecce Homo, or the Life and Work of Jesus Christ*, of which Professor Seeley has always been regarded

as the author. It created a profound sensation at the time of its appearance; but *Natural Religion* (1887), by the author of *Ecce Homo*, attracted much less attention. Among Professor Seeley's avowed works are *Life and Times of Stein, or Germany and Prussia in the Napoleonic Age* (1879); *The Expansion of England* (1883); and *A Short Life of Napoleon the First* (1886). He published a volume of miscellaneous contents under the title *Lectures and Essays*. He died January 13, 1895.

**Seer** (sēr), the standard measure of weight in India, but varying in different parts of the country. The imperial or standard seer is 2.205 lbs., exactly equivalent to the metrical kilogram; it is the fortieth part of a maund. As a standard liquid measure the seer is equal to about 6 gills.

**Seggar.** See *Pottery*.

**Segment** (seg'ment), in geometry, a part cut off from a circle or a sphere by a line or a plane.

**Segni** (sen'yē), a town of Italy, in the province and 40 miles south-east of Rome. One of the oldest Italian cities, it contains some interesting remains of antiquity, such as fragments of cyclopean walls, and an ancient gate. The cathedral is a very fine building. Pop. 6994.

**Segno** (sen'yō), in music, a sign placed over a note from which a portion of a piece is to be repeated.

**Sego**, or **SEGOO** (sā'gō), the capital of a Fula kingdom of the same name (now in the French 'sphere of influence'), in the Bambarra country, Western Africa, on the Upper Niger. The kingdom consists mainly of an alluvial plain of great fertility on the right bank of the river, extensively flooded during the rainy season. The capital is surrounded by earth-walls, and has two-storied white mud houses with flat roofs. Pop. of town about 10,000.

**Segorbe** (sā-gor'bā), a town in Spain, 29 miles N. N. W. of Valencia, on the Palancia, has a cathedral, and manufactures of earthenware and paper. Pop. 7232.

**Segovia** (sā-gō'vā-ā), a town in Spain, capital of the province of the same name, on a lofty rock, washed by the Eresma and Clamores, 43 miles northwest of Madrid. It is surrounded by walls flanked with round towers, and in the middle ages was a great royal and religious center. The chief objects of interest are the ancient Alcazar or fortress, the fine Gothic cathedral, and the aqueduct of Trajan. Pop. 14,547.—

The province, area 2713 square miles, watered by streams which rise in the Guadarrama range and flow north to the Douro. The inhabitants are the most part employed in agriculture and pastoral pursuits. Pop. 159,243.

**Segu.** See *Sego*.

**Seguidilla** (seg-i-dēl'yā), a Spanish form of versification, consisting of four lines, generally alternating lines, of seven and five syllables alternately. It usually has a close of the verses, called *estribillo*, of which the first and last lines rhyme.

**Seguin** (sé-gap), EDOUARD, born in France in 1812, studied medicine and surgery, devoted himself specially to the study of idiocy and the training of idiots, settled in the United States after the revolution of 1848, and died there in 1880. He achieved remarkable results in his treatment of idiots, and his writings on the subject hold the position of text-books.

**Séguir** (sā-gūr), JOSEPH ALEXANDRE COMTE DE, born at Paris in 1752; died in 1805; was the author of several comedies and operas, some of which still remain popular.—His brother LOUIS PHILIPPE, COMTE DE SÉGUIN D'AQUESSEAU, born in 1753; died in 1830; served in America under Rochambeau, and after the peace of 1783 was ambassador to St. Petersburg. In 1797 he was sent to Berlin; but after the execution of the king he retired from public affairs. In 1803 he was chosen a member of the Academy, and Napoleon appointed him one of the council of state. After the restoration he was received into the Chamber of Peers. His principal works are: *Théâtre de l'Hermitage*, originally written for the private theatre of Catherine II; *Tableau historique et politique de l'Europe de 1786 à 1796*; *Histoire Ancienne*; *Histoire Romaine* and *Mémoires*.—His son, PHILIPPE PAUL, COMTE DE SÉGUIN (born 1780; died 1873); was a general of the first empire and accompanied Napoleon I in his Russian campaign. He wrote *Histoire de Napoléon et de la Grande Armée pendant l'Année 1812* (1824), and left an extensive collection of *Mémoires*.

**Seidlitz Powders** (sid'litz, or sed'litz), an aperient medicine, named after the Seidlitz spa in Bohemia. These powders are usually put up in a blue and a white paper, the blue containing tartrate of soda and potash (Rochelle salt) with bicarbonate of soda, and the white tartaric acid. The former is dissolved in half a tumbler of water, and the acid powder is then



## Powders

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## Seigniorage

added, which produces effervescence, and the draught is taken while the effervescence is going on.

**Seigniorage** (sên'yor-aj), an ancient royalty or prerogative of the British crown whereby it claimed a percentage upon the bullion brought to the mint to be coined or to be exchanged for coin. No seigniorage is now charged for coining gold in Britain, but a considerable seigniorage is levied upon the silver and copper currencies.

**Seine** (sen or sän; ancient *Sequāna*), a river in France, which rises on the Plateau de Langres, dep. of Côte-d'Or, 20 miles northwest of Dijon. It flows generally in a northwest direction; receives on the right the Aube, Marne and Oise, and on the left the Yonne and Eure; passes the towns of Chatillon, Troyes, Corbeil, Paris, St. Denis, St. Germain, Poissy, Mantes, Elbœuf, Rouen, Quillebœuf, and, after a somewhat tortuous course, falls into the English Channel between Honfleur and Havre. Its total length is 480 miles, and 250 miles in a direct line; and its basin has an area of about 30,000 square miles. It is navigable from its junction with the Aube at Marcilly; vessels of 9 to 10 feet draught can reach Paris, below which it has been deepened by recent works; and vessels of 20 feet draught can reach Rouen, where the navigation for sea-going ships terminates. There is a 'bore' of from 8 to 10 feet at every tide; and the estuary, which commences at Quillebœuf, is impeded by sand-banks. The Seine is connected by canals with the Loire, Saône, Scheidt and Rhine.

**Seine** (sän), a department in France, completely inclosed by the department of Seine-et-Oise, and at once the smallest and most populous of the French departments, including as it does the city of Paris. Area, 185 sq. miles; pop. 3,848,618. The department has 3 arrondissements (Paris, St. Denis, and Sceaux), 28 cantons (20 in Paris), and forms the archiepiscopal diocese of Paris.

**Seine** (sän), a large net for catching such fish as mackerel and pilchard. It is often 160 to 200 fathoms long, and 6 to 10 broad, and is buoyed by corks and weighted so as to float perpendicularly.

**Seine-et-Marne** (sen-e-márn), a French department in the basin of the Seine and Marne, east of Seine-et-Oise. Area, 2215 sq. miles; pop. 361,939. Cereals occupy two-fifths of the department, and forests (the most important of which is the forest of Fontainebleau) one-fifth. There

are quarries of excellent building stone, and beds of common clay and porcelain clay, which supply the potteries of Fontainebleau and Montereau. Agriculture is a most thriving industry. The capital is Meun.

**Seine-et-Oise** (sen-e-wäz), a French department, in the basin of the Seine and Oise, inclosing the department of Seine. Area, 2163 sq. miles; pop. 749,753. Seine-et-Oise is a great agricultural and horticultural department, with numerous industrial establishments, including the national porcelain factory at Sèvres. There are valuable quarries of building stone, pavement, millstones, and extensive beds of porcelain and potters' clay. The capital is Versailles.

**Seine-Inférieure** (sen-an-fä-ri-cw), a maritime department of France, on the English Channel, south of the estuary of the Seine. Area, 2330 sq. miles; pop. 863,879. The department is in general fertile and well cultivated, the principal crops being oats, wheat and potatoes. There are numerous apple orchards, and vast quantities of cider are made. Manufactures are extensively carried on, Rouen being the seat of the cotton trade and Elbœuf of the woolen trade. Havre, Rouen, and Dieppe are the principal ports for foreign trade. Tréport, Dieppe, St. Valery, Fécamp, Etretat, etc., are fashionable watering-places. The coast fisheries are productive. The capital is Rouen.

**Seir-fish** (sēr), a fish of the mackerel family (*Cybius Guttatum*), which occurs in East Indian seas. In size, form, and the flavor of its flesh it bears a close resemblance to the salmon.

**Seisin**, SEIZIN (sē'zin), in law, possession of the freehold. Seisin is of two sorts, seisin in deed or fact, and seisin in law. Seisin in deed or fact is actual or corporeal possession; seisin in law is when something is done which the law accounts seisin, as enrolment, or when lands descend to an heir but he has not yet entered on them.

**Seismology** (sis-mol'ō-ji), the science which treats of volcanoes and earthquakes.

**Seismometer** (sis-mom'e-ter), an instrument for measuring the force and direction of earthquakes and other earth movements. It records both the horizontal and vertical movements by means of an index, the record being traced on smoked glass. There are various forms of seismometer or seismograph. One which is used in the observatory on Mount Vesuvius consists

of a delicate electric apparatus, which is set to work by the agitation or change of level of a mercurial column, which records the time of the first shock, the interval between the shocks, and the duration of each; their nature, whether vertical or horizontal, the maximum intensity; and in the case of horizontal shocks the direction is also given.

**Seistan** (sā-tān), a swampy tract between Afghanistan and Persia.

**Sejanus** (se-jā'nus), AELIUS, the son of a Roman knight, and noted as the favorite of Tiberius, was born at Vulturni in Etruria. He was commander of the praetorian bands, acquired the confidence of Tiberius, and aimed at the supreme power. He contrived to remove all the members of the imperial family who stood between him and power, but having awakened the suspicion of Tiberius, he was executed in A.D. 31.

**Selachii** (se-lā'ki-i), that section or group of the elasmobranch fishes which specially includes the sharks and dog-fishes.

**Selaginella** (sei-a-ji-nel'a), a genus of club-mosses, readily distinguished from the genus *Lycopodium* by their flat two-ranked stem. They are mostly natives of warm climates, and being often very elegant are objects of cultivation.

**Selangor** (sā-lān-gōr'), a native state of the Malay peninsula, south of Perak, under the protection of the British colony of the Straits Settlements; area, 3000 square miles. It yields tin, gutta-percha, etc. Since 1880 the British resident resides at Kuala Lumpur, 22 miles distant from Klang, the principal port, with which it is connected by railway. The sultan resides at Jugra. Pop. 168,789, more than half of whom are Chinese.

**Selborne** (sel'born), ROUNDELL PALMER, first Earl of (1812-95), an English lawyer and statesman, born at Mixbury, Oxford, educated at Rugby, Winchester and Oxford. He was a member of parliament in 1847 and 1853, became a Q. C. in 1849 and attorney-general, 1863-66. He advised the ministry in the controversy regarding the seized ship in the American Civil war. He also represented Great Britain in the negotiations arising from the claims of the United States following the war. In 1872 he was made a peer and became Lord Chancellor. He was the principal author of the Judicature Act of 1873. He broke with Gladstone on the questions of disestablishment of the Church of Ireland and Home Rule.

**Selborne**, WILLIAM WALDEGRAVE PALMER, second earl of

(1859- ), son of the preceding. He was under-secretary for the Colonies, 1890-1900; First Lord of the Admiralty, 1905; Governor of Transvaal and High Commissioner for South Africa, 1905-1911.

**Selby** (sel'bi), a market town of England, in the West Riding of Yorkshire, 14 miles south of York, on the Ouse, here navigable for vessels of 200 tons; has excellent communications by railway and canal, and is the seat of considerable trade and of a number of miscellaneous manufactures. Selby is the center of a rich agricultural district. The magnificent parish church formed part of an abbey of Benedictine monks, founded in 1068 by William the Conqueror. Pop. (1911) 9049.

**Selden** (sel'den), JOHN, a distinguished jurist, legal antiquary and Oriental scholar, was born in 1584 at Salvington, near Worthing, Sussex, where his father held a small farm, and was educated at the free grammar-school of Chichester, and at Hart Hall, Oxford, whence he proceeded to London to Clement's Inn and the Inner Temple. On being called to the bar he practiced principally as a chamber counsel, devoting his leisure to the study of constitutional history. The fruits of his studies he gave to the world in several valuable works, including the *Analecton Anglo-Britannicon*, a treatise on the civil government of Britain before the coming of the Normans; *Janus Anglorum, Facies altera* (1610), a treatise on the progress of English law down to Henry II; and *Titles of Honour* (1614), still a standard authority in regard to all that concerns the degrees of nobility and gentry in England. His *De Diis Syriis* (1617), on Syrian mythology, at once established his fame as an Oriental scholar; and his *History of Tithes* (1618) brought him into collision with the clergy. In 1621 he suffered a short imprisonment for having advised the House of Commons to resist King James's claim that their privileges were derived from royal grants; in 1628 he aided in drawing up the *Petition of Right*; and the following year he was again committed to the Tower, remaining in prison a considerable time. After his liberation he published a celebrated work, *Mare Clausum* (1635), upholding the rights of England to sovereignty over the 'narrow seas.' In 1640 he sat in the Long Parliament for the University of Oxford, and espoused the popular cause, but with great moderation. He sat as a lay member of the Westminster Assembly (1643), was named one of the parliamentary commissioners of the admiralty (1645), subscribed the

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**Solemn League and Covenant** (1646), and was voted £5000 by parliament in recompense of his losses and as a reward for his services to the state. He died in 1654, and was buried in the Temple Church, London. His *Table Talk* was published in 1689 by his amanuensis, Richard Milward.

**Selection**, **NATURAL**. See *Natural Selection*.

**Selectmen** (sel-ekt'men), in New England, officers chosen annually to manage the affairs of a town, provide for the poor, etc. A town has usually from three to seven selectmen, who constitute a kind of executive authority.

**Selenē** (se-lē'nē), in Greek mythology, the goddess of the moon, daughter of Hyperion, and sister of Helios (the sun) and Eos (the dawn). She was also called Phoebe, and in later times was identified with Artemis. In art she is often represented as a beautiful woman with large wings, a long robe, and a coronet.

**Selenite** (sel'e-nīt), crystallized native sulphate of calcium. See *Gypsum*.

**Selenium** (se-lē'n-um), a rare chemical element discovered by Berzelius in 1817 in the refuse of a sulphuric acid manufactory near Fahlun, in Sweden. It occurs in several minerals, chiefly in combination with copper, lead, mercury and silver, and is closely related, in its general chemical deportment, to sulphur and tellurium, these three elements forming a group which is characterized by certain well-marked general properties. Selenium takes fire when heated to a tolerably high temperature in air or in oxygen, burning with a blue flame, and with the production of the dioxide  $\text{SeO}_2$ . With hydrogen selenium forms the very disagreeably smelling gas *seleniuretted hydrogen* ( $\text{H}_2\text{Se}$ ), the analogue of sulphuretted hydrogen. To selenium the symbol  $\text{Se}$  and the atomic weight 96.5 are given.

**Seleucia** (sē-lū'shi-a), the name of several cities in Asia, founded by Seleucus Nicator. The most celebrated was Seleucia-on-the-Tigris, the eastern capital of the Seleucidae, about 80 miles from Babylon. It was one of the richest commercial cities of ancient times, counting about 600,000 inhabitants, chiefly Greeks. Taken by the Parthians 140 B.C., and sacked by Trajan 116 A.D., it was soon deserted, and became as desolate as Babylon itself. The next in importance was Seleucia Pieria, founded 300 B.C., and situated on the

sea-coast at the foot of Mount Pieria, 12 miles west of Antioch, of which it was the seaport, and which it rivaled in splendor.

**Seleucidae** (se-lū'si-dē), a dynasty of kings who succeeded to that portion of the empire of Alexander the Great which embraced the Asiatic provinces, and is generally known as Syria.—**SELEUCUS I**, surnamed *Nicator*, the founder of the line, was born about 358 B.C., and was a general of Alexander the Great, shortly after whose death (323 B.C.) he obtained the satrapy of Babylon. Subsequently Antigonos forced him to withdraw into Egypt (316 B.C.), but having induced Ptolemy, the governor of Egypt, along with Lysimachus and Cassander, to take the field against Antigonos, he was enabled to return to Babylon in 312 B.C. He gradually extended his possessions from the Euphrates to the Indus, assumed the title of king in 306, and afterward acquired Syria and the whole of Asia Minor, but was assassinated in 280 B.C. He is said to have been the most upright of Alexander's successors, and was the founder of Antioch and other cities. He was succeeded by his son Antiochus I and by a number of monarchs of the name of Seleucus and Antiochus, the most distinguished being Antiochus the Great. (See *Antiochus*.) The power of the Seleucidae began to decline as early as the reign of Seleucus II (246-226 B.C.), and they successively lost, through revolts and otherwise, Bactria, Parthia, Armenia, Judea, etc., and what subsequently remained was converted into a Roman province in 65 B.C.

**Selim I** (sē'lim), Sultan of Turkey, was the son of Bajazet II, born in 1467; died in 1520. The people, pleased with his warlike disposition, raised him to the throne in place of Bajazet, who was afterwards poisoned, as were also the brothers and nephews of Selim. In 1514 he entered upon a war with Persia and obtained large accessions of territory. He next directed his arms against the Mamelukes of Egypt, and in 1516-17 became master of Syria and Egypt. The title of *imam* and the standard of the Prophet were at this time granted to Selim by the last descendant of the Abasside Caliphs in Egypt, and in consequence the sultans of Constantinople became the chiefs of Islam, the representatives of Mohammed. Selim was succeeded on the throne by Solyman I.

**Selim III**, Sultan of Turkey, son of Mustapha III, was born in 1761; assassinated in 1808. He suc-



ceeded his uncle Abdul-Hamed in 1789, and attempted reforms in his government after European methods, but wars with Russia, Austria, etc., prevented their being carried out. In 1791 Selim was compelled to cede Choczim to Austria, and a year later he signed the Peace of Jassy, by which Russia acquired all Turkish possessions beyond the Dniester. Selim entered with great ardor upon his system of reforms; but the fanatic zeal of the people, kindled by the preaching of the dervishes, burst into open revolt, and he was deposed by the Janizaries (1807). An attempt to regain his throne ended in his murder. Selim's efforts for the reformation of Turkey were not altogether fruitless, for manufactures had begun to flourish, and generally a number of improvements calculated greatly to benefit the nation effected.

**Selinus** (se-i'nus), one of the most important of the Greek colonies in Sicily, founded probably about 628 B.C. on the southwestern coast of that island. Thucydides mentions its great power and wealth, and the rich treasures of its temples. It was conquered by the Carthaginians in 409, and in 249 destroyed by them. There are still important ruins of ancient Greek temples here, and valuable sculptures belonging to them have been preserved.

**Seljuks** (sel'jukz), a Turkish family deriving its name from Seljuk, chief of a small Turkish tribe which had gained possession of Bokhara and the adjoining neighborhood in the ninth century of our era. The most powerful of the various dynasties they founded in Mesopotamia, Persia, Syria, and Asia Minor during the eleventh and twelfth centuries were:—(1) The Seljuks of Iran or Bagdad, and Ispahan. The founder, Togrul-Beg, grandson of Seljuk, completed the conquest of Persia about 1061. His notable successors were Alp-Arslan (1063-77), Melek-Shah (1073-93), Moharrahmah (1105-18), and Sanjar (1118-57). This dynasty became extinct in 1194 with Togrul-Shah, who was vanquished by Tekesh, sultan of Kharizm.—(2) The Seljuks of Kerman, who ruled the three provinces of Kerman. Their dynasty, founded by Kaderd, nephew of Togrul-Beg, ended in 1091.—(3) The Seljuks of Aleppo, in Syria, founded in 1079, and became extinct in 1114.—(4) The Seljuks of Damascus, founded in 1096 by Dekkah. His successors reigned till 1155.—(5) The Seljuks of Iconium, or of Asia Minor, founded by Solyman-ben-Kutulmish, who was granted a territory in

Asia Minor by the Sultan Kalek-Shah. During the reign of Alia-ed-Din II, one of the last princes of this dynasty, the Turk Osman distinguished himself as chief captain. His descendants founded the dynasty of Osman in Asia Minor. The Seljuk Empire then fell under Mongol domination. See *Ottoman Empire*.

**Selkirk** (sel'kirk), a burgh of Scotland, county-town of Selkirk shire, on an eminence overlooking Ettrick Water, 39½ miles S.E. of Edinburgh. It is substantially built, and has a town hall, and monuments to Sir Walter Scott and Mungo Park. The staple industry is the manufacture of tweeds. In the vicinity is Philiphaugh, where the Covenanters under Leslie routed the forces of Charles I under Montrose. Pop. 6292.—**SELKIRK, or SELKIRKSHIRE** (formerly known as *Ettrick Forest*), is an inland county, bounded by Midlothian, Roxburgh, Dumfries, and Peebles; area 257 sq. miles. It is generally hilly, with heights ranging from a few hundreds to 2000 feet, and affording excellent pasturage. Large numbers of sheep are reared, the Cheviots being now the prevailing breed. The chief river is the Tweed with its tributaries Ettrick and Yarrow. Among interesting historical scenes in the county are the field of Philiphaugh, Oakwood Towers, the reputed residence of Michael Scott, the wizard; and Newark Castle, the scene of Scott's Lay of the last Minstrel. Other places of interest are St. Mary's Loch and the Loch of the Lowes, midway between which is the monument to the Ettrick Shepherd. Woollens are largely manufactured, chiefly in Selkirk, the capital of the county, and in Galashiels. Pop. 23,356.

**Selkirk, or SELCRAIG, ALEXANDER, 'Robinson Crusoe,'** was born in Largo, Fifeshire, in 1676; died on board the royal ship *Weymouth*, 1723. He took part in buccaneering expeditions in the South Seas, and in consequence of a quarrel with his captain he was put ashore, at his own request, on the island of Juan Fernandez. There he lived alone for four years and four months, when he was taken off by the captain of a privateer. He returned home in 1712, and his adventures became known to the public. Defoe's *Robinson Crusoe* appeared in 1719, but Crusoe's experiences have but little in common with those of Selkirk. Selkirk afterwards rose to the rank of lieutenant in the navy. A monument was erected to him in his native town in 1885.

**Selma** (sel'ma), a city, capital of Dallas county, Alabama, on the

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Alabama River, 50 miles w. of Montgom-

ery. It is the center of a large cotton-

growing region, and has extensive cotton

and oil mills, railroad repair-shops, etc.

During the Civil war it was an impor-

tant military station. Pop. 13,649.

**Seltzer Water** (selt'zér; a corrup-

tion of Selters), a

mineral water found naturally in the

village of Nlederselters, in the German

province of Hesse-Nassau, and elsewhere,

but also largely manufactured. Its chief

ingredlents are carbonic acid, carbonate

of soda, and common salt. It acts as

a mild stimulant of the mucous mem-

branes, and as a diuretic.

**Selvas** (sel'vas), or **SILVAS**, great

tracts of low flat land, covered

with dense vegetation and forest trees,

which occur along the course of the river

Amazon in South America.

**Semaphore** (sem'a-för; Greek, *sēma*,

a signal,' and *phērō*, 'I

bear'), a term originally applied to tele-

graphic or signaling machines, the action

of which depended upon the motion of

arms round pivots placed at or near their

extremities. Many kinds of semaphores

were in use before the invention of the

electric telegraph, and a simple form is

still employed on railways to regulate

traffic at or near stations.

**Semaphore Plant.** See *Moving*

*Plant.*

**Semecarpus** (sem-e-kar'pus), a

small genus of Asiatic

and Australlan trees, nat. order Anacar-

diaceæ. See *Marking-nut.*

**Semele** (sem'e-lē), in Greek mythol-

ogy, a daughter of Cadmus by

Harmonia, and beloved by Zeus. Jealous

of her husband's mistresses, Hera per-

suaded Semele to entreat her lover to

attend her with the same majesty as he

approached Hera. As he had sworn to

gratify her every wish, Zeus, though hor-

rified at this request, came to her accom-

panied by lightnings and thunderbolts,

when Semele was instantly consumed by

fire. Dionysus (Bacchus) was her son

by Zeus.

**Semendria** (sē-men'drē-a), or **SME-**

**DEREVO**, a town in Servia,

on the Danube, 22 miles s. e. of Belgrade.

It is imperfectly fortified, poorly built,

and rendered unhealthy by the proximity

of swamps. Pop. 6912.

**Semibreve** (sem'i-brēv), in music, a

note of half the duration

or time of the breve. The semibreve is

the measure note by which all others are

now regulated. It is equivalent in time

to two minims, or four crotchets, or eight

quavers, or sixteen semiquavers, or thirty-

two demi-semiquavers. See *Music.*

**Semicolon** (sem'i-kō-lun), in gram-  
mar and punctuation, the  
point (;), the mark of a pause to be  
observed in reading or speaking, of less  
duration than the colon, and more than  
that of the comma. It is used to dis-  
tinguish the conjunct members of a sen-  
tence.

**Seminole** (sem'i-nōls), a tribe of  
North American Indians,  
an offshoot from the Choctaw Muskogees.  
They separated from the Confederation  
of the Creeks, and settled in Florida in  
1750, under the name of Seminoles, that  
is, fugitives. They were subsequently  
joined by other Indians as well as  
negroes, and in 1822 they numbered 3900  
souls. As a punishment for their con-  
tinual plundering and murdering of the  
white settlers, General Jackson was sent  
against them in 1818. They subsequently  
sold their lands and agreed to be trans-  
ferred beyond the Mississipp, but they  
refused to fulfill their agreement, and  
under their chief Osceola carried on a  
long and determined resistance. In 1842  
they were finally driven from the Ever-  
glade morasses and obliged to succumb,  
when all but a scanty remnant were  
transferred to the Indian Territory, where  
they now form an industrious community  
of 2500 souls.

**Semipalatinsk** (sā-mē-pā-lā-  
tyensk'), or **SEMI-**  
**POLATINSK**, a fortified town of Siberia,  
on the Irtysh. It consists chiefly of  
wooden buildings facing the river, and  
carries on a considerable trade with the  
Kirghiz and with Tashkend Khokand,  
Bokhara, and Kashgar. Pop. 35,121.—  
The province of Semipalatinsk has an  
area of 198,192 square miles, and a pop-  
ulation of 685,197, chiefly Kirghiz, Cos-  
sacks, etc. It is mountainous in the  
southeast, consists of steppe land in the  
northwest, and is one of the warmest  
regions of Russian Asia in summer,  
though the winter is rather extreme.  
The chief occupation of the people is  
cattle-rearing.

**Semiquaver** (sem wā-ver), in  
music, note half the  
length of the quaver. See *Music.*

**Semiramis** (se-mir'a-mis), a fabulous  
queen of Assyria. As  
the story goes, she was a daughter of  
the fish-goddess Derceto of Ascalon, in  
Syria, by a Syrian youth. Being ex-  
posed by her mother, she was miracu-  
lously fed by doves until discovered by  
the chief of the royal shepherds, who  
adopted her. Attracted by her beauty,  
Onnes, governor of Nineveh, married her.  
She accompanied him to the siege of  
Bactra, where, by her advice, she as-

sisted the king's operations. She became endeared to Ninus, the founder of Nineveh (about B.C. 2182), but Onnes refused to yield her, and being threatened by Ninus, hanged himself. Ninus resigned the crown to Semiramis, and had her proclaimed queen of Assyria. She built Babylon, and rendered it the mightiest city in the world. She was distinguished as a warrior, and conquered many of the adjacent countries. Having been completely defeated on the Indus, she was either killed or compelled to abdicate by her son Ninyas, after reigning forty-two years. According to popular legend she disappeared or was changed into a dove, and was worshiped as a divinity. She is probably a mythological being corresponding to Astarte, or the Greek Aphrodite.

**Semiryeohensk** (sā-mē-re-chensk'), a province of Russian Turkestan close to the Chinese frontier; area 155,300 square miles. It is mountainous in the south, but the northern part is flat and barren. Large herds of cattle are reared by the inhabitants, and agriculture is more or less developed in the southern district. Pop. 1,080,700. —The chief town is VERNOME, which has an increasing trade with Kuidja and Kashgar.

**Semites** (sem'its), the name given a group of natives closely allied in language, religion, customs and physical features, inhabiting Southwestern Asia and Northeastern Africa; so called from the Scriptural passage speaking of them as descended from Shem, the son of Noah. They dwell in Arabia, Syria, Abyssinia, and the countries of the Euphrates and Tigris.

**Semitic Languages** (se-mit'ik), the languages belonging to the Semites or Semitic peoples, that is, those regarded as descendants of Shem. The Semitic languages form an important linguistic family, which is usually divided into a northern and a southern section. To the northern belong the ancient dialects of Assyria and Babylonia (recovered by means of the cuneiform inscriptions); the Hebrew, with the Samaritan and Moabitic; the Phœnician and Carthaginian; and lastly the Aramaic, which includes the Chaldean and the Syriac. The northern Semitic languages are now almost entirely extinct as spoken tongues, though Hebrew is to some extent still used in writing. The most important of the south Semitic tongues, and the only one now in extensive use, is the Arabic, which as a spoken language may be divided into the four dialects of Arabia, Syria, Egypt, and

Barbary. To this branch also belong the Himyaritic, formerly spoken in part of Arabia, the Ethiopic, or ancient ecclesiastical language of Abyssinia, and the Amharic and other modern dialects of the same country. The most prominent characteristic of the Semitic tongues is the triliteralism of their roots, that is, the peculiarity that their roots regularly consist of three consonants which always remain unchanged, the various words and word forms being produced by the insertion of vowels between the consonants of the root. Another peculiarity is the absence of compound words. See *Philology*.

**Semlin** (zem-iën'), a frontier town of Hungary, near the junction of the Save and Danube, and almost opposite the Serbian city of Belgrade. It carries on an important transit trade. Pop. 15,079.

**Semmering** (zem'er-ing), a mountain of Austria, 4575 feet high, on the borders of Styria and Lower Austria, 44 miles S. W. of Vienna. It is crossed by the Semmering Railway, the first of the mountain railways in Europe. The railway is carried along the face of precipices, through fifteen tunnels, and over sixteen viaducts, the surrounding scenery being magnificent. It was constructed at a cost of £1,000,000 for the Austrian government, between 1848 and 1853.

**Semmes** (semz), RAPHAEL, an American naval officer, born in 1809; died in 1877. He entered the navy in 1832, having previously studied law; took part in the Mexican war, and on the outbreak of the Civil war joined the Confederate service, and gained much prominence from his feats in command of the *Sumter* and the *Alabama*. (See *Alabama*.) He was imprisoned after the war, but gained his liberty at the amnesty. The rest of his life was devoted to law practice. He was the author of *Service Afloat and Ashore*, *Cruise of the Alabama and Sumter*, etc.

**Semnopithecus** (sem-nō-pith-ē'kus), a genus of Old World monkeys, to which belong the Entellus monkey (*Semnopithecus Entellus*) and the proboscis monkey (*S. or P. larvatus*).

**Semolina** (sem-o-lē'na), a term applied to a kind of wheat-meal in large hard grains, used for making puddings, thickening soup, etc. In grinding, the millstones are so adjusted as to leave the product in a granular form and not reduced to a state of flour. The hard wheats of Southern Europe are best adapted for this purpose.

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**Sempach** (sem'pakh), a village of Switzerland, in the canton and 8 miles northwest of Lucerne, on the Lake of Sempach (3½ miles long). It is remarkable as being the scene of a great victory which the Swiss gained over the Austrians under Duke Leopold, who was slain, together with 600 nobles and upwards of 2000 troops.

**Sempervivum.** See *Houseleek*.

**Senaar.** See *Sennaar*.

**Senate** (sen'at), originally the supreme legislative body of ancient Rome, composed of citizens appointed or elected from among the patricians, and later from among wealthy plebeians or others who had held certain high offices of state. Originally the senate had supreme authority in religious matters, much legislative and judicial power, the management of foreign affairs, etc. At the close of the republic and under the empire the authority of the senate was little more than nominal. In modern times the name 'senate' is applied to the upper or less numerous branch of a legislature, as in France, Italy, the United States, Canada, and in the separate states of the Union. The senate of the United States consists of ninety-six members, two from each state. Senators are elected for six years, but the terms of office are so arranged that one-third of the members retire every two years. (See *Senators, Popular Election of*.) A senator must be at least thirty years of age, nine years a citizen of the country, and a resident of the state from which he is chosen. In addition to its legislative functions the senate has power to confirm or reject nominations and treaties made by the President, and also to try impeachments.

**Senators, Popular Election of.**

The Seventeenth Amendment to the Constitution of the United States which was ratified by the necessary number of states on April 8, 1913, transferred the power of electing senators from the state legislature to the people at the polls. For more than sixty years proposals were made to change the Constitution in this manner; but it was not until June 24, 1911, that the senate was induced to give its consent to the change. The original theory in establishing the choice of senators was that they represented the states, whereas the members of the house directly represented the people. See *United States—Amendments to the Constitution*.

**Seneca** (sen'e-ka), a lake in the western part of New York State,

25 miles s. of Lake Ontario, into which its waters flow. It is about 37 miles long, from 2 to 4 miles broad, and 630 feet deep. It communicates with the Erie Canal, and steamers ply upon it.

**Seneca,** LUCIUS ANNÆUS, called Seneca the philosopher, son of the following, was born at Cordoba (Cordova) A.D. 3. When quite young he went to Rome, where he made rapid advances in knowledge under the tuition of his father, and also studiously pursued the Stoic philosophy. One of his best treatises *Consolatio ad Helviam* (a letter of consolation addressed to his mother), and also *Consolatio ad Polybium* (a letter consoling Polybium on the loss of his brother), were written in Corsica, whither he was banished in A.D. 41, being accused, through the jealousy of Messalina, of undue intimacy with Julia, a niece of the Emperor Claudius. He was recalled in 49, made prætor, and appointed joint-tutor with Burrhus of the young Domitian, afterwards the Emperor Nero. The good government of the first years of Nero's reign was largely due to Seneca (though Seneca had consented to the assassination of Nero's mother), but he lost his influence, and being accused of complicity in the conspiracy of Piso he was forced to commit suicide (A.D. 66). His works comprise treatises *On Anger*; *On Providence*; *On Tranquillity of Mind*; *On the Steadfastness of the Wise Man*; *On Clemency*, addressed to Nero; seven books *On Benefits*; seven on investigations of nature; and twenty books of moral letters. The tragedies which bear Seneca's name are very inferior to his prose writings, and it is doubtful whether he is really the author, some of them having been attributed to his father.

**Seneca,** MAECUS ANNÆUS, rhetorician, and the father of the preceding, was a native of Corduba, in Spain, and was born about 61 B.C. He went to Rome during the reign of Augustus, and there taught rhetoric with great success for several years. He died at Rome towards the close of the reign of Tiberius (A.D. 37). He was the author of a collection of extracts showing the treatment of school themes by contemporary rhetoricians, but of no importance as literature.

**Seneca Falls,** a town of Seneca Co., New York, on Seneca River, which flows from Seneca Lake to Cayuga Lake, 16 miles E. by N. of Geneva. It is a shipping point for a farming district. The beautiful falls on the river afford excellent water-power and there are manufactures of steam fire-



engines, hook-and-ladder trucks, woollen goods, pumps, etc. Pop. 6588.

**Seneca Indians**, a tribe originally inhabiting the western part of New York State, and belonging to the Six Nations. They number upwards of 2000 on New York reservations, and there is a small band in the Indian Territory.

**Senecio**. See *Groundsel*.

**Senefelder** (sā'ne-fel-dēr), ALOYS, the inventor of lithography, born at Prague 1771; died at Munich 1834. See *Lithography*.

**Senega** (sen'e-ga), or SEN'EKA (*Polygala Senega*), a plant belonging to the nat. order Polygalaceæ, common in the United States. It has a woody, branched, contorted root, about  $\frac{1}{2}$  inch in diameter, and covered with ash-colored bark. This has been cele-



Senega (*Polygala Senega*).

brated as a cure for the bite of the rattlesnake. Medically it is considered stimulating, expectorant, and diuretic, and is now almost exclusively used in cough mixtures, being similar in its effects to squill.

**Senegal** (sen-ē-gal'), a river of Western Africa, which rises in the interior not far from some of the Niger sources, and after a course of some 1000 miles falls into the Atlantic near lat. 16° N. It is navigable for about 700 miles from its mouth, as far as the cataracts of Félou, beyond which its capabilities have not been ascertained. Its volume approaching the coast is greatly reduced by numerous *morigots* or channels which divert its waters through the adjacent plains, and as its mouth is dangerously barred, at most seasons the entrance of any but small craft is prevented.

**Senegal**, a French colonial dependency in West Africa, in

Senegambia, comprising the island and town of St. Louis, at the mouth of the Senegal, several forts along the banks of that river, the island of Goree, Albuda on the Gambia, and other stations south of Cape Verd. Area (including dependencies), 51,000 square miles. The chief exports are ground-nuts, palm-oil, kola-nuts, gum, hides, wax, ivory, cabinet-woods, and gold-dust. Imports — manufactured goods, wines, spirits and provisions. The French first settled here in 1637. It was taken by the English in 1756, retaken by the French in 1779, and subsequently held by the English till the Peace of 1814. Pop. est. 1,800,000.

**Senegambia** (sen-ē-gam'hi-a), a name formerly applied to an extensive region of Western Africa, comprising the countries between lat. 8° and 17° N.; lon. 4° and 17° 30' W.; bounded N. by the Sahara, E. by Soudan, S. by Guinea, and W. by the Atlantic. The western or maritime portion of the country is a low, flat, swampy plain, from 150 to 200 miles wide. East of the country is mountainous with valleys running north and south. The chief rivers are the Senegal, the Gambia, the Rio Grande, and the Nuñez. Vegetation is luxuriant along the lower Senegal. Farther south the mangrove and palm, together with the gigantic baobab, the African teak, and other large trees are seen. Rice, maize, and other grains, with bananas, manioc, and yams are grown, while the orange, citron, and other fruits introduced by the Portuguese are now extensively cultivated on the hills. Wild animals comprise the elephant, hippopotamus, monkeys, antelopes, gazelles, lion, panther, leopard, hyenas, jackal, crocodile, etc. The climate is intensely hot, and very unhealthy for Europeans. The major portion of this territory is now part of the newly constituted Senegambia and Niger Territories, a dependency of France founded by decrees of 1902 and 1904. The remainder of it is included in Senegal.

**Seneschal** (sen'e-shal), formerly a steward or major-domo who superintended the affairs of the household of some prince or grandee, having charge of feasts and ceremonies.

**Senior** (sē'nyur), NASSAU WILLIAM, an English political economist, born in 1790. He was graduated as M.A. from Oxford in 1814, and in 1819 was called to the bar at Lincoln's Inn. In 1825 he was appointed to fill the newly constituted chair of political economy at Oxford. This he resigned in 1830, but was reappointed in 1847. Of his writings mention may be made of

*An Outline of the Science of Political Economy* (London, 1836); *Political Economy* (London, 1850); *Essays on Fiction* (London, 1864); a collection of articles on Scott, Thackeray, and others; and *Historical and Philosophical Essays* (two vols., London, 1865), many of the above being articles reprinted from the reviews. He died in 1864.

**Senlis** (san-lēs), a very old town in France, department of Oise, 30 miles S. E. of Beauvais. It has old walls, flanked by watch-towers; ruins of an ancient castle, the residence of French kings from Clovis to Henri IV; and a small but handsome cathedral (end of twelfth century). Pop. (1906) 6074.

**Senna** (sen'a), a substance used in medicine, consisting of the leaflets of several species of *Cassia*, but the exact botanical source of some of the commercial kinds is still uncertain. Alexandrian senna is derived from *Cassia lanceolata* and *C. obovata*. It is grown in Nubia and Upper Egypt, and imported in large bales from Alexandria. It is frequently adulterated with the leaves of other plants.

**Sennaar**, or **SENAAR** (sen-ār'), a region of Africa, in the Soudan, area about 115,000 sq. miles, between the Bahr-el-Azrek, or Blue Nile, and the Bahr-el-Abiad, or White Nile, E. of Kordofan and bordering on Abyssinia. The country is mostly flat and sterile, but well cultivated on the river banks, where are numerous towns or villages. The population, estimated at 1,500,000, is greatly mixed. Originally an independent Negro kingdom, it was afterwards subject to Egypt, but Khartoum, the Egyptian headquarters, and the whole country were abandoned consequent upon the Soudanese rebellion. It was reconquered by the British for Egypt in 1898. The town of Sennaar, on the Blue Nile, once large and well-built, is now largely in ruins, with a population of a few thousands.

**Sennacherib** (sen-nak'e-rib), an Assyrian king, son of Sargon, whom he succeeded B.C. 705. He suppressed the revolt of Babyionia, and marched against the Aramean tribes on the Tigris and Euphrates, of whom he took 200,000 captive. He then reduced

part of Media; rendered tributary Tyre, Aradus, and other Phœnician cities; advanced upon Philistia and Egypt, and finally proceeded against Hezekiah, king of Judah, who had revolted. Yielding to panic, Hezekiah paid the tribute exacted of 300 talents of silver and 30 talents of gold. On his return to Assyria Sennacherib again attacked Babylonia and afterwards reinvaded Judah. Having marched through Palestine he besieged Libnah and Lachish, and wrote a threatening letter to Hezekiah; but in consequence of a miraculous visitation which caused the death of 185,000 of his troops, Sennacherib returned to Nineveh and troubled Judah no more. From Herodotus we learn an Egyptian tradition regarding the destruction of Sennacherib's host, but no mention of it is found in the monuments of Sennacherib. The greatest architectural work of Sennacherib was the palace of Koyunjik, which covered fully eight acres. Of the death of Sennacherib nothing is known beyond the brief Scripture statement of 2 Kings xlx, 37, and Isa. xxxvii, 38, from which it appears that he was murdered 681 B.C.

**Senones** (sen'o-nēz), an ancient tribe of Gauls, who were settled on the river Yonne. The chief town of this tribe was the Sens of to-day.

**Sens** (sāns), a town of France, department of Yonne, on the right bank of the Yonne, 31 miles N. N. W. of Auxerre. It is surrounded with old walls, partly Roman, and entered by several ancient gates; is well built, and has a fine early Gothic cathedral and various manufactories. Pop. 14,962.

**Sensation** (sen-sā'shun), the name applied to indicate the consciousness of an impression produced on sensory nerve fibers. (See *Nerve*.) An impression might be produced upon a sensory nerve and transmitted to a nerve-center, leading to stimulation of the center and to some subsequent change, but if no consciousness of such existed it could not be called a sensation. Thus, an impression made on an organ of sense might reach a lower nerve center, and by reflex action induce a muscular movement, while the centers devoted to consciousness being asleep or preoccupied remained unaffected. To this kind of impression the term sensation is not applicable. The external organs by means of which particular kinds of impressions are primarily received, and thence transmitted to the brain, are called the organs of the senses; these are the eye, the ear, the nose, and the tongue, besides the nerves dispersed under



Senna (*Cassia lanceolata*).

the common integument, which give rise to the common sensation feeling or touch. This last is of a more general kind than the others, making us aware of heat and cold, rough and smooth, hard and soft, etc. In addition to these, according to Professor Bain, 'the feelings connected with the movements of the body, or the action of the muscles, have come to be recognized as a distinct class, differing materially from the sensations of the five senses. They have been regarded by some metaphysicians as proceeding from a sense apart, a sixth or muscular sense.' Of the sensations which are most readily perceived by animals, that of *resistance* or *touch* is perhaps the most widely diffused. By the resisting feel of matter we judge of its shape and of its other attributes. Next to resistance sensibility to *heat* is the best defined and most frequently displayed sensation. The sense or consciousness of *light* or *luminosity* succeeds that of temperature; *taste* comes next in order; then *hearing*; while *smell* is probably one of the least diffused of sensations. The special senses and the structure of the organs of sense are described under the headings *Eye*, *Ear*, *Nose*, *Smell*, *Touch*, etc. (which see).

**Sensationalism** (sen - sâ' shnn - al - izm), in philosophy, is the theory or doctrine that all our ideas are derived through our senses or solely by means of sensation.

**Senses.** See special articles *Eye*, *Ear*, *Nose*, *Smell*, *Touch*, etc.; also *Nerve*, *Sensation*, etc.

**Sensitive Flames** (sen'si-tiv), gas flames which are easily affected by sounds, being by them made to lengthen out or contract, or change their form in various ways. The most sensitive flame is produced in burning gas issuing under considerable pressure from a small taper jet. Such a flame will be affected by very small noises, as the ticking of a watch held near it, or the chinking of small coins 100 feet off. The gas must be turned on so that the flame is just at the point of roaring.

**Sensitive Plant** (*Mimosa pudica*; nat. order Leguminosae), a plant celebrated for its apparent sensibility. It is a native of tropical America, but is often grown in greenhouses. The leaves are compound, consisting of four leaves, themselves pinnated, uniting upon a common footstalk. At the approach of night the leaflets all fold together; and the common footstalk bends towards the stem; at sunrise the

leaves gradually unfold, and recover their usual state. So far, this is evidently the effect of light, but the same phenomena take place on touching the plant roughly, only that it recovers itself in a short period. The same property belongs to other species of *Mimosa*, and to species of other genera, as the *Dionaea muscipula* (which see), etc.

**Sensorium** (sen-sôr'i-um), the supposed center of sensation and consciousness, or the seat of the soul. Once believed to be some spot in the brain, now usually attributed to the brain as a whole.

**Sentence** (sen'tens), in grammar, a combination of words which is complete in itself as expressing a thought or proposition, and in writing is marked at the close by a full point. It is the unit or ground-form of speech. According to the grammars a sentence must always contain two members—the *subject* or thing spoken of, and the *predicate* or that which is enunciated regarding the subject. Accordingly every sentence must have a finite verb, though in impassioned language the verb is frequently understood. Sentences are distinguished into *simple*, *complex*, and *compound*. A simple sentence has only one subject and one finite verb, as 'The man is brave.' This may be more or less expanded by the use of adjuncts, and still retain its character of a simple sentence. A complex sentence is a principal sentence with one or more subordinate sentences, as 'The man, who is truly patriotic, will risk his life for his country.' A compound sentence consists of two or more simple sentences connected by conjunctions, as 'The sun rises in the east and sets in the west.' It differs from the complex sentence in having its clauses coordinate, and not, as in the other, in subordination to a principal clause.

**Sentinel Crab** (sen'ti-nel), (*Porophthalmus vigil*), a species of crab so named from its active watchful habits, and from the very elongated footstalks upon which the eyes are set. It inhabits the shores and islands of the Indian Ocean.

**Sentry** (sen'tri), or SENTINEL, a soldier set to watch or guard an army, camp, or other place from surprise, by observing and giving notice of the approach of danger. At night each sentinel is furnished with the countersign (a certain word or phrase), and no one may approach or pass him without giving this preconcerted signal.

Seoul. See *Sōul*.



**Sepal** (sep'al, sē'pal), in botany, one of the separate divisions of a calyx when that organ is made up of various leaves. When it consists of but one part the calyx is said to be *monosepalous*; when of two or more parts, it is said to be *di-*, *tri-*, *tetra-*, *pentasepalous*, etc. When of a variable and indefinite number of parts, it is said to be *polysepalous*.



s s, Sepals.

**Separation** (sep-a-rā'shun), the legal term to denote the living apart of man and wife without a divorce. It may be voluntary or under a decree.

**Sepia** (sē'pi-a), a genus of Cephalopoda or cuttle-fishes, included in the family Sepiadae. These cephalopods, of which the *Sepia officinalis*, or common sepia, is a typical example, belonging to the dibranchiate or 'two-gilled' section of their class, and to the group of decapoda or 'ten-armed' forms. The family Sepiadae possesses an internal calcareous shell, the so-called *sepistaire* or 'cuttle-fish bone,' which is often cast up upon some coasts, and was formerly in repute as an antacid in medicine, and as the source of the 'pounce' once used for spreading over eroded ink-marks to form a smooth surface for the corrected writing. There are four rows of pedunculated suckers on the arms of the genus *Sepia*. Lateral fins exist. The two tentacles or arms, which are longer than the remaining eight, possess suckers at their expanded extremities only. The eggs of the sepia resemble bunches of grapes in form, and hence are sometimes called 'sea-grapes.' The eggs are each protected in a leathery capsule. The common sepia occurs especially in the Mediterranean Sea, but also on the Atlantic coast. It is chiefly sought after on account of the inky matter which it affords. This secretion, which is insoluble in water, but extremely diffusible through it, is agitated in water to wash it, and then allowed slowly to subside, after which the water is poured off, and the black sediment is formed into cakes or sticks. When prepared with caustic lye it forms a beautiful brown color, with a fine grain, and has given name to a species of monochrome drawing now extensively cultivated.

**Sepoy** (sē'poi; a corrupted form of *sipahis*, soldiers, from *sip*, bow or arrow, the original weapon of the Hindu soldier), the name given to the native forces in India. They form an important part of the Anglo-Indian

army. 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.

**Septaria** (sep-tā'ri-a), nodules or rounded lumps found in rocks. They are usually composed of clay ironstone, or limestone mixed with clay; and are distinguished by the cracks (almost always filled up with some mineral) which cross each nodule. Great numbers are found in the London clay of the Isle of Sheppey, and in the shales of coal-fields.

**September** (sep-tem'bēr; from the Latin *septem*, seven), the ninth month of our year, but the seventh of the old Roman year, which began in March. It contains thirty days.

**Septicæmia** (sep-ti-sā'mi-a), *SEPTICÆMIA* (Gr. *septikos*, *septos*, putrefying; from *sepsō*, to putrefy, and *haima*, blood), blood-poisoning by absorption into the circulation of poisonous or putrid matter through any surface. Pyæmia is a subvariety.

**Septuagesima Sunday** (sep-tū-a-jes'i-ma), the third Sunday before Lent, so called from its being about seventy days before Easter (L. *sagesimus*, seventieth).

**Septuagint** (sep-tū-a-jint), or the *LXX*, the Version of the Seventy, the Alexandrine Version, etc., is the oldest Greek version of the Old Testament. It is so called either because it was approved and sanctioned by the sanhedrim, or supreme council of the Jewish nation, which consisted of about seventy members, or because, according to tradition, about seventy men were employed on the translation. The language is the Hellenistic Greek of Alexandria, based upon the Attic dialect. The translation is reported by Josephus to have been made in the reign and by the order of Ptolemy Philadelphus, king of Egypt, about 270 or 280 years before the birth of Christ. It is believed, however, by modern critics that the Septuagint version of the several books is the work, not only of different hands, but of separate times. It is probable that at first only the Pentateuch was translated, and the remaining books gradually. The Septuagint was in use up to the time of our Saviour, and is that out of which most of the citations in the New Testament from the Old are taken. It is an invaluable help to the right understanding of the Hebrew Scriptures. The principal extant MSS. known are the *Codex Alexandrinus* in the British Museum, the *Codex Vaticanus* in Rome,

and the *Codex Sinaiticus*, (imperfect) in St. Petersburg. The principal printed editions are the *Aldine* (Venice, 1518), the *Complutensian* (1522), the *Roman* or *Slatine* (1587), and the *Grabian* (Oxford, 1707).

**Sepulchral Mound.** See *Tumuli*, *Burrow*.

**Sepulveda** (sā-pōl'vā-dā), JUAN GINES DE, a Spanish theologian and historian, born about 1490 at Poso Blanco, near Cordova. He assisted Cardinal Cajetan at Naples in revising the Greek text of the New Testament, and in 1536 Charles V appointed him his historiographer, and tutor to his son Philip. In 1537 he quitted the Spanish court, and retired to Mariano, where he died in 1573. Among his writings are a *History of Charles V*, *History of Philip II*, *History of the Conquest of Mexico*, etc.

**Sequence** (sē'kwens), in music, the recurrence of a harmonic progression or melodic figure at a different pitch or in a different key to that in which it was first given. In the Roman Catholic Church the term sequence is applied to a hymn introduced into the mass on certain festival days.

**Sequestration** (sē-kwes-trā'shun), in law, the act of separating a thing in controversy from the possession of both parties, till the right is determined by course of law. It is either voluntary or necessary; voluntary when it is done by consent of the parties, and necessary when it takes place by order of the official authority. See *Bankrupt*.

**Sequin** (sē'kwīn), a Venetian gold coin first struck about the end of the thirteenth century, and equivalent in value to about \$2.30. Coins of the same name, but differing in value, were issued by other states.

**Sequoia** (se-kwoi'a; from the American Indian *Sequoyah*, who invented the Cherokee alphabet), a genus of conifers, consisting of two species only—*S. sempervirens*, the redwood of the timber trade, and *S. gigantea*, the big or mammoth tree of the western United States. They are both natives of America, the latter having been discovered in the Sierra Nevada in 1852. One specimen in Calaveras Co., California, has a height of 325 feet, and a girth 6 feet from the ground of 45 feet. The Mariposa Grove, 16 miles south of the Yosemite Valley, contains upwards of 100 trees over 40 feet in circumference, and one over 93 feet at the ground, and 64 feet at 11 feet higher. This grove has been set aside as a National

Park. The age of these trees is estimated at from 2000 to 3000 years. The *S. gigantea* has been successfully introduced into England, where some of them have already attained a good height. It is there known as *Wellingtonia*. The redwood is also very large and grows abundantly on the Coast Range of California. Its timber is easily worked and is much used.

**Seraglio** (se-rai'yō), properly SERAI, the palace of the Turkish sultan at Constantinople. It stands in a beautiful situation, on a point of land projecting into the sea. (See *Constantinople*.) Its walls embrace a circuit of about 9 miles, including several mosques, spacious gardens, the harem, and buildings capable of accommodating 20,000 men, though the number of the sultan's household does not amount to above 10,000. The principal gate of the seraglio is called *Bab-i Humayun* (Sublime Porte).

**Seraing** (sē-ran), a town of Belgium, in the province of Liège, 3 miles southwest of Liège, on the Meuse. Cockerill's extensive iron, steel, and machine works (including also coal-pits), employing 12,000 hands, are established here, and other industries are carried on. Pop. (1910) 42,803.

**Serajevo.** See *Bosna-Serai*.

**Serampore**, or SERAMPUR (ser-um-pūr'), a town of Hindustan, in the province of Bengal, on the right bank of the Hugli, 12 miles above Calcutta. It is built in the European style, and formerly belonged to the Danes, who sold it to the British government in 1845. Serampore was the headquarters of the celebrated Baptist missionaries Carey, Marshman, and Ward; and there are a church, school, college, and library connected with the mission. Pop. 44,451.

**Serapeum** (se-ra-pē'um), the name given to temples dedicated to the god Serapis, the two most celebrated of which are those of Alexandria and Memphis. See *Serapis*.

**Seraph** (ser'af), plural SERAPHIM, a name applied by the prophet Isaiah to certain attendants of Jehovah in a divine vision presented to him in the temple (Isa. vi, 2). These seraphim have commonly been understood to be angels of the highest order—*angels of fire*. The term seraphim is used elsewhere only of the serpents of the wilderness (Num. xxi, 6, 8, and Deut. viii, 15). See *Cherub*.

**Serapis** (se-rā'pīs), or SARAPIS, an Egyptian deity whose worship

was introduced into Egypt in the reign of Ptolemy I. Plutarch and Tacitus relate 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, and brought thence a colossal statue, which he set up in Alexandria. It was declared to represent the god Serapis, and appears to have been originally a statue of Pluto or Jupiter. The name Serapis is composed of the names Osiris and Apis. 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. The ruins of another temple to Serapis at Memphis were discovered in recent times. The Egyptians themselves never acknowledged him in their pantheon, but he was the principal deity in the Greek and Roman towns of Egypt. 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 140 B.C. it was introduced to Rome by Ant. Pius. The image of Serapis perished with his temple at Alexandria, it being destroyed in 380 by the order of Theodosius.

**Seraskier** (se-ras'kër), a name given to the commanders-in-chief of Turkish armies, and to the generalissimo or minister of war.

**Serbs**, the Servians. See *Servia*.

**Serenade** (ser-e-nād'), music performed in the open air at night; often, an entertainment of music given in the night by a lover to his mistress under her window; or music performed as a mark of esteem and goodwill towards distinguished persons. The name is also given to a piece of music characterized by the soft repose which is supposed to be in harmony with the stillness of night. The Italian name *Serenata* is now applied to a cantata having a pastoral subject, and to a work of large proportions, in the form to some extent of a symphony.

**Seres** (ser'es), a walled town in Turkey, 35 miles N. E. of Salonica. It is well built, and has various mosques and Greek churches, spacious bazaars, manufactures of linen and cotton goods, and a considerable trade in cotton, tobacco, corn, and fruit. Seres is the headquarters for the Turkish wool trade. Pop. (1905) 30,000.

**Sereth** (se-ret'), an important affluent of the Danube. It rises in the Carpathians in Bukowina, flows through

Roumania, and joins the Danube 5 miles above Galatz after a course of 300 miles. **Sereth**, a town of Austria, in Bukowina, wine, on the river of same name. Pop. 7014.

**Serf**, a term applied to a class of laborers existing under the feudal system, and whose condition, though not exactly that of slaves, was little removed from it, the serf being bound to the estate on which he lived. Under this system, from the vassals of the king downwards, 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. By these various means the serf population gradually decreased. In most parts of the Continent they had disappeared by the fifteenth 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 eighteenth century a species of serfdom existed among Scottish miners. Serfdom in Russia was abolished by a manifesto of Alexander II on March 17, 1861.

**Serge** (serj), a kind of twilled worsted cloth used for ladies' dresses, gentlemen's summer suits etc. Navy serge is a thick durable make of this stuff, used chiefly by seafaring folk.

**Sergeant** (sar'jent), a non-commissioned officer in the army, ranking next above the corporal. He is appointed to see discipline observed, to teach the soldiers their drill, and also to command small bodies of men, as escorts and the like. A company has five sergeants, of whom the senior is called first

or orderly sergeant; above them is the sergeant-major, who acts as assistant to the adjutant.

**Sergeant-at-arms.** See *Serjeant-at-arms*.

**Sergeanty** (sâr'jen-ti), **GRAND**, a tenure in feudal times whereby the tenant held land of the crown by performing some service to the sovereign in his own person. Petty-sergeanty was a tenure of land from the king by the service of rendering to him annually some small article, as a bow, sword, spurs, or the like.

**Sergipe** (ser-zhê'pe), or **SERGIPE-DEL-REY**, a maritime province of Brazil, N. of Bahia; area, 15,093 square miles. The coast is low and sandy, but the interior is mountainous. The chief river is the São-Francisco on the north. Cotton, sugar-cane, rice, tobacco, etc., are grown, and the woods furnish good timber, dyewoods and quinine. Pop. 356,264. The chief town is Aracaju; pop. 10,000.

**Sericulture** (ser'i-kul-shur), the cultivation of the silk-worm, for the purpose of obtaining silk from its cocoons. China and Japan are the leading seats of this industry, though it exists in various other localities. It has frequently been attempted in the United States, but the lack of cheap labor has always rendered it unsuccessful.

**Seriema** (ser-i-ê'ma; *Dicholophus cristatus*), a gallinatorial bird of the size of a heron, inhabiting the open grassy plains of Brazil and other parts of South America. Its feathers are of a gray color, and a kind of crest rises from the root of the beak, consisting of two rows of fine feathers curving backwards. The eye is sulphur-yellow, the beak and feet red. It is of retired habits, and utters a loud screeching cry, which somewhat resembles that of a bird of prey or the yelping of a young dog. The seriema is protected in Brazil on account of its serpent killing habits and is often domesticated.

**Series** (sê'rêz), in mathematics, a set of terms or magnitudes connected by the signs + and —, and differing from one another according to a certain law.  $1 + 2 + 3 + 4 + \dots + n$

is a series whose sum is  $\frac{n}{2}(n+1)$ . This

series is a simple form of *arithmetical progression*; the most general form is  $a + (a+b) + (a+2b) + \dots + (a+(n$

$-1)b$ ), and the sum is  $\frac{n}{2}(2a + (n-$

$1)b$ ), where  $n$  is the number of terms,

and  $b$  is called the common difference. A *geometrical series* or *progression* is of the form  $a + ar + ar^2 + \dots + ar^{n-1}$ , and the sum of such a series is  $a(rn-1)$   
 $r-1$

**Serinagar.** See *Srinagar*.

**Seringapatam** (ser-in-gâ-pâ-tam'; properly, *Sri-rangapatnam*, 'city of Vishnu'), a celebrated town and fortress in the province of Mysore, Madras Presidency, India. It is situated on an island formed by two branches of the Kaveri, 245 miles S. W. of Madras, and is generally ill-built, with narrow, dirty streets. It was once the capital of Mysore. The palace, formerly extensive, is now in ruins. Other notable public buildings are the great mosque, and the pagoda of Sri Ranga, the arsenal, and the cannon foundry. The massive fortifications were the work of Tippoo, the son of Hyder Ali, assisted by French engineers, and the fortress was three times besieged by the British, first in 1791, and afterwards in 1792 and 1799. On the last occasion it was carried by assault, Tippoo himself being slain while fighting desperately, together with 8000 men. Pop. 8584, once 140,000.

**Seriphos** (se-rî'fos), or **SERPHO**, a small rocky island belonging to the Greek Cyclades, yielding some corn and wine, while iron ore is mined. It was used as a place of exile by the Romans. Pop. 3851.

**Serjeant-at-arms** (sâr'jint), in the United States the sergeant-at-arms of the national House of Representatives or Senate, or of a State legislative body, is the officer charged with the preservation of order, and, frequently, with accounts, disbursements, and the serving of processes. In England he is one of the officers who attend the person of the sovereign to arrest offenders of distinction, etc. Two of them attend on the two houses of Parliament.

**Serjeant-at-law**, in England, a lawyer, formerly of the highest rank under a judge. The judges in common law formerly were always selected from the serjeants, but this monopoly has been abolished. A serjeant is appointed by a writ of the crown. A king's counsel, except in certain circumstances, takes precedence of a serjeant-at-law. *Serjeants' Inn* is a society or corporation consisting of the entire body of serjeants-at-law.

**Serous Fluids** (sê'rus), a name given to the lymph-like pellucid fluids secreted by certain membranes and contained in certain cav-



ities of the body. An excess of this secretion constitutes a diseased and often a dropsical condition. See next article.

**Serous Membranes**, are certain double membranes in the human body, as the pleura, pericardium, peritonem, etc., which form a sort of closed sac surrounding certain organs, the interior surfaces of the sac secreting a small quantity of serous fluid. Their chief function is to allow free action to the organs, and they are also intimately connected with the absorbent system, the vessels of which freely open on their surfaces. These membranes are liable to various diseases, as inflammation (pleurisy, pericarditis, etc.), morbid growths, dropsical effusions, hæmorrhage, etc.

**Serpent-charming**, an art of great antiquity, confined in practice exclusively to eastern countries. Several allusions are made to it in the Bible as Ps. lviil, 5; Eccl. x, 11; Jer. viii, 17, and also in classical writers. The power exercised by the charmers over poisonous serpents is unquestionably remarkable, and though there is little doubt that the common practice of the charmers is to extract the fangs before exhibiting their feats, yet we have good authority for believing that it is not unusual to dispense with this. The instrument usually employed in serpent-charming is a kind of pipe, which is varied by whistling and the use of the voice. The effect of this medley of sounds is to entice the serpents from their holes, and this done the serpent-charmer pins them to the ground with a forked stick. In India and other places the art of serpent-charming is an hereditary profession, and is practiced for the purpose of gaining a livelihood by administering to the amusement of the public. Besides the evident power music has upon the serpents, they appear to be influenced in a marked degree by the eye of the charmer, who controls them by merely fixing his gaze upon them.

**Serpent-eater.** See *Secretary-bird*.

**Serpentine** (sér'pen-tin), an abundant mineral, usually having a granular or impalpable composition, and presenting red, brown, black, yellow and gray colors, in veined, spotted, and other figures or combinations; surface almost dull; luster resinous; streak white, acquires some luster; hardness 3; specific gravity 2.5. Serpentine is divided into the *common* and *precious* serpentine, the former of which consists of those varieties which are destitute of handsome colors, while the latter includes

all such as are suited to purposes of ornament. Chemically it is a hydrous silicate of magnesia. Serpentine forms mountain masses, and beds in primitive rocks. Ornamental varieties of it are turned on the lathe into vases, and also worked into different ornaments.

**Serpent** (sér'pent), or SNAKE (*Ophidia*), the name given an order of reptiles, characterized by an elongated and cylindrical body covered with horny scales, but never with bony plates. There is never any breast-bone nor pectoral arch, nor fore-limbs, nor as a rule any traces of hind-limbs. In a few cases, however (as in the python), rudimentary hind-limbs may be detected. The ribs are always numerous, some serpents having more than 300 pairs. These not only serve to give form to the body and aid in respiration, but are also organs of locomotion, the animal moving by means of them and of its scales, which take hold on the surface over which it passes. The vertebræ are formed so as to give great pliancy, most if not all serpents being able to elevate a large portion of their body from the ground. They have hooked, conical teeth, not lodged in distinct sockets, useless for mastication, but serving to hold their prey. In the typical non-poisonous or innocuous serpents, both jaws and the palate bear continuous rows of solid conical teeth. In the venomous serpents, as vipers, rattlesnakes, etc., there are no teeth in the upper jaw excepting the two poison fangs. These are long, firmly fixed in a movable bone, above which there is a gland for the elaboration of poison. Each tooth is perforated by a tube through which the poison is forced. The tongue, which is forked, and can be protruded and retracted at pleasure, is probably rather an organ of touch than of taste. The eye is unprotected by eyelids, but it is completely covered and protected by an anterior layer of transparent skin attached above and below to a ridge of scales which surrounds the eye. No external ear exists. The nostrils are situated on the snout. The heart has three chambers, two auricles and a ventricle. The digestive system comprises large salivary glands, a distensible gullet, stomach, and intestine, which terminates in a cloaca with a transverse external opening. A urinary bladder is absent. The lungs and other paired or symmetrical organs of the body generally exhibit an abortive or rudimentary condition of one of these structures. As regards reproduction they are either oviparous or ovoviviparous, the eggs being either hatched externally or within the animal's body. Many serpents,

especially the larger species, as the boas, subsist on prey thicker than themselves, which they crush by constriction, and which they are able to swallow from the fact that throat and body are capable of great dilatation. The order is generally divided into two suborders, *Viperina* and *Colubrina*, the former having only two poison fangs in the upper jaw, the latter having solid teeth, besides grooved fangs. The different kinds or species of snakes will be found described in articles under their respective headings, such as *Rattlesnake*, *Python*, etc. See also *Reptiles*.

**Serpent**, a bass musical wind-instrument, of a serpentine form, made of wood covered with leather, having a mouthpiece and several keys; now almost superseded by the ophicleide.

**Serpent Worship**, ophiolatry; the worship of serpents as symbols or avatars of a deity, a branch of animal worship with a wide range in time and space. In modern times serpent worship is prevalent in India; also in Haiti, West Indies.

**Serpukhov** (ser'pu-hov), a town in Russia, in the government of Moscow, and 57 miles s. s. w. of the town of Moscow. It has an old cathedral, and manufactures of woolen, cotton, and linen cloth, paper, etc. Pop. 24,456.

**Serpula** (ser'pu-la), a genus of Annelida or worms, belonging to the order of Tuhicola or tube-dwelling worms, inhabiting cylindrical and tortuous calcareous tubes attached to rocks, shells, etc., in the sea. The worm fixes



Serpula, detached and in tube.

itself within its tube by means of the bristles attached to its body-segment. Its head segments are provided with plume-like gills or branchiae. No eyes exist in this creature, although it is extremely sensitive to the action of light.

**Serra da Estrella**, a lofty range of granite mountains near the middle of Portugal, highest summit 6460 feet. The range contains

some remarkable lakes, part of which are tepid.

**Serranus** (ser-ra-nus), a genus of fishes of the perch family, some of them found on the British coasts.

**Sertorius** (ser-tō-ri-us), QUINTUS, a Roman general, born about 120 B.C. After serving with reputation under Marius against the Teutones in Spain he was made questor in Cisalpine Gaul in 91 B.C. In the quarrel between Sulla and Marius he sided with the latter. When Sulla returned from the Mithridatic war (83 B.C.) Sertorius was proscribed and fled to Spain. There he attempted to organize a force capable of resisting the army sent by Sulla to conquer Spain, but finding his means unequal to the contest he crossed over to Africa. He now assisted the Mauritians fighting against their king. Having gained several victories and liberated the Mauritanians, the Lusitanians requested him to return to Spain and take command of their troops against the Romans. Opposed to much superior forces he displayed the talents of a skilful general, and successfully resisted the Roman leaders Metellus and Pompey. He was treacherously assassinated at a feast by his friend Perperna, B.C. 72. Sertorius has been made the subject of a tragedy by Corneille.

**Sertularia** (ser-tū-lar'i-a), the scientific name of a genus of Hydrozoa or zoöphytes to which, from their resemblance to miniature trees, the familiar name of 'sea-firs' is given.

**Serum** (sē-rum), the thin transparent part of the blood. The serum of the blood, which separates from the crassamentum during the coagulation of that liquid, has a pale straw-color or greenish-yellow color, is transparent when carefully collected, has a slightly saline taste, and is somewhat unctuous to the touch. It usually constitutes about three-fourths of the blood, the pressed coagulum forming about one-fourth. The term is also applied to the thin part of milk separated from the curd and oil. See *Blood*.

**Serum Therapy**, the treatment of epidemic diseases by the use of antibodies generated by the disease organism itself. It is held that the bacterium to which these diseases are due throw off a substance which if retained would be injurious or fatal to their existence. This substance, obtained from the persons affected, and converted into a serum fitted for injection, is held to have a repressive effect upon the disease, by arresting the growth and development of the bacterial organisms.

## Serval

There are two kinds of protective serums used in the treatment of disease. The one kind is an *antitoxic* serum which neutralizes bacterial toxins, and the other is an *anti-bacterial* serum which prevents the multiplication of the bacteria in the tissues. The chief antitoxic serums are the diphtheria antitoxin, the tetanus antitoxin, and antivenene; the chief antibacterial serums are the anti-streptococcic, anti-cholera, anti-typhoid, and anti-plague. The serums are supplied, as a rule, in liquid form, and administered by subcutaneous or intravenous or intraspinal injection, which must be given with the strictest antiseptic precautions. The value of serum therapy has been most thoroughly established in the case of diphtheria. The antitoxin for tetanus is similar to that used for diphtheria, but on account of the rapid progress of the disease is of little value unless administered early. Considerable success has been attained in the treatment of cerebrospinal meningitis by the use of Flexner's serum. Serum therapy is applied as a prophylactic as well as a curative agent in cases where there has been exposure to infection. See *Vaccination*.

**Serval** (ser'val), or BUSH-CAT (*Leopardus Serval*), a carnivorous animal nearly related to the leopard and its allies, a native of Africa. The average length is about 2 feet 8 inches, including the bushy tail, about 16 inches long.

**Servetus** (ser-və'tus), MICHAEL (properly MIGUEL SERVEDE), a learned Spaniard, memorable as a victim of religious intolerance, was born in 1509 at Villa Nueva, in Arragon. He was the son of a notary, who sent him to Toulouse for the study of the civil law. Here he began to give his attention to theology, and having formed views of the trinity antagonistic to the orthodox doctrine he removed to Germany, where he printed a tract entitled *De Trinitatis Erroribus* (1531), followed a year later by his *Dialogorum de Trinitate Libri duo*. Finding that his opinions were obnoxious in Germany, he escaped to France under the name of Michael of Villa Nueva. After fulfilling an engagement with the Frelons, booksellers of Lyons, he went to Paris, where he was graduated as doctor of medicine. At Paris Servetus met Calvin for the first time, and an arrangement was made for a theological discussion between them; but Servetus failed to appear. In 1538 he quarreled with the medical faculty at Paris, and proceeded to Charlieu, near Lyons, where he practiced three years, subsequently moving to Vienne. Here, in 1553, he published his matured theological system

under the title of *Christianismi Restitutio* ('Restoration of Christianity'). He was arrested for heresy and imprisoned, but contrived to escape, and purposed to proceed to Naples. He was, however, apprehended at Geneva on a charge of blasphemy and heresy, and his various writings were sifted in order to ensure his condemnation. The divines of all the Protestant Swiss cantons unanimously declared for his punishment, and Calvin was especially urgent and emphatic as to the necessity of putting him to death. As he refused to retract his opinions he was hurned at the stake on October 27, 1553. Servetus is numbered among the anatomists who made the nearest approach to the doctrine of the circulation of the blood.

**Servia** (ser'vi-a; Slavonic, *Serbia*; Turkish, *Syryp*), an independent kingdom of Eastern Europe, bounded N. and W. by Montenegro, Austria-Hungary and Albania; E. by Roumania and Bulgaria; and S. by Albania and Greece; area, 23,661 square miles; pop. 4,300,000. The surface is elevated and is traversed by ramifications of the Carpathians in the northeast, of the Balkans in the southeast, and of the Dinaric Alps in the west. The summits seldom exceed 3000 feet, though the highest reaches over 7000. The whole surface belongs to the basin of the Danube, which receives the drainage partly directly, and partly by the frontier river Save, augmented by the Drin and the Timok, but chiefly by the Morava, which flows through the center of the kingdom. The climate is somewhat rigorous in the elevated districts, but mild in the valleys and plains. There are extensive forests and uncultivated wastes, the forest area being forty-two per cent. of the total area. The chief agricultural products are maize, wheat, flax, hemp, and tobacco. Wine is made in the districts adjoining Hungary, and the cultivation of prunes is extensive, their product being largely converted into plum-brandy. Stock-raising is little less important, cattle, sheep, swine and goats being raised in large numbers. Silk-worms are extensively reared. Lead, zinc, quicksilver, copper, iron, and coal are found, and gold and silver in small quantities, but the mineral product is not large. Manufactures include carpet-weaving, embroidery, jewelry, and filigree work. The principal exports are dried prunes, pigs, wool, wheat, wine, hides, cattle, and horses; imports, cotton, sugar, colonial goods, hardware, etc. The bulk of the trade is with Austria. The great majority of the inhabitants are Slavonians, and adhere to

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the Greek Church. The Servian language, formerly often called the *Illyrian*, is a melodious Slavonic dialect closely allied to the Bulgarian and Slovenian, and forms with them the southern Slavonic group. Several collections of patriotic Servian songs have been published, and both Goethe and Grimm have acknowledged the excellence of Servian poetry. In prose literature, however, little has been produced besides theological and religious works. The present constitution of Servia dates from 1889. The government is an hereditary monarchy, and the people are represented by an elected legislative assembly called the *skupstchina*. Capital, Belgrade.

**History.**—Servia was anciently inhabited by Thracian tribes; subsequently it formed part of the Roman province of *Moesia*. It was afterwards occupied in succession by Huns, Ostrogoths, Lombards, Avars, and other tribes. The Servians entered it in the seventh century, and were converted to Christianity in the next century. They acknowledged the supremacy of the Byzantine emperors, but later made themselves independent, and under Stephen Dushan (1336-56) the Kingdom of Servia included all Macedonia, Albania, Thessaly, Northern Greece, and Bulgaria. About 1374 a new dynasty ascended the throne in the person of Lazar I, who was captured by the Turks at the battle of Kossova (in Albania) in 1389, and put to death. Servia now became tributary to Turkey. About the middle of the fifteenth century it became a Turkish province, and so remained for nearly 200 years. By the Peace of Passarowitz in 1718 Austria received the greater part of Servia, with the capital, Belgrade. But by the Peace of Belgrade in 1739 this territory was transferred to Turkey. The barbarity of the Turks led to several insurrections. Early in the nineteenth century Czerny George placed himself at the head of the malcontents, and, aided by Russia, succeeded after eight years of fighting in securing the independence of his country by the Peace of Bucharest, May 28, 1812. The war was renewed in 1813, and the Turks prevailed. In 1815 all Servia rose in arms under Milosh, and after a successful war obtained complete self-government, Milosh being elected hereditary prince of the land. Milosh was compelled to abdicate in 1839, and was nominally succeeded by his son Milan, who died immediately, leaving the throne vacant to his brother Michael. In 1842 this prince was compelled to follow the example of his father and quit the country, Alexander Kara-Georgevitch, son of

Czerny George, was elected in his room; but in December, 1858, he also was forced to abdicate. Milosh was then recalled, but survived his restoration little more than a year. His son Michael succeeded him (1860), but was assassinated by the partisans of Prince Alexander on July 10, 1868. The princely dignity was then conferred on Milan (Ohrenovitch), grand-nephew of Milosh. After the fall of Plevna in the Russo-Turkish war of 1877-78 Servia took up arms against Turkey, and by the Treaty of Berlin (July 13, 1878) it obtained an accession of territory and the full recognition of its independence. It was erected into a kingdom in 1882. In 1885 a short war took place between Servia and Bulgaria, resulting in favor of the latter. In 1889 Milan abdicated in favor of his son Prince Alexander, who was murdered in June, 1903, and succeeded by Peter Karageorgevitch. Servia was incensed at the annexation of Bosnia and Herzegovina by Austria, but kept the peace. She took an active part in the Balkan war in 1912-13 (q. v.), and gained considerable territory at the expense of Turkey and Bulgaria. The assassination of the Austrian archduke at Serajevo in 1914 led to the European war (q. v.), Austria insisting that the Serbs were responsible for the crime. Servia was overrun by the Bulgarians and Austrians, and the country laid waste. Over 100,000 Serbs were killed in battle. By the peace of 1919 (see *Treaty*), a new Serb-Croat-Slovene state, *Jugo-Slavia* (q. v.), was formed from the union of Croatia and Slavonia, Carniola, Bosnia and Herzegovina with Servia.

**Service-Tree** (*Pyrus domestica*, or *Pyrus Scabrus*; nat., order Rosaceæ, suborder Pomeæ), a European tree from 50 to 60 feet high, of the same genus as the apple and pear. It has imparipinnate leaves, whitish beneath, flowers in clusters, cream-colored, and resembling those of the hawthorn; fruit a reddish-color berry (about the size of a small gooseberry). The wood is very hard, fine-grained, and susceptible of a brilliant polish. *P. Americana*, the mountain ash, is a small tree common in New England and the Middle States.

**Servites** (serv'its), or SERVANTS, OR THE HOLY VIRGIN, a religious order founded at Florence about 1233. It first obtained recognition and sanction from Pope Alexander IV (1254-61), and from Martin V (1417-31) it received the privileges of the mendicant orders, but never had much influence in the church.

**Servius Tullius** (ser'vi-us tul'i-us), the sixth king of Rome. According to the tradition he was

the son of a slave, given by the elder Tarquin to Tanaquil, his wife. He married Tarquin's daughter, and on the death of his father-in-law (578 B.C., according to the usual chronology) he was raised to the throne. He defeated the Veientes and the Etruscans, and divided the population of Rome into tribes, instituting at the same time the *comitia centuriata* and *tributa*; he also beautified the city, and built several temples. According to the common story Servius married his two daughters to the grandsons of his father-in-law; the elder to Tarquin, and the younger to Aruns. The wife of Aruns murdered her own husband to unite herself to Tarquin, who had assassinated his wife. Servius was murdered by Tarquin, and his own daughter Tullia ordered her chariot to be driven over the mangled body of her father (534 B.C.).

**Sesamum**, or **SESAME** (*ses'a-mum*, *ses'a-mē*; *Sesamum*), a genus of annual herbaceous plants, nat. order Pedaliaceæ. The species, though now cultivated in many countries, are natives of India. They have alternate leaves and axillary yellow or pinkish solitary flowers. *Sesamum orientale* and *S. indicum* are cultivated, especially in India, Egypt and Syria; they have also been introduced in America. Sesamum seeds are sometimes added to broths, frequently to cakes by the Jews, and likewise in the East. The oil expressed from them is bland and of a fine quality, and will keep many years without becoming rancid. It is often used as a salad-oil, and is also known as *gingelly-oil* and *benné-oil*. The leaves of the plant are mucilaginous, and are employed for poultices. Of the seeds two varieties are known in commerce, the one white and the other black.

**Sesostriis** (*se-sos'tris*), a name given by the Greeks to an Egyptian king, who is not mentioned by that name on the monuments, and who is often identified with Ramses I. See *Rameces*.

**Sessa** (*ses'sa*), a town in South Italy, province of Terra di Lavoro, 17 miles east of Gaeta. It is a bishop's see, and has a handsome cathedral. It was a flourishing Roman colony under the name of Suessa-Aurunca. Numerous Roman remains (of aqueducts, baths, theater, etc.) still exist. Pop. 5367.

**Sessile** (*ses'sil*; Latin *sessilis*, from *sedeo*, *sessum*, to sit), in zoology and botany, a term applied to an organ attached or sitting directly on the body to which it belongs without a support; as, a *sessile leaf*, one issuing directly

from the main stem or branch without a petiole or footstalk; a *sessile flower*, one



Sessile Leaves.



Sessile Flower.

having no peduncle; a *sessile gland*, one not elevated on a stalk.

**Session** (*ses'h'un*), COURT OF, also called the COLLEGE OF JUSTICE, the highest civil judicatory in Scotland, established by James V in 1532. It consists of thirteen judges: the lord-president, the lord justice-clerk, and eleven ordinary lords. The court is divided into an inner and an outer house. In the former sit the lord-president and three ordinary lords forming the first division, and the lord justice-clerk and other three ordinary lords forming the second division. The remaining ordinary lords sit in the outer court and hear cases singly. The judgments of inferior courts, except those of the small debt courts, are mostly subject to the review of the Court of Session. Judgments of the Court of Session may be appealed against to the House of Lords. The judges are appointed by the crown *ad vitam aut culpam*. See *Justiciary Court*.

**Sessions.** See *Quarter Sessions*.

**Sestertius** (*ses-ter'shi-us*), an ancient Roman silver coin worth 2½ asses. The sestertius was the fourth part of a denarius, and was worth about 4 cents.

**Sestetto** (*ses-tet'to*), a musical piece for six independent instruments or voices.

**Sestos.** See *Abydos*.

**Setaria.** See *Millet*.

**Sethites** (*seth'its*), a Gnostic sect that existed in Egypt in the second century and bore some resemblance to that of the Ophites. They worshiped Seth, the son of Adam, as the son of God, but not of the creator of Adam and Eve, and maintained that he had reappeared in the person of Jesus Christ. They pretended to have several books written by him.

**Setif** (să-tēf'), a town in the Algerian province of Constantine, connected by rail with Algiers, Constantine and Philippeville. Pop. 9281.

**Seton** (sē'tun), in surgery, a skein of silk or cotton, or something similar, passed under the true skin and the cellular tissue beneath, in order to maintain an artificial issue, and moved from time to time to keep the wound open, the object sometimes being to produce counter irritation locally, and at others to relieve the system generally. In the former case setons are applied to the neighborhood of the part affected, while in the latter they are always inserted at the nape of the neck.

**Seton**, ERNEST THOMPSON, author and artist, born at South Shields, England, August 14, 1860; lived in the backwoods of Canada 1866-70; on the Western plains 1882-87. He became the official naturalist to the government of Manitoba, studied art in Paris, and is well known as an animal painter and illustrator. He has written many books on animal life, notable for their stories of striking animal intelligence. About 1898 he began the organization of a group of boy naturalists and athletes, known under the name of Seton Indians, from their adopting the Indian customs in their exercises. This organization gave the suggestion of the boy scout movement, now so widely popular. See *Boy Scouts*.

**Setter** (set'er), a breed of dogs, so named from their habit of crouching or 'setting' on observing the game which they are trained to hunt. The distinct races are the English, Irish and Russian setters. The two former have a narrower muzzle than the pointer, with the lower angle more rounded; the eye quick; the ears long, thin, and covered with wavy, slicken hair; the tail with a fan-like 'brush' of long hair, and slightly curled at its tip; the hind legs and feet fringed. The Russian setter has thick woolly fur, the muzzle bearded, the soles of the feet hairy, and possesses a very keen scent. Crossed with the English it produces an admirably sharp variety.

**Settle** (set'l), ELKANAH, an English playwright who lives only in the ridicule heaped on him by Dryden and Pope. He was born at Dunstable in 1648; educated at Oxford; produced several plays—*Cambyse*, the *Empress of Morocco*, etc., and by his conceit provoked the scourge of Dryden. In his latter days he kept a booth at Bartholomew Fair. He died in the charter-house in 1723.

**Settlement** (set'l-ment), in law, (1) a deed by which property is settled; specially the general will or disposition by which a person regulates the disposal of his property, usually through the medium of trustees, and for the benefit of a wife, children, or other relatives; or the disposition of property at marriage in favor of a wife. (2) Legal residence or establishment of a person in a particular parish, town, or locality, which entitles him to maintenance if a pauper, and subjects the parish or town to his support. The *primâ facie* settlement of a pauper is the place of his birth, and this remains his settlement until he has acquired another settlement. In the United States a settlement may be acquired in various ways, to wit: by birth; by the legal settlement of the father, in the case of minor children; by marriage; by continued residence; by the payment of requisite taxes; by the lawful exercise of a public office; by hiring and service for a specified time; by serving an apprenticeship; and perhaps some others, which depend upon the local statutes of the different states. See *Poor*.

**Setubal** (să-tū'bāl), or SETU'VAL, or as called by the English ST. UBS, a seaport of Portugal, on a bay of the Atlantic, at the mouth of the estuary of the Sado, 20 miles S. E. of Lisbon. It exports lemons, olives, oil, wine and great quantities of hay-salt. Pop. 22,074.

**Sevastopol**. See *Sebastopol*.

**Sevenoaks** (sev'en-ōks, or sen'ōks), a town in Kent, 22 miles S. E. of London. It stands on a ridge of hills, on one of which seven large oak trees are said to have grown, is situated in the midst of beautiful scenery, and is a favorite residential locality. There is a grammar school dating from 1432. Pop. 9183.

**Seven Sleepers**, a famous story of seven Christian youths of Ephesus imprisoned by order of the Emperor Decius in a neighboring cave in which they had sought refuge, and where they slept for nearly 200 years, awaking in the reign of Theodosius II to find, of course, a new civilization. They then related their story to the multitude, gave them their benediction, and expired. The church has consecrated the 27th of June to their memory. The Mohammedans have a similar legend. The basis of the Christian story is said to have been the fact that the dead bodies of seven youths so imprisoned were found in a cave, and the habit which Christian writers had of describing death as fall-

## Seven Sorrows of the Virgin

## Seven Wise Masters

ing asleep in the Lord doubtless contributed to the miraculous character of the story. The conception has been secularized in the modern legend of Rip Van Winkle.

### Seven Sorrows of the Virgin,

**FEAST OF**, a Roman Catholic festival, instituted in 1725 by Pope Benedict XIII, and celebrated on the Friday before Palm Sunday. The seven sorrows commemorated by this feast are (1) the prediction of Simeon (Luke II, 34, 35); (2) the flight into Egypt; (3) the loss of Jesus in Jerusalem; (4) the sight of Jesus bearing his cross; (5) the sight of Jesus on the cross; (6) the piercing of the side of Jesus; (7) the burial of Jesus.

**Seven Stars.** See *Pleiades*.

### Seventeen-year Locust, *Cicada septendecim*.

This remarkable insect begins and ends life in the open air, but spends 17 years in the earth. Safely hidden from sight, it feeds on the sap of tree-roots, and then, emerging into the light, completes its career in the tree branches. When the insect emerges from the ground after its 17 years' burial it works its body rapidly backward and forward like a man trying to put on an extremely tight coat. The result of the movement is the breaking of the shell which covers the creature and the immediate appearance of its wings. The remarkable power of instinct is shown as soon as the insect is freed of its enveloping armor. It makes instantly for the nearest tree and pairing here at once begins. The young, after a brief larval life above ground, penetrate the earth again, to remain there for the allotted 17 years. The habitat of this species is the northern United States. There is a variety farther south with a lifetime of 13 years. Broods of these insects appear in different years in separated localities. During their aerial life they do much damage to trees by injuring the bark of the new growth.

**Seventh-day Adventists**, a religious denomination originating in New England in 1844-45, when some of those connected with the Adventist movement of that period became convinced that the date of the Sabbath had never been changed by Divine authority. From New England the belief in this view spread westward, and in 1855 the headquarters of the society were removed to Battle Creek, Michigan, where its publishing, educational and sanitarium institutions were built. The denomination was formally organized under the name of

Seventh-Day Adventists in 1863, and its headquarters were removed to Washington, D. C., in 1903. The distinctive doctrinal features of the Seventh-Day Adventist denomination are, the observance of the seventh day of the week (Saturday) as the Sabbath, according to the fourth commandment of the Decalogue: 'The seventh day is the Sabbath of the Lord thy God'; and the teaching that the second advent of Christ is near at hand. They hold that the example of Christ and the teaching of the New Testament are against any change in the day of rest. They base their views of the near coming of Christ on the fulfillment of the historical prophecies of Daniel and the Revelation, and on the instruction of Christ concerning the signs of his second coming in the twenty-fourth of Matthew and similar passages. They fix no date for the second advent. They believe in the Bible as the rule of faith and practice, in justification by faith, in the baptism of believers by immersion, and in life and immortality only in Christ. The leading publishing houses of the society in this country are located in Washington, Nashville and Mountain View (California), publishing interests being established also in a number of foreign countries, with mission presses in various mission fields. Books and periodicals are being issued in many languages, the sales now amounting to about one and a half million dollars annually. The denomination has given special attention to the teaching of health and temperance principles, believing this to be a part of gospel work. About forty medical sanitariums are operated by the denominational organizations in this and other countries. Eighty-three denominational colleges and academies were reported in 1909 in America and abroad. The membership of the church in 1912 was 104,526, about two-thirds of this number being in the United States.

**Seventh-day Baptists.** See *Baptists* and *Sabbatarians*.

**Seventy,** THE. See *Septuagint*.

**Seven Wise Masters**, the title of a collection of early oriental tales, the plot of which is the following: a king's son, well educated by seven wise masters, finds by studying the stars that he is in danger of death if he speaks within seven days. The first day his stepmother, whose improper advances he had repulsed, accuses him to her husband of attempted violence, and demands his execution, at the same time telling the king a story to



obtain her end. One of the seven wise masters obtains a day's respite for the prince by telling a tale with a moral counteracting that of the stepmother's. Each day she renews her solicitations and stories to the king with the same object, but the effect of her tales is always nullified by another from one of the seven wise masters, until the expiration of the seven days enables the prince to reveal the designs of his stepmother.

### Seven Wise Men, or SEVEN SAGES OF GREECE.

As generally set down they were Periander of Corinth, Pittacus of Mitylene, Thales of Miletus, Solon of Athens, Bias of Priene, Chilo of Sparta and Cleobolus of Lindus. Maxims of prudence and elementary morality are regarded as embodying a summary of their wisdom. Among these maxims are 'Know thyself,' 'Nothing in excess,' 'Consider the end,' etc.

### Seven Wonders of the World,

an old designation of seven monuments, remarkable for their splendor or magnitude, generally said to have been: the pyramids of Egypt, the walls and hanging gardens of Babylon, the temple of Diana at Ephesus, the statue of the Olympian Jupiter at Athens, the Mausoleum at Halicarnassus, the Colossus of Rhodes, and the Pharos or light-house of Alexandria.

**Seven Years' War,** a famous European war which lasted from 1756 to 1763. As the result of a war with Prussia (see Prussia) Maria Theresa of Austria had to cede Silesia to Frederick the Great. With a view to recover her lost territory she concluded an alliance with Russia, secured the support of Poland and Saxony, and attempted to form a closer union with France. In the meantime war, which already existed between the American colonies, broke out between France and England (1755), and George II, in order to protect his German states, concluded an alliance with Prussia, while France agreed to aid Austria against Frederick. Being informed of these negotiations, Frederick resolved to anticipate his enemies. In August, 1756, he invaded Saxony, occupied the chief towns, and compelled the Saxon army to surrender. This step created a stir in the European courts, and 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. In 1757 Frederick marched into Bohemia and gained a bloody battle at Prague (May 6). Soon after, however, the Austrians under

Daun defeated Frederick at Kollin (June 18), relieved Prague, and forced the Prussians to retreat to Saxony and Lusatia. The French army, after defeating Frederick's German allies (under the Duke of Cumberland) at Hastenbeck, united with the imperial forces; Frederick met them at Rossbach and routed both armies on Nov. 5. He then hurried back to Silesia, which was occupied by the Austrians, and vanquished a superior army under Daun at Leuthen (Dec. 5), thus recovering Silesia. While Frederick was thus occupied in the south and west, his general Lehwald had successfully repelled the Swedes and Russians on the north and east. The next campaign was opened in Feb., 1758, by Ferdinand, duke of Brunswick, who, at the head of Frederick's allies, opposed the French in Lower Saxony and Westphalia. He defeated the French at Krefeld in June, and ultimately drove the enemy behind the Rhine. Frederick, driven out of Moravia, defeated the Russians, who had advanced to Zorndorf, in Brandenburg. He was defeated in turn by Daun at Hohenkirchen, but before the end of the year drove the Austrians from Silesia and Saxony. Louis XV and his mistress, the Marchioness de Pompadour, were bent on continuing the war, and concluded a new alliance with Austria, Dec. 30, 1758. Frederick, however, had also obtained a new treaty with Britain, which promised him a large yearly subsidy. The new campaign was opened in March, 1759, Prince Henry, Frederick's brother, marching into Bohemia, where he dispersed the hostile forces, and captured immense quantities of military stores. The Russians, having defeated the Prussian general Wedel near Züllichau (July 23), advanced to Frankfort-on-the-Oder. Frederick hastened to meet them in person, and had already defeated them at Kunersdorf (Aug. 12) when his victory was snatched from him by the Austrians under Laudon, who inflicted on him a defeat such as he had never sustained before. Frederick's position was now extremely precarious. The Russians were victorious in his hereditary states, Daun was in Lusatia with a large army, and Saxony was overrun by the imperial troops. In the west Frederick's allies had been more successful. On Aug. 1 Ferdinand gained a splendid victory at Minden over the French troops under Contades and Broglie. On the same day his nephew 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 invaded Prussian



Pomerania, were driven by Manteuffel and Platen under the cannon of Stralsund. The campaign of 1760 seemed at first to forebode ill success to Frederick. While he himself was engaged in Saxony Fouqué suffered a defeat in Silesia, in consequence of which the Austrians occupied the whole country. Frederick thereupon gave up Saxony in order to recover Silesia. On August 15th he defeated Laudon at Liegnitz, by which he effected his purpose of recovering Silesia. He then returned to Saxony and attacked the imperial forces at Torgau, on the Elbe (Nov. 3), defeated them in a bloody engagement, and went into winter quarters in Saxony. The Russians also were forced to retire to Poland, and Ferdinand defeated the French at Marburg (July 31). In the campaign of 1761 the operations of Ferdinand of Brunswick and the French on the Rhine consisted of alternate advances and retreats, and the Russians and Austrians were so enfeebled that they failed to make any impression on Frederick's remnant of an army. In the campaign of 1762 the French were defeated (June 24) at Wilhelmsthal, and Cassel surrendered to the allies on Nov. 1. Two days after this the preliminaries of peace between Britain and France were signed, and the peace itself was confirmed at Paris, Feb. 10, 1763. After a short negotiation Frederick concluded a peace with Austria and Saxony at Hubertshurg (Feb. 15), by which he retained Silesia. The war in Europe was accompanied by war by sea and land between the French and British abroad, the result of which was to give Britain a decided superiority over France both in America and India, France surrendering all her colonies on the North American continent.

**Severn** (sev'ern), the second largest river in England, formed by the union of two small streams which rise in Mount Plinlimmon, Montgomeryshire, and after a circuitous southerly course of about 210 miles falls into the Bristol Channel. It receives the Tern, Upper Avon, and Lower Avon on the left, and the Teme and Wye on the right. Its basin has an area of 8580 square miles. It is navigable to Welshpool, about 178 miles above its mouth and 225 feet above sea-level. Below Gloucester its navigation is much impeded, but this has been obviated by a canal from this city to a point on the estuary 2 miles from Berkeley, capable of carrying vessels of 350 tons. Below Gloucester the banks become so low that destructive inundations have not unfrequently occurred. These have been partly caused by one

of the most remarkable features of the river, its bore, or by the height of the tides, which at the mouth of the Avon sometimes exceed 48 feet, and at Chesham attain even 60 feet.

**Severus**, ALEXANDER. See *Alexander Severus*.

**Severus** (se-v'erus), LUCIUS SEPTIMIUS, a Roman emperor, born near Leptis, in Africa, of a noble family, in the year 146 A.D. He early showed an ambitious mind and great military ability. Under Commodus he commanded the legions in Pannonia, and on the murder of Pertinax in March, 193, was proclaimed emperor by his troops. Severus accordingly marched to Rome to subdue the partisans of Didius Julianus, who had purchased the imperial purple from the prætorians. On his approach Julian was assassinated by his own soldiers. Severus gained many adherents, banished the prætorians, and ridded himself of the rivalry of Albinus, commander of the Roman forces in Britain, by conferring upon him the title of Cæsar. He then marched to the East against Pescennius Niger, who had also been elected emperor by a powerful army. After many obstinate battles Niger was routed on the plains of Issus (A.D. 194). Having sacked Byzantium and conquered several eastern nations, Severus returned to Rome. He attempted to assassinate Albinus by his emissaries, but when this had failed of success he met him in battle on the plains of Gaul, near Lyons (February, 197), and was again victorious. The adherents of Albinus were destroyed, and on the return of Severus to Rome the richest of the citizens were sacrificed, and their property was confiscated by the emperor. Severus, with his two sons Caracalla and Geta, now marched to the East to repel an invasion of the Parthians, and subjugated Seleucia, Babylon, and Ctesiphon. Leaving Parthia he visited the tomb of Pompey the Great, and entered Alexandria. After subduing an insurrection in Britain, and building a stone wall from the Tyne to the Solway Firth as a defense against the incursions of the Caledonians, he died at York, A.D. 211.

**Severus**, WALL OF, the name given to the wall or barrier formed at the boundary of the Roman empire in Britain between the Solway and the Tyne by the Roman emperor Severus about 210 A.D., following the line of a similar structure made in the reign of Hadrian (A.D. 120), and usually called Hadrian's Wall. It was more than 70 miles long; on the north towards Scotland was a great ditch, on the southern

edge of this was a stone wall varying from 6 to 9 feet in breadth and about 16 feet high, with towers between 50 and 60 feet square at intervals of about a Roman mile. South of this was an earthen rampart, then a second ditch, backed by two minor earthen ramparts. At larger intervals were the stations or barracks. Remains of it are still to be seen over long ranges of country.

**Séviigné** (sā-vēn-yā), MARIE DE RABUTIN-CHANTAL, MARQUISE DE, daughter of Bénigne de Rabutin, baron de Chantal, distinguished for her epistolary talents, born at Paris in 1626; died in Grignan, department of Drome, in 1696. In 1644 she married the Marquis de Séviigné, who was killed in a duel in 1651, leaving her the mother of a son and a daughter. She then devoted herself to the education of her children and to the culture of her own mind. In 1660 her daughter, to whom she was extremely attached, married the Count de Grignan, and shortly afterwards accompanied her husband to Provence. A seven years' separation from her daughter gave rise to the greater part of the *Letters* which have gained Madame de Séviigné so much reputation. After the year 1687 Madame de Séviigné was rarely severed from her daughter, and in May, 1694, went to live with her permanently. The subjects of many of the *Letters of Madame de Séviigné* are so entirely domestic as to produce little interest; but others abound with court anecdotes, remarks on men and books, and the topics of the day, which are conveyed with great ease and felicity. They are models of the epistolary style, perfectly natural from their expression, lively sentiment and description, and a playfulness which gives grace and interest to trifles.

**Seville** (se-vil'), SEVILLA (se-vēl'yā), a city of Spain, in Andalusia, on the left bank of the Guadalquivir, capital of a province of the same name, 62 miles N. N. E. of Cadiz. It is an archiepiscopal see, and is largely built in the Moorish style, with narrow, ill-paved streets, the old Moorish houses having spacious interior courtyards with a fountain in the middle. The city has a large and handsome Gothic cathedral dating from the fifteenth century, with its famous Moorish Giralda or tower, part of a mosque which gave place to the present cathedral, and dating from 1196; an alcazar or palace in the Moorish style; an exchange called the Casa Lonja; a bull-ring, a fine stone building holding 12,000 persons; an aqueduct of 410 arches built by the Moors, a university, a picture-gallery rich in examples of

Murillo and Zurbaran; the house of Murillo, with collection of pictures; several interesting churches; an enormous hospital in the Grecian style, built in 1546; etc. On the other side of the river is the suburb of Triana, inhabited by gypsies, bull-fighters, etc. The manufactures include silks, cottons, woollens, pottery, machinery, chocolate, leather, and especially tobacco and cigars, there being an immense cigar factory in which some 5000 females are employed. The river is navigable for vessels of considerable size up to the city; a good trade is carried on, large quantities of oranges in particular



Seville.—La Giralda and part of the Cathedral.

being exported. Seville is one of the most ancient cities of Spain. Julius Cæsar gave it the title of *Romula*. It was the residence of the Gothic kings before they moved to Toledo in the sixth century. It surrendered to the Moors early in the eighth century, and remained in their possession till 1248, when Ferdinand III, king of Castile, after a year's siege, forced Seville to open its gates to him. At this time it is said to have contained 600,000 inhabitants; and upon the capitulation 300,000 Moors abandoned the city. After the discovery of America it became the center of the commerce of the New World, and was very flourishing; but the superior advantages of the port of Cadiz

Induced the government to order the galleons to be stationed at the latter place, after which it began to decline. In 1810 the city surrendered to Soult, who exercised great cruelties and extortion in it, till in 1813 he was forced by the British to evacuate it. In 1843 it was besieged for nine days by Espartero, when it capitulated. Pop. 148,315.—The province has an area of 5428 square miles, and the greater part consists of fertile plains, producing all kinds of cereals, seeds, vegetables, oranges and other fruits; wine, oil, tobacco, etc. Large numbers of horses are reared. The chief river is the Guadalquivir. Minerals include iron, silver, lead, and copper. The chief exports are wheat, barley, oranges, oil, wool, copper, etc. Pop. 555,256.

**Sèvre** (sävr), the name of two rivers in N. W. France. The Sèvre Nantaise rises in the department Deux-Sèvres, and flows into the Loire opposite Nantes after a course of 86 miles. The Sèvre Niortaise rises 31 miles more to the southeast, in the same department, and flows into the Atlantic 10 miles north of La Rochelle after a course of 89 miles. The department of Deux-Sèvres takes its name from these two rivers.

**Sèvres** (sävr), a town in France, department of Seine-et-Oise, near St. Cloud, on the Seine, here crossed by a handsome bridge. It is celebrated for its glass and porcelain manufactories. The porcelain of Sèvres is unrivaled for brilliancy of color and delicacy of execution. Previous to 1769 the chinaware made here was of soft porcelain alone, and is known as *Old Sèvres*; subsequently it is of hard porcelain. The building in which the manufacture is carried on was founded in the middle of the eighteenth century, and since 1759 has been state property. Pop. (1906) 7949.

**Sèvres**, **DEUX** (dew-sävr; 'two Sèvres'), a department in France, bounded by Maine-et-Loire, Vienne, Charente, Charente-Inférieure, and Vendée; area, 2316 square miles. A branch of the Cevennes traverses the department from southeast to northwest. Cereals, leguminous crops, and hops are grown. The vine, though extensively cultivated, yields only an inferior wine. The forests are chiefly of hard wood. The minerals include iron, millstones, pavement, and limestone in abundance. The principal manufactures are linen and cotton goods, serge, flannel, woolen hosiery, and gloves. The capital is Niort. Pop. 342,474.

**Sewage** (sü'fj), the matter which passes through the drains,

conduits, or sewers, leading away from human habitations singly, or from houses collected into villages, towns, and cities. It is made up of excreted matter, solid and liquid, the water necessary to carry such away, and the waste water of domestic operations, together with the liquid waste products of manufacturing operations, and generally much of the surface drainage water of the area in which the conveying sewers are situated. Until very recent times human excreta was deposited in outhouses or pits, commonly called cesspools. The invention of water-closets necessitated the use of the sewers, and the water-carriage of excreta was until lately regarded as the most satisfactory method of disposing of these matters. It was argued that the oxygen of the air held in solution by the water destroyed the organic matter and rendered it innoxious. But experience has shown that a large river can only oxidize the excreta of the towns on its banks, and that whenever these are passed into the rivers at some distance from the sea they are apt to become offensive. Sewage, when fresh and freely exposed to the air, is almost inodorous, but once it accumulates putrefaction sets in, it becomes vilely odorous, and pollutes the atmosphere by the production of poisonous gases. To prevent this it has been suggested that all sewers should have a greater fall than at present, and many attempts have been made to prevent the accumulation of gases in sewers by ventilation. Many methods for the ultimate disposal of sewage have been proposed, but these all may be divided into three great classes, viz.: *precipitation*, *irrigation*, and *filtration*, since the throwing of sewage into a body of water in order that it may be carried away by currents, diluted and oxygenated, has ceased to hold a place in modern sanitary schemes. The precipitation of sewage, by which the solid matter is separated from the liquid and used as a manure or otherwise, has been the subject of numerous patents and many chemicals have been employed for that purpose. Lime, lime and phosphate of alumina, and sulphate of iron have all been used with some degree of success. In the A B C process the sewage is first clarified by blood, charcoal, and clay, and afterwards treated with sulphate of alumina, producing a valuable manure. Irrigation—by which the sewage is directly applied to a piece of ground—has been fully tried in several localities, and many people consider it the most successful solution of the problem as to the ultimate disposal of sewage. The ground is carefully prepared, and the sew-

age allowed to flow over its surface by gravitation, and by this process the productivity of the soil is enormously increased. But farmers will use the liquid only when their land requires it; consequently where this system is adopted the local authorities have had to add a farm trust to their many other responsibilities, and the system is generally carried out at a heavy annual loss to the public. Filtration—the purification of sewage by causing it to filter through the earth—has been proposed in cases where land is very valuable or difficult to be secured for the disposal of sewage, on the supposition that this system will require only one acre for every 10,000 inhabitants. As the sewage passes down through the earth the air must of necessity follow it, the oxygen of which will re-aerate the earth and make it again fit for use. But the chief objection to precipitation, irrigation, and filtration is that they can only be applied at the outfall, and therefore have no beneficial influence on the sanitary state of the localities from which the sewers flow. The most successful methods of dealing with the sewage difficulty are based on the principle of keeping all excremental matters out of the sewers and dealing with them so as to prevent decomposition. Moule's earth-closet has been successfully used in detached houses and villages in Great Britain, but the bulk of material renders it difficult to apply the system in towns. In the United States the disposal of sewage has received the earnest consideration of sanitarians. Experiments have been made to destroy refuse of large towns by the use of fire or its equivalent. In New York harbor, at Governor's Island; in Baltimore, at the Johns Hopkins University; in Allegheny City, Pa., such attempts have been partially successful. In the city of Milwaukee, Wisconsin, also in Des Moines, Iowa, large furnaces have been built with this end in view. In Pittsburgh the Rider furnace has been approved of as meeting the object proposed. Dry air closets, by which the noxious deposits are subject to a current of dry air, which renders them dry and changes them so as no longer to have the injurious effects of fecal discharges, are now being introduced. With regard to indoor drainage, care should be taken to see that each trap connected either with bath, water-closet, sink, or fixed basin is ventilated to the open air, and the pipe from the bath, sink, or fixed basin should never pass into the trap of the water-closet, as the heated water promotes decomposition. The overflow pipe from the cistern should not open into the soil pipe, and the main

soil pipe should be of iron, well covered with protecting composition. Cesspools should in all cases be abolished.

**Seward** (sū'ard), ANNA, born at Eyam, Derbyshire, in 1747; died at Lichfield, where most of her life was spent, in 1800. She was intimate with Erasmus Darwin, and gained an unaccountable reputation as a poet. Sir Walter Scott published her *Poems and Correspondence* in 1810-11.

**Seward**, WILLIAM HENRY, statesman, born at Florida, Orange county, New York: May 16, 1801; died at Auburn, Cay county, in the same state, October 1872. He studied for the bar, and began practicing in Auburn in 1823, but gradually drifted into politics, and in 1830 was elected a member of the New York senate. Displaying marked abilities as a politician, he was in 1838 and 1840 chosen governor of his native state, and in 1849 was elected to a seat in the United States Senate. He was the friend and adviser of President Taylor, and distinguished himself by his firm resistance to the extension of slavery. In 1860 he was a candidate for the presidency, but being defeated in the convention by Abraham Lincoln he exerted himself to secure Lincoln's election. Lincoln afterwards nominated Seward as Secretary of State for foreign affairs, in which post he discharged his duties with great ability. He was dangerously wounded in April, 1865, when Lincoln was assassinated, but recovered and fulfilled the same office under Lincoln's successor, Andrew Johnson. He resigned his post on the accession of President Grant in 1869. He wrote a *Life of John Quincy Adams*; his *Speeches, Correspondence*, etc., appeared in 1869; and an *Autobiography*, with continuation, in 1877.

**Sewell** (sū'el), ELIZABETH MISSING, a novelist, born in the Isle of Wight in 1815, daughter of a solicitor. She became well known as the authoress of *Amy Herbert* (1844), *Gertrude* (1845), *Laneton Parsonage* (1846), *Margaret Perceval* (1847), and other novels of the so-called High Church School of Fiction. She also wrote works of travel, poems, and several elementary historical works. — Her brother WILLIAM (born 1805; died 1874), was educated at Oxford, became incumbent of Carishrook, and published religious and literary treatises and translations of the classics.

**Sewellel** (sew-el'el; *Haplodon rufus*), a small rodent animal of the United States, inhabiting California, Oregon, and Washington. It has characters that unite it both with the beaver and



the squirrels or marmots. It lives in colonies in underground burrows, and feeds on vegetable substances. It is about 12 inches long, stoutly built, and has almost no tail.

**Sewing-machines.** The first attempts to devise machines for replacing hand labor in sewing are as old as the eighteenth century. The first machines were contrivances for imitating mechanically the movements of the hand in sewing. In the machines of Thomas Stone and James Henderson (1804) there were two pairs of pincers, one of which seized the needle below and the other above the cloth, and pulled it quite through on either side alternately. In Heilmann's machine, exhibited at Paris in 1834, the needle had the eye in the middle and a point at each end. This machine was intended for embroidery work. Previous to this (in 1830) Thimmonier and Ferrand had contrived a machine producing what is known as the chain-stitch. But the great disadvantage of this stitch is that the whole seam becomes undone if the end of the thread is pulled. In 1854 Singer, an American, devised a machine calculated to remedy this defect of the chain-stitch by means of a mechanism for tying a knot in the seam at every eighth stitch. But long before Singer's invention Elias Howe, a poor American mechanic, had invented the first really satisfactory sewing-machine, for which he obtained a patent in May, 1841. Howe's machine used two threads, one of which passed through the eye of the needle, while another was contained in a small shuttle; and it produced a seam in which each stitch was firmly locked, so that it could not come undone by pulling. Many improvements have since been made by other inventors. The principle of the two threads and the lock-stitch has been adhered to in most of the machines that have been invented subsequently to that of Howe, but various details applying that principle have been altered for the better. In the Wheeler and Wilson machine the place of the shuttle is supplied by a reel which revolves in a vertical plane within a round piece of mechanism so contrived as to form a loop with the reel-thread, which becomes interlocked with that held by the needle. Of single-thread machines one of the best is that of Wilcox and Gibbs, which, while it is easy, quick, and noiseless in working, makes a securer stitch than one-thread machines generally. Sewing-machines have now been adapted to produce almost all kinds of stitching which can be done by the hand. Most sewing-machines are

worked by the foot, but many are worked by the hand, and some may be worked by either. Steam and electricity are also frequently employed as a motive power for sewing-machines. The manufacture of sewing-machines is most extensively carried on in America. In Great Britain also large numbers are now made—chiefly in or near Glasgow.

**Sex**, the name applied to indicate the particular kind of generative or reproductive element in the constitution of an animal or plant, being that property or character by which an animal is male or female. Sexual distinctions are derived from the presence and development of the characteristic generative organs—*testes* and *ovary*—of the male and female respectively. See *Reproduction*.

**Sexagesimals** (*sek-sa-jez'l-mals*), or **SEXAGESIMAL FRACTIONS**, fractions whose denominators proceed in the ratio of sixty; as,  $\frac{1}{60}$ ,  $\frac{1}{3600}$ , &c. These fractions are called also astronomical fractions, because formerly there were no others used in astronomical calculations. They are still retained in the division of the circle, and of time, where the degree or hour is divided into sixty minutes, the minutes into sixty seconds, and so on.

**Sexagesima Sunday**, the second Sunday before Lent, the one immediately before Shrove Tuesday, so called because it falls about sixty days before Easter.

**Sextant** (*seks'tant*), an improved form of quadrant, capable of measuring angles of 120°. It consists of a frame of metal, ebony, etc., stiffened by cross-braces, and having an arc embracing 60° of a circle. It has two mirrors, one of which is fixed to a movable index, and various other appendages. It is capable of very general application, but it is chiefly employed as a nautical instrument for measuring the altitudes of celestial objects, and their apparent angular distances. The principle of the sextant, and of reflecting instruments in general, depends upon an elementary theorem in optics, viz., if an object be seen by repeated reflection from two mirrors which are perpendicular to the same plane, the angular distance of the object



Sextant.



from its image is double the inclination of the mirrors. The annexed figure shows the usual construction of the sextant. QP is the graduated arc, BI the movable index, B mirror fixed to the index, A mirror (half-silvered, half-transparent), fixed to the arm, GO' colored glasses, that may be interposed to the sun's rays. To find the angle between two stars hold the instrument so that the one is seen directly through telescope T and the unsilvered portion of the mirror, and move the index arm so that the image of the other star seen through the telescope by reflection from B and A is nearly coincident with the first, the reading on the arc gives the angle required; half degrees being marked as degrees, because what is measured by the index is the angle between the mirrors, and this is half that between the objects.

**Sexton** (seks'tun), a corruption of *sacristan*, an under officer of the church, whose business, in ancient times, was to take care of the vessels, vestments, etc., belonging to the church. The greater simplicity of Protestant ceremonies has rendered this duty one of small importance, and the sexton's duties now consist in taking care of the church generally, to which is added the duty of digging and filling up graves in the churchyard.

**Sextus Empiricus** (seks'tus em-pir'i-kus), a celebrated skeptic who flourished in the first half of the third century A.D. He was probably a Greek by birth, and he is said to have lived at Alexandria and Athens. Scepticism appears in his writings in the most perfect state which it had reached in ancient times, and its object and method are more clearly developed than they had been by his predecessors. (See *Scepticism*.) We have two works by him, written in Greek, one, entitled *Outlines of Pyrrhonism*, 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.

**Seychelles** (sā-shel'), a group of about thirty islands in the Indian Ocean, between lat. 3° 40' and 5° 35' S., and lon. 55° 15' and 56° E. They were first occupied by the French, and were ceded to the British in 1814. The settlers are mostly of French extraction. The largest island is Mahé, the majority of the others being mere rocks. With the exception of two consisting of coral, they are composed of granite piled up in huge masses, and terminating in peaks. Most of them are covered with verdure,

and yield good timber. Cotton, coffee, cocoa, spices, tobacco, maize, rice, and tropical fruits are cultivated; and coconut-oil, soap, vanilla, etc., exported. Pop. (1909) 22,409.

**Seymour** (sēmōr), a city of Jackson Co., Indiana, 87 miles W. of Cincinnati. It has railroad repair shop and manufactures of flour, staves, hubs, spokes, cradles, woollen goods, etc. Pop. 6305.

**Seymour** (sēmūr), a noble English family of Norman origin. Their name is corrupted from St. Maur which was their seat in Normandy. They acquired lands in Monmouthshire in the thirteenth century, and early in the fifteenth century added to these estates others in Somersetshire. The first conspicuous member of this family, SIR JOHN SEYMOUR, was the father of the third wife of Henry VIII and of Edward Seymour, who, on his sister's marriage in 1536, was raised to the peerage as Viscount Beauchamp, and the following year created Earl of Hertford. During the minority of Edward VI the Earl of Hertford caused himself to be appointed governor of the king and protector of the kingdom (January, 1547). The following month he obtained the post of lord-treasurer, was created Duke of Somerset, and made earl-marshal. The success of his expedition against Scotland (1547) excited the jealousy of the Earl of Warwick and others, who procured his confinement in the Tower in October, 1549. He was deprived of his offices and honors and heavily fined. Six months later he obtained a full pardon, was admitted to court, and ostensibly reconciled to Warwick. The latter, however, caused Somerset to be again arrested in October, 1551, on a charge of treasonable designs against the lives of some of the privy-councillors. He was tried, and beheaded on Tower Hill in January 1552.—His brother, THOMAS, Lord Seymour of Sudeley, was made a peer and lord high-admiral of England by the protector. He married Catherine Parr, widow of Henry VIII, and was continually plotting against his brother. In 1548 he was attainted of treason, and he was executed in 1549.—The eldest son of the protector was created by Elizabeth Earl of Hertford, and the grandson of this Earl of Hertford having distinguished himself in the royalist cause, obtained in his favor the revival of the title of Duke of Somerset in 1660.

**Seymour**, ORATIO, statesman, born at Pompey Hill, Onondaga Co., New York, in 1810. After serving three terms, with marked ability, in the

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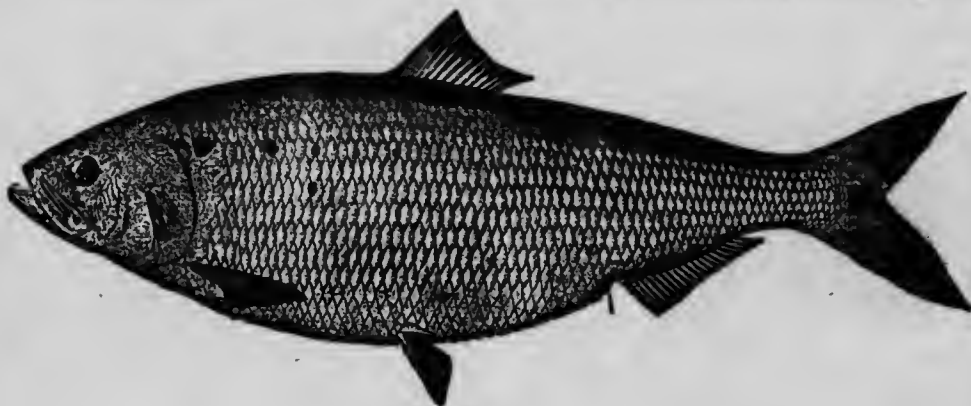
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New York legislature, in 1852 was elected governor on the Democratic ticket. At the outbreak of the Civil war he was decidedly in favor of the supremacy of the constitution, and as governor showed conspicuous energy and ability in raising troops. He was elected governor again in 1862, but was defeated for this office in 1864. In 1868 he was the Democratic nominee for the presidency, but was defeated by Gen. Grant. As an orator Mr. Seymour was easy, agreeable and powerful, rising often into true eloquence. He died February 12, 1886.

**Sfax** (sfäks), a town on the east coast of Tunis, situated in the midst of fruit gardens. It is surrounded by walls and bastions, and has a strong citadel. It exports large quantities of fruit, wool, sponges, alfa, etc. Sfax was captured by the French after a two days' bombardment, on July 16, 1881. Pop. (1906) 50,000.

1906, was defeated in a contest for parliament, and in 1907 organized an Antarctic expedition under his own leadership, in the steamer *Nimrod*. On October 29, 1908, he headed a sieging party journeying over the ice towards the South Pole. On January 16, 1909, they reached much the greatest southing made to that time, a point 111 miles from the pole, the elevation being 11,600 feet above sea-level. Parties from the same expedition ascended Mount Erebus and reached the South Magnetic Pole, fixing its location at 72° 25' s. lat., 155° 16' e. lon. He made a third expedition to the south polar region in 1915, for geographical research, but his ship was sunk by the ice and he, with part of his crew, narrowly escaped. Ten who were left behind were rescued by him in 1917. In honor of his exploits he was knighted by the British government.

**Shad**, a name of several fishes, of the family Clupeidae or herrings, and



Shad.

**Sforza** (sfort'sä), a celebrated Italian house, which played an important part in the fifteenth and sixteenth centuries, gave six rulers to Milan, and formed alliances with most of the princely houses of Europe.

**Shackleton** (shak'el-tun), ERNEST HENRY, polar explorer, was born in Ireland in 1869; attended Dulwich College in 1886, but left before completing his course, following a natural inclination to go to sea. He circumnavigated the world four times, and during the South African war took part in the transportation of troops. In 1901 he sailed in Captain Scott's Antarctic expedition, and was a member of the party which advanced farthest in the direction of the pole. Returning home, he was for a time secretary to the Scottish Geographical Society, but resigned in

including two European species, the common or allice shad (*Clupea alosa*) and the twaite shad (*C. finta*), and one American species (*C. sapidissima*). 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. The form of the shad is the same as that of the other herrings, but it is of larger size, and in some places receives the name of 'herring king.' Its color is a dark blue above, with brown and greenish lusters, the under parts being white. The twaite shad is about a half less than the allice species and weighs on an average about 2 pounds. The American species of shad, varies in weight from 4 to 12 pounds, and is highly esteemed for food, it being one of the most savory of food fishes. It is consumed in great quantities in the fresh

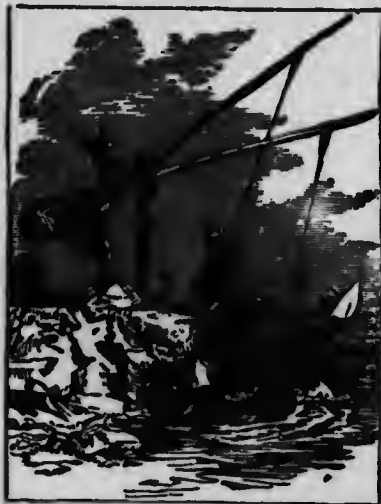
## Shad-bush

state, being taken in nets during its ascent of the rivers. Shad are found all along the coast from New England to the Gulf of Mexico, and have been successfully introduced on the Pacific coast.

**Shad-bush.** See *June-berry*.

**Shaddock** (shad'uk; *Citrus decumana*), sometimes called *pompelmoose*, a large species of orange, attaining the diameter of 7 or 8 inches, with a white, thick, spongy, and bitter rind, and a red or white pulp of a sweet taste, mingled with acidity. It is a native of China and Japan, and was brought to the West Indies by a Captain Shaddock, from whom it has derived its name. Under the name of grape fruit it is now a favorite relish on American tables.

**Shadoof**, SHADUF (sha-döf'), a contrivance extensively employed in Egypt for raising water from the Nile for the purpose of irrigation.



Raising water by Shadoofs.

It consists of a long stout rod suspended on a frame at about one-fifth of its length from the end. The short end is weighted so as to serve as the counterpoise of a lever, and from the long end a bucket of leather or earthenware is suspended by a rope. The worker dips the bucket in the river, and aided by the counterpoise weight, empties it into a hole dug on the bank, from which a runnel conducts the water to the lands to be irrigated. Sometimes two shadoofs are employed side by side. When the waters of the river are low two or more shadoofs are employed, the one above the other. The lowest lifts the water from the river and empties it into a hole on the bank, a second dips into this hole, and empties the

water into a hole higher up, and a third dips into the hole just below, and empties the water at the top of the bank, whence it is conveyed by a channel to its destination.

**Shadow** (shad'ö), the figure of a body projected on the ground, etc., by the interception of light. *Shadow*, in optics, may be defined a portion of space from which light is intercepted by an opaque body. Every opaque object upon which light falls is accompanied with a shadow on the side opposite to the luminous body, and the shadow appears more intense in proportion as the illumination is stronger. An opaque object illuminated by the sun, or any other source of light which is not a single point, must have an infinite number of shadows, though not distinguishable from each other, and hence the shadow of an opaque body received on a plane is always accompanied by a *penumbra*, or partial shadow, the complete shadow being called the *umbra*. See also *Penumbra*.

**Shadwell** (shad'wei), THOMAS, an English dramatic poet, born at Stanton Hall, Norfolk, in 1640, educated at Cambridge, studied the law for some time at the Middle Temple, and then visited the Continent. On the recommendation of the Earl of Dorset he was created poet-laureate in the place of Dryden, whose bitter enmity against Shadwell found expression in his severe satire of Mac Flecknoe. He died in 1692, in consequence, it is supposed, of taking too large a dose of opium. Although coarse, his comedies are not destitute of genuine humor.

**Shafter** (shaf'ter), WILLIAM RYFUS, soldier, was born at Galesburg, Michigan, October 16, 1833. He entered the Union army as lieutenant of volunteers in 1861, remained in it through the Civil war, and was mustered out as brevet brigadier-general in 1865. In the following year he entered the regular army as lieutenant-colonel, was promoted colonel in 1879, and brigadier-general in 1897, in charge of the department of California. On May 4, 1898, he was placed in charge of the army of invasion of Cuba, and conducted the operations against Santiago until the surrender of the Spanish forces. He subsequently returned to the department of California, and died November 12, 1906.

**Shaftesbury** (shäfts'bur-i), ANTHONY ASHLEY COOPER, FIRST EARL OF, was born at Wimborne St. Giles's, in Dorsetshire, in 1621, and succeeded to a baronetcy on the death of his father in 1631. After leaving Exeter College, Oxford, he studied law at Lin-

coln's Inn, and was chosen representative for Tewkesbury in 1640. At the commencement of the Civil war he supported the royal cause, but advised mutual concession. Finding that in consequence of this opinion he was distrusted by the court he joined the parliament, and received command of its forces in Dorsetshire. When Cromwell turned out the Long Parliament, Sir Anthony was one of the members of the convention which succeeded, nevertheless he signed the protestation charging the protector with arbitrary government, which did not, however, prevent him from becoming one of his privy-council. After the deposition of Richard Cromwell he aided the restoration of Charles II with all his influence, and in 1661 was created Baron Ashley, and appointed chancellor of the exchequer and a lord of the treasury. Yet he strongly opposed the Corporation Act (1661) and the Act of Uniformity (1662), both measures favored by the crown. He afterwards became a member of the obnoxious Cahal. In 1672 he was created Earl of Shaftesbury and lord high chancellor. His conduct on the bench was able and impartial, but he was deprived of office, probably through the influence of the Duke of York; and he at once became one of the most powerful leaders of the opposition. For his warmth in asserting that a prorogation of fifteen months amount to a dissolution of parliament he was confined in the Tower from Feb., 1677 to Feb., 1678. After his liberation he took a prominent part in the attacks on Catholics during the popish plot scare. In 1679 he became president of the council and the same year was instrumental in passing the Habeas Corpus Act. In 1681 he was indicted for high treason but acquitted. He entered into the plots of the Monmouth party and had to fly to Holland, where he died in 1683. He is the *Achitophel* of Dryden's famous satire.

**Shaftesbury**, ANTHONY ASHLEY COOPER, THIRD EARL or, grandson of the preceding, a celebrated philosophical and moral writer, was born at Exeter House, in London, in 1671; died at Naples in 1713. A few years before he died his works were collected and published under the title of *Characteristics of Men, Manners, Opinions and Times*.

**Shaftesbury**, ANTHONY ASHLEY COOPER, SEVENTH EARL or (1801-85), one of the great English philanthropists. Through the Factory Act of 1847 he reduced the hours of labor, and put a stop to the employment of boys in mines, and introduced many other reforms.

**Shag** (*Graculus cristatus*), a species of cormorant, also called the crested or green cormorant, from its dark-green plumage. Its average length is about 26 inches, and its nest, composed of roots and stalks of sea-weed lined with grass, is usually found on rocky ledges. The young birds have a brownish tint amid the green plumage, with brown and white under-surfaces.

**Shagreen** (sha-grēn'), a species of leather prepared without tanning, from horse, ass, and camel skin, the granular appearance of its surface being given by imbedding in it, whilst soft, the seeds of a species of plant, and afterwards shaving down the surface, and then by soaking causing the portions of the skin which had been indented by the seeds to swell up into relief. It is dyed with the green produced by the action of sal-ammoniac on copper filings. It is also made of the skins of the shark, sea-otter, seal, etc. It was formerly much used for watch, spectacle, and instrument cases.

**Shah** (shā); in Persian, signifies 'king.' The proper title of the king in Persia is *Shah-in-shah*, King of kings.

**Shah Jehān** (je-hān'), the fifth Mogul emperor of Delhi, reigned from 1627 to 1658, when he was deposed by his son Aurengzebe. During his reign the Mogul Empire attained a great magnificence; he founded Delhi, where he erected the celebrated peacock throne, valued at \$33,000,000; built the beautiful Taj Mahal at Agra, a mausoleum to his favorite wife, and several other buildings which have become architecturally famous. He died at Agra in 1666.

**Shahjehānpur** (shā-ju-hān'pūr), a town in India, in the Northwest Provinces, 95 miles northwest of Lucknow, in the executive district of the same name. There is a cantonment at the place, an American Methodist mission station with churches and schools; and sugar works in the neighborhood. Pop. 75,128.

**Shairp** (shārp), JOHN, poet and critic, born at Houstoun House, Linlithgow, in 1819; died in 1885. He was educated at Edinburgh Academy, Glasgow University and Balliol College, Oxford. After a term as assistant-master at Rugby he was appointed professor of humanity in the united College of St. Salvador and St. Leonards at St. Andrews in 1861, becoming principal in 1868. From 1871 he also held the chair of poetry at Oxford. His works consist of *Kilmahoe, a Highland Pastoral*, and



## Shakers

*other Poems* (1864); *Studies in Poetry and Philosophy* (1868); *Culture and Religion* (1870); *Poetic Interpretation of Nature* (1877); *Burns, in the Men of Letters Series* (1879); and *Aspects of Poetry* (1881).

**Shakers** (shā'kerz), or SHAKING QUAKERS, a sect which arose at Manchester, in England, about 1747, and was eventually transferred to the United States, where it now consists of a number of thriving families. The formal designation which they give themselves is the United Society of Believers in Christ's Second Appearing. That of Shakers was given them in ridicule, but is nevertheless passively accepted by them. The founder of the sect as it at present exists was Ann Lee, an expelled Quaker, born in Manchester in 1756. She went to America in 1774 with seven followers and formed the first settlement at Watervliet, near Albany. They agree with the Quakers in their objections to take oaths, their neglect of certain common courtesies of society, their rejection of the sacraments, etc. They believe in the immediate revelations of the Holy Ghost (gifts); maintain that the old law is abolished, the new dispensation begun; that intercourse between heaven and earth is restored; that God is king and governor; that the sin of Adam is atoned, and man made free from all errors except his own; that every human being will be saved; that the earth is heaven, now soiled and stained, but ready to be brightened by love and labor into its primeval state. At first the motions from which they derive their name were of the most violent, wild, and irregular nature—leaping, shouting, clapping their hands, etc.; but at present they move in a regular, uniform dance to the singing of a hymn, and march round the hall of worship, clapping their hands in regular time. The societies are divided into smaller communities called families, each of which has its own male and female head. Celibacy is enjoined upon all, and married persons on entering the community must live together as brother and sister. All property is held in common, and all bind themselves to take part in the family business—the men either as farmers, builders, gardeners, smiths, painters, or as followers of some other handicraft; and the women in some household occupation, or in the work of education. The membership at present is only about 500. A party of about 100 settled in the New Forest, Hampshire, about 1871, and were evicted for debt in the winter of 1874, when they suffered much from the severe weather. After

## Shakespeare

the death of their father, Mrs. Giring, the community dissolved.

**Shakespeare**, SHAKSPERE (shā'k-spér), WILLIAM, a famous poet and dramatist, was born in 1564, at Stratford-upon-Avon, a small town in Warwickshire, England. It is known (from the parish register of his birthplace) that he was baptized on the 26th of April, and from this it has been considered probable that he was born on 23d April. His father was John Shakespeare, a hurgess of Stratford, who combined his business as a butcher, a wool-stapler, and a Glover with dealings in timber and corn. His mother was Mary Arden, daughter of Robert Arden of Wilme-cote, a prosperous yeoman farmer. They had eight children (four sons and four daughters), of whom William was the



William Shakespeare, from monumental bust at Stratford-upon-Avon.

third. When the third son was born and for some time afterwards the family were prosperous, for we find that in 1568 John Shakespeare was high-bailiff of Stratford. From this fact it may safely be inferred that his son received the best education which the grammar-school of Stratford could give. How long the boy remained at school is not known, but it is assumed that he may have been withdrawn about his fourteenth year, owing to the difficulties which in 1578 had overtaken his father's financial affairs. Concerning his occupation after leaving school we are free to choose among the various traditions which report that he was apprenticed to a butcher, that he was for some time a schoolmaster, and



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**SHAKESPEARE AT THE COURT OF QUEEN ELIZABETH**

Two years after his removal to London, Shakespeare had attained such prominence as a dramatist and player that he was received at Court by Queen Elizabeth.

that he was a lawyer's clerk. Passing from conjecture, the first absolutely authentic event in Shakespeare's life is his marriage with Anne Hathaway, daughter of a yeoman in the hamlet of Shottery, near Stratford. The marriage bond is dated November 28, 1582, at which date Shakespeare was in his nineteenth year, while, from the date on her tombstone, it is known that his wife was eight years older. On the 26th of May following their first child, named Susanna, was baptized, and in February of 1585 a son and daughter were born, who received the names of Hamnet and Judith.

From this date until we find Shakespeare established in London as a player and dramatist there is a gap of seven years, during which we are again left to tradition and conjecture. To account for his leaving Stratford it has been suggested that his marriage with Anne Hathaway had proved unsuitable and unhappy, but there is no positive evidence in support of this belief. Then, again, there is the famous legend of the deer-stealing for which it is said he was prosecuted by Sir Thomas Lucy of Charlecote. In retaliation he wrote, according to Rowe, a satirical ballad which so enraged the baronet that Shakespeare thought it prudent to leave Stratford. The more probable reason is, that his increasing domestic responsibilities, together with the acquaintance he presumably had with the players from London who visited Stratford, induced him to push his fortune in the city. What was his occupation at the outset of his London life is also doubtful. Tradition has it that he tended the horses of those who rode to the plays, and with such success that he organized a company of youthful assistants who were known as Shakespeare's boys. There is probably little truth in this story. What is certain, however, is the fact that he soon became a well-known player and a dramatist of such distinction as to call forth an envious reference in 1592 from a fellow-dramatist. This is found in a Groat'sworth of Wit, written by Robert Greene, and published a few weeks after his death by Chettie. In this piece Greene describes a rival dramatist as 'an upstart crow beautified in our feathers, that, with his *tygre's heart wrapt in a player's hyde*, supposes he is as well able to bombast out a blank verse as the best of you, and being an absolute *Johannes fac totum*, is, in his own conceit, the only Shakscone in a country.' While this may certainly be accepted as having reference to Shakespeare, the supposed

allusion in Spenser's *Tears of the Muses* (1590-91) to Shakespeare as 'our pleasant Williy' is not easily established.

The first date in Shakespeare's life, after his arrival in London, which is settled by clear evidence is 1593. In that year he published his *Venus and Adonis*, with a dedication of this, 'the first heir of my invention,' to Henry Wriothesley, earl of Southampton; and in the following year he dedicated to the same patron his other poem of *The Rape of Lucrece*. As suggesting that this patronage was substantial in its nature, there is a story to the effect that the earl at one time gave Shakespeare £1000 to complete some purchase he had on hand. Whatever truth there may be in the story, it is certain that about this time Shakespeare began to grow in fortune and in fame. In the accounts of the treasurer of the chamber it is set down that he appeared, along with Burbage and other players, before Queen Elizabeth in the Christmastide of 1594. He must, also, at this period have been producing his earlier plays and thriftily accumulating the wealth which they were likely to bring. In connection with this increase of fortune it is noteworthy that the affairs of his father, John Shakespeare, seem also to have improved, for in 1596 he applied at the herald office for a grant of arms, which application was conceded in the following year. In 1596 Shakespeare's only son Hamnet died and was buried at Stratford, where the family continued to reside. The tradition is that Shakespeare visited his native town once a year during the time that he lived in London. However this may be, it is clear that his interest in Stratford was not founded entirely in sentiment or family affection, for we find that in 1597 he bought a substantial house called New Place for £60; and in a return of grain and malt he is described as the holder of ten quarters. There is also documentary evidence to prove that he was possessed of property in the parish of St. Helen's, Bishopsgate. That he was a man of some public importance in London is also indicated by a letter dated 1598, and still extant, in which Abraham Sturley suggests to Richard Quiney that by the friends of Mr. Shakespeare he might be helped to certain favors which they desired conferred on their native town of Stratford; and that the player and dramatist was a man able and likely to be generous with his friends is suggested by an extant letter in which this same Richard Quiney applies to Shakespeare for a loan of £30. While these things indicate the growth

of his material prosperity, we have proof that his fame as a lyrical poet and dramatist was also being securely established. For in 1598 there was published the *Palladis Tamia*, by Francis Meres, in which twelve of his plays are enumerated; and in which mention is made of his 'sugred sonnets among his private friends.' Yet, notwithstanding this literary activity, he was still a player, for when Jonson's comedy of *Every Man in his Humour* was produced in 1598, Shakespeare took part in the performance. In the following year we find that he was a shareholder in the Globe Theater, and his practical turn is still further evidenced by the fact that he bought (1602) 107 acres of arable land in the parish of Old Stratford for £320, and acquired (1605) for £440 the unexpired term of a lease of the tithes of Stratford, Old Stratford, Bishopton, and Welcombe. Along with these material possessions he received the style and title of William Shakespeare, Gentleman, of Stratford-on-Avon; but in London he was still a player in 1603, since we know that when Ben Jonson's play of *Sejanus* was produced in that year Shakespeare occupied a place in the list of actors. At what time he ceased to appear upon the stage is not known; we are even left in doubt when he ceased to live in London and retired to Stratford, though this was probably between the years 1610 and 1612. His father, John Shakespeare, had died in 1601; his elder daughter Susanna had married, in 1607, a practicing physician named John Hall; in the same year his brother Edmund, who was also a player, died in London and was buried in Southwark, the author of *Hamlet* paying twenty shillings for 'a forenoon knell of the great bell'; and in 1608 his mother, Mary Shakespeare, followed her husband to the grave. Of his life in Stratford after his return we have no information except doubtful stories and a few scraps of documentary evidence. The latter chiefly prove that he continued to retain a keen interest in the everyday facts of the world. Thus we find him, in 1611, subscribing towards the expenses of a Stratford road-bill in parliament; buying a house in Blackfriars, London, for £140; engaging in a chancery suit with reference to his tithes in Stratford; and opposing the inclosure of some common lands at Welcombe. In February, 1616, his younger daughter Judith married Thomas Quiney, a vintner of Stratford; on the 25th of the following month he executed his will; and in another month he was dead. The cause of his death is

unknown, but in Stratford there was a tradition 'that Shakespeare, Drayton, and Ben Jonson had a merry meeting, and, it seems, drank too hard, for Shakespeare died of a fever there contracted.' By his will he left the bulk of his property to Susanna Hall and her husband, his daughter Judith, his sister Joan, and his grandson, while a few friends and fellow-players were also remembered. To his wife he bequeathed specifically the 'second-best bed with the furniture'; for otherwise there would probably be ample provision made for her as a widow having right of dower in her husband's freehold property. He was buried in the chancel of Stratford church, on the north wall of which a monument, with bust and epitaph, was soon afterwards set up. The face of this bust, which may have been modeled from a cast taken after his death, was colored, the eyes being hazel, the beard and hair auburn. This bust, and the portrait engraved by Droeshout, prefixed to the first folio edition of his writings (1623), are the chief sources of our information regarding the appearance of the poet. There is also a death-mask dated 1616, and what is known as the Chandos portrait, which are interesting but not authoritative. As for his character, as estimated by his contemporaries, it found fit expression in the words of Ben Jonson. 'I loved the man,' he said, 'and do honour his memory on this side idolatry as much as any. He was indeed honest, and of an open and free nature, had an excellent phantasy, brave notions, and gentle expressions. Seven years afterwards (1623) his wife, Anne Hathaway, died. His daughter Judith, whose three children died in childhood, survived him until 1662, while his elder daughter, Susanna, died in 1649, leaving one daughter named Elizabeth. This grandchild of the poet's was married first to Mr. Thomas Nash of Stratford, and then to Sir John Barnard, but in 1670 she died childless, and thus the family of Shakespeare became extinct.

In classifying the plays of Shakespeare by the aid of such chronology as is possible, modern critics have found it instructive to divide his career as a dramatist into four marked successive stages. The first period (1588-93) marks the inexperience of the dramatist, and gives evidence of experiment in characterization, looseness in the construction of plot, with a certain symmetrical artificiality in the dialogue. To this stage belong:—*Titus Andronicus* (1588-90) and *part I Henry VI* (1590-91), both of which, it is thought, Shakespeare

merely retouched; *Love's Labour's Lost* (1590); *The Comedy of Errors* (1591); *The Two Gentlemen of Verona* (1592-93); *A Midsummer Night's Dream* (1593-94); *Parts II and III Henry VI* (1591-92), in which it is thought probable that Marlowe had a hand; and *King Richard III* (1593). The second period (1594 to 1601) is that in which, with increased security in his art, the dramatist sets forth his brilliant pageant of English history, his brightest conception of the comedy of life, and more than proves his capacity for deeper things by one great romantic tragedy. To this stage belong:—*King Richard II* (1594); *parts I and II Henry IV* (1597-98); *King Henry V* (1599); *King John* (1595); *Romeo and Juliet* (1596-97); *The Merchant of Venice* (1596); *Taming of the Shrew* (1597); *Merry Wives of Windsor* (1598); *Much Ado about Nothing* (1598); *As You Like It* (1599); and *Twelfth Night* (1600-01). The third period (1602-08) shows that the dramatist, having mastered all the resources of his art and tasted life to the full, is strangely fascinated by mortal mischance, so that even his comedy becomes bitter, while his tragedy is black with the darkest tempests of passionate human experience. To this stage in his development belong:—*All's Well that Ends Well* (1601-02); *Measure for Measure* (1603); *Troilus and Cressida* (1603); *Julius Caesar* (1601); *Hamlet* (1602); *Othello* (1604); *King Lear* (1605); *Macbeth* (1606); *Antony and Cleopatra* (1607); *Coriolanus* (1608); and *Timon of Athens* (1607-08). The fourth period (1609 to 1613) is that in which Shakespeare, after having passed through a season which was probably darkened by his own personal experiences, suddenly attained the glad serenity of mind which enabled him to write his last romantic plays. To this period belong:—*Pericles* (1608), which is only partly from Shakespeare's hand; *Cymbeline* (1609); *The Winter's Tale* (1610-11); *The Tempest* (1610); with (the doubtful) *Two Noble Kinsmen* (1612) and *King Henry VIII* (1612-13), which are partly by another writer, supposed to be Fletcher. Of non-dramatic pieces Shakespeare was the author of *Venus and Adonis* (1593), *The Rape of Lucrece* (1594), the *Sonnets* and *A Lover's Complaint* (1609); while it is agreed that only a few of the poems in the collection published under the name of *The Passionate Pilgrim* (1599) were written by him. *The Phoenix and the Turtle*, with Shakespeare's name appended, was

published as one of the poems in Chester's *Love's Martyr, or Rosalin's Complaint* (1601). The plays (of which there were eighteen, published singly in quarto form between the years 1597 and 1622) were mostly pirated, but a few were probably printed from the author's manuscripts. The first collected edition (the First Folio) was published in 1623, seven years after Shakespeare's death, by John Heminge and Henry Condell, who claim to be the 'friends and fellows' of the author. These editors depreciate the 'maimed and deformed' copies previously published, and declare that they are now offered 'cured and perfect,' while the eighteen plays not previously published are 'absolute in their numbers.' What is known as the Second Folio (1632) is a reprint of the former with conjectural emendations which are often misleading. The Third Folio (1664) contains seven additional plays, and the Fourth Folio (1685) was a reproduction of the third. The more important critical editions of Shakespeare's plays and complete works since published are as follows:—Nicholas Rowe, 7 vols. 8vo (1709); Alexander Pope, 7 vols. 4to (1723-25); Louis Theobald, 7 vols. 8vo (1733); Sir T. Hanmer, 6 vols. 4to (1743-44); Bishop Warburton, 8 vols. 8vo (1747); Samuel Johnson, 8 vols. 8vo (1765); E. Capell, 10 vols. 8vo (1767); Johnston and Steevens, 10 vols. 8vo (1773); E. Malone, first 'Variorum Edition,' 10 vols. 8vo (1790); Boswell, 'Variorum Edition,' 21 vols. 8vo (1821); S. W. Singer, 10 vols. 18mo (1826); C. Knight, 8 vols. 8vo (1838-43); J. P. Collier, 8 vols. 8vo (1841-44); J. O. Halliwell, 16 vols. folio (1853-65); N. Delius, 8 vols. 8vo (1854-65); A. Dyce, 6 vols. 8vo (1857); R. G. White (Boston), 12 vols. 8vo. (1857-60). Since then there have been innumerable editions in many languages. The contention that Bacon wrote the Shakespeare plays was first voiced in 1856 and has been revived from time to time, but the contention rests on slender basis and few scholars have been converted to the theory.

**Shale** (shāl), a term applied in geology to all argillaceous strata which possess to a greater or less degree the quality of splitting into layers parallel to the planes of deposition. It is the solidified mud of ancient waters, and is various in color and composition, the chief varieties being sandy, calcareous, purely argillaceous and carbonaceous. Shale is frequently found deposited between seams of coal, and commonly bears fossil impressions. The sub-variety



known as bituminous shale burns with flame, and yields an oil, mixed with paraffin, of great commercial importance. Shale also yields alum to a large extent.

**Shaler** (shā'ler), NATHANIEL SOUTHGATE, geologist, born in Campbell county, Kentucky, in 1841. He was graduated from Harvard College in 1862. He served in the Civil war, in 1868 became professor of paleontology in Harvard, and in 1887 professor of geology. He was also dean of the Lawrence Scientific School, and was director of the Kentucky geological survey, 1873-80. He published numerous works of a popular-science character, also seven volumes of geological reports and *Text Book of Geology*. Among his other works are *The Story of Our Continent*, *Domesticated Animals*, etc. He died April 10, 1906.

**Shalloon** (sha-iōn'), a light woollen stuff said to derive its name from *Châlons* in France, where it was originally manufactured.

**Shallop** (shai'up). This name is usually applied to a large boat with two masts and rigged like a schooner.

**Shallot** (sha-lot'), a plant, the *Allium ascalonicum*, a species of onion, the mildest cultivated. It is sufficiently hardy to endure the severest winters. The shallot is used to season soups and made dishes, and makes a good addition in sauces, salads and pickles.

**Shamanism** (sham'an-izm), a general name applied to the religions of a number of the nomad peoples of Northern Asia. The Shaman is a wizard priest who performs sacrifices and works magical spells. The worshippers believe in a Supreme Being, but to this they add the belief that the government of the world is in the hands of a number of secondary gods both benevolent and malevolent towards man, and that it is absolutely necessary to avert their malign influence by magic rites and spells.

**Shammai** (sham'a-i), a Jewish rabbi of whom little is known.

See *Hillel*.

**Shamokin** (sha-mō'kin), a borough of Northumberland Co., Pennsylvania, 19 miles S. E. of Sunbury. It is in a rich anthracite coal region, and ships coal largely. It has also iron and powder works, and important manufactures of silks, knit-goods, shirts, stockings and bricks. Pop. 19,588.

**Shamoy Leather** (sham'oi) a soft leather prepared from the skins of goats, deer and sheep (originally the chamols, whence

the name) by impregnating them with oil. This leather can be washed without losing its color, and is put to numerous uses.

**Shampooing** (sham-pō'ing), the name given in the East Indies to a process connected with bathing, in which the whole body is pressed and kneaded by the hands of the attendants. In this country it signifies manipulation of the scalp and hair.

**Shamrock** (sham'rok), the name commonly given to the national emblem of Ireland. It is a trefoil plant, generally supposed to be the plant called white clover (*Trifolium repens*), but some think it to be rather the wood-sorrel (*Oxalis Acetosella*). The plant sold in Dublin on St. Patrick's Day is the small yellow trefoil (*Trifolium minus*).

**Shamyl** (sham'il), a Caucasian chief, was born in the north of Daghestan in 1797; and died in 1871. He studied Arabian grammar and philosophy under the Mollah Jelal-eddin, and became a disciple of Kasi-Mollah, whose revival of Sufism had formed a bond of union among the tribes of Daghestan. In 1824 he joined Kasi-Mollah in the struggle which then broke out against the Russians. In this struggle he ultimately became the elected chief, and displayed unusual powers of leadership, continuing to resist the Russian power until 1859, when he was captured and taken to St. Petersburg. Here he was hospitably received by the czar, who provided him with a pension and a residence.

**Shanghai**, or SHANGHAI (shang-hi'), a large city and seaport of China, province of Kiangsoo, on the Woosung or Whangpoo, about 12 miles above its entrance into the estuary of the Yang-tsze-kiang. The Chinese city proper is inclosed within walls 24 feet high, the streets being narrow and dirty, and the buildings low, crowded, and for the most part unimportant. In 1843 Shanghai was opened as one of the five treaty ports, and an important foreign settlement is now established (with a separate government) outside the city walls. The Woosung here is about  $\frac{1}{2}$  mile wide, and increases to over 1 mile at its outlet into the Yang-tsze, at the port of Woosung. Along the bank of the river extends a wide 'bund' or quay, with a bulwark of stone and numerous stone jetties, for landing and loading cargo. In the foreign settlement there are a fine cathedral, municipal offices, hospitals, club-house, etc. A municipal council is elected by the English and Americans, and another by the French, whose quarter is sepa-

## Shannon

ately administered. The subjects and citizens of each nationality are under the protection of their respective consuls, and a complete judicial staff has been established, forming at Shanghai a supreme court, with jurisdiction over all British subjects in China and Japan. The Chinese authorities retain complete control over all shipping dues, duties on imports and exports, etc. Shanghai has water communication with about a third of China, and its trade since the opening of the port has become very extensive, the total of exports and imports together, native and foreign, amounting to more than \$200,000,000. The chief imports are cottons, yarns, woolens, and opium; and the exports, silk, tea, rice, and raw cotton. The largest part of the foreign trade is in the hands of British merchants. The foreign pop. is about 7000, and the native population is estimated at 650,000.

**Shannon** (shan'un), the largest river of Ireland, rises at the base of Cullcagh Mountain in County Cavan; flows s. w. and s., dividing Connaught from Leinster and Munster; and enters the Atlantic by a wide estuary; length about 250 miles. This estuary begins a little below Limerick, and is navigable by large vessels, while small craft ply nearly the whole length of the river. It is connected with the Royal Canal and the Grand Canal, which give a direct communication to Dublin, and also a communication south into the basins of the Barrow and Suir.

**Shanny** (shan'l; *Pholis laevis*), a small sea-fish allied to the blenny, and found under stones and seaweeds, where it lurks. By means of its pectoral fins it is able to crawl upon land, and when the tide ebbs will often creep upon shore until it finds a crevice wherein it can hide until the tide returns.

**Shansee** (shan'sé'), an inland province of Northern China, with an area of about 55,000 sq. miles, is the original seat of the Chinese people, and in its lowland parts is well cultivated. The rivers, which are almost all tributaries of the Yellow River (Hoang-Ho), are numerous, but not large. The chief grain crops are wheat and millet, and there are coal, iron, copper, and other minerals. The capital is Tae-yuen-foo. Pop. about 12,200,000.

**Shan States**, a number of small communities occupying a district N. of Siam and E. of Burmah, the boundary of which is not well defined. The area is estimated at about 70,000 sq. miles. Each state is governed by a chief and

a council; the nominal religion is Buddhism, and the practice of slavery is general. The people (Shans) have attained much proficiency in various handicrafts, and show great aptitude for trade. Pop. over 1,000,000.

**Shantung** (shan'tung'), a maritime province of China, on the Yellow Sea; area, about 65,000 square miles. The greater portion of this province is level. The chief river is the Yellow River or Hoang-Ho, which, after traversing the province in a northeast direction, flows into the Gulf of Pe-cheli. Wheat, millet, indigo, and silk are the chief products, and the manufactures include silk and hempen cloths, felt, etc. There are rich deposits of coal and iron, and gold, lead, and other minerals are found. It was in this province that Confucius was born. The capital is Tse-nan-foo, and the population is estimated at about 37,500,000.

**Shari** (shä're), a large river in Central Africa, which enters the southern side of Lake Tchad by several mouths after a course of about 700 miles from the southeast. See *Tchad*.

**Shark**, the general name for a group of elasmobranchiate fishes, celebrated for the size and voracity of many of the species. The form of the body is elongated, and the tail thick and fleshy. The mouth is large, and armed with several rows of compressed, sharp-



White Shark (*Carcharias vulgaris*).

edged, and sometimes serrated teeth. The skin is usually very rough, covered with a multitude of little osseous tubercles or placoid scales. They are the most formidable and voracious of all fishes, pursue other marine animals, and seem to care little whether their prey be living or dead. They often follow vessels for the sake of picking up any offal which may be thrown overboard, and man himself often becomes a victim to their rapacity. The sharks formed the genus *Squalus* of Linnaeus, which is now divided into several families, as the Carcharidae, or white sharks; Lamnidae, or basking sharks; Scymnidae, including the Greenland shark; Scyllidae, or dog-fishes, etc. The basking shark

(*Selache maxima*) is by far the largest species, sometimes attaining the length of 40 feet, but it has none of the ferocity of the others. The white shark (*Carcharias vulgaris*) is one of the most formidable and voracious of the species. It is rare on the northern coasts, but common in many of the warmer seas, reaching a length of over 30 feet. The hammer-headed sharks (*Zygana*), which are chiefly found in tropical seas, are very voracious, and often attack man.



Hammer-headed Shark (*Zygana mullous*).

They are noteworthy for the remarkable shape of their head, which resembles somewhat a double-headed hammer, the eyes being at the extremities. Other forms are the porbeagle, blue shark, fox shark, sea-fox, sea-ape or thresher, and Greenland or northern shark. The shark is oviparous or ovoviviparous, according to circumstances. See *Dog-fish*, *Porbeagle*, etc.

**Sharon** (shār'un), a borough of Mercer county, Pennsylvania, 41 miles s. w. of Meadville. Coal is largely mined in the vicinity, and there are large steel and iron works, foundries, machine shops and rolling mills, with other branches of iron-working industry; also saw, planing and flour mills. Pop. 15,270.

**Sharp**, in music, the sign (#) which, when placed on a line or space of the staff at the commencement of a movement, raises all the notes on that line or space or their octaves a semitone in pitch. When, in the course of the movement, it precedes a note, it has the same effect on it or its repetition, but only within the same bar.—**Double sharp**, a character (x) used in chromatic music, and which raises a note two semitones above its natural pitch.

**Sharp**, JAMES, a Scottish prelate, was born in the castle of Banff in

1613. He studied for the church at the University of Aberdeen, and was afterwards professor of philosophy at St. Andrew's. In 1660 he was sent by several leading Presbyterians on a mission to General Monk in favor of the Restoration, and the latter sent him to Breda to meet Charles II, after a conference with whom he went over to the Church of England. For this he was rewarded by being appointed professor of theology in St. Andrew's, and chaplain to the king of Scotland. In 1661 parliament met and established episcopacy, and he was shortly afterwards appointed archbishop of St. Andrew's. His persecutions of the Covenanters made him detested by that party, and in 1679 he was waylaid and murdered on Magus Moor, Fifeshire, by a party of his enemies headed by John Balfour of Burley.

**Sharp**, WILLIAM, a celebrated English line engraver, born at London in 1749; died in 1824. He first practiced as a writing engraver, but ultimately followed the higher branches of his art with great success. His merit was first recognized in connection with the engraving of Stothard's designs for the *Novelist's Magazine*, and his chief works of large size are from paintings by Copley, West, Reynolds, Raeburn, Stothard, Romney, Salvator Rosa, and Annibal Carracci.

**Sharp**, WILLIAM, a British writer, born in Renfrewshire in 1850. He was educated at Glasgow University, and published several volumes of poetry and biography, also *Wives in Exile*, *Silence Farm*, and other novels. He died Dec. 14, 1905, and after his death it became known that he had also written under the pen name of Fiona Macleod, supposed to be a separate writer. Under this name he wrote a number of novels, three volumes of Celtic tales, etc.

**Sharpe**, SAMUEL, a nephew of Rogers the poet, born in 1799; died in 1881. In addition to numerous biblical publications he was the author of a *History of Egypt*, *Chronology of Ancient Egypt*, and numerous works on hieroglyphics and Egyptian antiquities.

**Sharpsburg** (shärps'burg), a borough of Allegheny Co., Pennsylvania, on the Allegheny River, 5 miles N. E. of Pittsburgh. It has rolling mills, steel works, and manufactures of stoves, wire, paints, bricks, etc. There are petroleum and iron fields in its vicinity. Pop. 8153.

**Shasta**, MOUNT, a peak of volcanic origin in Siskiyou Co., California, at the north end of the Sierra

Nevada, 14,850 feet above sea-level. On its summit are three glaciers, one of which, the Whitney glacier, is 3 miles long. On its slopes are some gigantic trees over 300 feet high. The mountain is almost a perfect cone, and is a dormant volcano.

**Shastra** (shes'tra), or SHASTRA, a law or book of laws among the Hindus; applied particularly to a book containing the authorized institutes of religion, and considered of divine origin. It is also used in a wider sense of treatises containing the laws or institutes of the various arts and sciences.

**Shave-grass.** See *Equisetum*.

**Shaw** (shə), ALBERT, editor and author, was born at Shandon, Ohio, in 1857. He became a journalist, and in 1890 established the *American Review of Reviews*, which he has since edited. He is the author of numerous works, including *Icaria—a Chapter in the History of Communism*, *Coöperation in the Northwest*, *Municipal Government in Great Britain*, etc.

**Shaw**, ANNA HOWARD, an American suffragist, born at Newcastle-on-Tyne, England, February 14, 1847, came to America with her parents in 1851. She graduated from both the theological and medical departments of the University of Boston, and had several charges in the Methodist Church. In 1885 she resigned to become a lecturer on the suffrage platform, and in 1904 was chosen president of the National American Woman's Suffrage Association. Died July 2, 1919.

**Shaw**, GEORGE BERNARD (1856- ), a sayist and critic, born in Dublin, Ireland, in which city he passed the first twenty years of his life, removing to London in 1876. He left school when he was fifteen, and this ended his formal education. A clerkship was obtained for him in a real-estate office, but he resigned this after a short time and set himself to make a name and a place for himself in the literary world of London. For ten years he struggled, meeting with scant recognition, but during these years he became interested in Socialism, and was one of the founders of the Fabian Society. His knowledge of art and music made it possible for him to undertake the task of art critic for the *Pall Mall Gazette* and musical critic for the *Star*. Later he was dramatic critic for the *Saturday Review*. His work began to attract attention, and his novels, *An Unsocial Socialist* and *Cashel Byron's Profession*, received favorable comment.

His first play, *Widowers' Houses*, was Socialist propaganda. It was produced

in 1892. His second play, *Mrs. Warren's Profession*, was directed against the social evil and because of its unconventional frankness it was denounced as immoral. Shaw succeeded in shocking the British public, and throughout the rest of his life he rarely lost an opportunity to repeat the shocks, professing himself delighted when he heard himself described as a power for evil. Even during the great war he refused to allow himself to be caught up with the current thought, and his trouble-making proclivities found vent in a number of magazine articles wherein he attacked the government and hinted that England was not wholly guiltless so far as responsibility for the war was concerned. Shaw averred that he took great pleasure in laughing at society, and in time he was accepted as a humorist who was never quite serious even when he wrote or spoke about the most sacred things. His play, *Man and Superman*, is regarded as the clearest concrete expression of his philosophy of life. This play, like the many which he wrote, had a wide sale in book form. With its voluminous instruction to the players, its graphic description of the scenes, and its brilliant introductory pages, it is unique among published plays.

His plays, in addition to those mentioned, include: *Arms and the Man*, *Candida*, *You Never Can Tell*, *The Man of Destiny*, *The Devil's Disciple*, *Cæsar and Cleopatra*, *John Bull's Other Island*, *Fanny's First Play*, *Androcles and the Lion*. In 1916 he wrote *Augustus Does His Bit*, and in 1917 *Heartbreak House*. He has written various tracts on Socialism published by the Fabian Society, and is author of *Fabianism and the Empire* and *Fabianism and the Fiscal Question*.

**Shaw**, CHARLES GRAY (1871- ), an American educator and author, born at Elizabeth, N. J., educated at Cornell and New York Universities and Drew Theological Seminary. He studied philosophy at Jena and Berlin and was appointed Professor of Philosophy at New York University in 1899. Among his published works are *Christianity and Modern Culture*, *The Precinct of Religion*, *Schools of Philosophy* (in 'Science History of the Universe'), *The Value and Dignity of Human Life*, and *The Ego and Its Place in the World*.

**Shaw**, HARRIETT MCCREARY (1863- ), an American artist, born at Fayetteville, Arkansas, educated at the University of Arkansas and Denver School of Arts, in which latter institution she became an instructor. She was director of exhibits at the Woman's Building at the Seattle Exposition in 1909 and lectured extensively on fine arts. She re-



ceived the silver medal for ivory miniatures at the St. Louis Exposition, gold and silver medals for life portraits at the Seattle Exposition, and many other medals.

**Shaw, HENRY WHEELER** ('Josh Billings'), an American humorist, born at Lanesborough, Mass., in 1818. His humorous sketches, which he signed 'Josh Billings,' were written in a kind of phonetic spelling and attained wide popularity. For many years he was a contributor to the *New York Weekly*. He went on the lecture platform and met with instant success; his droll sayings and quaintness of utterance winning his audiences. He published *Every Boddy's Friend*, *Josh Billings' Complete Works*, *Josh Billings' Trump Cards*, and *Josh Billings' Spice Box*. He died at Monterey, Cal., in 1885.

**Shaw, JAMES BYRNIE** (1866- ), an American educator and mathematical expert, born at Remington, Ind. He was on the faculty of various colleges in Illinois and Michigan. From 1903 to 1910 he was professor of mathematics at the James Milliken University, Decatur, Ill., assistant professor and later associate professor of mathematics at the University of Illinois. He was a member of several mathematical societies in America, France and England.

**Shaw, JOHN BALCOLM** (1860- ), an American educator, author, and Presbyterian clergyman. He was born at Bellport, N. Y., and was graduated from Union Theological Seminary, New York, in 1888. He was pastor of the West End Church of New York from 1888 to 1904; of the Second Presbyterian Church, Chicago, from 1904 to 1913; and of Immanuel Church, Los Angeles, 1913-15. Subsequently he was president of Elmira College, New York. Author of *Four Great Questions*, *The Difficult Life*, *Life That Follows Life*, etc.

**Shaw, LESLIE MORTIMER** (1848- ), an American lawyer and cabinet officer, born at Morristown, Vt. He was graduated from Cornell College, Iowa, 1874, and practiced law in Denison, Iowa. Later he engaged in banking and became permanent chairman of the International Monetary Convention, Indianapolis. He was governor of Iowa for two terms, 1898-1902, and served as Secretary of the Treasury in the cabinet of President Roosevelt, 1902-07.

**Shaw, RICHARD NORMAN** (1831-1912), a Scottish artist and architect, born in Edinburgh and educated there. The New Scotland Yard, in London, is regarded as his finest achievement.

**Shawl** (shawl), an article of dress usually of a square or oblong shape, worn by both sexes in the East, but in the West chiefly by women. Some of the Eastern shawls, as those of Cashmere, are beautiful and costly fabrics. The usual materials in the manufacture of shawls are silk, cotton, hair or wool. Norwich and Paisley were long famed for their shawls made in imitation of those from India. The use of the shawl in America belongs almost entirely to the nineteenth century.

**Shawnee**, a city of Pottawatomie Co., Oklahoma, 30 miles E. S. E. of Oklahoma City. Its industries include cotton-gins, compresses, oil mills, machine shops, etc. Pop. 12,474.

**Shaya-root**. See *Chay-root*.

**Shay's Rebellion**, an outbreak in western Massachusetts in 1786, under the leadership of Daniel Shay, who had been an officer in the war of the Revolution. It was due to the poverty and exhaustion of the country after the war and the discontent against the Federal and State taxes. Worcester was seized, the higher courts were expelled, and an attempt made to capture the Federal arsenal. The insurgents were soon after attacked and dispersed and some of their leaders tried and condemned to death, but none were executed.

**Shea** (shé'a), the *Bassia butyracea* of botanists, is a native of tropical Asia and Africa. The trunk of this tree, when pierced, yields a copious milky juice, and *shea* or vegetable butter is found in the nuts when crushed. The latter are the size of a pigeon's egg, and each tree yields about a hushel. See *Bassia*.

**Sheading** (shé'ding), in the Isle of Man, a riding, tithing, or division in which there is a coroner or chief constable. The isle is divided into six sheadings.

**Shears** (shé'rz), a kind of large scissors, consisting of two movable blades with bevel edges for cutting cloth, etc. Sometimes, as in the shears used by furriers, weavers, etc., they are made of a single piece of steel bent round until the blades meet.

**Shear-tails** (*Thumastura*), a genus of humming-birds, of which the slender shear-tail (*T. enicura*) and Cora's shear-tail (*T. Cora*) are two familiar species. These birds occur, the former in Central America generally; the latter in Peru and in the Andes valleys. They derive their name from the elonga-

tion of the two central tail-feathers of the males.

**Shearwater**, the name of several marine birds of the genus *Puffinus*. The great shear-water (*P. cinereus*), which is 18 inches long, is found on the southwest coasts of England and Wales. They fly rapidly, skimming over the sea, from which they pick up small fishes, molluscs, etc. The name is sometimes applied to the scissor-bill or skimmer (*Rhynchops nigra*).

**Sheat-fish**, a name given to the fishes of the family Siluridae, of which the best-known species is the sly allurus or sheat-fish (*Silurus glanis*), found in the Swiss lakes, and in Eastern European rivers. See *Silurus*.

**Sheath** (shēth), in botany, a term applied to a petiole when it embraces the branch from which it springs, as in grasses; or to a rudimentary leaf which wraps round the stem on which it grows.

**Sheath-bill** (*Chiönis alba*), a bird belonging to the order Grallæ. They derive their name from the horny sheath which overlies the nostrils, and is continued back until it extends in a kind of hood, thickly feathered, covering the face. In appearance and flight they are not unlike pigeons, their plumage being dazlingly white. They inhabit the islands of the southern oceans, more especially Kerguelen's Island and the Crozets.

**Sheathing**, in naval architecture, is an external covering applied to the bottoms of wooden vessels to protect them from barnacles and other animal or vegetable parasites. Copper was for a long time the material frequently used, but various other metals have been recently tried, among the most successful being Muntz's metal.

**Sheave** (shēv), a grooved wheel in a block or pulley upon which the rope or chain works.

**Sheba** (shē'ba), anciently a region in the south of Arabia, whose queen paid a celebrated visit to Solomon.

**Sheboygan** (shē-bol'gan), a city of Wisconsin, capital of a county of the same name, is situated on the west shore of Lake Michigan, at the mouth of the Sheboygan river. It has a good harbor and a trade in wheat and lumber. Fish are caught and exported in large quantities. Manufactures are varied and extensive, chair making being the most important. There are also large tanneries, flour mills and an extensive furniture factory, enamelling works, stoneware works, and other industries. Pop. 26,398.

**Shechem** (shē'kem), an ancient city of Palestine, situated on the watershed between the Mediterranean and the Jordan, about 30 miles north of Jerusalem, and midway between Galilee and Judæa. In the New Testament narrative it has been identified with Sychar, and is now represented by Nablus. See *Nablus*.

**Shechinah** (she-ki'na), a term used by the Jews to indicate the cloud or visible representative of the divine presence between the cherubim of the mercy-seat of the tabernacle and afterwards of the temple of Solomon.

**Sheep**, a ruminant animal of the genus *Ovis*, family Capridæ, and nearly allied to the goat. It is one of the most useful animals to man, as its wool serves him for clothing, its skin is made into leather, its flesh is an excellent article of food, and its milk, which is thicker than that of cows, is used in some countries to make butter and cheese. The varieties of the domestic sheep (*Ovis aries*) are numerous, but it is not known from what wild species they were originally bred, although it is probable that the smaller short-tailed breeds with crescent-shaped horns are descended from the wild species known as the moufflon. The ordinary life of a sheep is from twelve to fifteen years; but it is usually fattened and sent to market at the age of two or three years unless its fleece be the object desired. The latter is shorn every year about the month of May. The chief English varieties of the sheep are the large Leicester, the Cotswold, the Southdown, the Cheviot, and the black-faced breeds. The Leicester comes early to maturity, attains a great size, although the mutton is not of the finest quality, and its fleece weighs from 7 to 8 lbs. The Cotswold breed, which has been improved by crossing with the Leicesters, has fine wool, and a fine grained mutton. The Southdowns are large, their wool is short, close, and curled, and the mutton is highly valued. The Cheviot is a hardier breed than any of the preceding; its wool is short, thick, and fine, while its mutton is of excellent quality. The black-faced breed is the hardest of all, its wool is long and coarse, and its mutton is considered the finest. The Merino variety of sheep originally belonged to Spain (where in summer they feed upon the elevated districts of Navarre, Biscay, and Aragon, and winter in the plains of Andalusia, New Castile, and Estremadura), but they are now reared in other parts of the continent, as also in Australia and New Zealand. In the United States nearly all the sheep

are of Merino origin, though the breeds have not been kept pure. Their wool is long and fine, but the mutton is of minor value. Of other breeds, which are numerous, mention may be made of the broad-tailed or fat-tailed sheep (*Ovis laticauda*), common in Asia and Egypt, and remarkable for its large tail, which is loaded with fat; the Iceland variety, which has sometimes three, four, or five horns; the fat-rumped sheep of Tartary; the Astrakhan or Bucharlan sheep, the wool of which is twisted in spiral curls of a fine quality; the Wallachian or Cretan sheep, which has long, large, spiral horns; and the Rocky Mountain sheep, a wild species, native to North America, and notable for its large horns. See *Argali*, *Bighorn*, *Mouflon*.

**Sheep Bot-fly.** See *Bot-fly*.

**Sheep-laurel**, a small North American shrub of the genus *Kalmia* (*K. angustifolia*). It is a favorite garden shrub, and receives its name from its leaves and shoots being hurtful to cattle. Called also *Lambkill*.

**Sheepshanks**, JOHN, art patron, born at Leeds, England, in 1787; died in 1863. In 1850 he presented his fine collection of paintings, etc., to the nation, and they are now in the South Kensington Museum. They comprise 233 oil-paintings and 103 sketches and drawings by the most eminent British artists of his time.

**Sheep's-head**, the name of a fish (*Sparus ovis*) caught on the shores of Connecticut and Long Island and southward as far as Florida. It is allied to the gilt-head and the bream, and is considered a delicious food. It receives its name from the resemblance of its head to that of a sheep.

**Sheep-tick**, a well-known dipterous insect (*Melophagus ovinus*) belonging to the family Hippoboscidae or horse-flies. The pupæ produced from the eggs are shining oval bodies which become attached to the wool of the sheep. From these issue the tick, which is horny, bristly, of a rusty ochraceous color, and wingless. It fixes its head in the skin of the sheep, and extracts the blood, leaving a large round tumor. Called also *sheep-louse*.

**Sheeraz.** See *Shiraz*.

**Sheerness** (*shēr-nēs'*), a seaport, dockyard, and garrison town of England, county of Kent, in the Isle of Sheppey, on the river Medway, at its junction with the Thames, 47 miles east of London by rail. The harbor is safe and commodious, and the fortifica-

tions, which are modern, are of immense strength. The admiralty dockyard employs a large number of men, and is principally utilized for repairs. Sheerness has large military and naval barrack accommodation. It has now become a favorite summer resort, as it has a fine beach and excellent facilities for bathing, etc. Pop. 17,494.

**Sheers** (*shērs*), a kind of apparatus for hoisting heavy weights, consisting of two or more poles erected in a mutually inclined position, and fastened together at the top, their lower ends being separated to form an extended base. The poles are steadied by guys, and from the top depends the necessary tackle for hoisting. Permanent sheers, worked by steam, are now used at loading wharfs in dockyards.

**Sheet** (*shēt*), a rope fastened to one or both the lower corners of a sail, to extend and retain it in a particular situation.

**Sheffield** (*shēf'fēid*), a borough of England, county of York (West Riding), situated on hilly ground at the junction of the Sheaf and Don, about 160 miles north of London by rail. The site of the town was originally confined to the angle formed by the Sheaf and Don, but it now extends along the slopes above these rivers and their tributaries, the Loxley, Rivelin, and Porter. In the central parts great improvements have recently been made in the crowded streets by the corporation, and the suburban districts are well built and picturesquely situated. The chief ecclesiastical building is the ancient parish church of St. Peter's in the Perpendicular style, and recently restored. Of educational and literary institutions there are the Free Grammar School, the Church of England Educational Institute, the University College, the Wesley College, Ransmoor College, the School of Art, the Free Library, and the St. George's Museum founded by Mr. Ruskin. Other important buildings are the Town Hall, the Cutlers' Hall, the Corn Exchange, the Music Hall, and the Albert Hall. There are numerous hospitals and charitable institutions. The town is well supplied with parks, chief of these being the Norfolk, Flrth, and Weston parks, the latter of which includes a museum and the Mappin Art Gallery. There is a fine botanical garden. The trade of Sheffield is chiefly connected with cutlery, for which it has long been famous, and the manufacture of all forms of steel, iron, and brass work. The steel manufacture includes armor plating, rails, engine castings, rifles, etc. There are also manu-

factures of engines, machinery, plated goods, Britannia-metal goods, optical instruments, stoves and grates, etc. Sheffield is supposed to have been originally a Roman station. Edward I granted it a charter as a market town in 1206, and there is indication in Chaucer's writings that the town was then noted for its cutlery. But it is only since the beginning of the last century that it has developed such importance as a manufacturing center. The chief modern event in its history was a terrible disaster in 1804, occasioned by the bursting of Bradford Reservoir. Pop. (1911) 454,653.

**Sheik** (shēk or shāk), a title of dignity properly belonging to the chiefs of the Arabic tribes, but now largely used among Moslems as a title of respect. The head of the Mohammedan monasteries, and the head man of a village, are sometimes called sheiks. The chief mufti at Constantinople is the Sheik-ul-Islam.

**Sheil** (shēl), RICHARD LALOR, an Irish political orator, born at Drumdowney, Tipperary, in 1791; died in 1851. He was educated at Stoneyhurst and at Trinity College, Dublin, and became a member of the Irish bar in 1814. Soon afterwards he produced a number of plays and wrote a series of papers called *Sketches of the Irish Bar*. Along with O'Connell he agitated for Catholic emancipation, and in 1831 he entered parliament as member for Louth, where he soon established his reputation as an orator. He was successively appointed vice-president of the board of trade (1839), judge advocate-general (1841), master of the mint (1846), and minister at Florence (1850).

**Shek'el**, a Jewish weight and in later times a coin. The weight is believed to have been about 218 or 220 grains troy, and the value of the silver coin 60 cents. There were also half-shekels coined both of silver and copper. A shekel (weight) of gold was worth \$9.10. The shekel of the sanctuary is supposed to have been originally worth double the common shekel.

**Shelbyville** (shel-bi-vil), city and the county seat of Shelby county, Indiana, on the Blue River, 26 miles S. E. of Indianapolis. The industries are furniture manufacture, flour, brick, lumber, etc. The principal buildings include a Carnegie Library, the City Hospital, Ford Sanitarium, courthouse, city hall and high school building. Pop. 9500.

**Shelbyville**, a city and the county seat of Shelby county, Kentucky, 30 miles E. of Louisville. It

has tobacco warehouses and grain elevators, and there is a large trade in cattle and horses. There is a fine courthouse and a library. Pop. 3412.

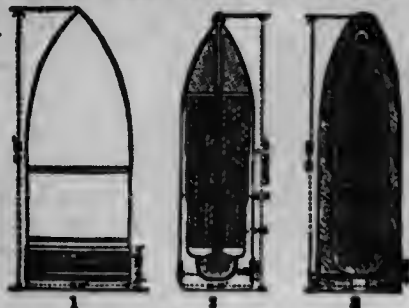
**Sheldrake** (shel'drāk), or SHEILDRAKE, the name given to two species of British ducks, namely, the common sheldrake (*Tadorna vulpanser* or *Anas tadorna*) and the ruddy sheldrake (*Casarca rutila*). They are sometimes called hurrow-ducks, from their habit of making their nests in rabbit-burrows.

**Shell**, the name applied to the external limy covering secreted by various groups of invertebrate animals, but restricted in a scientific sense to that form of exoskeleton secreted by the mantle of the mollusca. Thus the hard coverings of crabs, sea-urchins, lobsters, foraminifera, etc., are scientifically known as 'tests,' and are not to be regarded as true shells. The shell in mollusca grows with the growth of the animal, to which it affords protection. The shell or test of a crustacean does not grow after it has once been formed, but is cast and renewed from time to time. In its most elementary form the molluscan shell exists as simply a covering to the gills. Each separate piece is termed a valve. When the shell consists of one piece, as in whelks, limpets, etc., it is called a *univalve*; when in two pieces, as in oysters, mussels, etc., it is called a *bivalve*; and in the Chiton family of gasteropoda it is called, because of its eight pieces, a *multivalve*. In their chemical composition shells are usually composed of carbonate of lime, mixed with a small proportion of organic matter. (See *Mollusca*.) Shells are much used in ornamental manufactures. See *Cameo*, *Mother-of-pearl*.

**Shell**, a hollow projectile filled with a bursting charge of gunpowder or other explosive composition, and fitted with a fuse to fire it at the desired point. Shells are usually made of cast-iron or steel, and for mortars or smooth-bore cannon are spherical, but for rifled guns are as a rule elongated. There are many kinds of shells.—*Common shells* are simple hollow projectiles filled with powder. On explosion they act like a mine. They are very effective in breaching earthworks or masonry.—*Palliser shells* are made of mottled iron with pointed heads, nearly solid, and chilled white by being cast in iron molds. They are intended for use against armor-clad vessels; the chilled point, in virtue of its intense hardness and great crushing strength, penetrates to an extraordinary depth. *Steel shells* of similar power have also been made.—*Shrapnel shells* are shells filled with bullets, and with a small burst-



ing charge just sufficient to split the shell open and release the bullets at any given point.—*Segment shells* are of the nature of shrapnel. They contain iron segments built up round the inside of the shell. From their construction they are inclined



Shells.

1, Armor-piercing Steel Shell for 111-ton Gun. 2, Shrapnel for 111-ton Gun. 3, Common Shell for 111-ton Gun.

to spread much more than shrapnel on bursting, and they should consequently be fired to burst close to the object. With percussion fuzes great results are produced.

**Shelley** (shel'i), MARY WOLLSTONECRAFT, the second wife of the poet Shelley, was the daughter of William Godwin and Mary Wollstonecraft, and was born at London in 1797; died in 1851. She married Shelley in 1816, after having lived with him two years previously to the death of his first wife. Her romance of *Frankenstein*, which excited an immense sensation, was published in 1818, when she was twenty-one years' old. Left by her husband's death, in 1822, with two young children to support, she devoted herself for many years to literary composition, producing *Valperga*, *The Last Man*, and other works. In 1840-41 she edited Shelley's works, with preface and biographical notes.

**Shelley**, PERCY BYSSHE, born at Field Place, Horsham, Sussex, August 4, 1792, was the son of Sir Timothy Shelley, a landed proprietor of ancient family, and was educated at Sion House School, Brentford, at Eton, and at University College, Oxford. Of a delicate constitution, he was early characterized by an extreme sensibility and a lively imagination, and by a resolute resistance to authority, custom, and every form of what he considered tyranny. At Eton he put himself in opposition to the constituted authorities by refusing to submit to flogging. At Oxford, in his second year at the university, he published anonymously, apparently as a challenge to the

heads of the colleges, to whom it was sent, a scholastic thesis entitled *A Defense of Atheism*. The authorship being known, he was challenged, and refusing either to acknowledge or deny it was at once expelled. After leaving the university he completed his poem of *Queen Mab*, begun some time previously, and privately printed in 1813. His first great poem, *Alastor, or the Spirit of Solitude*, saw the light in 1816; and this was followed, in 1817, by the *Revolt of Islam*, a poem in the Spenserian stanza. In Sept. 1811, six months after his expulsion, he eloped to Edinburgh with Harriet Westbrook, the daughter of a retired innkeeper. She was sixteen years of age, his own age being nineteen. The marriage turned out unhappily, and after nearly three years of a wandering, unsettled life Mrs. Shelley returned with two children to her father's house. In Nov., 1816, she committed suicide by drowning. Shelley was deeply affected by this event, but soon after married Mary Godwin, with whom he had visited the continent in 1814, and by whom he already had a child. By a suit in chancery decided in 1817, Mr. Westbrook obtained the guardianship of the children, on the plea that his atheistical opinions and irregular views on marriage made the father unfit to be intrusted with them. Partly from his lungs being affected, and partly from anxiety lest he should be deprived of the children of his second marriage, Shelley left England finally in March, 1818, and the whole short remainder of his life was passed in Italy. After staying for some time with Lord Byron at Venice he proceeded to Naples; after Naples he visited Rome; and from Rome he went to Florence and Leghorn, and finally settled at Pisa. On July 8, 1821, he was sailing with a Mr. Williams in the Bay of Spezia when both were drowned by, as was long believed, the upsetting of the boat through a sudden squall; but there is some warrant for suspicion that the boat was purposely run down by an Italian felucca for the sake of plunder. According to the quarantine laws of Tuscany the bodies were burned, and the ashes of Shelley were deposited by his friends in the Protestant burying-ground of Rome. Apart from special causes of alienation, Shelley's poetry would never have been popular with the mass of readers, even although in strength of imagination and fertility of fancy, particularly in the power of impersonation, as well as in command of language and appreciation of the beautiful in poetic art, he has had few rivals. The most popular of his works are his minor poems, which ap-

peared from time to time along with his larger pieces, particularly the *Cloud* and the *Skylark*. His principal poems, besides those already mentioned, are *Rosalind and Helen* and *Julian and Maddalo* (the latter a poem recording some of his intercourse with Byron), produced in 1818; the *Cenci* and the *Prometheus Unbound*, in 1819; the *Witch of Atlas*, in 1820; and the *Epipsychidion*, the *Adonais* (an elegy on Keats), and the *Hellas*, in 1821. Many memoirs of Shelley have appeared, the best of which is the *Life* by Prof. Ed. Dowden, published in 1886.

**Shell-lac**, or SHELLAC. See *Lac*.

**Shem**, the eldest son of Noah, and ancestor of Abraham, who was the eighth in descent from him according to the genealogies in the book of Genesis.

**Shemakha** (she'má-ká), a town of Russia, in Transcaucasia, about 70 miles northwest of Baku. In recent times it has suffered severely from earthquakes. Silk manufacture is the principal industry. Pop. 20,008.

**Shemitic Languages.** See *Semitic Languages*.

**Shenandoah** (shen-an-dō'á), a borough of Schuylkill county, Pennsylvania, 12 miles N. of Pottsville. It is in one of the most productive anthracite coal regions, and has large collieries, dynamite works, etc. Pop. 25,774.

**Shenandoah**, a river which flows northeast through the valley of Virginia, and immediately below Harper's Ferry joins the Potomac, of which it is the principal tributary. Its length is 170 miles, the greater part of which is navigable for boats. The valley of the Shenandoah was the scene of numerous military operations in the American Civil war, and was devastated by General Sheridan in 1864.

**Shendy** (shen'di), a town of Nubia, on the Nile, between Berber and Khartum, is a depôt for the caravan traffic with Kordofan. From Shendy light-draught steamers can pass readily to Khartum. Pop. 6000.

**Shen-se** (shen'sē), a province of China, bounded on the north by the Great Wall, and on the east by the Yellow River; area, about 70,000 sq. miles. It is purely an agricultural province. From Se-gan Foo, the provincial capital, and anciently the capital of the empire, radiate a number of roads going east, south, and west, and Shen-se is the great channel of communication between China and Central Asia. Pop. about 9,000,000.

**Shenstone** (shen'stōn), WILLIAM, an English poet, was born at Leasowes, in the parish of Halesowen, Worcestershire, in 1714, studied at Pembroke College, Oxford, and passed his life in retirement on his small paternal estate of Leasowes, beautifying it, and writing odes, elegies, ballads, and pastorals, which had considerable popularity. He now holds his place in literature chiefly by his *Pastoral Ballads* and his *Schoolmistress*, in the Spenserian stanza, published in 1742. He died in 1763.

**Sheol** (shé'ól), a Hebrew word frequently occurring in the Old Testament, and rendered in the Septuagint by 'hades,' in the Authorized Version by 'grave,' 'pit,' and 'hell,' but in the Revised Bible of 1885 never, except in one instance, by the last term. It was, as originally conceived, the gloomy under-world, the abode of the ghosts or spirits of the dead. No retributive idea was connected with it until the time of the exile. See *Hell*.

**Shepherd Kings.** (shep'erd). See *Hycos*.

**Shepherd's Dog**, a variety of dog employed by shepherds to assist in tending the flocks, remarkable for its intelligence and usefulness. It is generally of large size, and of powerful, lithe build. The tail is inclined to be long, and possesses a bushy fringe. The muzzle is notably sharp. The eyes are large and bright. The limbs are strongly made, and the whole frame betokens an adaptation to an open, outdoor life. Of all strains of shepherd's dog the Scotch collie or colley is the most celebrated. See *Collie*.

**Shepherd's Purse** (*Capsella bursa pastóris*), a plant of the nat. order Cruciferae. It is an annual weed, found in all temperate climates, having simple or cut leaves and small white flowers. It is found everywhere, in fields, pastures and roadsides.

**Sheppey** (shep'pi), an island of England, in the county of Kent, at the mouth of the Thames, between the estuaries of the Medway and the Swale. It is 9 miles long and 5 broad, is rich and fertile, and contains the town of Sheerness.

**Shepton-Mallet** (shep'tun mal'et), a town of England, in Somersetshire, 4½ miles east of Wells. It has a remarkably handsome market-cross, erected about 300 years ago, and a church with a fine tower 120 feet high. The manufactures comprise silk, velvet, crape, ribbons, etc., but brewing is now the principal industry. Pop. 5011.

**Sheraton**, a style of furniture, designed by Thomas Sheraton (1751-1806), next to Chippendale the most famous English cabinet-maker. Some of his earlier designs are full of grace and delicacy, but the later ones are spoiled by too elaborate ornament. He borrowed and adapted extensively, but the slender forms and swan-necked pediments were his own invention, and the delicate inlay, the occasional slight carving in low relief and the painted enrichments gave his work a delicate and appealing beauty.

**Sherborne** (sher'burn), a town of England, in Dorsetshire, 18 miles N. N. W. from Dorchester. It is a place of great antiquity, having been the seat of a bishopric from 705 till 1078. The church of the ancient abbey, founded in 998, is one of the finest minsters in the south and west of England. There are here also ruins of a castle, dating from the time of Stephen. Pop. 5954.

**Sherbrooke** (sher'brook), a city of Quebec province, Canada, capital of a county of same name, 100 miles E. of Montreal, on both sides of the river Magog. It is a flourishing place, with manufactures of tweeds and various other articles, for which its extensive water-power is utilized. Pop. 18,000.

**Sherbrooke**, ROBERT LOWE, Viscount, was born at Bingham in 1811, and educated at Winchester and Oxford. In 1842 he was called to the bar, and the same year emigrated to Australia. He returned to England in 1851, and in 1852 was elected to Parliament. He was chancellor of the exchequer 1868-73, in 1873 succeeded Mr. Bruce at the Home Office, and in 1874, went out of office with his party. On the return of the Liberals in 1880, he was raised to the peerage with the title of Viscount Sherbrooke. His *Poems* appeared in 1885. He died July 27, 1892.

**Shere Ali Khan** (shēr a'ls kân), Amir of Afghanistan, was born about 1823, and succeeded his father, Dost Mohammed, in 1863. During the earlier part of his reign he passed through many vicissitudes, but in 1868 he was fully established on the throne of Kabul. In 1869 he entered into friendly relations with the Indian government. These friendly relations continued till 1878, when a Russian mission was received with honor at Kabul, while shortly afterwards permission was refused for a British mission to cross the frontier. Thereupon the British invaded Afghanistan and took possession of the Khaiber Pass and the Kuram Valley. Shere Ali fled from

Kabul, accompanied by the members of the Russian mission, and in 1879 died, a fugitive, in Afghan Turkistan. He was succeeded by his second son, Yakub Khan, who, however, on account of the Cavagnari massacre, was speedily deposed and deported to India, and was succeeded by his cousin, Abdur Rahman Khan, in 1880.

**Sheridan** (sher'i-dan), PHILIP HENRY, the greatest cavalry leader produced by the American Civil war, was born in Albany, New York, March 6, 1831, was graduated from the Military Academy, West Point, in 1853, and from 1855 to 1861 served on the frontiers of Texas and Oregon. At the outbreak of the Civil war he was a captain in the 13th Infantry. Having greatly distinguished himself in the earlier battles of the war, in April, 1864, Grant appointed him chief of cavalry of the Army of the Potomac, and he made several daring cavalry raids towards Richmond. In August he took command in the Shenandoah Valley, where General Early was present with a Confederate army. Several battles took place between them, the most striking being that in which he rode from Winchester to Cedar Creek, a distance of 20 miles, and turned a Federal defeat into a brilliant victory. This feat is known as 'Sheridan's Ride.' During the final advance upon Richmond he was Grant's right-hand man; he fought the battle of Five Forks, which necessitated Lee's evacuation of Richmond and Petersburg; and as Lee fled he constantly harassed and attacked him, and by occupying his line of retreat compelled his surrender at Appomattox Court-house, April 9, 1865. After the war he held various military commands. In March, 1869, he was raised to the rank of lieutenant-general, and in February, 1883, on the retirement of Sherman, he succeeded to the command of the army and on June 1, 1888, while suffering from a fatal illness, he was given the supreme rank of general. He died August 5, 1888. An account of his military career, written by himself, appeared in 1889.

**Sheridan**, RICHARD BRINSLEY BUTLER, was born at Dublin, Ireland, in 1751, his father being Thomas Sheridan. (See *Sheridan, Thomas*). He was sent for a short time to a school in Dublin, and in 1762 to Harrow, where he did not distinguish himself. In 1772 he eloped to France with Miss Linley, a young singer of great beauty and accomplishments. Shortly before his marriage he had entered at the Middle Temple, but his studies were prosecuted with little assiduity, and he was never called to the

bar. Without means or a profession, he applied himself to composition for the stage, and on January 17, 1776, brought out *The Rivals*, which, after a temporary failure from bad acting, attained a brilliant success. On Nov. 21 he produced the comic opera, *The Duenna*, which had a run of seventy-five nights, an unprecedented success. In 1776 he managed to find money to become one of the proprietors of Drury Lane Theater, where, in 1777, appeared *The School for Scandal*, his most famous comedy, and in 1779 *The Critic*, a farce, which like *The Duenna* and *The School for Scandal* was a model of its kind, and shared in their brilliant success. His dramatic reputation, and especially his social gifts, brought him into intimacy with Fox, Burke, Windham, and other Whig leaders, and in 1780 Fox got him returned to parliament for Stafford. In 1782 he became under-secretary of state; in 1783 secretary of the treasury; in 1806 treasurer of the navy and privy-councilor. He never became a statesman, but his fame soon rose high as an orator. His greatest effort was his 'Begum' speech on the impeachment of Warren Hastings (1787), which Pitt said 'surpassed all the eloquence of ancient and modern times.' His wife died in 1792. In 1795 he married Miss Ogle, a daughter of the Dean of Winchester, with whom he received a considerable accession of means. He was on terms of intimacy with the Prince of Wales (afterwards George IV), which did not improve his naturally dissolute and extravagant habits. His parliamentary career ended in 1812, and the remainder of his life was constantly harassed by debt and disappointment. He died in 1816, having narrowly escaped arrest for debt on his death-bed. Sheridan's plays are especially distinguished for their wit, which, though brilliant, is easy and natural. In plot and character there is little originality, but admirable selection. His wit was polished and refined, and what he borrowed was at least brilliantly set.

**Sheridan**, a city, capital of Sheridan Co., Wyoming, 30 miles from the Montana State line; surrounded by rich coal and agricultural and cattle-raising country; with brewery, iron works, etc. Pop. 10,000.

**Sheridan**, THOMAS, grandfather of R. B. Sheridan, was born in 1694; died in 1738. He was a close friend and confidant of Swift, and was noted for his learning and eccentricities. He wrote the *Art of Punning*, and published an edition of Persius.—His son, THOMAS, father of the dramatist, born 1721; died 1788, was educated at West-

minster School and Trinity College, Dublin. He became an actor and teacher of elocution, and published a *Plan of Education*, *Life of Swift*, and a *Dictionary of the English Language*.—His wife, FRANCES CHAMBERLAINE (1724-86), was the author of two novels, *Sidney Biddulph* and *Nourjahad*; and two plays, *The Discovery* and *The Dupe*.

**Sherif** (she-réf'), an Arabic title equivalent to noble, borne by the descendants of Mohammed. It 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. The title is applied specifically to the chief magistrate of Mecca.

**Sheriff** (sher'if), in England, the chief officer of the crown in every county, appointed annually. The office is one of great antiquity, and originally conferred higher powers than at present. The custody of the county is committed to the sheriff by letters-patent, and he has charge of all the business of the crown therein. During his tenure of office he takes precedence within the county of any nobleman, and is entitled to sit on the bench with the justices of assize. The person appointed is bound under a penalty to accept the office, except in specified cases of exemption or disability, but a person who has served one year is not liable to serve again till after an interval of three years if there be another sufficient person in the county. The sheriff is specially intrusted with the execution of the laws and the preservation of the peace, and for this purpose he has at his disposal the whole civil force of the county—in old legal phraseology, the *posse comitatus*. The most ordinary of his functions, such as the execution of writs, he performs by a deputy called under-sheriff, while he himself only performs in person those duties which are either purely honorary, such as attendance upon the judges on circuit, or which are of some dignity and public importance, such as presiding over elections and holding county meetings, which he may call at any time. Since the time of Henry I the Liverymen of London have, on Midsummer Day, elected two sheriffs, who have been jointly sheriff of Middlesex, but by the Local Government Act of 1888 it is provided that while the city of London may continue a separate county, with its own sheriffs, these shall no longer be jointly sheriff of Middlesex, and that the county of London shall have a sheriff of its own. The office of sheriff was formerly hereditary in some counties, and continued so in Westmoreland



till the death of the last hereditary sheriff, the Earl of Thanet, in 1849. In the United States the sheriff is an elective official, with very different position and duties. He does not hold the position of a judge at all, but acts as the highest peace officer of his county, having to pursue and arrest criminals, to carry out sentences, to take charge of the jail, etc.

**Sherlock** (sher'lok), THOMAS, Bishop of London, the son of Dr. Wm. Sherlock, dean of St. Paul's, was born in London in 1678, was educated at Catharine Hall, Cambridge, and succeeded his father as master of the Temple in 1704. In 1728 he was appointed to the see of Bangor; in 1734 he was translated to the see of Salisbury; and in 1748 (having refused the primacy) to the see of London, where he remained till his death in 1761. He was the author of several controversial works on Christian evidences, including *The Use and Intent of Prophecy* (1725), *The Trial of the Witnesses of the Resurrection of Jesus* (1729), and published four volumes of his discourses at the Temple Church (1754-58), which gained him a high reputation as a pulpit orator.

**Sherlock**, WILLIAM, Dean of St. Paul's, was born in Southwark, 1641, studied at Eton and at Peterhouse, Cambridge; became rector of St. George, Botolph Lane, London, in 1669; prebendary of St. Paul's, 1681; master of the Temple, 1684; and dean of St. Paul's, 1691. At first he refused the oaths to William and Mary, but subsequently took them. He was the author of numerous theological and controversial works, including a *Practical Discourse Concerning Death* (1690); a *Vindication of the Doctrine of the Trinity* (1691), being a reply to Dr. South; and a *Treatise on the Immortality of the Soul* (1704). He died at Hampstead in 1707.

**Sherman** (sher'man), a city, capital of Grayson county, Texas, 64 miles N. of Dallas. It is the center of a cotton and grain district and has manufactures of iron, cotton, cotton-seed oil and flour. It is the seat of several collegiate institutions. Pop. 12,412.

**Sherman**, JAMES SCHOOLCRAFT, Vice-President of United States, was born in Utica, New York, October 24, 1855. He was admitted to the bar in 1880, and became prominent in politics, being made mayor of Utica and elected to Congress in 1887. Here he became an active advocate of Republican measures, gained a leading position in his party, and in 1908 was elected on the William H. Taft ticket for the office of Vice-President. He was renominated in

1912, but died October 30, before the election.

**Sherman**, JOHN, statesman, born in Lancaster, Ohio, in May, 1823; admitted to the bar in 1844. In 1855 he was elected to Congress. As a ready and forcible speaker he was an acknowledged power from the first. He grew rapidly in reputation as a debater, and in 1861 was elected United States Senator. He rendered valuable services in strengthening the public credit, and in 1860 was one of the authors of the bill for the reconstruction of the seceded States. He was appointed Secretary of the Treasury in 1877, and secured the resumption of specie payment. In 1883 he was again Senator and remained in the Senate until 1897, when he entered McKinley's cabinet as Secretary of State. He retired in 1898, on the outbreak of war with Spain, and died Nov. 22, 1900.

**Sherman**, WILLIAM TECUMSEH, brother of the preceding, was born at Lancaster, Ohio, Feb. 8, 1820, was graduated from the military academy at West Point, in 1840, and served in Florida, Mexico, and elsewhere till 1853, when he resigned his commission. On the breaking out of the Civil war he became a lieutenant in the 4th Regiment Infantry, and May 14, 1861, was appointed colonel of the 13th Regiment. He was present at the battle of Bull Run, greatly distinguished himself at Shiloh, and subsequently took a prominent part in the operations under Grant around Vicksburg and Memphis. In March, 1864, he succeeded Grant as commander of the military division of the Mississippi, and at the beginning of May, simultaneously with Grant's advance in the east, he entered upon his invasion of Georgia. On September 1, after a number of battles, in which he displayed fine powers of strategy, he received the capitulation of Atlanta, and on the 14th of November began his famous 'march through Georgia,' which ended in the occupation of Savannah. Then turning northwards into the Carolinas and fighting more battles, he received the surrender of General J. E. Johnston, at Durham station, April 26, 1865, a surrender which brought the war to a close. Sherman was made a major-general in August, 1864, lieutenant-general in July, 1866, and general and commander-in-chief in March, 1869. He was retired in 1884. Died Feb. 14, 1891.

**Sherman**, ROGER, was born in Massachusetts in 1721. He was a member of Congress from 1774 till his death; a member of the committee of five appointed to draft the Declaration of Independence; a member of the boards



of war and ordnance; one of the committee to draw the Articles of Confederation, and a member of the Constitutional Convention of 1787. He was elected a member of the first United States Senate, and served from 1791 to 1793, dying in the latter year. He had remarkable influence in the revolutionary struggle.

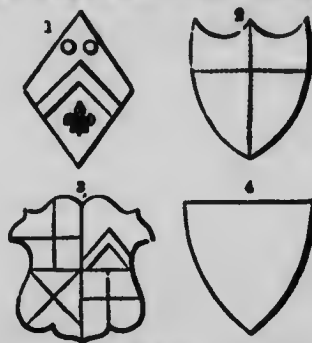
**Sherman Act**, THE, was passed by the 51st Congress, and approved by President Harrison on July 14, 1890. It was in the nature of a compromise between the Senate and House, the Senate having voted for free coinage of silver, while a majority of the House was opposed to it. The compromise measure, as offered by Senator Sherman, provided for the purchase by the secretary of the treasury of 4,500,000 fine ounces of silver bullion monthly, and for the coinage of silver dollars at the rate of two millions per month until July 1, 1901. The act, after prolonged debate, was repealed, Nov. 1, 1903, in extra session of Congress convened by President Cleveland for that purpose. The silver in the treasury when the act was repealed was 139,406,257 ounces, costing \$125,888,929. Another Sherman act, like the one described due to John Sherman, had for its purpose the regulation of Trusts, or business combinations, and the preservation of competition. Upon it were based the legal proceedings against Trusts which have recently attracted great attention and led to the dissolution of some of the great illegal combinations. See *Trust*.

**Shetland** (shet'land), or ZETLAND, an insular county of Scotland, about 50 miles N. E. of Orkney; area, 551 sq. miles. It consists of about ninety islands and islets, of which twenty-nine are inhabited, the largest, Mainland, comprising about three-fourths of the total area. The coasts are generally bold and precipitous, presenting cliffs broken into the most rugged and fantastic forms, and attaining in Foula the height of 1200 feet above the sea. Their deep creeks and sounds form a succession of noble natural harbors. The Shetland pony is well known, and is not surpassed by any horse of its dimensions for strength and hardihood. The herring-fisheries are very valuable. The only town is Lerwick. Pop. of county, 28,166.

**Shiel** (shēl), LOCH, a fresh-water lake in Scotland, on the boundary between Inverness-shire and Argyleshire. It is about 15 miles long, but extremely narrow. It discharges by the river Shiel, which flows 3 miles N. W. to the sea at Loch Moldart.

**Shield** (shēld), a piece of defensive armor, borne on the left arm. Shields gradually disappeared with the introduction of firearms, but the target and broadsword were the favorite arms of the Scotch Highlanders up to the middle of the eighteenth century. See *Arms and Armor*.

**Shield**, In heraldry, the escutcheon or field on which are placed the bearings in coats of arms. The shape of the shield upon which heraldic bearings are displayed is left a good deal to fancy; the form of the lozenge, however, is used only by single ladies and widows. The shield used in funeral pro-



Shields.

- 1, Lozenge shield. 2 and 3, Fanciful forms. 4, Spade shield — the best heraldic form.

cessions is of a square form, and divided per pale, the one half being sable, or the whole black, as the case may be, with a scroll border around, and in the center the arms of the deceased upon a shield of the usual form. See *Heraldry*.

**Shield-fern**, a common name for *Aspidium*, nat. order Polypodiaceae, so named from the form of the indusium of the fructification, which is roundly-peltate or kidney-shaped. The fronds of the species *A. fragrans* possess aromatic and slightly bitter properties and have been employed as a substitute for tea.

**Shields** (shēldz), JAMES S., United States senator and general, was born in Dungannon, county Tyrone, Ireland, in 1810; died at Ottumwa, Iowa, in 1879. At the age of 16 he came to America; at 33 was a judge of the Supreme Court of Illinois. He took part in the Mexican war as brigadier-general of Illinois troops; was shot through the lungs at Cerro Gordo, and severely wounded at Chapultepec. He served as Governor of Oregon territory, and as senator from Illinois, Minnesota, and Missouri. In the Civil war he was brig-

adler-general of volunteers, and did splendid service, resigning on account of broken health.

**Shields**, NORTH, a town and port of England, in Northumberland, on the north bank of the Tyne. It has large docks and is an important seat of the shipbuilding industry.

**Shields**, SOUTH, a borough of England, in the county of Durham, near the mouth of the Tyne, opposite to North Shields, and communicating with it by steam-ferry. The industries comprise glass, earthenware, alkali and chemicals, cordage, steam-engine boilers, and chain-cables and anchors, besides shipbuilding. The ports of North Shields and South Shields, formed by an expansion of the river into a wide bay, have been greatly improved and deepened by dredging and the construction of piers, and are capable of containing vessels of any size at their quays. Pop. (1911) 108,649.

**Shiites** (shī'īts), one of the two great sects of Mohammedans, who do not acknowledge the Sunna as a law, and believe that Ali, the fourth caliph after Mohammed, was his first lawful successor. The Persians are Shiites. See *Sunnites*.

**Shikarpur** (shik-ār-pūr'), chief town of Shikarpur District, Sind Province, Bombay Presidency, India, 18 miles west of the Indus and 26 southeast of Jacobabad. It is an emporium for transit trade between the Bolan Pass and Karachi, but has lost much of its commercial importance since the opening of the Indus Valley Railway. The principal manufactures are carpets and coarse cotton cloth. Pop. 49,491.

**Shikohabad** (shē-kō-ā-hād'), a town of India, in the North-western Provinces, Mainpuri District, 34 miles w. of Mainpuri town. It is the birthplace of several Hindu and Mussulman saints, and contains numerous temples and mosques. It has manufactures of sweetmeats and cotton cloth, and was formerly a great emporium for raw cotton. Pop. 11,826.

**Shikoku** (shē-kō'hō), the smallest of the four main islands of Japan, s. of Hondo, and E. of Kishiu. Area, 6840 square miles. The surface is mountainous, with fertile valleys. Its products embrace subtropical fruits, vegetable wax, sugar-cane and silk. Pop. 3,013,817.

**Shillelagh**, or **SHILLALY**, a Hibernicism for a stout oaken cudgel about 2 feet long, carried and used by Irishmen in faction fights and on similar occasions. Said to be

derived from *Shillelagh*, a wood famous for its oaks.

**Shilling** (shil'ing), an English silver coin, equal in value to 12 bronze pence or one-twentieth of a pound sterling, and approximate in value to 25 American cents, to 1.25 French francs, and to 1.11 German marks.

**Shillong** (shē'lōng'), a town of India, in the Khasi and Jaintia Hills District, the administrative capital of the province of Assam, on the Brahmaputra. It is on a table-land 4900 feet above sea-level. Pop. 8384.

**Shiloh** (shī'lō), BATTLE OF, the second great battle of the Civil War, fought April 6-7, 1862, at Pittsburg Landing, Miss., between the Union forces under Grant and Buell and the Confederates under A. S. Johnston and Beauregard. It was a Confederate failure but not a Union victory, and each side was weakened by about 10,000 men.

**Shimoga** (shē-mō'gā), chief town of Shimoga District, Mysore State, Southern India, 171 miles N. W. of Bangalore. Pop. 12,040.—Area of district, 3797 square miles; pop. 499,728.

**Shimose** (shē-mōs), an explosive of high power, made by Gian Shimose, a Japanese chemist and used in the war with Russia.

**Shin**, LOCH, a lake of Scotland, in the south of Sutherlandshire, stretching northwest to southwest about 24 miles, with an average breadth of about 1 mile.

**Shingle** (shin'gi), a thin piece of wood resembling a roofing slate, and used for the same purpose and in the same way. In Canada and the United States, and other places where timber is plentiful, shingles are extensively used for roof-covering.

**Shingles** (*L. cingulum*, a belt), an eruptive skin disease (*Herpes zoster*), which usually starts from the backbone and goes half round the body, forming a belt of inflamed patches, with clustered vesicles. It rarely encircles the body, though the popular opinion that if it does it will prove fatal is a delusion. It is sometimes produced by sudden exposure to cold after violent exercise, and sometimes follows acute affections of the respiratory organs. It seems to depend upon abnormal nervous action, as it frequently marks out upon the surface the part of the integument supplied by some one branch of a nerve. It is usually attended with more or less neuralgic pain and fever. It is a self-limited or cyclical disease, usually running its course in about a fortnight.

**Shintoism** (shin'tō-izm), one of the two great religions of Japan. In its origin it was a form of nature worship, but the essence of the religion is now ancestor worship and sacrifice to departed heroes.

**Ship**, the general term for a vessel intended for navigating the ocean, and especially a vessel intended for distant voyages. Ships are of various sizes, fitted for various uses, and receive various names, according to their rig and the purposes to which they are applied, as man-of-war ships, transports, merchantmen, barques, brigs, schooners, luggers, sloops, xebecs, galleys, etc. The name as descriptive of a particular rig, and as roughly implying a certain size, has been used to designate a vessel furnished with a bowsprit and three or four masts, each of which is composed of a lower-mast, a top-mast, and a top-gallant mast, and carrying a certain number of square sails on each of the masts. These masts are named, beginning with the foremast, the fore, the main, and mizzen masts; and when there is a fourth it is called the jigger-mast. The principal sails are named according to the masts to which they belong. (See *Sails*.) Owing to increase of size and the development of steam navigation this restricted application of the term ship is now of little value.

There were two primitive types of boats, from one or other of which, or rather perhaps from a joint development of both, the ship has developed. These were the raft and the canoe; the one, formed by fixing together planks, and spars, gave a floating surface strong and buoyant enough to support a cargo; the other, made by hollowing out the body of a tree and sharpening the ends, gave with little constructive art the rude model of a form fitted for navigation. In like manner there have been from time immemorial two distinct modes of propulsion, by oars and sails.

The ancient art of shipbuilding, like many other arts, was lost in the overwhelming tide of barbarism which overthrew the last of the great empires of antiquity. The ruder nations of Europe had to begin again in great measure on their own resources. The character of war galley of the ancients may possibly be preserved in the mediæval galleys applied to the same purpose. On the Mediterranean, too, an unbroken line of coasting ships may probably have continued to sail. But it appears evident that the progress made in shipbuilding under the Roman Empire, not to speak of the Greeks, the Phœnicians, and still

earlier navigators, was much greater than was transmitted to mediæval Europe. Shipbuilding made little progress in Europe till the discovery of the compass, which was introduced in a rude form in the twelfth century, and had been improved and had come into common use in the fourteenth century. The opening up of the passage to India and the discovery of America made another epoch in its progress. In the building of large vessels the Spaniards long took the lead, and were followed by the French, who specially distinguished themselves in the theoretical study of the art. In the early progress of the art of shipbuilding the English took little or no part. When Henry VII built the *Henry Grace à Dieu*, which is regarded as the parent of the British navy, the English were greatly inferior to the nations of Southern Europe both in navigation and in shipbuilding. In the reign of Elizabeth the English fleet proved its superiority to that of Spain in respect of fighting capacity, but it was afterwards rivaled by that of Holland. Rapid improvement was made in shipbuilding during the seventeenth and eighteenth centuries in England as well as the maritime countries of Europe. The first three-decker was built in England in 1637. She was called the *Sovereign of the Seas*, and was deemed the best man-of-war in the world. In 1708 the French adopted three-deckers; and from their application of science they acquired a decided superiority in the size and models of their ships over the English. In the early part of the nineteenth century the lead in improvement was taken by the United States, a fact which was significantly displayed in the war of 1812. English builders were at first sceptical as to American improvements; but in 1832 Scott Russell theoretically established the principles on which speed in sailing depends—principles which had already been practically applied not only by the Americans but by the Spaniards. From the time of their theoretical establishment they were rapidly adopted in England, and a race of improvement began between Great Britain and America. The true principles of construction both in build and rig were exemplified in the celebrated Baltimore clipper schooners, which were sharp in the bow, deep in the stern, of great length, and lying low in the water, with long, slender masts, and large sails cut with great skill. The same principles were afterwards applied to square-rigged vessels, and produced the English and American clipper ships which did so

much to develop the trade of India, China and Australia with both Europe and America.

A great change came over the art of shipbuilding when steam was introduced and wood gave place to iron and then to steel. The development of the steamboat, for river traffic, was quickly followed by that of the steamship, for ocean use, the first of these to cross the ocean being the *Savannah*, which in 1819 crossed from Savannah to Liverpool, partly by sail. In 1824 the *Fulton* and in 1825 the *Enterprise* proceeded from England to India, largely relying on their sails. The first steamer built expressly for regular voyages between Europe and America was the *Great Western*, launched in 1837. She was propelled by paddle-wheels, but about the same time Ericsson invented his screw-propeller, which was soon adopted in sea-going ships. (See *Screw-propeller*.) Iron vessels were built early in the century for canal service, then for river service, and later for packet service on the coasts. About 1838 iron vessels were built for ocean service, but the first ocean-going steamship in its present form, built of iron and propelled by the screw, was the *Great Britain*, launched in 1842. Compound engines were first introduced in 1854. The use of iron and steel in the construction of ships long made Britain, where there is such an unlimited supply of iron, and such skill in working it, the home of shipbuilding, but the United States has now the necessary plants to build vessels second to none in the world, the Delaware River being the most active locality in this art. Many of the vessels belonging to the great ocean lines are splendid specimens of naval architecture, some of them being over 800 feet in length, having a capacity of 45,000 tons, and with engines working up to 50,000 horse-power. These large vessels are all propelled by steam, though some sailing vessels of very large size are now in use.

An iron vessel is lighter than a wooden one of the same size, and with iron the same 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, which is now superseding iron for building ships, is a still lighter material and is equally manageable. In wooden ships the keel forms the base of the whole structure; from it rise on either side a large number of ribs, consisting of strong timbers usually built up of several pieces, and having the requisite curvature

according to the shape of the vessel; to the ribs are attached by bolts or wooden pins the planks that form the outer skin or covering, the interstices between the planks being made water-tight by caulking; internally beams extend from side to side to support the deck or decks. In steel or iron ships the keel is of far less importance than in wooden ships, and does not as in them hold the position of foundation or 'back-bone' to the whole structure, since an iron vessel ought to be mutually supporting throughout. 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 iron-plate overlapping each other at the edges, where they are riveted together. There may be an inner skin of plating as well as an outer. The ribs are tied together and at the same time held apart by beams 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 bulkheads.

Concrete ships were introduced in 1910, Norwegian shipbuilders having the credit for the invention. The first concrete ship built in the United States was the *Faith*, a 7900-ton vessel, launched at Redwood City, Cal., in March, 1918. In the construction of these ships wooden forms are placed in position and the concrete mixture, in a fluid state, is poured into them. The concrete has within it a skeleton of steel rods, running fore and aft, with interlaced rods of steel supplemented by wire mesh. Heavy oil engines of the Diesel type (*q. v.*) are being used more and more for the propulsion of vessels. See *Ironclad Vessels*, *Gunboat*, *Navigation*, *Torpedo-boat*, *Navy*, etc. The promotion of ship construction in the United States is under the direction of the Shipping Board and the Emergency Fleet Corporation. See *Shipping Board*.

**Ship Canal**, a canal for the passage of seagoing vessels. Ship canals are intended either to make an inland or comparatively inland place a seaport, or to connect sea with sea and thus obviate a long ocean navigation. Of the former kind are the Manchester Ship Canal, opened in 1894, and the Amsterdam Canal. Of the latter kind are the Panama Canal, the Kiel Canal, the Suez Canal and Cape Cod Canal. The Panama Canal, connecting the Atlantic Ocean with the Pacific, is the greatest engineering work of the kind the



world has ever seen. See the separate articles.

**Ship Railway**, a method of conveying ships overland in a cradle on rails or in a water-tank on a wheeled truck or car. Such a railway is said to have been in operation on the Isthmus of Corinth as early as 427 B.C., conveying a vessel 140 feet long and 16 wide. The Greeks, in 831 A.D. and the Venetians in 1483 are said to have used a tramway for this purpose. Several ship railways were projected in the last century, one to cross the Isthmus of Suez in 1861, one across Honduras in 1872, and one in 1870 across the Isthmus of Tehuantepec. None of these were constructed. A ship railway was begun in Nova Scotia in 1888, to go from Chignecto Bay, in Bay of Fundy, to Northumberland Straits, a distance of 17 miles. It was abandoned in 1891, when three-fourths completed.

**Shipka Pass** (ship'ka), a pass in the Balkans, about 4000 feet above the sea, the scene of a desperate and bloody ten days' struggle during the Russo-Turkish war (August and September, 1877). In his futile endeavors to take Fort Nicholas at the summit of the pass from the Russians, Suleiman Pasha lost 20,000 of his best men.

**Shipley** (ship'li), a town of England, in the West Riding of Yorkshire, on the Aire, 3 miles N. W. of Bradford. The inhabitants find employment in the worsted manufacture, or in the large stone-quarries in the neighborhood. Pop. 27,710.

**Ship-money**, an impost levied at various times in England, especially on the seaports, for the purpose of furnishing ships for the king's service. Having lain dormant for many years, it was revived by Charles I, who in 1634 levied it on the coast towns, and in 1635 issued writs for ship-money all over the kingdom. The tax met with strong opposition, and the refusal of John Hampden to pay the twenty shillings at which he was rated was one of the proximate causes of the civil war.

**Ship of Fools.** See *Brandt*.

**Shipping Board**, UNITED STATES, a board authorized by Congress in September, 1916, charged with the administration of the Government fleet of merchant vessels and with the regulation of marine carriers. It is composed of five appointive members, at salaries of \$7500 per year. The first chairman of the board was William Denman, of San Francisco, nominated by Pres-

ident Wilson in January, 1917, but owing to a controversy in the Shipping Board Mr. Denman resigned in July. The Board of 1918 consisted of Edward N. Hurley (chairman), Raymond B. Stevens (vice-chairman), John A. Donald, Bainbridge Colby, and Charles R. Page (commissioners). The *Emergency Fleet Corporation* is a subsidiary organization of the Shipping Board. It has let many contracts for the construction of ships.

**Ship's Husband**, an agent, appointed by the owner or owners of a vessel to see to her repairs, stores, etc., prior to a voyage.

**Ship-worm** (*Teredo navalis*), the popular name of a lamellibranchiate mollusk belonging to the Pholadidae or pholas family, and distinguished by the elongation of the respiratory 'siphons' or breathing-tubes conveying water to the gills, which give to this mollusk a somewhat vermiform or worm-like aspect. The two valves or halves of the shell are of small size and globular shape, and are situated at its anterior extremity, the valves being three-lobed. In length the ship-worm averages about a foot, and in thickness about 1/2 inch. It has gained great notoriety from its boring habits, occasioning great destruction to ships and submerged wood by perforating them in all directions in order to establish a habitation. In boring into the wood (the shell is the boring instrument) each individual is careful to avoid the tube formed by its neighbor, and often only a very thin film of wood is left between the cavities, which are lined with a calcareous incrustation. Various plans and methods have been used to protect ships, piers, etc., from this destructive animal, such as copper-sheathing, treating with creosote, etc., but the one which appears to have been most successful in arresting its ravages is that of driving a number of short nails with large heads into the exposed timber. The rust from the heads of the nails appears to prevent its operation. A large species of teredo (*T. gigantea*) occurs in warm latitudes, where it bores into the hardened mud or sand of the sea-bed, as well as into timber.

**Shiraz** (shé'ráz), a celebrated city of Persia, capital of the province of Fars, 165 miles N. E. of Bushire. It is situated at an elevation of 4500 feet above the level of the sea, in a large and fertile plain covered with rose-gardens, vineyards, cypress groves, and orchards. Founded about the beginning of the eighth century, it was long one of the most splendid cities of Persia, the residence of the ruler, the seat of



science and art, celebrated for its magnificent buildings, its delicious climate, its elegant manufactures, and its extensive trade. It lost much of its importance after being conquered by Timur in the end of the fourteenth century, and it was almost entirely destroyed by an earthquake in 1812, and again in 1853. At present it is known chiefly for its wines and its inland work. Near the city are the tombs of Sadi and Hafiz, the poets. Pop. est. from 30,000 to 50,000.

**Shire** (shlr; from Anglo-Saxon *sciran*, to divide), the name applied to the larger divisions into which Great Britain is divided, and practically corresponding to the term county, by which it is to a large extent superseded, though the word is in considerable use as a termination to county names, as Brookshire, Lancashire, etc. In some cases the shires are identical with the old Saxon kingdoms; such are Kent, Sussex, Essex, Middlesex, Surrey, Norfolk and Suffolk. Other kingdoms were for convenience divided into several shires, and some shires which once had a separate existence have been merged into others. The head of the shire was originally the ealdorman (earl); the duties of the ealdorman, however, ultimately devolved upon the shire-reeve (sheriff). Scotland followed the example of England as regards the division of the country into shires, and twenty-five shires are enumerated in a public ordinance of 1305. In Scotland Kirkcudbright is neither a county nor a shire, but a stewartry, and in England there were at one time three counties palatine. (See *County Palatine*.) The shires in England were subdivided into *hundreds*, *sokes*, *lathe*s, etc., and these again into *tithings*; in Scotland they were subdivided into *wards* and *quarters*. —The *Shires* is a term loosely applied to a belt of English counties running in a northeast direction from Devonshire and Hampshire, but often used for the midland counties generally.

**Shiré** (shé'rā), a river of Southeastern Africa, draining Lake Nyassa into the Zambesi, which it enters on its left bank, after a course of about 270 miles nearly due south. It is navigable throughout its entire length, with the exception of about 35 miles of falls and rapids, during the course of which it descends as much as 1200 feet. The upper part of the Shiré is in Nyassaland, the lower part in Portuguese territory.

**Shirley** (shlr'li), a former town of Hampshire, England, 2 miles n. w. of Southampton, of which it is now a suburb, having been brought within the limits of Southampton.

**Shirley**, JAMES, dramatist, was born in London in 1598, and was educated at Merchant Taylors' School, St. John's College, Oxford, and Catherine Hall, Cambridge. He took holy orders, but soon after went over to the Church of Rome, and for some time made a living as a schoolmaster. Then he became a playwright, and had written more than thirty regular plays, tragedies, and comedies before 1642, when parliament suppressed theaters. After the Restoration some of his comedies were revived, but he did not again attempt to write for the stage. He died October 29, 1666, it is said, of fright caused by the great fire. Shirley was the last of the great writers who belong to the school of Shakespeare, and his dramas, though they do not display much inventive power, are yet poetical, and the dialogues full of animation. His best tragedy is perhaps *The Traitor*, and his best comedy *The Lady of Plesure*, both produced in 1635; but Shirley himself preferred *The Cardinal* (1641), an attempt to compete with Webster's *Duchess of Malfi*. He was the author also of three small volumes of poems and masques.

**Shirwa** (shir'wā), or TAMANDUA, a lake of southeast Africa, lying on the left side of the Shiré, to the southeast of Lake Nyassa. It is a secluded basin, lying at an elevation of 2000 feet above the sea, and surrounded by mountains which reach a height of 7000 to 8000 feet. It is mostly shallow, and infested by hippopotami and crocodiles.

**Shisdra** (shis'drá), a town of Russia, government of Kaluga, 80 miles southwest of Kaluga; has manufactures of woollen cloth, glass and leather. Pop. 10,572.

**Shishak** (shl'shak), an Egyptian king, mentioned by the Hebrew writers, the Sheshenk I of the monuments, and the first sovereign of the Bubastite twenty-second dynasty, established about 961 B.C. It was he to whom Jeroboam fled for protection when he fell under the suspicion of Solomon; and in the fifth year of Rehoboam he invaded Judah, and returned with the treasures of the temple and the palace. A remarkable sculpture at the temple of Karnak gives a list of 130 names of towns and peoples, including towns both of Judah and of Israel, conquered in this expedition by Shishak, who appears to have been one of the ablest and most powerful of the Egyptian monarchs. His reign lasted at least twenty-one years.

**Shittim-wood** (shit'im), of which the tabernacle in the wilderness was principally constructed; was the wood of the shittah-tree of the Bible, which is supposed to be the *Acacia seyal* of the Sinaitic peninsula. (See *Acacia*.) It is a light but cross-grained and enduring wood, of a fine orange-brown color.

**Shoa** (shō'a), a province in the south-east of Abyssinia, often holding the position of a semi-independent kingdom; area, 26,000 sq. miles. It consists (like the rest of Abyssinia) mostly of plateaus reaching up to an elevation of 10,000 feet on the southeast and south, overtopped by higher mountains, and intersected by numerous streams mostly tributaries of the Blue Nile. The capital is Ankober. In 1889 Menelek, king of Shoa, became ruler of all Abyssinia, which has since become a protectorate of Italy.

**Shock**, In medicine, a sudden vital depression of the system produced by violent injuries or violent mental emotions. It is especially a surgical term. The vital phenomena of the body—consciousness, respiration, heart-action, capillary circulation—are depressed in proportion to the shock received by the nerve centers. In the state of collapse consequent upon a shock the patient lies completely prostrate, the face pale and bloodless, the skin cold and clammy, and the features contracted and expressive of great languor. There is also extreme muscular debility, and the pulse is frequently so weak as scarcely to be perceptible. Incoherency, drowsiness, or complete insensibility is often manifested on the part of the patient. Shock results either in a complete suspension of the action of heart, causing death, or passes into reaction; and the treatment of shock is to be directed to the immediate development of reaction. In mild cases external warmth, a little stimulant, and rest are all that is required; but in the severer forms a more liberal recourse to heat and stimulants is absolutely necessary, and should be continued until indications of commencing reaction appear. The heat should be applied to the pit of the stomach and the extremities by means of hot flannel, hot water tins, or like appliances. The stimulant most recommended is brandy in hot water, and this should be followed by nourishment, such as beef-tea.

**Shoddy** (shod'i), the fibrous substance composed of woollen rags torn fine in a machine called a 'devil,' and converted into cheap cloth

by being mixed and spun with a certain proportion of fresh wool.

**Shoeburyness** (shō'ber-i-ness), a village of Essex, on the estuary of the Thames, opposite Sheerness, and 45 miles E. of London. A school of gunnery is maintained here for the purpose of giving practical instruction to officers and men of the artillery, and for carrying on experiments in artillery and ammunition. At Shoeburyness all new inventions in armor, whether for fortifications or for iron-clads, are tested, and all new guns are tried. Pop. 5000.

**Shoes**, coverings for the feet, generally made of leather in Europe and America, but in Holland and France often of wood, and in China and Japan of paper and other fabrics. The shoe is a combination of the sandal of the oriental races and the moccasin of untanned hide of savage races—sole without upper and upper without sole. The first allusion to a shoe in the Old Testament is where Abraham refuses to take so much as a 'shoe-latchet' from the King of Sodom. For 'shoe' in this instance we are probably to understand 'sandal'; but shoes proper, as well as sandals, seem to have been used among the Jews; for on the black obelisk from Nimroud Jews are represented as wearing shoes or boots with turned-up toes, similar to those worn by orientals in the present day. The Romans used various kinds of shoes, such as the *solea* or sandal; the *calceus*, which covered the whole foot, somewhat like our shoes, and was tied with a latchet or lace; and the *caliga*, a very strong kind of shoe, sometimes shod with nails, worn by the soldiers, who were thence called *caligati*. Both in ancient and in modern times the fashion of shoes has varied much, just as in other articles of dress. In the reigns of Henry I and Stephen, shoes were made for the fashionables with long points stuffed with tow, and made to curl in the form of a ram's horn; and in the reign of Richard II the points had increased to such an extent that they reached the knee, to which they were secured by chains of silver or gold. In the eighteenth century, among the ladies, absurdly high-heeled shoes were the rage, a fashion which has been revived within recent years. The present simple form of shoe was adopted in the early part of the seventeenth century, and somewhat later the shoe buckle came into use. In the early part of the nineteenth century buckles appear to have become unfashionable, their place being supplied by the simpler and less costly shoe-strings. To the

same period belongs another improvement, that of making shoes right and left. Boots are a variety of shoe with the upper leathers lengthened so as to protect part of the leg. Till recently the making of boots and shoes was a purely manual handicraft; now, with the exception of the finest and best finished qualities, the manufacture is done almost entirely by machinery, and has become a thriving industry in New England and in some other parts of the United States.

**Shogun** (shō'gun), the name of the military chiefs of Japan, who early in Japanese history usurped the rule of the emperors or Mikados and reigned supreme, until the revolution of 1868 restored the Mikado to power. For a time (1854-68) the name of Tycoon was erroneously given to the Shogun.

**Sholapur** (shō-lā-pūr'), chief town of Sholapur District, Bombay Presidency, India, 150 miles by rail from Poona. Its situation between Poona and Haiderabad has made it, especially since the opening of the railway in 1859, the center for the trade of a large extent of country. Its chief industry is the manufacture of silk and cotton cloth. Sholapur was stormed by General Munro in 1818, when the whole of the Peshwa's territories were incorporated in the Bombay Presidency. Pop. (including cantonment), 75,288.

**Shooting-star**, a meteor in a state of incandescence, caused by friction when passing through the atmosphere, and seen suddenly darting along some part of the sky. They are very numerous, and indicate that small fragments of matter are abundant in the area of the solar system. See *Aerolite* and *Meteor*.

**Shore** (shōr), JANE, the wife of a rich goldsmith of London in the fifteenth century, and mistress of Edward IV. After the death of Edward, in 1483, she seems to have been the paramour of Lord Hastings, whom Richard III, then Duke of Gloucester, and protector, suddenly ordered to be beheaded, June 13, 1483. Richard had accused Hastings of conspiring against him along with Jane Shore. The charge could not, however, be substantiated, and he directed her to be tried for lewdness by the spiritual court, and she was obliged to do public penance at St. Paul's. She found a new protector in the Marquis of Dorset, after whose banishment she seems to have married one Lynom, the king's solicitor. She is supposed to have died about 1527, at an advanced age, during the reign of Henry VIII.

**Shorea** (shō're-a), a small genus of Indian plants, nat. order Diteraceæ. One species (*S. robusta*) yields the timber called in India *sāl* or *saul*. See *Sāl*.

**Shoreham** (shōr'am), or NEW SHOREHAM, a seaport town of England, in the county of Sussex, 6 miles west of Brighton, at the mouth of the Adur, here crossed by a suspension-bridge. It has a fine old parish church, which dates from about 1100. The harbor is encumbered by a bar, hut carries on considerable trade. Pop. 5731.—OLD SHOREHAM was situated a mile N. W. of the modern town, and its harbor was long a great outlet to the Continent, but in the fifteenth century it got silted up.

**Shore-hopper** (*Orchestia littorea*), a genus of crustaceans of the order Amphipoda, having the first pair of legs of smaller size than the second pair. By this, and by its more compressed body, it may be distinguished from the familiar sand-hopper, in company with which it is often met on sandy coasts.

**Shorthand** (short'hand), the method of writing by which the process is so abbreviated as to keep pace with speech. It is also known, according to the principle underlying the particular system, as tachygraphy (quick writing), brachygraphy (short writing), stenography (compressed writing), and phonography (sound writing). It was practiced by the ancient Greeks and Romans, not only on account of its brevity but for purposes of secrecy; but all knowledge of the art was lost from the tenth century until the end of the sixteenth, when modern shorthand had its birth in the publication by Dr. Timothy Bright of his *Characterie* (1587), and by Peter Bales of his *Arte of Brachygraphie* (1590). In these early systems arbitrary signs were used in most cases to denote each word. The earliest system of shorthand of any practical importance was that of John Willis, whose *Arte of Stenographie* (1602) became very popular. It was based on the common alphabet, with the addition of arbitrary signs; and this, indeed, was the character of the numerous systems which obtained until the time of Pitman. Among Willis' imitators were T. Shelton, whose system (1620) was used by Samuel Pepys, and that of Jeremiah Rich, whose system (1646) was commended by Locke. Rich's system was improved by William Mason (1672), the best shorthand writer of the seventeenth century; and Thomas Gurney published

his *Brachygraphy*, founded on Mason's system, in 1753. The use of Gurney's system has been perpetuated by his descendants, who have been the official shorthand writers of the houses of parliament since the beginning of the last century. In 1767 appeared the *Universal English Shorthand* of John Byrom, an a, b, c system characterized by 'simple strokes and no arbitrary characters'; and in 1780 was published an improvement of Byrom's system by William Mason. Samuel Taylor published his *Stenography* in 1786. This, which is the best of all the a, b, c systems, contributed largely to make stenography popular, and it was the system which was almost universally used until Isaac Pitman gave his *Phonography* to the world in 1837. In comparison with Gurney's system, Taylor's system possesses more easy and natural outlines, and is therefore capable of being written with a greater degree of speed. Like Byrom, Taylor discarded arbitrary characters altogether; but Harding, who reëdited his system in 1823, introduced a few.

Pitman had a number of predecessors, whose systems, like his own, were strictly phonetic. These systems, however, never obtained any footing, while Pitman's almost immediately became popular, and is now used by a larger number of reporters and shorthand writers, both in the United States and Great Britain, than any other. Taylor's system ranks next in point of use, and Gurney's third. Like all other phonetic systems, Pitman's rejects the ordinary orthography, and writes words according to their sounds; thus, *though* becomes *tho*, *plough* becomes *plow*, and *enough* becomes *enuf*. Discarding the common alphabet, which formed the basis of the stenographic systems, it has adopted an alphabet of its own, consisting of a series of straight lines, curves, dots, etc., each representing a distinct sound. This alphabet is the basis of a highly ingenious and complex system, which aims at securing the greatest degree of brevity consistent with legibility. This end it endeavors to attain by a variety of devices, forming integral parts of the system. In rapid writing on Pitman's system the vowels are generally omitted.

Of several other systems which have recently been given to the public among the best known are Professor J. D. Everett's *Shorthand for General Use* (1877), Edward Pocknell's *Legible Shorthand* (1881), and J. M. Sloan's adaptation of the French system of Duployé (1882). The chief feature of the system of

Professor Everett, who claims to have adhered to the phonetic principle more strictly than Pitman, is that, by a variety of devices, all vowels are indicated. In Pocknell's system there is a tendency to return to the earlier alphabetic style, with a greater use of arbitrary signs. In the Sloan-Duployé system the characters do not strictly indicate certain sounds, nor are they all written in the order in which they are meant to be read. A further distinction of this method is, that it introduces three slopes between the perpendicular and the horizontal. This question of slope is of great importance, and it is claimed as the merit of the Bavarian stenographer Gabelsberger that he recognized that geometrical characters should be discarded in favor of the elementary lines of current writing. An attempt to deal with this question of slope, and with the other equally important question of the vowels, was made in *Script Shorthand* (1886), which is said to have already yielded valuable results. This system is founded on the phonetic principle, and is characterized by one (the longhand) slope and by joined vowels. The *Oxford Shorthand* (1888) is perhaps the most recent system of abbreviated writing. It has been introduced into various schools, and seems to be making good progress in public estimation. The merits claimed for this system are, that it is written on one slope as in longhand. Consequently, while there is by this method a gain in speed and legibility, the longhand of the learner is not spoiled by its practice. The alphabetic signs, also, are few and simple; the vowels and consonants are joined and written in their natural order, and the various 'positions' of the alphabetical outlines in other systems are here abolished.

England was the birthplace of modern shorthand, and other nations derived their first knowledge of the art either directly or indirectly from England. In France the system used by the majority of professional shorthand writers is that of Prévost, which is a modification of Taylor's system. In Germany the most important system is that of Gabelsberger (1829), on which is based the system of W. Stolze (1840). Gabelsberger's system is founded on modifications of geometrical signs, so adjusted as to facilitate rapid writing as in ordinary longhand, while the vowels are indicated by the shape or position of the consonants. It has been adapted to English by H. Richter (1886), and to most of the languages of Europe. In



the United States the Isaac Pitman and Benn Pitman systems are largely used, and are taught in a great number of schools. There are several other systems which have their advocates, notably the Gregg system, invented by John Robert Gregg in 1888, which differs from the two Pitman systems in that there are no heavy lines, the outlines are mostly sloping, being based on the movements of the hand in longhand writing. Probably the highest record for speed was that made January 18, 1919, by Herman J. Stich, of New York, who took dictation from a court record dictated at the rate of 300 words a minute for five minutes and transcribed it with only two errors for each three hundred words. He used the Isaac Pitman system of shorthand.

**Shorthorns**, a breed of cattle externally distinguished by the shortness of their horns, which originated in England in the beginning of the last century. Starting in the Tees valley under the name of Durhams, Teeswaters, or Shorthorns, they soon spread over all the richly pastured districts of Britain. They are excellent for grazing purposes, being of rapid and large growth with aptness to fatten, but are inferior to some other breeds for dairy purposes. They have been successfully introduced in the United States.

**Shoshone Falls** (sho-sho-né'), on Lewis or Snake River, in Idaho. Among the waterfalls of North America they rank next to that of Niagara in grandeur, being about 250 yards wide and 200 feet high.

**Shoshones**, or SNAKES, a tribe of North American Indians inhabiting a considerable stretch of territory in Idaho, Utah, Nevada, etc. They live partly by hunting and fishing, many of them also on roots and small animals. They are estimated to number about 5000.

**Shoshong** (shō-shong'), a town in the British protectorate of Bechuanaland, South Africa, about 400 miles N. of Kimberley, with which it is connected by road and telegraph. It is the gateway between Southern and Central Africa, the three great routes from Griqualand West, the Orange Free State, and the Transvaal meeting here, and again branching off north to the Zambesi, northeast to the Matabele country, and northwest to Damaraland. Pop. estimated at 30,000.

**Shot**, a term applied to all solid projectiles fired from cannon, and also to hollow projectiles without bursting charges, as the Palliser shot. Solid shot have gradually disappeared since

the introduction of rifled guns, which fire elongated shot with more or less conical heads. Some of the shot fired by the immense guns now used weigh not far short of a ton. Smooth-bored ordnance still use solid round shot and case-shot. Case-shot consists of iron balls packed in iron or tin cylindrical cases. Grape differs only in the balls being larger. (See *Shell*, *Cannon*, etc.) Shot is also the name given to the small round pellets of lead used with sporting guns for shooting small quadrupeds and birds. This kind of shot is made by dropping the melted lead through the holes of a colander set at a considerable height above water, the drops naturally assuming the globular form.

**Shoulder-joint**, the articulation of the upper arm or humerus with the glenoid cavity of the scapula or shoulder-blade. (See *Arm*.) The shoulder-joint forms an example of the ball-and-socket joints, the ball-like or rounded head of the humerus working in the shallow cup of the glenoid cavity. Such a form of joint necessarily allows of very considerable movement, while 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. The muscles which are related to the shoulder-joint are the *supraspinatus* above, the long head of the *triceps* below, the *subscapularis* internally, the *infraspinatus* and *teres minor* externally, and the long tendon of the *biceps* within. The *deltoid* muscle lies on the external aspect of the joint, and covers it on its outer side in front, and behind as well, being the most important of the muscles connected with it. The movements of the shoulder-joint consist in those of abduction, adduction, circumduction, and rotation—a 'universal' movement being thus permitted; and its free motion is further aided, when the bony surfaces are in contact, by separate movements of the scapula itself, and by the motions of the articulations between the sternum and clavicle, and between the coracoid process and clavicle also. The biceps muscle, from its connection with both elbow and shoulder joints, brings the movements of both into harmonious relation. The shoulder-joint is liable to various diseases and injuries. Local injury may result in inflammation of the joint, while special diatheses or diseased conditions of constitutional origin may each give rise, either *per se* or through injuries, to such lesions as strumous or scrofulous disease of the joint, to syphilitic lesions, and to gouty

or rheumatic attacks. Of the accidents to which the joint is liable *dislocations* are by far the most frequent.

**Shovel** (shuv'l), SIR CLOUDESLEY, a British admiral, born of poor parents in 1650, entered the navy as a cabin-boy, but soon rose by his talents, commanded the *Edgar* at the first fight of Bantry Bay, and shortly afterwards was knighted. He distinguished himself at Beechey Head (1690), La Hogue (1692), and Malaga (1704), and in 1705 was named rear-admiral of England, and succeeded Sir George Rooke as commander-in-chief of the British fleets. He took part in the capture of Barcelona (1705), and in the unsuccessful attempt upon Toulon (1707). When returning home with the fleet (October 22, 1707) he was wrecked on the rocks near Scilly, and of the 800 men on board his ship, *The Association*, not a soul was saved. His body was washed on shore next day, and hurried in Westminster Abbey.

**Shovel Board, Shove Board, or**

**Shuffle Board**, a game in which counters, disks, or pieces of money are shoved over a smooth surface on which nine squares are marked off, the object being to send the pieces on these squares, where they count according to the number marked on the square on which they rest. Also a long, smooth board where counts are made by sending the disk nearest the end without going off.

**Shovel-fish** (*Scaphiorhynchus cataphractus*), a genus of ganoid fishes belonging to the Sturionidae or sturgeon family, and found in North American rivers. It is so named from the flattened form of the head.

**Shoveller-duck** (*Spatula clypeata*), a genus of Anatidae or ducks, distinguished by its long bill, of which the tip is hooked and broadened. The average length of this bird is about 18 or 20 inches. In the male the colors are rather gay and varied—green, white, brown, pale blue and black. The coloring of the female is more somber. The shoveller duck is found in North America and Europe.

**Showbread** (shō'bred), in the Bible, the twelve loaves of bread, representing the twelve tribes of Israel, which were exhibited before the Lord on the golden table in the sanctuary. They were made of fine flour unleavened, were changed every Sabbath, and were eaten by the priests only.

**Shrapnel** (shrap'nel), HENRY, an English general, who entered the Royal Artillery in 1779, served

with the Duke of York's army in Flanders, and shortly after the siege of Dunkirk invented the case-shot known by the name of shrapnel-shells, an invention for which he received from government a pension of £1200 a year in addition to his pay in the army. He retired from active service in 1825, attained the rank of lieutenant-general in 1827, and died in 1842.

**Shrapnel-shell.** See *Shell*.

**Shreveport** (shrev'pört), a city of Louisiana, capital of Caddo parish, on the Red River, 327 miles by rail N. W. of New Orleans, with which it has regular steamboat communication. It is situated in a splendid cotton-growing region, and is one of the principal cotton-markets in the southwest. It has lumber and cotton-seed oil mills, machine shops, etc. Pop. 28,015.

**Shrew** (shrö), or **SHREW-MOUSE**, a genus of mammals belonging to the order Insectivora, and to be carefully distinguished from the ordinary and common mice (Muridae), which are included in the order Rodentia; and from the dormice (Myoxidae), also belonging to the Rodent order. The shrews form the family Soricidae, and the genus *Sorex* includes the typical members, three of which are found in Europe and Asia, namely, the common shrew, the lesser shrew, and



Common Shrew (*Sorex araneus*).

the water shrew, while there are a number of species in North America. Here also are the red-toothed shrews, belonging to the allied genus *Blarina*. The common shrew (*S. araneus* or *vulgaris*) averages about 4 inches in length, the square tail making up half of this measurement. It may readily be distinguished by its prolonged muzzle, by the teeth being colored brown at the tips, and by the reddish-brown fur. It feeds upon insects and their larvæ, and inhabits dry places, making a nest of leaves and grasses. Its habits are chiefly nocturnal. Shrews are very voracious in their habits, and frequently kill and devour one another. They secrete a fluid of disagreeable odor

in special glands, and this odor prevents larger animals from eating their flesh. In former days the bite of the shrew was accounted venomous, while its body, variously treated, was regarded as a cure for many complaints. The water shrew (*S.* or *Crossopus fodiens*) attains a total length of from 4½ to 5 inches. The snout is not so pointed as that of the common shrew. The ears are very small. The color is black on the upper and white on the under parts. A prominent swimming fringe of stiff white hairs is found on the tail and on the toes, and forms a distinctive feature of the species. Its food resembles that of the common shrew, but aquatic larvae appear to form a large part of its nutriment. It makes its hurrows in the overhanging banks of rivers and lakes, and dives and swims with great facility.

**Shrew-mole** (*Scalops aquaticus*), a genus of insectivorous mammals, belonging to the family of Soricidae or shrew-mice, but also by some zoologists placed in the Talpidae or mole family. It is found in North America, usually near rivers and streams, and hurrows after the fashion of the common mole, like which, also, its fur is fine and closely set. The average length is about 7 inches.

**Shrewsbury** (shrōs'ber-i), a municipal and parliamentary borough of England, capital of Shropshire, situated on a slightly elevated peninsula formed by a bend of the Severn, 42 miles N. W. of Birmingham. It consists of some handsome modern houses and many old timbered houses of very picturesque appearance. Three bridges cross the Severn and connect the town with its suburbs. Among objects deserving of notice are the remains of the old walls; the ruins of the castle; the Church of Holy Cross, originally attached to a magnificent Benedictine abbey, founded in 1083; the grammar school ranking high among public schools, founded by Edward VI in 1551, and removed to new buildings at Kingsland in 1882; the market-house, of the time of Queen Elizabeth; statues of Lords Clive and Hill, etc. The chief manufactures are glass-staining, the spinning of flax and linen yarn, iron-founding, brewing, the preparation of brawn, and the making of the well-known 'Shrewsbury cakes.' In 1403 the famous battle which issued in the defeat of Hotspur and the Earl of Douglas, his ally, by Henry IV was fought in the vicinity. Pop. 29,389.

**Shrike** (shrik), a general name applied to the members of a family (Laniidae) of insectivorous birds be-

longing to the dentirostral division of the order. The family is conveniently divided into two groups, the Laniinae, or true shrikes, and the Thamnophilinae, or bush-shrikes. The genus *Lanius* is distinguished by the broad base of the bill, which is hooked at the tip. The nostrils, which are situated laterally, are surrounded by bristles. The fourth quill is longest in the wings, and the tail is of graduated or conical shape. The great Northern shrike of North America imitates the sounds of other birds. This species is colored gray on the upper and white on the under parts; the quills of the tail being black with white tips, while a band of black crosses the forehead, surrounds the eyes, and terminates at the ear covers. The average length is about 9 or 10 inches. The food consists



Great Northern Shrike of North America.

of mice, shrew-mice, small birds, frogs, and insects; and these birds have the habit of impaling their prey on thorns of trees, in order to tear it to pieces with greater ease, a habit which has obtained for them the name of butcher-birds. The red-backed shrike (*Lanius* or *Enneoctonus collurio*) and the woodchat shrike (*L.* or *E. rufus*) are European species. In the Thamnophilinae, or tree shrikes, the bill is long and possesses an arched keel, the tip being hooked and bristles existing at the base. Some of the species attain a length of from 12 to 13 inches. They are common in South America. The name of drongos or drongo-shrikes has been given to certain American birds allied to the shrikes, and forming the family Dicrurinae. The loggerhead shrike inhabits the Gulf States; the white-rumped and white-winged shrikes are inhabitants of the Western States.

**Shrimp**, the name applied to many small crustaceans, and especially to the *Orangon vulgaris* or common shrimp, which belongs to the order Decapoda (ten-footed crustacea) and to the suborder Macroura (long-tailed).

The common shrimp reaches a size of about 2½ inches, and is common on both coasts of North America and also on those of Europe. It hurrows in the sand and in Europe is caught for the market by means of a bag-net placed transversely on a pole, which is pushed through the sand at a depth of about 1½ or 2 feet. When alive it is of a light-brown or almost white color, resembling that of the sand in which it lives, but after boiling it assumes the well-known brown color. The *Pandulus annulicornis*, or red shrimp, inhabits deeper water than the common shrimp, and is not nearly so abundant. It is taken for the market chiefly on the east and south coasts of England, but occurs also in Scotland and Ireland. It reaches a size of from 2 to 2½ inches. When alive it is of a reddish-gray, with spots of deeper red; after boiling it is of a uniform deep red. This species is sometimes confounded with the common prawn; but it never reaches the size of the prawn, which, when adult, is above 4 inches in length. Belonging to the crustacean order Amphipoda, and allied to the sand-hoppers, we find the so-called 'fresh-water shrimp' (*Gammarus*

among Roman Catholics some shrines are still objects of pilgrimage.



Portable Shrine, Malmesbury Abbey.

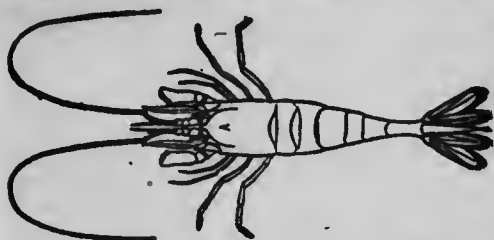
**Shropshire** (shrop'sher), or SALOP, a west inland county of England, on the border of Wales. Area, about 1343 sq. miles. The county is divided into nearly equal portions by the Severn, running southeast; the northern is generally level; the southern is more hilly. Shropshire is a fine agricultural and pastoral region and has considerable mineral wealth, including coal, iron and lead. The coal fields are extensive. The county is famous for its breed of sheep. A good deal of cheese is made, and large flocks of turkeys are raised. The manufactures include that of iron to a very great extent, chinaware, carpets, gloves, and flannel. Pop. 246,306.

**Shrouds**, a range of large ropes extended from the heads of the lower masts to both sides of a ship to support the masts, and named, from the masts to which they belong, the main, fore, and mizzen shrouds. Topmast, topgallant, and bowsprit shrouds are all similar in their object.

**Shrove-Tuesday**, the day before the first day of Lent or Ash-Wednesday, so called as a day on which confession was specially made and 'shrift' received. (See *Carnival* and *Lent*.) It was formerly a day of considerable festivity, and from the common practice of eating pancakes then the day came to be called *Pancake Tuesday*.

**Shrub**, a liqueur, consisting of lime or lemon juice and syrup, with the addition of rum or other spirit. It is made chiefly in the West Indies.

**Shrubs**, plants in which the perennial portion forms the greater part, which branch near the base, which are taller than bushes but not so tall as trees, seldom exceeding the height of a man. For practical purposes shrubs are divided into the deciduous and evergreen kinds. Among ornamental shrubs the best known are those belonging to the



Common Shrimp, male (*Crangon vulgaris*).

*rus pulex*) of streams and brooks, distinguished as a genus by the slender upper antennae, by the tufts of spines on the tail, and by the first and second pairs of legs possessing small nippers. The name 'shrimp' has been applied to this form from its rough resemblance to the familiar marine shrimps. In the United States shrimps are chiefly used as bait by anglers.

**Shrine** (shrin), originally a reliquary, or some kind of receptacle, for holding the bones or other relics of saints. Sometimes shrines were merely small boxes with raised tops like roofs; sometimes actual models of churches; sometimes the tombs or mausoleums of saints—large constructions, like that of Edward the Confessor at Westminster. Many were (and are) ornamented with gold, precious stones, or inlaid work; and



genera *Rosa*, *Ribes*, *Rhododendron*, *Asclea*, etc. Among evergreen shrubs are the box, the laurel and various heaths.

**Shumla** (shōm'lā), a fortified town of Bulgaria, 50 miles west of Varna. Inclosed on the north and west by hills which form a natural rampart, strongly fortified, and with roads leading northward to Rustchuk and Silistria, southward to the passes of the Balkans, and eastward to Varna, Shumla is one of the most important military positions in the Balkan Peninsula. Pop. (1906) 22,290.

**Shusha** (shō-shā'), a town of Asiatic Russia, in Transcaucasia, in the government of Elisabethpol, 230 miles southeast of Tiflis, on an isolated rocky eminence nearly 4000 feet high. Shusha was formerly a fortress, and the capital of the khanate of Karabagh, annexed to Russia in 1822. Pop. 25,656.

**Shushan.** See *Susa*.

**Shuster** (shōs'ter), a town of Persia, in the province of Khuzistan, on the Karun, 170 miles west by south of Ispahan. Once a flourishing provincial capital of Persia, it is now rising into importance again owing to its position on the Karun. That river is well adapted for steam navigation from its mouth to the neighborhood of this place, from which the land journey to Ispahan is 200 miles shorter than from Bushire. Pop. about 15,000.

**Shuster, WILLIAM MORGAN**, Persian official, was born at Washington, District of Columbia, in 1877. He took a partial course in Columbia College and Law School, was in the War Department in 1898, and in 1899 was sent to Cuba to adjust its finances. He afterwards filled government positions in Porto Rico, China, and the Philippine Islands, being made a Philippine commissioner in 1906. In April, 1910, in response to a request from the Persian government, he was sent to that country to fill the post of treasurer-general. This he did with exceptional ability, straightening out its tangled finances and greatly improving its financial condition. His attempt to seize the property of the deposed Shah for public purposes led to vigorous opposition from Russia, invasion of the country was threatened, and in response to Russia's demand Persia was obliged, in December, 1911, to dismiss its efficient and popular treasurer-general.

**Shutar Gardan** (shō'tar gur-dun'), a mountain pass in Afghanistan, connecting the Kuram and

Logar valleys. The ascent from the Indian side is slight, but the descent into the Logar Valley is long and very steep. The pass commands the road to Kabul, and the possession of it in 1870 enabled General Roberts to advance on that city and occupy it almost without opposition.

**Shut-in Society**, an organization in the United States founded for the purpose of brightening the lives of persons in sickness by providing various objects which they would otherwise be unable to obtain. The members of local societies, besides supplying their sick members with fruit, flowers, reading material, medicines, and nourishing food, also undertake to supply easy chairs and other helps to convalescents.

**Shuttle** (shut'l), the instrument used to carry the weft-thread in weaving.

**Shuya** (shō'yā), a town of Russia, in the government of Vladimir, 68 miles N. E. of Vladimir, on the navigable Teza. It is one of the centers of the cotton industry of middle Russia. Pop. 18,968.

**Sialidae** (si-al'i-dē), a group of neuropterous insects, with very large anterior wings, which frequent the neighborhood of water. *Sialis lutaria* is a well-known member of this group, being used as a bait by anglers.

**Sialkot.** See *Sealkote*.

**Sialogogues** (si-al'u-gogz), in medicine, drugs which cause an increased secretion of saliva, as pyrethrum, the various preparations of mercury, cubebs, etc.

**Siam** (si-am', or sē-ām'), a kingdom embracing a great part of the Indo-Chinese Peninsula and part of the Malay Peninsula, and lying between Burmah on the west, and Anam and Cambodia on the east and southeast. Its boundaries are ill-defined on the north and northeast, but its area is estimated at about 220,000 square miles, and its population at about 6,230,000, including 2,000,000 Siamese, 2,000,000 Laotians, 1,000,000 Chinese, and 1,000,000 Malays. A large part of the territory is not well known. Siam proper consists mainly of the low-lying alluvial basin of the Menam and its numerous tributaries, which flows southward into the Gulf of Siam, forming an extensive and intricate delta, on which is situated Bangkok, the capital. This alluvial plain, intersected by numerous streams and canals, is extremely fertile, producing magnificent crops of rice, sugar, cotton, maize, and indigo. Both sides of the Menam basin are skirted by densely wooded ranges of hills, forming the water-

partings towards the Salwin and Mekong, the latter of which is the great river of Eastern Siam. The minerals include gold, tin, iron, copper, lead, zinc, and antimony, besides several precious stones, such as the sapphire, oriental ruby, and oriental topaz. Mining is chiefly in the hands of the Chinese. Much of Upper Siam seems incapable of being cultivated. During the dry season, which lasts from November to May, there is an utter absence of rain in this region, which again is so flooded by rain during the wet season as to be converted into a vast swampy forest. Cocoa and areca palms are numerous in Siam; fruits are abundant and of excellent quality; black pepper, tobacco, cardamoms, and gamboge are important products. The forests produce aloes-wood, sappan-wood, teak-timber, bamboos, rattans, gutta-percha, dammar, catechu, benzoin, etc. Among wild animals are the tiger, leopard, bear, otter, ourang-outang, single-horned-rhinoceros, and elephant, which here attains a size and beauty elsewhere unknown. The last, when of a white color, is held in the highest reverence. 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 python serpent attains an immense size, and there are many species of snakes.

**Commerce.**—Nearly the whole of the trade of Siam is in the hands of foreigners, and the foreign trade centers at Bangkok. The chief export is rice, after which come teak, pepper, dried fish, birds'-nests, cattle, and teel seed. The chief imports are gold-leaf and cotton fabrics, after which come opium, china goods, gunny bags, hardware, kerosene-oil, and silk goods. The trade is chiefly with Hong-Kong and Singapore, and (to a much less extent) with Lower Burmah and Great Britain.

**People.**—The Siamese are members of the great Mongolian family, and of the same race as the people of Burmah and Anam. In stature they do not average more than 5 feet 3 inches in height; they have a lighter-colored skin than the western Asiatics, but darker than the Chinese. They are generally vain, indolent, superstitious, and cowardly, but polite, kind-hearted, and tolerant. Elementary education is general, most of the Siamese being able to read and write. Among the higher classes European manners and customs are gaining admission, including European dress. The houses are mostly constructed of timber and bamboo, and in

localities subject to inundation are raised on piles. The Siamese profess Buddhism, introduced into the country about the middle of the seventh century. Christianity is now making some progress in the country. Some of the temples are large and elaborate structures, richly decorated. The language forms a connecting link between the Chinese and Malay. The written characters seem to be derived from a form of Sanskrit. The literature is meager, uninteresting, and in point of imagination and force of expression much below the Arabic, Persian, or Hindustani. The literary language has been much influenced by Pali and Sanskrit. The language of the chief Buddhist works is Pali. The printing-press has been introduced in recent years, and many of the best Siamese works can now be had in a printed form.

**Government.**—The legislative power is exercised by the king in conjunction with a council of ministers. The royal revenue, estimated at \$10,000,000 a year, is raised by the land-tax, and by taxes on fruit-trees, spirits, opium, gambling, customs, tin-mines, edible birds'-nests, and fisheries. There is a small standing army, officered to some extent by Europeans, and a general armament of the people, in the form of a militia. There are about 40 provinces, each administered by a governor.

**History.**—Siam appears to have no place in history prior to A. D. 638, and the credible records go back only to 1350, the date of the foundation of Ayuthia, the old capital. The Portuguese established intercourse with Siam in 1511, but in the seventeenth century were gradually supplanted by the Dutch. English traders were in Siam very early in the seventeenth century, but in consequence of a massacre their factory at Ayuthia was abandoned in 1688. The French were expelled about the same time, and the trade was neglected until 1856, when Sir J. Bowring's treaty again opened up Siam to Europeans. Since that date western ideas of civilization have been introduced to some extent, and a few of the Siamese youth are now sent to Europe for their education. The recent king, Chulalongkorn I, was born in 1853, and succeeded his father in 1868. Like his father he had an education in English, and was alive to the advantages to be obtained by adopting European inventions and discoveries. He died Oct. 3, 1910, and was succeeded by his son Vajiravudh. In 1893 France acquired possession of the eastern bank of the Mekong river as far north as the 23d parallel, including the river islands. This act on the part of

France greatly reduced the area of Siam. In 1917 it declared war against Germany.

**Siamang** (s'i-a-mang; *Siamanga* or *Hylodactylus syndactylus*), one of the higher anthropoid or man-like apes. This animal inhabits Sumatra. It averages about 3 feet in height.

**Siamese Twins**, the best-known example of two human beings having their bodies connected inseparably from their birth, being joined by a thick fleshy ligament from the lower end of the breast-bone of each, having the common navel on its lower border, so that they stood in a sort of oblique position towards each other. Born in Siam in 1811, of a Chinese father and a Sino-Siamese mother, and named Eng ('right') and Chang ('left'), they were brought to the United States in 1820. They were on exhibition in Europe and America a number of times, and ultimately settled in the State of North Carolina. They married two sisters and had large families of children, none of whom exhibited any malformation. Chang received a paralytic stroke in 1870, and three years later was affected with an inflammatory disease of the respiratory organs. He died unexpectedly (Jan. 17, 1874) while his brother was asleep, and Eng died a few hours afterwards. The Siamese twins attracted great attention during their lifetime, particularly from physiologists and medical men, some of whom thought that the ligament connecting them might have been cut without causing the death of either.

**Sibbald** (sib'ald), **SIR ROBERT**, a Scottish physician and naturalist, born in 1641, was educated at Edinburgh, Leyden and Paris, and settled in Edinburgh as a physician in 1662. He was the first professor of medicine in the University of Edinburgh, took a leading part in establishing the Royal College of Physicians and was its first president. He was also one of the founders of the botanic garden, and the author of numerous pamphlets and treatises on medicine, botany, zoology, and Scottish antiquities. In 1682, in recognition of his eminence in science and medicine, he was knighted by the Duke of York, then high commissioner in Scotland. He died in 1712.

**Sibbaldia** (sib-al'di-a), a genus of dwarf evergreen plants, nat. order Rosaceæ, named after Sir Robert Sibbald (above). *S. procumbens* has trifoliate leaves and heads of small yellowish flowers. It is found on the summits of the mountains in Vermont, as well as in similar localities from Canada to Greenland.

**Siberia** (si-bé'ri-a), a great division of the Russian dominions. It occupies all North Asia, stretching uninterruptedly eastward from the Ural Mountains to the Pacific Ocean, and southwards from the Arctic Ocean to the Chinese dominions and Russian Central Asia. It has a total area of about 4,800,000 square miles, with a population of about 6,740,600, and is divided into the governor-generalships of Western Siberia, Eastern Siberia, and the Amur region; Western Siberia, including the governments of Tobolsk and Tomsk; Eastern Siberia, including the governments of Yeniseisk and Irkutsk and the provinces of Yakutsk and Transbaikalia; and the Amur region, including the province of Amur and the Maritime Province or Primorskaya. A region of such vast extent has naturally a very diversified configuration; but generally speaking Siberia may be considered as a vast inclined plane sloping gradually from the Altai, Sayan, and Yablonoi Mountains on the south to the Arctic Ocean on the north. In the east it is traversed in different directions by several mountain ranges, but elsewhere it is almost unbroken by any greater heights than a few hills. It is drained chiefly by the Obi (2120 miles), with its great tributary, the Irtysh (2520 miles), the Yenisei, and the Lena (3000 miles), all of which pursue a northerly course to the Arctic Ocean; and by the Amur (2700 miles, 2400 of which are navigable), which flows in an easterly and northeasterly direction to the Pacific. The principal lake is Lake Baikal, in the south, 400 miles long, 20 to 53 broad, and 1560 feet above sea-level. The chief islands are the New Siberia group in the Arctic Ocean, and the island of Saghalin, off the mouth of the Amur, in the Sea of Okhotsk, an arm of the Pacific. The coast-line is very extensive, but the Arctic Ocean is ice-bound at least ten months out of the twelve, and is almost valueless for commercial purposes, and the Sea of Okhotsk, on the Pacific, is infested with masses of floating ice and dense fogs. The principal ports are Vladivostok, on the Sea of Japan, the chief naval station of Russia on the Pacific; Okhotsk, on the Sea of Okhotsk; and Petropavlovsk, on the east coast of Kamchatka. Siberia enjoys a warm summer, but the winter is exceedingly severe. South Siberia has, in many parts, a very fertile soil, which yields rich crops of wheat, rye, oats, and potatoes; but immense tracts of Siberia are utterly unfit for tillage, more particularly the tundras or great stretches of boggy country along the Arctic Ocean. In the west are extensive steppes.

Roughly speaking, the northern limits of agriculture are 60° N. lat. Cattle-breeding and bee-keeping are largely pursued. Hunting and fishing are also sources of remuneration, ermines, sables, and other fur-bearing animals being numerous. The wild animals include the elk, reindeer, and other deer, bear, wolf, white and blue fox, lynx, etc. The forests are extensive and valuable, the forest belt, continuous with that of Russia, being perhaps the largest extent of forest land in the world, with the exception of the Amazonian forest. The trees consist of pine, spruce, oak, maple, beech, birch, poplar, etc. Manufactures and mining are in a backward state, though Siberia has very considerable mineral wealth. Large quantities of gold are obtained, as well as silver, platinum, lead, iron, coal, etc. The trade is mainly with Russia, the foreign trade being insignificant. The chief towns are Irkutsk, capital of Eastern Siberia and a trading city; Tomsk, capital of gov. Tomsk, a trading city, with a university; Tobolsk, capital of Western Siberia; Omsk, and Vladivostok. Yermak, a Cossack adventurer, entered Western Siberia in 1580, and made a rapid conquest of the western portion of the country, which he handed over to Ivan the Terrible of Russia. Bands of hunters and adventurers then made their way across the Urals, attracted by the furs, and gradually penetrated to the Arctic Ocean and the Pacific. The latest acquisitions by Russia were the Amur territory, and coast regions of Manchuria, ceded by China in 1858 and 1860, but further progress in that section of Asia was checked by the war with Japan in 1904-05. Prior to the European war, 1914-18, Siberia was used as a place of exile, and thither were sent the men and women who opposed the Czarist government. These political offenders were at first kept under restraint, but gradually were permitted considerable liberty, and many of them settled in Siberia and so well did they develop the land that many enterprising tenants were attracted. This northward trek was stimulated by the building of the Trans-Siberian Railroad, giving communication, without change, from Petrograd to Vladivostok and Port Arthur, its full length being over 5600 miles. The Siberians objected to the Bolshevik (q. v.) form of government, established by Lenin at Moscow, and at the end of 1918 set up a separate government, with headquarters at Omsk. In their struggle with the Bolsheviks they were aided by the Czecho-Slovaks, and by American and Allied troops who were landed in the country.

**Sibi** (sē-bē'), a district of Southern Afghanistan, ceded to the British by the terms of the treaty of Gandamak in 1881; pop. 74,555. Its administration is carried on under the control of the governor-general's agent in Baluchistan. The town of Sibi has developed very largely since the cession, and especially since the opening of the Sind-Pishin Railway, on which it is a station. Pop. 4551.

**Sibságar** (sēb-sā'gur), chief town of Sibságar District, Assam Province, India, on the navigable Dihlu, 9 miles south of the Brahmaputra. It is the seat of some river trade, and has exports of cotton, rice, and, above all, of tea, Sibságar District ranking as the first tea-growing district in Assam proper. Pop. 5868.--The district, which is mostly a level plain intersected by tributaries of the Brahmaputra; area, 4906 square miles. Pop. 597,909.

**Sibutu.** See *Cagayan*.

**Sibyl** (sib'ill), the name common to certain women mentioned by Greek and Roman writers, and said to be endowed with a prophetic spirit. Their number is variously stated, but is generally given as ten. Of these the most celebrated was the Cumæan sibyl (from Cumæ in Campania). She is said to have written in Greek verses the collection of prophecies famous under the name of Sibylline books, and containing the *fata urbis Romæ*, which she offered to Tarquin the Proud for sale. When the king, on account of the high price asked, refused to buy them, she threw three of the books into the fire, and on a second refusal three more, after which the king, alarmed, paid for the three remaining the price originally asked for the whole. These books were preserved in the temple of Jupiter Capitolinus, and were consulted on occasions of national danger. In 83 B.C. they were destroyed by fire along with the temple, and the senate sent delegates to the Italian and Greek cities, especially to Erythræ, to collect whatever Sibylline verses they could find; and after the rejection of those which were considered spurious, about 1000 of them were retained, and preserved in the new temple of Jupiter Capitolinus. This collection of Sibylline oracles seems to have been burned by Stilicho shortly after 400 A.D. The so-called Sibylline oracles which have come down to modern times are of Jewish or Christian origin, dating from about 170 B.C. to 700 A.D.

**Sicard** (sē-kār), ROCH-AMBROISE CURRON, famous in the history of the education of deaf-mutes, was born in 1742 near Toulouse, entered into holy



orders, and was sent by the Archbishop of Bordeaux to Paris to study the method of the Abbé de l'Epée for the instruction of deaf-mutes. He became, in 1786, director of the school for deaf-mutes established by the Archbishop of Bordeaux in the city of that name, whence, in 1789, he removed to Paris as successor to the Abbé de l'Epée, in whose system he had made some important improvements. He also wrote several works on the instruction of deaf-mutes. During the revolution he narrowly escaped with his life; and under the Directory it was only by concealing himself that he was enabled to avoid the consequences of a sentence of exile pronounced against him. He died in 1822.

**Sicca** (sik'a), an Indian jeweler's weight of about 180 grains troy. The Sicca rupee, formerly current in India, contained about 176 grains of pure silver, and was equal to about 52 cents.

**Sicilian Vespers** (si-sil'yan), the name given to the outbreak of the insurrection in Sicily in 1282 against the French. Charles of Anjou (see next article) had established himself, through the favor of the pope, in possession of the Two Sicilies. He ruled with great severity, and the oppressed people applied in vain for relief to the pope. Giovanni di Procida, a nobleman of Salerno, went to Aragon, and invited King Pedro, whose wife, Constantia, was a daughter of the former king, Manfred, to undertake the conquest of Sicily. Pedro embraced his proposals, and on March 30, 1282, at the hour of vespers on Easter Monday, the inhabitants of Palermo flew to arms and fell upon the French, who were all massacred. Before the end of April Messina and other towns followed the example of Palermo, and the Sicilian Vespers ended in the overthrow of the domination of Charles of Anjou and the establishment of the Aragonese dynasty.

**Sicilies** (sis'i-lez), **KINGDOM OF THE Two**, a former kingdom of Italy, consisting of Naples (or South Italy) and Sicily. In 1047, while Greeks and Saracens were struggling for the possession of Lower Italy and Sicily, the twelve sons of Tancred de Hauteville, a count in Lower Normandy, came in with their followers. Robert Guiscard, one of these brothers, subdued Apulia and Calabria, taking the title of duke, and his youngest brother, Count Roger, conquered Sicily. Roger's son and successor, Roger II, completed the conquest of all Lower Italy by subduing Capua, Amalfi, and Naples, at that time celebrated commercial republics, and in 1130 took the title

of king, calling his kingdom the Kingdom of the Two Sicilies. In 1189 the race of Tancred became extinct, and the German emperor, Henry VI, of the house of Hohenstaufen, claimed the kingdom in right of his wife, Constantia, the daughter of Roger II. The kingdom remained with the family of Hohenstaufen until 1206, when Pope Urban IV, feudal overlord, bestowed it upon Charles of Anjou, brother of Louis IX of France, who caused the legitimate heir, Conradin of Suabia (1238), to be beheaded. Sicily, however, freed herself in 1282 from the oppressions of the French (see *Sicilian Vespers*) 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 until 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 (1738), 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 revolution and the subsequent European commotions. (See *Ferdinand I.*) 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 prov-

inces 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** (sik'i-li), the largest island of the Mediterranean, belonging to Italy, from the southwestern extremity of which it is separated by the narrow strait of Messina, about 2 miles wide; area about 9700 sq. miles, divided into seven provinces; pop. about 2,000,000. It is triangular in shape, ending in the three capes of Faro on the N. E., Scirocco on the S., and Boeo on the W.; whence the ancient poetical name of Trinacria. The north and east coasts are steep and rocky, and are provided with good harbors, the finest being that of Palermo, the south and west coasts are flatter and less indented. The greater part of the surface consists of a plateau of varying elevation. Considerable mountains occur in the north, beginning at the northeastern extremity of the island, where they are evidently a continuation of the mountains on the other side of the Strait of Messina. They reach heights varying from 4000 to 6000 feet. The lower slopes of these mountains are clothed with olive-yards and orange-groves, mulberry gardens and vineyards, and their higher slopes with forests of oak and chestnut. The highest elevation in Sicily is the active volcano of Etna, in the east of the island, which rises to a height of 10,874 feet. (See *Etna*.) To the south of Etna, on the east coast, is the plain of Catania, the only plain of any great extent. It is watered by the Simeto. The principal perennial streams, besides the Simeto, are the Salso, Platani, and Belice. The climate, as in the other regions of the Mediterranean, is mild and equable, but its salubrity is impaired by the sirocco, and, locally, by the occurrence of malaria. The soil is very fertile. Three-fourths of the cultivated surface are covered with cereals, chiefly wheat, though oats and barley are also grown. Cotton, sugar, and tobacco are also cultivated to some extent. Fruits of every variety are extensively grown, including large quantities of oranges and lemons. The vine flourishes almost everywhere, and much wine is produced. The chief exports are fruits, wine, and sulphur, besides olive-oil, sumach, cream of

tartar, etc. Sicilian sulphur is extensively exported, the center of this trade being Girgenti, on the south coast. Tunny and sardine fisheries are carried on round the coast. Manufactures are but little developed. The chief seats of foreign commerce are the three principal towns, Palermo, Messina, and Catania. The system of roads and railways is still defective. Agriculture is generally carried on in a very primitive manner, and the rural populations are in a very rude and debased condition. Education is extremely backward; life and property are by no means secure, and brigandage still exists as well as the custom of the vendetta.

At the dawn of history the older races inhabiting Sicily, the Iberian Sicani, from Iberia (Spain), and the Siculi from Italy, were hemmed in by Phœnician and Greek colonies. The Greeks, who entered the island in the eighth century B.C., founded the great cities of Syracuse, Agrigentum, and Messina, drove the Phœnicians to the northwest coast, and spread their influence and culture over the whole island. Greek art and literature here flourished, and many Greek names of distinction are connected with Sicily. The Carthaginians subsequently took the place of their kinsmen, the Phœnicians, and between them and the Greeks a struggle ensued, which ended in favor of the latter (480 B.C.). War with the Carthaginians (1st Punic war) brought the Romans to Sicily, and having acquired the Carthaginian portion of the island (241 B.C.) they extended their rule over the whole, Sicily becoming a Roman province in 212 B.C. On the decline of the Roman Empire the island was overrun by the Goths, who retained possession till A.D. 551, when Sicily became part of the Byzantine Empire. In the beginning of the ninth century the Saracens became masters, and continued so till their expulsion by the Normans in the eleventh century, 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* (*Kingdom of the Two*). The most important recent event on the island was the earthquake of Dec. 28, 1908, which destroyed the flourishing city of Messina with about 100,000 of its population. The ruined city is gradually being rebuilt.

**Sickingen** (zik'ing-en), FRANZ VON, a famous German knight of large possessions in the Rhine valley, was born in 1481, and from early youth devoted himself to the military life. He aided the emperors Maximilian I and Charles V in their wars, engaged in repeated private feuds of his own; gained

great renown as a protector of the poor and oppressed; was a friend of the Humanists and Reformers, and under the influence of Ulrich von Hutten, formed a scheme to carry through the Reformation by force, and abolish the ecclesiastical principalities. He began the war by an attack on the Archbishop of Treves, but was assailed by the landgrave of Hesse and the count palatine of the Rhine, and at last he was compelled to surrender, mortally wounded, together with his last castle, Landstuhl, near Kaiserslautern. He died the day after the capitulation, May 7, 1523.

**Sickle** (sik'i), a reaping-hook; a curved blade of steel with a handle, and having the edge of the blade in the hollow of the curve, used for cutting grain and the like. The sickle has been mostly superseded by the scythe, and the scythe in turn has given place to the mowing- and reaping-machines.

**Sickles**, DANIEL EDGAR, soldier, born in New York city in 1825. He studied law, and was elected to Congress on the Democratic ticket in 1856. In 1859 he killed Philip Barton Key for illicit relations with his wife; was tried, and acquitted through the force of public sympathy after a trial lasting twenty days. He entered the army during the Civil War and was made successively brigadier-general and major-general of volunteers, commanding a brigade in the battles around Richmond, a division at Antietam, and a corps at Chancellorsville. He commanded the third corps at Gettysburg and lost a leg in the battle of July 2, 1863. In 1867 he was made commander of the second military district, comprising North and South Carolina. He was appointed minister to Spain in 1869, and since then was president of the New York Civil Service Board, sheriff of New York and member of Congress. He died May 2, 1914.

**Siculi** (sic'u-li), an ancient Sicilian tribe that occupied the eastern half of the island of Sicily.

**Sicyon** (sis'i-on), a city of ancient Greece, in the northern part of the Peloponnesus, 9 miles from Corinth, and near the Gulf of Corinth, on which it had a port. Sicyon was celebrated for its schools of sculpture and painting. At first dependent upon Argos, it was afterwards closely allied to Sparta, which it aided in the Peloponnesian War. Under Aratus (251 B.C.) it became one of the most important cities of the Achaean league, of which it finally shared the fate, falling under the dominion of Rome. In the second century A.D. it was almost depopulated.

**Sida** (sē'da), a genus of herbs and shrubs, nat. order Malvaceae, the numerous species of which are extensively distributed throughout the warm parts of the world. Like all malvaceous plants they abound in mucilage, and some species are employed in medicine, especially in India, while others have tough ligneous fibers which are used for cordage in various countries.

**Siddons** (sid'unz), SARAH, daughter of Roger Kemble, the manager of an itinerant company of players, was born at Brecon, South Wales, in 1755. She commenced her theatrical career when quite a child, and in her nineteenth year was married to William Siddons, an actor in her father's company. In 1774 she met with the first recognition of her great powers as an actress at Cheltenham in consequence of her representation of *Belvidera* in *Venice Preserved*. Her success at Cheltenham procured for her an engagement at Drury Lane, but her first appearance there was a comparative failure, and in 1777 she again went on circuit in the provinces. Her second appearance at Drury Lane took place October 10, 1782, in the character of *Isabella* in the *Fatal Marriage*. Her success was complete, and she was universally acknowledged to be the first tragic actress of the English stage. For thirty years she continued to astonish and enchant the lovers of the drama, and having acquired an ample fortune, she took her leave of the stage in 1812. Her greatest characters were *Queen Catharine* in *Henry VIII*, and *Lady Macbeth*. In her art she was a close and systematic student, while in private life she enjoyed the respect of all who knew her. She died June 8, 1831.

**Sidereal System.** See *Stars*.

**Sidereal Time** (si-dē're-al), 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, and is exactly the period of the revolution of the earth on its axis. It is the most constant unit of time which we possess. Its length is 23 hours 56 minutes 4.098 seconds. A *sidereal year* is the period in which the fixed stars apparently complete a revolution and come to the same point in the heavens, and is the exact period of the revolution of the earth round the sun. There are thus 365 days, 6 hours, 9 minutes, 9.5 seconds in a sidereal year. See *Day*.

**Siderite** (sid'er-ite), in mineralogy, an important iron ore, also called spathic iron ore. See *Iron*.

**Sideroxylon.** See *Iron-wood*.

**Sidgwick** (sidj'wik), HENRY, writer on moral philosophy, was born at Skipton, Yorkshire, in 1838, was educated at Rugby and Trinity College, Cambridge, and became a fellow and lecturer of his college in 1859. In 1875 he was appointed prælector of moral philosophy in Trinity College, and in 1883 Knightbridge professor of moral philosophy in the university. His works include *Methods of Ethics* (1874), *Principles of Political Economy* (1883), and *Outlines of the History of Ethics* (1883). He died September 26, 1900.

**Sidi-Bel-Abbès** (sè'dè-bel-äb-bäs'), a fortified town of Algeria, in the department of Oran, 48 miles by rail south of Oran, on the Mekerra, in a healthy, fertile, and populous plain. It is a town of quite recent origin, and is the center of one of the chief esparto-grass districts in Algeria. Pop. (1906) 24,494.

**Sidmouth,** VISCOUNT. See *Adding-ton*.

**Sidney** (sid'ni), a city, county seat of Shelby county, Ohio, on the Miami, 12 miles N. N. E. of Piqua. There are manufactures of iron wares, leather, hollow-ware (both cast-iron and aluminum), road-scrappers, wheelbarrows, tools, machinery, etc. 6607.

**Sidney,** or SYDNEY, ALGERNON, second earl of Leicester, and of Dorothy Percy, daughter of Henry, earl of Northumberland, was born at Penshurst, Kent, in 1622. He accompanied his father in his embassies to Denmark and France. He was also early trained to a military life, and served with some distinction in Ireland, where his father was lord-lieutenant. In 1643 he returned to England, and joined the parliamentary forces. In 1644 he was lieutenant-colonel of a regiment of horse in Manchester's army, and was severely wounded at Marston Moor. In 1645 he was given the command of a cavalry regiment in Cromwell's division of Fairfax's army, and was returned to parliament for Cardiff. He was nominated one of the commissioners to try Charles I, but took no part in the trial, although he approved of the sentence. He refused all concurrence in the government of Cromwell, retiring to Penshurst, but when the return of the Long Parliament in May, 1659, gave expectations of the establishment of a republic, he again took his seat, and was nominated one of the council of state. He was soon after appointed a commissioner to mediate a peace between Denmark and Sweden,

and while he was engaged in this embassy the Restoration took place. Conscious of the offense he had given the royal party, he refused to return, and remained an exile for seventeen years. At length, in 1677, the influence of his friends procured him permission to return to England. After the death of Shaftesbury, in 1682, he entered into the conferences held between Monmouth, Russell, Essex, Hampden, and others, and on the discovery of the Rye House Plot he was arrested and sent to the Tower on a charge of high treason. He was tried before the notorious Chief-justice Jeffreys, and his trial was conducted with a shameless absence of equity which has conferred upon him all the glory of a martyr. He was executed on Tower Hill, December 7, 1683. Parliament about 1690 declared his sentence unjust. His *Discourses Concerning Government* were first printed in 1698.

**Sidney,** SIR PHILIP, one of the most conspicuous figures at the court of Queen Elizabeth, was the son of Sir Henry Sidney of Penshurst, Kent, where he was born Nov. 29, 1554. He became a favorite with the queen, who in 1577 sent him on an embassy to Germany. In 1583 he married Frances, daughter of Sir Francis Walsingham, and the same year he received the honor of knighthood. In 1585 he went to the Netherlands with his uncle Dudley, earl of Leicester, who commanded the forces sent to assist the Dutch against the Spaniards, and he was appointed governor of Flushing and general of horse, but at Zutphen, Sept. 22, 1586, he was mortally wounded, and died at Arnheim, Oct. 7. He was a man of versatile gifts, and made his mark in many ways. He was a soldier and statesman of great promise, and his contributions to literature, though not numerous, were of great importance. They include the *Lady of the May*, a masque, performed in 1578; *Arcadia* (1590), a romance in a medley of prose and verse in an Italian style then popular; *Astrophel and Stella* (1591), the first important body of sonnets in the English language; and the *Defense of Poesy*, first published in 1595 as an *Apologie for Poetrie*.

**Sidon** (si'don), or ZIDON, a seaport of Syria, situated on the eastern coast of the Mediterranean, between Lebanon and the sea, about midway between Beyrout and Tyre, was long the principal city of Phœnicia (1600-1300 B.C.). Its artistic products were famous at an early period, as also its manufactures of glass, linen, purple dye, and perfumes, and in commercial enterprise it occupied a dis-



tinguished position. In the Persian, Grecian and Roman periods it was still great and populous, and even in the middle ages it was a place of considerable importance. During the crusades it was taken and retaken several times. It was almost completely destroyed during the troubles of the thirteenth century, but in the fifteenth it reappeared, under its modern name of Salda, as the port of Damascus. The trade is now unimportant. Pop. about 15,000.

**Siebenbürgen** (zē'ben-bür-ge-n). See *Transylvania*.

**Siebengebirge** (zē'bēn-ge-bir-gē; 'Seven Mountains'), a small mountain range of Germany, on the right bank of the Rhine, not far from Bonn. Seven mountains tower above the rest, of which the Drachenfels, close to the Rhine, and presenting a splendid view from the river, is the most beautiful. On all of them are ruins of ancient castles.

**Siebold** (zē'boit), PHILIP FRANZ VON, scientific explorer of Japan, born at Würzburg, Germany, 1796; died 1860. He studied medicine, and entered the service of the king of the Netherlands as medical officer in the East Indian army, and on his arrival at Batavia was attached to a mission to Japan. His medical qualifications gained him the favor of the Japanese, and enabled him to collect a vast amount of information concerning that country, then so little known. On his return to Europe he published a number of valuable books on Japan, and founded the Japanese Museum at Munich.—His brother, KARL THEODOR SIEBOLD (1804-1885), published several standard works on zoology.

**Siedlce** (syed'l-tse), a town of Russian Poland, capital of the government of the same name, 57 miles E. S. E. of Warsaw, the seat of a bishop. Pop. 23,714.—The government of Siedlce, between the Vistula and the Bug, has an area of 5533 square miles, and a population (1906) of 907,700.

**Siege** (sēj), the surrounding or investment of a fortified place by an army with a view to its capture. The taking of a fortified place may be attempted (1) by surprise, (2) by a sudden onset, (3) by blockade out of gunshot (see *Blockade*), (4) by a siege, properly so called. In a regular siege the fortress is first blockaded, so as to cut off all intercourse from without, the besieging force encamping just beyond reach of the enemies' guns. Then if any detached works are situated before the fortress, their capture must be effected in order to admit the opening of the

trenches. The trenches are formed in the direction of the fortress; but that they may not be enfiladed from thence they must proceed in a zigzag form. (See *Sap*.) For the protection of the workers trenches called *parallels*, because they run in a direction parallel or nearly so to the sides of the fortress, are dug at intervals. While the trenches are being opened, the besieged, by sallies and counter operations of every kind, strive to drive off the besiegers, and to destroy their work; and the besiegers make efforts to establish themselves more and more securely, to raise batteries, and then, by means of trenches and advanced parallels, to approach the walls of the fortress; and all the while the artillery is kept constantly playing from the batteries of the besiegers as well as from the works and guns of the besieged. From the last parallel, which approaches very near the fortress, the besiegers prepare to make breaches. Here likewise mining operations are carried on whenever they are found advisable. When at last the breaches are practicable the storming or scaling of the walls follows.

**Siegen** (zē'gēn), a town of Germany, in the Prussian province of Westphalia, on the Sieg, 47 miles east of Cologne. It is an ancient place, with manufactures of leather, paper, soap, linen, etc., while in the vicinity are numerous iron-mines and smelting furnaces. Pop. (1905) 25,201.

**Siegfrid** (sēg'frēd). See *Sigurd*.

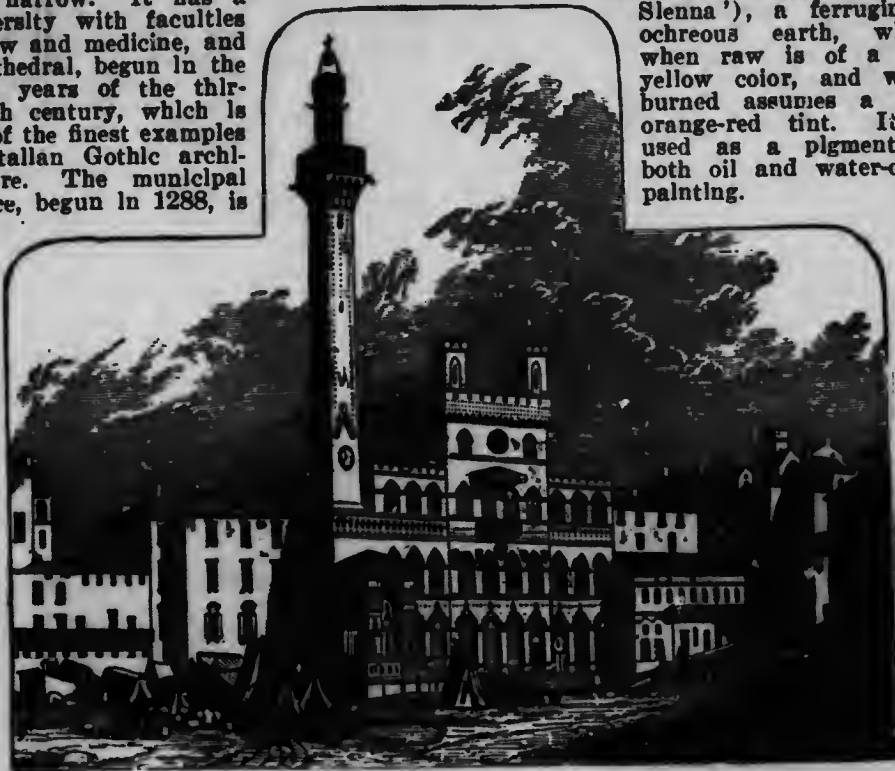
**Siemens** (sē'mēns), SIR CHARLES WILLIAM, engineer, born in Hanover, April 4, 1823, was educated at the gymnasium at Lübeck, the polytechnic school at Magdeburg, and the University of Göttingen. After a training in engineering and electricity in the workshops of Count Stolberg he migrated to London in 1843, and at a later date was joined by his brother (Werner), who took part in his various undertakings. The great works of Siemens Brothers at Charlton, West Woolwich, for the manufacture of submarine electric telegraph cables, were established in 1868; and the great steel-works at Landore, Swansea, in 1868. He labored mainly in two distinct fields, the applications of heat and the applications of electricity, and won a great reputation in both. He was knighted, April, 1883, in reward for his services, which had been previously recognized by numerous scientific societies, and by the Universities of Oxford, Glasgow, Dublin and Würzburg. He died at London in November, 1883, and his brother, Werner, in 1892.

## Siena

**Siena** (sē-ā'nā), or **SIENNA** (anciently *Sens Julia*), a city of Central Italy, on three connected hills on the southern frontiers of Tuscany, 59 miles south of Florence, is surrounded by old walls, entered by nine gates, and has also a citadel; the streets are irregular, steep and narrow. It has a university with faculties of law and medicine, and a cathedral, begun in the early years of the thirteenth century, which is one of the finest examples of Italian Gothic architecture. The municipal palace, begun in 1288, is

popular historical novels, including *Que Vadis*, a story of Imperial Rome; *The Deluge*, *Sword and Fire*, *Knights of the Cross*, etc. His first novel, one of humor, was entitled *A Prophet in His Own Country*. He died in 1916.

**Sien'na**, or **SIENNA EARTH** (It. *Tierra di Sienna*, 'earth of Sienna'), a ferruginous ochreous earth, which when raw is of a fine yellow color, and when burned assumes a rich orange-red tint. It is used as a pigment in both oil and water-color painting.



Palazzo Pubblico or Municipal Buildings, Siena.

a fine specimen of Pointed Gothic. It stands in the historic Piazza del Campo, now the Piazza di Vittorio Emanuele, a large open semicircular space in the center of the city, and is adorned with frescoes of the Sienese school. The institute of fine arts contains a valuable collection of pictures of the older Sienese painters. There are various other buildings of interest, including churches and palaces. The manufactures are not of much importance. In the middle ages Siena gave its name to a school of painting, and was the birthplace of famous painters, sculptors and architects. It was long the powerful rival of Florence, but was annexed to Tuscany in 1557. Siena is the seat of an archbishop. Pop. 42,389.

**Sienkiewicz**, **HENRY**, a Polish novelist, born in Lithuania in 1845. He produced a number of

**Sieradz** (syā'rāds), a town of Russian Poland, government of Kalish, on the Warta, 127 miles s. w. of Warsaw. It is an ancient place, having been founded prior to the introduction of Christianity. Pop. 7019.

**Sierra** (sē-er'rá; Spanish, 'a saw'), a term applied in Spain and Spanish-peopled countries to a ridge of mountains.

**Sierra Leone** (si-er'ra le-ō'nē), a British colony on the coast of Western Africa; a coaling station for the Royal Navy, and the headquarters of the West India regiments stationed on the west coast of Africa. The colony consists of the peninsula of Sierra Leone proper, Sherbro Island and several other small islands, and the whole coast region from the French territory on the northwest to that of Liberia on the

southeast; area in occupation, 468 square miles; of entire colony, about 4000 square miles. The inhabitants depend chiefly upon trade, and are mostly collected in Freetown (the capital) and the neighboring villages. The exports are palm kernels, palm-oil, rubber, ground-nuts, kola-nuts, gum-copai, hides, ginger, and benné-seed. The trade is chiefly with Great Britain. Education is purely denominational, but is assisted by state aid. Fourah Bay College, for the education of a native ministry supported by the Church Missionary Society, is affiliated with Durham University. Sierra Leone is a crown colony under the governor of the West Africa Settlements; but four people's representatives are called to the Legislative Council. It first became a British colony in 1787, when a company was formed with the intention of making it a home for rescued slaves. One great obstacle to the prosperity of the colony is the deadly nature of its climate, particularly to Europeans, and Sierra Leone was long known as the 'white man's grave.' But Freetown, in particular, has now a good supply of pure water, and great improvements in sanitation have recently been effected. Pop. 76,655.

**Sierra Madre** (má'drá), the name given the mountain range that bounds the Mexican plateau on the west. The eastern and central mountains are also often given the same name.

**Sierra Morena** (mō-rē'na), a chain of mountains in Spain, between New Castile and Andalusia, separating the Guadiana on the north and the Guadalquivir on the south, and attaining a height of 5550 feet above sea-level.

**Sierra Nevada** (nē-vā'dá; Spanish, 'Snowy Range'), a chain of mountains in Southern Spain, the most elevated in the peninsula. The greater part of it is in the province of Granada, running east and west, and the highest peak is Mulahacen, which has an elevation of about 11,678 feet, and is capped with everlasting snow. The range is rich in fertile valleys and picturesque scenery.

**Sierra Nevada**, a mountain range in California, extending north and south along the eastern boundary of the state, over an extent of 400 miles. It consists of an aggregate of ranges, on an average some 70 miles wide, with numerous peaks reaching an elevation of from 10,000 to over 14,000 feet, Mount Whitney (the loftiest peak of the United States outside of Alaska) being 14,898 feet high. Gold-mining, timber-cutting, and sheep-rearing are im-

portant industries in these ranges. Deep and narrow valleys are striking features of the range, these having almost vertical walls thousands of feet in height. They include the famous Yosemite, the Hetch-hetchy, and others. Much of the region is densely forested, its trees including the gigantic *Sequoia gigantea*, the greatest of trees.

**Sieyès** (sye-yās), EMMANUEL JOSEPH, better known as the Abbé Sieyès, was born at Fréjus in 1748, and pursued his studies for the church at Paris. He was active in furthering the progress of the revolution, and soon acquired great influence in the National Assembly. He originated the idea of the new geographical division of France into departments, arrondissements, and communes. In 1791 he became member for the Seine department, and in 1792 deputy for the department of Sarthe. During the Reign of Terror he withdrew into the country, but after Robespierre's downfall he returned to the convention and took an active part in affairs. In 1799, on his return from a mission to Berlin, by which he secured the neutrality of Prussia, he became a member of the directory. He subsequently suppressed the Jacobin Club, and was active in bringing about the overthrow of the directory and the substitution of the consular government by the revolution of the 18th Brumaire, the new constitution being devised by him. But Sieyès soon found his speculations completely overmatched by Bonaparte's practical energy, and though a consul provisionally, he saw it desirable to terminate his political career. He retired with the title of count, and obtained grants of land and property to the value of at least \$250,000. He was exiled at the restoration, but returned on the July revolution of 1830, and died at Paris in 1836.

**Sight** (sīt), DEFECTS OF, are usually caused by anomalies in the shape of the eye. (See *Eye*.) The normal eye is an optical apparatus so constructed that the images of distant objects are thrown with sharpness on the retina; if this is not the case the objects are not seen distinctly. There are two very common instances of defective eyesight, short-sight, or *myopia*, and long-sight, or *hypermetropia*, the one being the reverse of the other. In the former case, owing to the too great power of the crystalline lens, or to the eye cavity extending too far backwards, images from objects at some distance are formed in front of the retina. The sight of the myope is thus confused or absolutely defective for objects beyond a certain short range, but

on the other hand it is very clear for near objects. The remedy for myopia is the employment of biconcave glasses, which, if the myopia is not considerable, need only be used for looking at distant objects. In the case of *hypermetropia* objects are seen distinctly only at a range beyond that belonging to normal vision. Owing to the shortness of the eye cavity the lenses in this case are unable to converge the rays to a focus within the limits of the eye-chamber, the image being therefore formed (theoretically) behind the eye. This defect is corrected by the use of convex lenses, which, by converging the rays of light, cause the image to fall on the retina. Both these defects are usually congenital. A similar defect to hypermetropia is that of *presbyopia* (Greek *presbys*, old), which usually comes on with advancing years, and is due to diminished focusing power and lessened elasticity of the lens, the result being that the image of a near object is not clearly formed on the retina but behind it, while distant objects are seen as well as ever. The remedy in this case also is convex lenses. *Astigmatism* is a defect usually characterized by asymmetry in the curvature of the cornea in different meridians. (See *Astigmatism*.) Opacities in the cornea or crystalline lens, etc., are also not uncommon causes of defective eyesight.—*Double-vision* is when, as in some cases of squinting, each eye sees things separately or it may result from muscular paralysis.—*Night-blindness* or *hemeralopia* is a peculiar defect by which a person becomes suddenly and entirely blind when night comes on, though he can see perfectly well in the daytime. See *Night-blindness*. See also *Color-blindness* and *Squinting*.

**Sigillaria** (sij-i-lä'ri-a), a genus of fossil plants found in great abundance in the coal measures. The plant occurs in the form of compressed



Sigillaria in a Coal-mine near Liverpool.

stems attaining a height of 40 to 50 feet, and a breadth of 5 feet. The stem

generally occurs as a double layer of coal with a fluted outer surface, and showing, at regular intervals, the scars produced by the bases of the leaf-stalk. Their roots are found in the shale, and are known by the name of *stigmæria*, being at first supposed to be distinct plants. No foliage of any kind has been found connected with the trunk. Some suppose sigillarias to be allied to tree-ferns, others to Coniferae.

**Sigismund** (sij'is-mund), a German emperor from 1411-37, was born in 1368, and on the death of his father, the emperor Charles IV, he obtained the margraviate of Brandenburg. He married Mary, daughter and heiress of Louis the Great of Poland and Hungary; but on the latter's death in 1383 the Poles elected Mary's sister as queen; Sigismund, however, was crowned king of Hungary in 1387. He was subsequently involved in a war with Turkey, and being defeated by Bajazet at Nicopolis in 1396, he fled into Greece. On his return to Hungary in 1401 he was made prisoner, and the nation gave the throne to Ladislaus of Naples. Sigismund escaped, and having raised a powerful force, reduced Hungary to subjection. In 1411 he was elected emperor of Germany, and crowned at Aix-la-Chapelle. He took a leading part in the Council of Constance in 1414, but disgraced himself by allowing John Huss, to whom he had granted letters of safe-conduct, to be put to death. On the death of Wenceslaus in 1419 the Hussites refused to acknowledge his succession to the kingdom of Bohemia until he had signed the compact with the Council of Basel in 1431. He was then crowned emperor at Milan, and again at Rome in 1433. He was now in possession of the imperial crown and the crown of four kingdoms. He died at Znaim in 1437.

**Signals** (sig'nalz), the means of communicating to the eye—as by flags, lights, etc., and to the ear—as by guns, steam-whistles, fog-horns, rockets, etc., intelligence to greater distances than can be reached by the human voice. The most complete system of signaling is that devised to enable ships to communicate when at some distance. The system now in general use is a combination of square and triangular flags of the same length, and of pendants which are a little longer; the colors are black, white, red, blue, and yellow, but the first two are most used, as being more easily distinguished. For signaling in windy weather solid figures of canvas on iron frames have been introduced; but the cone, cube, cylinder, and sphere,



which present the same appearance seen from all points, are the only figures available. Consequently the number of signs is limited, and this renders a code desirable. A word may be easily spelled by hanging many flags one above another, but with flags to represent a few symbols — e. g., the nine numerals, 0, and two repeaters — much time is saved if a combination of four symbols be taken arbitrarily to represent a word or common phrase; this is a code. The above-named symbols can communicate 14,000 words and phrases; and they form the basis of the code adopted by the United States navy and the British Admiralty and Board of Trade. In the army signaling is carried on during the day by means of flags, sun-flashes (see *Helio-graph*), etc.; and during the night by means of colored lamps, or by a system of long and short flashes of light. On the railways signaling is effected by the semaphore, colored lights, and during fog by cases filled with detonating powder and placed on the rails at certain places, to be exploded by the wheels of the passing locomotive. See *Fog-signals* and *Heliosat*.

**Signature** (sig'na-tūr), in music, the signs placed at the commencement of a piece of music. There are of two kinds, the time signature and the key signature. The key signature, including the clefs, is usually written on every staff; and the sharps



Key and Time Signatures on the Treble and Bass Clefs.

1, Key of C; two minims (or their equivalents) in the bar. 2, Key of G; four crotchets in the bar. 3, Key of D; two crotchets in the bar. 4, Key of F; three minims in the bar. 5, Key of B flat; three crotchets in the bar.

or flats there occurring affect all notes of that degree (with their octaves) throughout the piece. The time signature is placed only at the beginning of the first line and where changes occur. It indicates the number of aliquot parts into which the bar is divided.

**Signature**, among printers, a number or letter placed on the first page of each sheet of a book, to distinguish the sheets and serve as a guide to the binder.

**Signet** (sig'net), in England, one of the royal seals, used for the

authentication of royal grants. In Scotland the signet is a seal by which royal warrants for the purpose of justice seem to have been at one time authenticated. The clerks to the signet or writers to the signet are a class of legal practitioners in Scotland who formerly had important privileges, which are now nearly abolished. They act generally as agents or attorneys in conducting causes before the Court of Session.

**Sign-manual**, ROYAL, the signature of the sovereign, which must be adhibited to all writs which have to pass the privy seal or great seal. The sign-manual consists usually of the initial letter of the sovereign's name, with the letter R (for *rex* or *regina*) added.

**Signorelli** (sēn-yo-rei'is), LUCA (called also, from his birthplace, LUCA DA CORTONA), a celebrated Italian painter, was born at Cortona about 1441, and studied under Piero della Francesca at Arezzo. He began to distinguish himself about 1472, and painted till 1512, or perhaps later. He was the first to apply anatomical knowledge to painting, and thus became the precursor of Michael Angelo. His greatest works are a series of magnificent frescoes in the cathedral of Orvieto, comprising the *History of Antichrist*, and *Resurrection of the Dead, Hell and Paradise*. These frescoes were finished between 1499 and 1502. Of his other works the most remarkable are the *Madonna Enthroned*, 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. He died at Arezzo about 1525.

**Signs** (sins), ASTRONOMICAL. See *Symbols* (Astronomical).

**Signs**, MATHEMATICAL, symbols which indicate mathematical processes and conditions.  $a + b$ ,  $a - b$ ,  $a + b$ ,  $a \times b$ , and  $a \sim b$  read  $a$  plus  $b$ ,  $a$  minus  $b$ ,  $a$  divided by  $b$ ,  $a$  multiplied by  $b$ , and the difference between  $a$  and  $b$ ;  $a > b$ ,  $a < b$ ,  $a = b$ ,  $a \equiv b$ , and  $a - b$  read  $a$  greater than  $b$ ,  $a$  less than  $b$ ,  $a$  equal to  $b$ ,  $a$  approximately equal to  $b$ , and  $a$  identical with  $b$ ;  $\int$  is the sign of integration;  $\therefore$  denotes *then* or *therefore*, and  $\because$  denotes *since* or *because*;  $\sqrt{a}$ ,  $\sqrt[n]{a}$ ,  $\sqrt[n]{a}$  represent the square root, the cube root, and the  $n$ th root of  $a$ .

**Sigourney** (sig'ur-nē), LYDIA HUNTER, an American authoress, was born at Norwich, Connecticut, in 1791; died in 1865. In 1815 she published a volume entitled *Moral Pieces in Prose and Verse*, which was

quickly followed by other works, most of which enjoyed a great popularity. Among her principal poems are: *Traits of the Aborigines of America*, *Zinsendorf*, *The Western Home*, and *Pocahontas*. Her prose works are mainly biographical, historical, didactic, and epistolary.

**Sigsbee** (sigs'bē), CHARLES DWIGHT, naval officer, born at Albany, New York, in 1845; was graduated from the Naval Academy in 1863; served in the battle of Mobile Bay in the Civil war; and commanded the *Maine* in 1898, when it was blown up in Havana harbor. During the Spanish war he commanded the scout steamer *St. Paul*. In 1900 he was made chief of the bureau of naval intelligence. Retired in 1907. He invented a new method in deep-sea sounding and made other inventions.

**Signenza** (sē-gen'thā), a town in Spain, in the province of Guadalajara, 72 miles northwest of Madrid. It is a place of considerable antiquity, and contains a fine Gothic cathedral. Pop. 4638.

**Sigurd** (sē'gūrd), or SIGURD, in northern mythology, the hero of the *Volsunga Saga*, on which the *Nibelungenlied* is based. According to the legend of the Volsungs, Sigurd (the Siegfried of the *Nibelungenlied*) is the posthumous son of Sigmund, son of Volsung, a descendant of Odin. After obtaining the golden treasure by slaying the dragon Fafnir with his good sword Gram he eats the monster's heart, and thus acquires the power of understanding the songs of birds. He then rides through a volume of flame surrounding a house in which the fair Brenhyldr (Brunhild) lay asleep. He wakes Brenhyldr, to whom he plights his troth, and then rides to the palace of Gluki the Nifung, whose wife gives him a potion which causes him to forget Brenhyldr and he marries Gudrun (Chriemhild), Gluki's daughter. Her brother Gunnar (Gunter) determines to marry Brenhyldr, but is unable to ride through the flames; so his mother by her arts causes Sigurd to go through the flames and bring away Brenhyldr in the form of Gunnar. Sigurd then resumes his shape, and Brenhyldr is handed over to Gunnar. When Brenhyldr hears the true story of her rescue her love for the hero turns to hatred, and she seeks to slay him. Sigurd is eventually killed by Gunnar's half-brother. His death revives Brenhyldr's love, and she dies of a broken heart. This story has given rise to more discussion than any other subject connected with the Teutonic Heroic age.

**Sihon.** See *Sir Darius*.

**Sikandarabad.** See *Secunderabad*.

**Sikhs** (sēks; from a Sanskrit word meaning 'disciple'), a religious sect in Northwestern Hindustan which worships one only and invisible God. Its founder was Nanak Shah, born in 1469 in the province of Lahore. He labored to lead the people to a practical religion, to a pure worship of God and love to mankind. He died about 1540. Of his successors Arjun-mai gave stability and unity to the religion by publishing Nanak's writings in the *Adi-Granth*, the first sacred book of the Sikhs. The Sikhs had now rejected the authority of the Koran and the Vedas, and thus aroused the enmity both of the Mohammedans and Brahmans. Arjun-



Sikh Soldiers.

mal was thrown into prison, where he died. His son and successor, Har Govind, transformed the Sikhs from peaceful believers into valiant warriors, and under his reign began the bloody contest with the Mohammedans. The real founder of the Sikh state was Govind Singh, or Singh, the tenth ruler from Nanak. He abolished the system of castes, and gave all men equal rights. His followers, owing to their valor in the protracted contest with the Mohammedans, received the title of *Sinhs* or *lions*. Govind Singh wrote the *Dasama Padshah ke Granth*, or book of the tenth prince, which, besides treating of religious sub-

jects, contained the history of the author's exploits. The Sikhs hold it in equal veneration with the *Adi-Grantha*. Govind Singh died in 1708, and the Sikhs gradually yielded to the superior power of the Mohammedans. A small number of the Sikhs escaped to inaccessible mountains, and preserved the doctrines of their fathers and an inextinguishable hatred towards the Mohammedans. After Nadir Shah's return to Persia they left the mountains and subdued all Lahore. The Sikhs then broke up into a number of independent communities, each governed by a *sirdar*; but in 1792 Runjeet Singh established himself as despotic ruler of the Sikhs with the title of Maharajah. The territory of the Sikhs now comprehended the whole Punjab, part of Multan, and most of the country between the Jumna and Sutlej; total area, 69,000 square miles. After Runjeet Singh's death, in 1839, a period of anarchy followed. In 1845 (first Sikh war) the Sikhs attacked the British under Sir Hugh Gough at Mudki. Here they were repulsed (December 18), and again defeated at Ferozeshah three days later. On January 20, 1846, the Sikhs were routed by Sir H. Smith near Aliwal, and on February 10 by Gough at Sohraon. A treaty was signed by which Britain held the city of Lahore, and a British resident took supervision of the government. In 1848 a general revolt broke out, and it was evident that the Sikhs had resolved on a decisive struggle, being also assisted by the Afghans. In this, the second Sikh war, Lord Gough advanced with an army against them, but received a severe check at Chillianwalla, January 13, 1849. Both armies were then reinforced, and on February 21, at Gujrat, the power of the Sikhs was completely broken. The Sikh dominion was proclaimed at an end on March 29, and the Punjab was annexed to the British Empire in India, the Maharajah Dhulip Singh receiving an annuity of £50,000. (See *Punjab*.) The bulk of the Sikhs are of Jat origin; they are of fine physique, and possess great powers of endurance as well as courage. During the mutiny the Sikhs displayed the utmost loyalty to the British. They number over 2,000,000, and compose the mass of the gentry in the region between the Five Rivers.

**Si-kiang** (sē-kē-ang'), or WEST RIVER, China, by far the most important of the streams which unite to form the Canton River. It is navigable for vessels drawing 12 feet 75 miles from the sea. See *Canton*.

**Sikino** (sik'i-nō; ancient *Sikinos*), a small island of the Cyclades, in the Grecian Archipelago, east of Melos; area, 17 square miles. Pop. 700. The surface is lofty, but the soil is fertile. The staple product is wine.

**Sikkim** (sik'im), a rajahship under British protection in North Hindustan, bounded on the north and northeast by Tibet, southeast by Bhutan, south by Darjiling, and west by Nepal; area, about 1550 square miles. Sikkim is situated at a considerable elevation within the Himalayan mountain zone, and the passes into Tibet range from 13,000 to 16,000 feet above sea-level. The largest river is the Teesta, which, like the rest of the drainage, belongs to the basin of the Ganges. Little is known of the mineral resources of the country. The valleys and slopes are covered with dense jungle, and the vegetation varies, according to the elevation, from the cotton, banyan, and fig in the lower zones, to the fir, rhododendron, and dwarf bamboo in the upper. The climate is unhealthy in the valleys, but salubrious above 4000 feet. The cultivated soil raises good crops of millet, maize, rice, tea and cotton. The aboriginal inhabitants are Lepchas, with marked Mongolian features and a language radically Tibetan. The capital is Tumlong. Pop. 59,014.

**Silage** (sī'lij), a term applied to fodder which has been preserved by the process of ensilage (which see).

**Silene** (sī-lē'nē), a genus of plants belonging to the nat. order Caryophyllaceae. The species are in general herbaceous, many annual, very few shrubby. The stems and calyxes of many of the species are viscous, hence the popular name *catch-fly*. They are mostly natives of South Europe and North Africa. Moss campion or stemless catch-fly (*S. acaulis*) is found on nearly all the Scotch mountains, and on the Devonshire and Cumberland hills. Its flowers are of a beautiful purple color. Bladder campion (*S. inflata*) abounds in Britain. It is about one foot high, and has white flowers, with an inflated calyx. The young shoots may be used like asparagus. *S. acaulis* and *S. inflata* and two other species are found in the United States.

**Silenus** (sī-lē'nus), a Grecian divinity, foster-father and constant companion of Bacchus, and likewise leader of the satyrs. He was represented as a robust old man, generally in a state of intoxication, and riding on an ass carrying a cantharus or bottle.

**Silesia** (sī-lē'shl-a; in German, *Schlesien*), a territory of Central

Europe, now divided politically between Prussia and Austria. Prussian Silesia (15,576 sq. miles; pop. (1910) 5,228,311 is bounded east by Posen and Poland, south by the Austrian territories, west and north by Saxony and Brandenburg. The province is intersected by branches of the Sudetic Mountains in the south, but is level towards Brandenburg and Posen, and although in parts marshy and sandy, is yet fertile. The principal river is the Oder. Silesia produces corn, flax, madder, hemp, hops, tobacco, fruits, and tolerable wines. The mountainous parts yield timber and afford good pasturage and meadow land. Minerals include iron, copper, lead, zinc, silver, coal, sulphur, etc., and there are mineral waters in several places. The coal output is very large and great quantities of iron and zinc ore are mined; lead is also an important product. Linen, cotton, and woolen goods, and leather are the chief manufactures. Silesia is divided into three governments—Breslau, Liegnitz, and Oppeln. Breslau is the capital. Silesia was annexed to Poland in the beginning of the tenth century. In 1103 it became independent, and was governed by three dukes of the royal house of Piast. At the beginning of the fourteenth century seventeen independent dukes reigned in Silesia at one time, and ruined the country by their feuds. In order to escape the grasp of Poland it acknowledged the sovereignty of the Bohemian kings. In 1075 the ducal line of Piast became extinct, and the country was incorporated in the Austrian dominions. In 1740 Frederick II of Prussia laid claim to part of Silesia (based on old agreements to which effect had never been given), and in 1763, at the close of the Seven Years' war, a great part of Silesia was ceded to Prussia. Austrian Silesia consists of that part of Silesia which was left to Austria; area, 1987 square miles. It is mountainous, and although the soil is not in all parts favorable, it is rendered productive by the industry of the inhabitants, who are also extensively engaged in linen, cotton, and woolen manufactures. Troppau is the capital. Pop. (1911) 756,590.

**Sillex** (sil'leks), same as *Silica* (which see).

**Silhet**, or **SYLHET** (sil-het'), chief town in the district of the same name, Assam, Hindustan, on the right bank of the Surma. The houses of the Europeans are built on hillocks surrounded by fine spreading oaks, but the native quarter is overgrown with vegetation and intersected by open sewers.

Pop. 14,407.—The district, area 5413 square miles, consists of a uniform level intersected by a network of rivers and drainage channels. Rice is its chief crop.

**Silhouette** (sil-y-et'), is the representation of the outlines of an object filled in with black color, in which the inner parts are sometimes indicated by lines of a lighter color, and shadows or extreme depths by the aid of a heightening of gum or other shining medium. The name comes from Etienne de Silhouette, French minister of finance in 1759, in derision of his economical attempts to reform the financial state of France while minister. During this period all the fashions in Paris took the character of parsimony, and were called *à la Silhouette*. The name has only remained in the case of these drawings.

**Silica** (sil'i-ka; SiO<sub>2</sub>), a compound of oxygen and silicon, forming one of the most frequently occurring substances in the materials of which this globe is composed. Silica forms a principal ingredient in nearly all the earthy minerals, and occurs either in a crystallized form or in the amorphous masses. In its naturally crystallized form it is known as *rock-crystal*. Colored of a delicate purple these crystals are known as *amethyst*, and when of a brown color, as  *Cairngorm-stone*. Silica is also met with in the form of *chalcedony* and *carnelian*. It enters largely into the lapidary's art, and we find it constituting jasper, agate, cat's-eye, onyx, and opal. In opal the silica is combined with water. The resistance offered by silica to all impressions is exemplified in the case of *flint*, which consists essentially of silica colored with some impurity. Silica is found to constitute the great bulk of the soil which serves as a support and food of land plants, and it enters largely into the composition of many rocks. Many natural waters present us with silica in a dissolved state. It is, however, not soluble in pure water. The action of an alkali is required to bring it into a soluble form. Silica forms a number of hydrates, which have acid properties, and from which a vast number of salts known as silicates are obtained.

**Silicate Paint** (sil'i-kät), natural silica, when dried and forming an almost impalpable powder, mixed with colors and oil. Unlike the ordinary lead paints, all the silicate colors are non-poisonous. Silicate white has great covering power; it is not affected by gases; and heat of 500° is successfully resisted.



**Silicon** (sil'i-kon), the non-metallic element of which silica is the oxide; chemical symbol, Si; atomic weight, 28. It may be obtained in amorphous and crystalline states. In the latter form (adamantine silicon) it is very hard, dark-brown, lustrous, and not readily oxidized. It unites with hydrogen, chlorine, etc., to form well-marked compounds.

**Siliqua** (sil'i-kwa), in botany, a kind of seed-vessel, such as the long pod-like fruit of crucifers. It is characterized by dehiscing by two valves which separate from a central portion called the *replum*. It is linear in form, and is always superior to the calyx and corolla. The seeds are attached to two placentae, which adhere to the replum, and are opposite to the lobes of the stigma. Examples may be seen in the stock or wall-flower, and in the cabbage, turnip, and mustard.

**Siliquaria** (sil-i-kwa'-ri-a), a genus of marine gasteropodous molluscs, found both fossil and recent. The shell is tubular, spiral at its beginning, continued in an irregular form, divided laterally through its whole length by a narrow slit, and formed into chambers by entire septa.



Siliquaria angulata.

**Silistria** (sil-is'tri-a), a town of Bulgaria, on the right bank of the Danube, 66 miles north by east of Shumla. It was an ill-built and dirty town until the war with Russia in 1853-56, but after that time it was considerably improved. Silistria was strongly fortified up to 1878, when the fortifications were to be dismantled in accordance with the terms of the Berlin Treaty. In May and June, 1854, with a garrison of 15,000, it successfully resisted a siege of thirty-nine days by 60,000 to 80,000 Russians. Pop. 12,055.

**Silius** (sil'i-us), CAIUS, surnamed *Italicus*, a celebrated orator and advocate at Rome, born in the reign of Tiberius, about the year 25 A.D. He was consul at the time of Nero's death, and proconsul of Asia under Vespasian. Being seized with an incurable ulcer, he starved himself to death in his seventy-fifth year. The only work of Silius which has reached modern times is an epic poem on the second Punic war.

**Silk**, the peculiar glossy thread spun by the caterpillars or larvae of certain species of moths, and a well-

known kind of fabric manufactured from it. The chief silk-producing larvae belong to the family of the Bombycidae, of which group the common silk-moth (*Bombyx mori*) is the most familiar species, being that which is by far the most important in artificial culture. This family of moths is distinguished by the small size of the proboscis, by the thick hairy body; and by the large, broad wings. The common silk-moth possesses a short body, stout legs and white wings, which are marked by black lines running parallel with the wing borders. The female moth deposits her eggs in summer on the leaves of the mulberry-tree. (*Morus alba*.) For hatching artificially the eggs are placed in a room heated gradually up to a temperature of about 80° Fahr. In eight or ten days the young appear. The caterpillars are then covered with sheets of paper on which mulberry leaves are spread, and make their way through perforations in the paper to the mulberry leaves, their natural food. The leaves when covered with caterpillars are laid on shelves of wicker-work covered with brown paper. When first hatched the larvae or worms are black and about  $\frac{1}{2}$  inch long. The larval or caterpillar stage lasts from six to eight weeks, and during this period the insect generally casts its skin four times. After casting its last skin the insect is about 2 inches long, and in ten days attains its full growth of 3



Silk-worm — Larva, Chrysalis, and Cocoon.

inches. The insect's body consists of twelve apparent segments, with six anterior forelegs, and ten fleshy legs or 'prolegs' provided with hooks in the hinder body-segments. The mouth is large, with powerful jaws. At this stage the insect becomes languid, refuses food, and prepares for its next change into the pupa or chrysalis stage. Oak, broom, or other twigs are now laid on the wicker frames, and the worms crawl into these, where they spin their cocoon by

winding a self-produced silk thread many times round their body. This silky thread is formed from a glutinous secretion contained in two tubular glands on either side of the body, opening on the lower lip of the larva in a prominent aperture called the *spinneret*. This secretion becomes tenacious and thread-like when brought in contact with the air, and the two filaments unite as they issue from the spinneret, apparently by the glutinous secretion of another and special gland. The spinning of the pupa-case or cocoon lasts from three to five days. After passing about three weeks in the nymph or chrysalis stage, the larval form emerges from the cocoon as the perfect moth or *imago*. But those insects destined to afford the silk material are not allowed to enter the *imago* stage. The completed cocoon with its contained larva is thrown into warm water, which dissolves the glutinous matter cementing the threads together, and facilitates the unwinding of the silk. The average length of the thread furnished by a single cocoon is 300 yards. About 12 lbs. of cocoons yield 1 lb. of raw silk, and 1 oz. of silk-worms' eggs will give 100 lbs. of cocoons. The female moth produces from 300 to 500 eggs.

For the perfect and successful cultivation of the silk-worm, vigorous and healthy mulberry-trees are necessary. The favorite European species is *Morus alba* or white mulberry. Other noted species are *M. alpina*, *M. Moretti*, and *M. japonica*, the latter introduced from Japan. Among the most destructive diseases of the silk-moth's eggs and larvae are those known by the names of *muscardine* and *pébrine*. The latter disease created great ravages in France for some years, and ruined many cultivators, but latterly has been successfully combated.

In Europe some moths produce one generation, others two generations annually; but the caterpillars from the former class produce the best silk. In India some forms produce eggs monthly, while three or four generations annually are not uncommon in that country. A valued variety of the *Bombyx mori* is the *Novi* race of Italy, which spins a large white oval cocoon. The Japanese race produces a cocoon having a divided appearance in the center. The *Bombyx Yama-mai*, or Japanese oak-feeding silk-moth, produces a green cocoon, the silk of which is much used for embroidery. *B. Peryini* inhabits North China and is also an oak-feeder. Its cocoon is large and grayish-brown in color. The *B. Cynthis* of China and North Asia manufac-

tures a gray cocoon, from which the Chinese manufacture a silk recognized by its soft texture. From the cocoon of the *Antheraea Paphia* of India, or '*tussar* moth,' the natives manufacture the *Tussar* silk fabric. *Bombyx tessier* of Bengal makes a pure white silk used by the natives. There are several other varieties of silk-producing moths, but they are less notable and commercially unimportant.

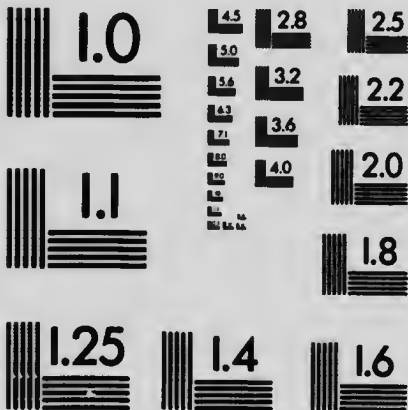
The Chinese appear to have been the first to render the filamentous cocoon substance serviceable to man, and China is still the chief silk-producing country in the world. Before the reign of Augustus the use of silk was little known in Europe, and the culture of the silk-worm was not introduced until the sixth century. It was at first confined to Constantinople, but soon spread to Greece, and then through Italy to Spain. When the Duke of Parma took Antwerp in 1585 a check was put on its trade in silk goods, and many of the weavers from Flanders and Brebant took refuge in England. In France looms were set up at Lyons in 1450, and at Tours in 1470. The first nursery of white mulberry-trees was founded by a working gardener of Nismes, who ultimately propagated them in many districts in the south of France. In 1685 the Edict of Nantes drove hosts of silk workers into exile, as many as 50,000 having settled in Spitalfields, London. A silk-throwing machine, constructed on Italian models secretly obtained, was fitted up at Derby in 1714 by Thomas Lombe (afterwards Sir Thomas Lombe), who obtained a patent in 1719, and on its expiration received a grant of £14,000 for his services to his country. Italy is now the chief silk-producing country in Europe, France coming next. Of the world's crop about two-thirds is produced in the East.

In the manufacture of silk the first operation is the unwinding of the cocoons and the *reeling* of the silk. For this purpose they are placed in shallow vessels containing hot water, which softens the gummy matter of the cocoons. The ends of the filaments are then conducted by guides to large reels moved by machinery. Four or five (or more) threads from as many different cocoons are thus brought together, and uniting by the gum form one thread. When the cocoon is half unwound the filament decreases 50 per cent. in thickness. The silk thus produced is called *raw silk*. Before it can be woven into cloth the raw silk must be thrown. This is often a special trade, and is



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usually conducted by machinery in large mills. Previous to *throwing*, the silk is carefully washed, wound on bobbins, and assorted as to its quality. In the throwing-machine it is again unwound from the bobbins, twisted by the revolutions of a flyer, and then wound on a reel. The twist of the silk is regulated as required by varying the relative velocities of the flyer or reel. The silk thus prepared is called *singles*, and is used for weaving common or plain silks and ribbons. The next operation, called *doubling*, is the twisting of two or more of these threads on one bobbin. This is done in a throwing-machine, and the silk thus spun is called *tram* silk, commonly used for the weft of richer silks and velvets. Two or more of these threads of tram-silk twisted in the throwing-mill together constitute *organzine*, a species of silk thread used for warps of fine fabrics. But in tram-silk the threads are all twisted in one direction, forming individual strands like twine, whereas in organzine the collected threads are twisted in an opposite direction to the twist of the strands, like cable or rope. The silk in this condition is called *hard*, in consequence of the gum, which is, however, separated by careful boiling. The throwing-machine has been greatly improved both as to accuracy and produce by assimilating it to the cotton throstle. The manufacture of *waste* silk is quite different from that just described, being more akin to that of wool or cotton. Waste silk consists of the floss-silk or outer fibers of the cocoons; of the silk of defective cocoons, such as those from which the moths have been allowed to issue; of the remains of cocoons from which the fiber has been mostly reeled, etc. Until about 1857 this waste was entirely useless, but is now the object of an important industry, being cleared of the gum by boiling, and subjected to such processes as breaking, combing, drawing, and roving, till it is ready for spinning. In the manufacture of silk fabrics France holds the leading place in Europe, Lyons being the chief seat of the trade. In Britain silk fabrics are manufactured at Coventry, Macclesfield, Derby, Spitalfields in London, Manchester, Nottingham, and in Ayrshire, Scotland. While the production of silk has been attempted at various times in the United States, beginning in Georgia shortly after its settlement, it has never proved a success, owing to the lack of the necessary cheap labor. Yet the silk manufacture has made much progress in this country, and the American market

for silk has grown very important, it consuming more than one-third of the total raw silk product. Its imports of raw silk and silk fabrics together form about one-half of the world's consumption. The silk manufacture in this country is mainly concentrated in New Jersey and Pennsylvania, Paterson N. J., leading in this industry. The value of the silk goods produced in the United States in 1910 was estimated at considerably more than \$150,000,000. The total silk product of the world is nearly 50,000,000 pounds.

**Silk, Artificial**, a silk-like fiber made from cellulose. This material was first exhibited by Comte de Chardon at the Paris exposition of 1889, and was found to be an excellent imitation of silk both in appearance and utility and at one-third the cost of silk. As now made, wood-pulp is dissolved in an alkali, then forced through microscopic holes in a thin platinum plate. A setting bath of acid fixes the filaments so that they can be twisted together (16 or 32 of them) into a thread. In 1907 a total of 5,000,000 pounds of this material was made in Europe. Large quantities of it, superior in quality, are now made in the United States.

**Silk-cotton Tree** (*Bombax ceiba*), a tree belonging to the nat. order Sterculiaceæ, indigenous to the West Indies and South America. It has a reddish and prickly stem and palmated leaves. The flowers change from white to red, and the wood is soft and spongy. The down which is contained in the seed capsule is used for stuffing pillows, chairs, sofas, etc. Canoes are constructed from the timber.

**Silk-worm.** See *Silk*.

**Silkworm-gut**, a substance prepared from the silky secretion of the caterpillars of the ordinary silk-worm taken from the insects' body, and constituting the lustrous and strong line so well known to anglers.

**Silliman** (sil'i-man), BENJAMIN, physicist, was born in North Stratford (now Trumbull), Connecticut, Aug. 8, 1779; died Nov. 26, 1864. He was admitted to the bar in 1802, but in the same year abandoned law to take up a professorship of chemistry at Yale College. After studying under Dr. Woodhouse, at Philadelphia, he delivered his first course of lectures at Yale in the winter of 1804-05. He then spent fourteen months in England, Scotland, and Holland to prosecute further his studies in physical science. Shortly after his

return he made a geological survey of a part of Connecticut. In 1818 he founded the *American Journal of Science and Arts*, of which he was sole editor for twenty years. He made a second visit to Europe in 1851, and in 1855 gave his last course of lectures at Yale.—His son, BENJAMIN (1816–85), was assistant and successor to his father both as professor and editor. He wrote works on chemistry and physics, including *First Principles of Chemistry* (1846) and *Principles of Physics* (1858), also many papers on scientific subjects and was one of the original members of the National Academy of Sciences.

**Silos.** See *Ensilage*.

**Silphidæ** (sil'fi-dē), a family of beetles which subsist upon putrefying substances. See *Burying-beetle*.

**Silures** (sil-ū-rēz), an ancient British tribe which inhabited the district included in the modern counties of Hereford, Radnor, Brecknock, Monmouth, and Glamorgan. They were of the earlier Celtic stock, and were among the most warlike of the British tribes. They were subdued by the Romans about 78 A.D.

**Silurian System.** See *Geology*.

**Siluridæ.** See *Silurus*.

**Silurus** (sil-ū-rus), a genus of fishes of the family Siluridæ, order Physostomi. This genus, of which five species are known, inhabits the temperate parts of Europe and Asia. The head and body are covered with soft skin, and the jaws have four or six barbels. The only species which occurs in Europe is sly silurus or sheat-fish (*Silurus glanis*), found in the fresh waters east of the



Sly Silurus (*Silurus glanis*).

Rhine. It attains to a weight of 300 or 400 lbs., and the flesh is firm and well flavored. The family Siluridæ (otherwise named sheat-fishes) constitutes a very extensive section of fishes, the species of which are, for the most part, confined to the fresh waters of warm climates. They present great diversity of form, but their most obvious external characters are

the want of true scales. The month is almost always provided with barbules.  
**Silvas.** See *Selvas*.

**Silver** (sil'vēr), one of the earliest known and most useful of the metals. It appears to have been known almost as early as gold, and, without doubt, for the same reason, because it occurs very frequently in a state of purity in the earth, and requires but an ordinary heat for its fusion. Pure silver is of a fine white color. It is softer than copper but harder than gold. When melted its specific gravity is 10.47; when hammered, 10.51. Its chemical symbol is Ag. It is next in malleability to gold, having been beaten into leaves only 100,000th of an inch in thickness. It may be drawn out into a wire much finer than a human hair. It excels all other metals as a conductor of heat and electricity. Silver melts when heated completely red-hot, and may be boiled and volatilized by a very strong and long-continued heat. It is rapidly volatilized when heated on charcoal by the flame of the compound blow-pipe. When cooled slowly crystals of silver may be obtained. Silver is not oxidized by exposure to the air, neither is it affected by water, but it is blackened or tarnished by sulphuretted hydrogen. The atomic weight of silver is 108. *Oxide of silver* ( $\text{Ag}_2\text{O}$ ) is produced by dissolving silver in a solution of nitric acid and precipitating with an alkali. Its specific gravity is 7.14. The compound called *horn silver* or *chloride of silver* ( $\text{AgCl}$ ) is obtained by dissolving silver in nitric acid and mixing the solution with a solution of common salt. Its specific gravity is 5.550. When exposed to the light it turns to a blackish color, hence its great use in photography. *Bromide of silver* is the most sensitive to light of any known solid. It is used for coating the 'dry-plates' employed in photography. When silver is long exposed to the air it acquires a covering of a violet color, which deprives it of its luster; this coating is sulphide of silver. Sulphide of silver occurs native as *silver-glance*. Silver readily forms alloys with iron, steel, lead, tin, and mercury. Of the combinations of acid and silver the most important is *nitrate of silver* ( $\text{AgNO}_3$ ), obtained by dissolving silver in nitric acid. If the silver and acid are pure the solution of silver nitrate is colorless, very heavy, and caustic; it stains the skin, and all animal substances, of an indelible black; after evaporation it deposits, on cooling, transparent crystals of nitrate of silver (which see).

There are five important silver ores,

via.: native silver, vitreous silver (or silver-glance), black silver, red silver, and horn silver. The first is usually found in dentiform, filiform, and capillary shapes, also in plates formed in fissures and in superficial coatings; luster metallic; color silver-white, more or less subject to tarnish; ductile; hardness between gypsum and calcareous spar; specific gravity, 10.47. Native silver occurs principally in veins, traversing gneiss, clay-slate, and other palaeozoic rocks, but not usually in great quantity. It often forms a natural alloy with gold. Vitreous silver presents itself in various shapes, and is of a blackish lead-gray color with a metallic luster. It is malleable, about as hard as gypsum, and subject to tarnish; specific gravity, 7.19. It is more or less pure silver sulphide, and has been found almost exclusively in veins along with ores of lead, antimony, and zinc. It occurs in Saxony, Bohemia, Hungary, Mexico, and Peru; and is an important species for the extraction of silver. Black silver generally occurs in granular masses of an iron-black color. It is sectile and about as hard as gypsum; specific gravity, 6.2. This mineral is a composition of silver (about 68.5 per cent.) with antimony and sulphur and traces of iron, copper, and arsenic. It is found in veins along with other ores of silver, and is a valuable ore for the extraction of silver. It occurs chiefly in Saxony, Bohemia, Hungary, and the American continent. Red silver is found in crystals and often massive, granular, and even as an impalpable powder. It is a double sulphide of silver and antimony, containing on an average 60 per cent. of silver. It occurs in veins with other silver ores, galena, and blende. It is found in various parts of Saxony, also in Bohemia, Hungary, and Norway; but chiefly in Mexico, Peru, and the Western United States. Horn silver, or silver chloride, occurs in crystals and also in crusts and granular masses. It contains about 76 per cent. of silver. It is found in the upper parts of veins in clay-slate, and also in beds with other silver ores or with iron-ochre. It is not abundant in Europe, but occurs in large masses in Mexico and Peru. The above are the ores of silver from which silver is chiefly extracted; but argentiferous sulphides of lead and copper are also smelted for the small proportion of silver they contain.

Silver is extracted from its various ores by *smelting* or *amalgamation*. The former method is founded on the great affinity of silver for lead, which, when fused with silver, acts as a solvent and extracts it from its union with baser

metals. The silver is afterwards separated from the lead by the process of cupellation (see *Assaying*), which consists in exposing the melted alloy to a stream of atmospheric air, by which the lead is converted into an oxide (litharge) while the silver remains untouched. The latter method depends upon the property of mercury to dissolve silver without the aid of heat. The first is called the *dry*, the last the *wet* way of treating silver ores. One or the other process is employed according to the nature of the ores. The ores which are treated in the *dry* way are usually those consisting principally of argentiferous sulphide of lead. By this method the ore is first pulverized and roasted to expel the sulphur, and is then freed from the lead. The ores best adapted to the process of amalgamation are native silver and vitreous silver. The ores are first selected to form a proper mixture with reference to the quantity of silver and sulphur they contain. The sulphur is then got rid of by adding to the mixture of an ore 10 per cent. of common salt, by which, during the furnace operation, the sulphur is oxidized, and the acid thus formed unites with the base of the salt and forms sulphate of soda; while the hydrochloric acid thus set free combines with the silver in the ore that was not in the metallic state, and forms chloride of silver. In this state the ore is reduced to an impalpable powder by various mechanical processes. It is then submitted to the action of mercury, with which it forms what is called an *amalgam*. This amalgam is subjected to the action of heat in a distilling furnace, by which the mercury is sublimed, and the silver remains. Silver is sometimes separated from copper by the process of *eliquation*. This is effected by means of lead, which when brought into fusion with the alloy combines with the silver.

Silver is regarded as money, or the medium of exchange, by at least two-thirds of the population of the globe. In Japan the circulating medium is silver and paper; in China, Corea, Manchuria, Mongolia, Tibet, Siberia, Anam, Cochln China, Tonkin, and Slam, silver alone; also in the East Indies, including Hindostan, Ceylon, Upper and Lower Burmah, and Borneo. The silver is estimated by weight.

The silver mines of North and South America are incomparably more important than those of all the rest of the world. The Mexican mines were worked before the Spanish conquest, and then produced large quantities of silver. They are still the richest in the world, their

annual yield being valued at about \$40,000,000. Up to the present time their total yield has been estimated at between \$2,800,000,000 and \$3,000,000,000. Great deposits of silver have been discovered in the Western States of America, particularly in Nevada, Arizona, California, Colorado, Idaho, Montana, New Mexico, and Utah, and the yield in 1914 amounted to about \$40,000,000. Canada stands third, with a product of over \$11,000,000. Silver ore, chiefly argentiferous galena, has also been found in great quantities in the Barrier Ranges of New South Wales, and silver is produced in various parts of Europe. The world's annual production of silver is over \$100,000,000. From 1792, when the United States mint commenced operations, until 1873, there were coined \$8,045,838. In 1873 coinage was stopped by act of congress, but resumed in 1878 under the Bland-Allison act, by which not less than two millions worth nor more than four millions worth of silver bullion was to be coined each month—resulting, up to 1890, in the making of \$378,160,793; in addition there were coined from trade dollars \$5,078,472; and from seigniorage of bullion purchased under act of 1890 the sum of \$6,641,109—an aggregate of \$389,886,374 in full legal tender silver money since 1878. By act of July 14, 1890, the secretary of the treasury was required to purchase 4,500,000 fine ounces of silver bullion each month, and to continue the coinage of silver dollars at the rate of two millions per month until July 1, 1891. Under this act there had been coined \$29,408,461—a total coinage, since 1878, of \$419,294,835. Of this amount only \$58,016,019 were in circulation June 1, 1893; the remainder being in the treasury or represented by silver certificates. Under the act of July 14, 1890 (known as the Sherman act), there had been purchased silver bullion to the amount of 168,674,590.46 fine ounces, costing \$155,930,940.84; paid for by the issue of United States treasury notes payable in coin. The act of July 14, 1890, was repealed in 1893 in special session of Congress called for the purpose, and in 1900 gold was made the standard of coinage in this country, only the smaller silver coins being made. As a result the commercial value of silver greatly declined, becoming for a time less than half its coinage value.

**Silver-fir**, a species of fir, the *Abies picea* or *Picea pectinata*, so-called from two silvery lines on the under side of the leaves. It yields resin, turpentine, tar, etc. The American silver-fir yields the Canada balsam used for

optical and also for various medicinal purposes.

**Silver-fish**, a variety of the *Cyprinus auratus*, or gold-fish.

**Silver-fox**, a species of fox, *Vulpes argentatus*, inhabiting the northern parts of Asia, Europe and America, and distinguished by its rich and valuable fur.

**Silvering**, the application of silver leaf is made in the same way as that of gold, for which see *Gilding*.

**Silverton** (sil'ver-tun), a municipality of New South Wales, the center of the Barrier Ranges silver-mining district. It is situated about 18 miles from the border of South Australia, and 822 miles west of Sydney.

**Simbirsk** (sem-bërsk'), an eastern government of Russia; area, 19,120 square miles. It consists in general of an extensive fertile plain watered by the Volga and its affluents. Agriculture and cattle-breeding are the leading industries. The principal crops are grain, hemp, flax, hay and tobacco. Minerals are unimportant. There is an abundance of fish in the rivers and numerous small lakes. Pop. 1,783,000.—SIMBIRSK, the capital, stands on a lofty bank of the Volga, 448 miles E. S. E. of Moscow. It has wide streets and squares, a cathedral, etc. There is an annual fair, and a good trade in corn and fish. Pop. about 50,000.

**Simcoe Lake** (sim'kō), a lake of Ontario, Canada, between Lake Ontario and Georgian Bay, an arm of Lake Huron. It is about 30 miles long and 18 miles wide, and discharges itself into Lake Huron by the river Severn. Its banks are well wooded, and it contains several islands.

**Simeon** (sim'e-un), TRIBE or, the descendants of Simeon, the second of Jacob's sons by Leah. They received a section in the southwest of Canaan, which was originally allotted to Judah.

**Simeon Stylites** (sti-l'i'téz). See *Stylites*.

**Simferopol** (sêm-fer-o'pōi), a town of Russia, capital of the government of Taurida, in the south of the Crimea. The old town is poorly built, and occupied chiefly by Tartars; the new town has spacious streets and squares. Pop. 60,876.

**Simia** (sim'i-a), the generic name applied by Linnaeus to all the monkeys, now the genus which includes the orang.

**Simiadae** (sim'i-a-dē), a quadrumanous family of mammals.



now limited to include the higher apes, such as the orang, gorilla and chimpanzee.

**Simla** (sīm'la), a town of British India, in the Punjab, chief sanitarium and summer capital of British India, is situated 78 miles N. N. E. of Umballa. It stands 7084 feet above sea-level, on a transverse spur of the Central Himalayas, and consists of scattered bungalows and other buildings, which extend for about 6 miles along the heights, among woods of *deodar*, oak, and rhododendron. Simla contains many fine public buildings, including the viceregal lodge, government buildings, a town-hall, hospital, dispensary, and many schools. A brisk export trade exists in opium, fruits, nuts, and shawl-wool. Its average temperature is about 62°, and its summer heat seldom exceeds 72°. Pop. about 15,000, considerably augmented during the summer season.

**Simla Hill States**, a collection of Indian native states surrounding the sanitarium of Simla; total area, 6569 square miles. The mountains of these states form a continuous series of ranges ascending from the low hills of Ambāla (Umballa) to the great central chain of the Eastern Himalayas. The chief river is the Sutlej. The climate is genial, and the winters comparatively mild.

**Simms** (sīmz), WILLIAM GILMORE, novelist, born at Charleston, South Carolina, in 1806; died in June, 1870. He was for some time clerk in a drug house at Charleston, afterwards studied law, and was admitted to the bar in 1827, but abandoned that profession for literature and journalism. He published in 1827 a volume of poems; but his best poem, *Atalantis, a Tale of the Sea*, appeared in 1833. This was followed by a series of romances founded on revolutionary incidents in South Carolina, and by several border tales and historical romances. Among these we may mention *Martin Faber* (1833), *Guy Rivers* (1834), *The Yemassee* (1835), *The Partisan* (1835), *Pelayo* (1838), *The Kinsman* (1841, subsequently called *The Scout*), *The Cacique of Kiawah* (1859). His other works include: *Southern Passages and Pictures*, a series of poems (1839); *History of South Carolina* (1840); *The City of the Silent*, a poem (1851); and *South Carolina in the Revolution* (1854). He was editorially connected with several periodicals, and filled several political offices.

**Simnel** (sīm'nel), LAMBERT, an impostor who was put forward by a party of malcontent leaders of the

York faction early in the reign of Henry VII. He was trained to personate Edward Plantagenet, earl of Warwick, son of the murdered Duke of Clarence. Simnel was crowned at Dublin, and landed with his followers in Lancashire. They were totally defeated near Newark, June 16, 1487, when most of the leaders in the rebellion perished. Simnel ended his days as a domestic in the royal service.

**Simois** (sīm'ô-ls), a river adjacent to Troy, celebrated by Homer.

**Simon** (sēm'ôn), JULES (properly JULES FRANÇOIS SUISSE SIMON), a French philosopher and statesman, born at Lorient, department of Morbihan, Dec. 31, 1814, and educated in the École Normale, Paris. In 1839 he succeeded Cousin as professor of philosophy in the Sorbonne, but lost this post in 1852 by refusing to take the oath of allegiance to Napoleon III. In 1855-56 he delivered a series of philosophical lectures in several towns of Belgium, and in 1863 was returned to the Chamber of Deputies. He strongly opposed the war with Prussia, and after the revolution of September 4, 1870, he became a member of the provisional government, and was minister of education under Thiers from 1871 to 1873. In 1875 he was elected to the senate, and at the same time member of the Academy. In 1876 he became leader of the Republicans, and was minister of the interior until May 16, 1877, when he was dismissed by MacMahon. He afterwards edited the *Echo Universel*. His chief works include *Histoire de l'École d'Alexandrie* (1844), *Le Devoir* (1854), *La Liberté de Conscience* (1859), *L'Ouvrière* (1863), *L'École* (1864), *Le Travail* (1866), *La Peine de Mort* (1869), *Souvenirs du 4 Septembre* (1873), and *Le Gouvernement de M. Thiers* (two vols. 1878). He died June 8, 1896.

**Simonides** (si-mon'i-dēs), a Greek lyric poet, born in the island of Ceos about B.C. 556. He visited Athens, and after the death of Hipparchus, who had treated him very generously, he proceeded to Thessaly, where he obtained the patronage of powerful families. He subsequently returned to Athens, and at a competition for the best elegy upon those who fell on the field of Marathon, gained the prize over Æschylus himself. When eighty years of age he was victorious in another celebrated poetical contest, which was his fifty-sixth victory of this nature. Shortly after this he was invited to the court of Hiero at Syracuse, where he remained until his death in 467 B.C. at the advanced age of ninety. Simonides is credited with the addition

to the Greek alphabet of the long vowels and the double letters. Only fragments of the works of this poet have come down to us.

**Simon Magus** (si'mun mā'gus; that is, the *Magician*), an impostor mentioned in the Acts of the Apostles, a native of Samaria. According to tradition, he went to Egypt, where he studied heathen philosophy and magic. On his return he exhibited his acquired arts as a proof of his divinity. He made many proselytes, and it is said that he was worshiped as a god at Rome. His name has given rise to the term *Simony* (which see). He is regarded as one of the early Gnostics.

**Simonoseki** (si-mon-o-sek'i), or SHIMONOSEKI, a port and town of Japan, on the southwest point of the Island of Hondo. It is an important depôt station for the transmission of European imports from Nagasaki to the interior, and for the return traffic. Pop. 42,786.

**Simony** (sim'u-ni), originally meant the sin of buying and selling spiritual gifts, and was so-called from Simon Magus, who attempted to buy the gift of the Holy Spirit from the apostles. In English law it is the crime of trafficking with sacred things, particularly the corrupt presentation of anyone to an ecclesiastical benefice for money or reward. This offense is not punishable in a criminal way at common law, but by an act of Queen Elizabeth it is provided that a corrupt presentation is void, and that the presentation shall go to the crown.

**Simoom**, SIMOON (si-moom', si-moon'), a hot, suffocating wind that blows occasionally in Africa and Arabia, generated by the extreme heat of the parched deserts or sandy plains. The air, heated by contact with the noon-day burning sand, ascends, and the influx of colder air from all sides forms a whirlwind or miniature cyclone, which is borne across the desert laden with sand and dust. Its intense, dry, parching heat, combined with the cloud of dust and sand which it carries with it, has a very destructive effect upon both vegetable and animal life. The effects of the simoom are felt in neighboring regions, where winds owing their origin to it are known under different names, and it is subject to important modifications by the nature of the earth's surface over which it passes. It is called *Sirocco* in South Italy, *Kamsin* in Egypt and Syria, and *Harmattan* in Guinea and Senegambia.

**Simplified Spelling**, a system of English spelling recently introduced, in which the

spelling is simplified in the direction of ease, simplicity and uniformity. A list of over 500 words in common use has been issued, and been adopted in some publications, but by no means generally. The Simplified Spelling Board has published a list of twenty rules for the aid of those who favor the reformed spelling. The first list of 300 spellings was adopted by President Roosevelt in 1906 and the Public Printer ordered to use it in all executive documents, but the objections to the innovation were so great as to lead to withdrawal of the order.

**Simplon** (sim'plon; Italian *Sempione*), a mountain, 11,117 feet high, belonging to the Alps, in the canton of Valais, Switzerland, and celebrated for the road that passes over it, which commences near Brieg, on the Swiss side, and terminates at the town of Domo d'Ossola, in Piedmont. Begun in 1800 under the direction of Napoleon, it was completed in 1806. It is carried across 611 bridges and rises to the height of 6578 feet. The Simplon tunnel was begun officially July, 1891, and opened to the public Jan. 23, 1906. It is 12½ miles long, costing \$15,000,000. The expense was shared by Italy and Switzerland. The tunnel connects the towns of Briga in Switzerland and Iselle in Italy.

**Simpson** (simp'sun), SIR JAMES YOUNG, eminent Scottish physician, born in 1811 at Bathgate in Linlithgowshire; died at Edinburgh in 1870. In 1839 he was appointed to the chair of midwifery in the University of Edinburgh. His first paper on chloroform was read before the Medico-Chirurgical Society of Edinburgh on March 10, 1847; the remainder of his life was chiefly devoted to the introduction of anæsthetics. He received honors from numerous scientific societies, and was made a baronet in 1866.

**Simpson**, MATTHEW, an American Episcopal bishop of the Methodist Episcopal Church, was born June 11, 1810; died June 18, 1884. He graduated at Madison (now Allegheny) College and took up the practice of medicine, but soon abandoned it to enter the Pittsburgh Conference as a probationer. After preaching in Ohio and Pennsylvania he became vice-president of Allegheny College and then president of Indiana Ashbury (now De Pauw) University. In 1852 he was elected a bishop of the Methodist Church. His works include: *A Hundred Years of Methodism*, *Cyclopedia of Methodism*, *Yale Lectures on Preaching*, and *Sermons*.

**Simrock** (sim'rok), KARL, a German writer, born at Bonn in 1802, studied there and at Berlin, entered the civil service of Prussia at Ber-

lin, was dismissed in 1830 on account of expressing sympathy with the French July revolution; settled at Bonn and devoted himself to literature; was appointed professor of the Old German language and literature in 1850, and died in 1876. Besides writing original poetry, he translated into modern German verse some of the most important of the old German poems, including the *Nibelungenlied*, *Reineke Fuchs*, etc., and altogether rendered great service to the study of the German language and literature.

**Sims** (simz), GEORGE ROBERT, journalist and dramatic writer, born at London in 1847. He became a contributor to *Fun* under the pen name of 'Dagonet,' and wrote much on the London slums. His most successful dramas are *The Lights o' London*, *The Romany Rye*, and, in collaboration with Henry Pettitt, *The Harbor Lights*, *London Day by Day*, and *The Merry Dutchman*, a comic opera. He also wrote several novels.

**Sims**, JAMES MARION (1813-83), American surgeon, was born in South Carolina. He studied medicine in Charleston and Philadelphia, specializing in diseases of women. He established a women's hospital in New York; subsequently practised for some years in Europe, organized an Anglo-American ambulance corps in 1870 and had charge of a large hospital in Sedan.

**Sims**, WILLIAM SOWDEN (1858- ), American naval officer, was born at Port Hope, Canada, and was appointed from Pennsylvania to the U. S. Naval Academy, graduating in 1880. He served on the North Atlantic, Pacific and China stations, and was naval attaché to the American embassies at Paris and St. Petersburg (Petrograd), 1897-1900. He became commander in 1907, captain in 1911, rear admiral and president of the Naval War College in 1916, vice-admiral in 1917. After America's entrance into the European war he was placed in charge of all vessels of the United States operating abroad in Atlantic waters. He had been in the war zone as special representative and observer before America entered the war.

**Sinai** (sī'nā, or sī'nī), properly the general name of a mountain mass in Arabia Petræa, in the south of the peninsula of the same name, which projects into the Red Sea between the gulfs of Akaba and Suez. Sometimes the name is confined to the culminating mountain of the mass, which rises 8551 feet above sea-level. The whole mass is of a triangular shape, about 70 miles long from north to south, and consists of a series of mountains, composed for the most part

of granite, syenite, and porphyry, with occasional strata of sandstone and limestone, and intersected by numerous wadis or valleys. The principal peaks of the mass are Jebel Zebir, 8551 feet; Jebel Katerin, 8536 feet; Jebel Umm Shomer, 8449 feet; Jebel Mûsâ, 7375 feet; and Jebel Serbâl, 6734 feet. From the time of Justinian downwards Jebel Mûsâ, or Mount of Moses, has been almost universally regarded as the mountain of the law.

**Sinaitic Codex** (sī-na-it'ik), a Biblical MS. written on vellum, and containing a large portion of the *Septuagint*, with the apocryphal books, the whole of the Greek New Testament, with the epistle of Barnabas and a fragment of the *Shepherd of Hermas*. It was discovered in a convent at Mount Sinai by Tischendorf (which see) in 1844-59, and at his suggestion presented to Alexander II of Russia, who caused it to be published in 1862. It probably dates from the fourth century.

**Sinaloa** (sē-na-lō'a), or CINALOA, a state of Mexico, bordering on the Bay of California; area, 33,671 square miles. The western portion of the state is sandy and barren, but the center is very fertile. The eastern division is traversed by the Mexican Cordilleras. In the fertile districts vegetation is luxuriant, the chief products being sugar, tobacco, cotton, figs, pomegranates, etc. The inhabitants are chiefly engaged in cattle-rearing and mining. Pop. 296,701.—The capital and chief town is CULIACAN.

**Sina'pis.** See *Mustard*.

**Sin'apism**, a mustard poultice.

**Sinclair** (sing'klar), originally ST. CLAIR, a Scottish family of Norman origin, founded by William de Santo Claro, who settled in Scotland, and received from David I the grant of the barony of Roslin. The earldoms of Orkney, of Caithness, and of Rosslyn have been specially connected with this family, which at one time was one of the most powerful in the kingdom.

**Sinclair**, CATHERINE, daughter of Sir John Sinclair (see below), born in 1800; died in 1864. She published numerous tales, novels, and books for children, etc., which had an extensive circulation.

**Sinclair**, SIR JOHN, agriculturist and general statist, was born at Caithness, Scotland, May 10, 1754, and educated at the universities of Edinburgh, Glasgow and Oxford. He was called to both the Scottish and English

bars, but did not practice. He served for many years in parliament and in 1796 was created a baronet. His works include *Statistical Account of Scotland*, *History of the Public Revenue of the British Empire*, *Code of Health and Longevity*, etc. He died in 1835.

**Sinclair** (sin-ciär') UPTON, an American author and socialist, born at Baltimore, September 20, 1878. His novel, *The Jungle* (1906), led to a government investigation of the Chicago stockyards. His other publications include *Springtime and Harvest* (1901), *The Industrial Republic* (1907), *The Money-changers* (1908), *Sylvia* (1913).

**Sind**, **SINDH**, or **SCINDE** (sind), a province of British India, in the northern part of the presidency of Bombay. It consists of the lower valley and delta of the Indus, and is bounded on the west and northwest by Baluchistan and Afghanistan; northeast by the Punjab; east by Rajputana; and south by the Rann or Ran of Kach and the Indian Ocean; area, 53,000 sq. miles, while the native state of Khairpur, included in the district, has 6000 sq. miles. The chief city and port is Kurrachee or Karachi, but the ancient capital, Haidarabad, is still a populous town. Fertility and monotony are the great features of Sind. The only elevations deserving the name of mountains occur in the Kirthar range separating Sind from Baluchistan. The plain country comprises a mixed tract of dry desert and alluvial plain. The finest and most productive region lies in the neighborhood of Shikarpur, where a narrow island 100 miles long is inclosed on one side by the River Indus and on the other by the Western Nara. Another great alluvial tract stretches eastwards from the Indus to the Eastern Nara. Sand-hills abound on the eastern border, and large tracts rendered sterile for want of irrigation occur in other parts of Sind. Forests of *Acacia arabica* in some parts stretch along the banks of the Indus for miles, but the forests as a whole are not extensive. The delta of the Indus contains no forests, but its shores and inlets abound with low thickets of mangrove-trees. Herds of buffaloes graze on the swampy tracts of the delta, and sheep and goats abound in Upper Sind. The dryness of the soil, and the almost entire absence of rain, render irrigation very important. Thus the Indus is almost to Sind what the Nile is to Egypt. Numerous irrigation canals, drawn from the main river or its tributaries, intersect the country in every direction. The tilled land yields two crops annually; the spring crop consist-

ing of wheat, barley, grain, oil-seeds, indigo, hemp, and vegetables; the autumn crop of millet, sorghum (the two chief food-grains in Sind), rice, oil-seeds, pulse, and cotton. The native fauna includes the tiger, hyena, wild ass, wolf, fox, hog, antelope, and ibex. Domestic animals include camels, buffaloes, horses, sheep, and goats. Venomous snakes abound, and yearly cause a large number of deaths. The river fisheries of the Indus supply the province with fresh fish, and afford a considerable export trade. The trade of Sind centers almost entirely upon the great seaport of Kurrachee; the chief exports are raw cotton, wool, and grain of various kinds. The climate ranks among the hottest and most variable in India. The leading textile fabrics are coarse silk, cotton, or mixed cloths. The history of Sind is of little interest. It was subdued by the Mongul Emperor Akbar in 1580, since which period it has always been either nominally or really tributary. In 1730 it fell under the power of Nadir Shah, but on his death it reverted to the imperial sway of Delhi. From about the middle of the 18th century it was subordinate to Afghanistan. Civil dissension in the end of the century led to the elevation of the Talpur dynasty of the 'Ameers.' The government then became a wholly unchecked military despotism, upheld by a feudal soldiery. The hostility displayed by the Ameers of Sind towards the British, during and after their operations against the Afghans, led ultimately to its invasion by British troops, and final conquest by Sir C. Napier's victory at Miani in 1843. Sir C. Napier was appointed its first governor, and it was soon after annexed to the presidency of Bombay. Pop. (excluding Khairpur) 3,410,223.

**Sindhia**, **SCINDIAH** (sin'di-a), the hereditary title of the head of a Mahratta dynasty ruling in Gwalior, which was founded in 1738 by Ranojee Sindhia, a chief who raised himself from obscurity by his own merits. He died in 1754. In 1781 Madaji Sindhia negotiated a peace between the British and the Mahrattas, and having introduced European discipline and tactics into his army, possessed himself of Delhi, Agra, and the person of the Mogul emperor, in whose name he subsequently acted. He was the most powerful member of the Mahratta confederacy.

**Sinding** (sin'ding), **CHRISTIAN** (1856- ), a Norwegian composer, born at Königsberg. He studied at Dresden, Munich and Berlin, and settled as organist and teacher at Christiania. He has written a great number of compo-





abolish all taxation except on land values, arguing in favor of the collection of all revenue from this single source. The tax was to be laid on the land alone, without regard to any improvements upon it, though dependent upon the enhanced value which it may have gained from position, in a city or otherwise, this being denominated the 'unearned increment' of value. This unearned increment, he asserts, is a natural growth, not due to any act of the owner, but born of the general advance of civilized conditions, and for this reason belonging to society as a whole instead of to individuals. The George theory has given rise to Single Tax associations in this and other countries, which vigorously maintain the doctrine.

**Sing-Sing**, the former name of Ossining (which see).

**Sinigaglia** (sin-i-gal'yá; anciently *Sena Gallica*), a seaport in the province of Ancona, Italy, on the Adriatic. It has a small harbor and a considerable fishing trade, and is frequented for sea-bathing. Sinigaglia was founded by the Senonian Gauls, and received a Roman colony in B.C. 289. It now presents quite a modern aspect. Pop. 5635.

**Sinister** (sin'is-ter), in heraldry, a term which denotes the left side of the escutcheon.

**Sinking Fund**, a term originally applied to a scheme by which it was expected to bring about the gradual extinction of the British national debt. This scheme was first projected in 1716 by Sir Robert Walpole. The principle of the sinking fund is now in use in various governments and corporations, for the purpose of paying off accumulated debts, and with more or less success in accordance with the judgment shown in its management.

**Sinn Fein** (shin fin), the motto and name of an Irish society (meaning 'Ourselves Alone'), founded in 1905, which had for its aim the recovery and assertion of the Irish nationality. It was under the leadership of Arthur Griffith, a brilliant journalist. The Nationalist party was opposed to the Sinn Fein movement and clung to the possibility of compromise with England, while the Sinn Fein was radical, demanded an absolute break, the complete severance of Ireland from British control, the revival of the Irish language, dress, and so forth. During the discussion of the Home Rule Bill in 1913 the Sinn Fein party rose to power and associated itself with the Irish Volunteer movement, paralleling the Ulster Volunteer movement. The rebellion of

1916 (see *Ireland*) was engineered by the Sinn Fein, some of whose leaders were executed and others imprisoned. Again, in 1918, the British authorities interned a number of prominent Sinn Feiners.

**Sinope** (si-nó'pē; Turkish, *Sinoub*), a seaport of Asiatic Turkey, situated on the neck of land connecting the rocky peninsula of Cape Sinope, in the Black Sea, with the mainland, 350 miles E. N. E. of Constantinople. It possesses a fine harbor, and has a naval arsenal and a building-yard. On November 30, 1853, eighteen Russian ships attacked and destroyed a Turkish flotilla in the harbor. Sinope is an ancient Greek town, and was the birthplace of Diogenes and capital of Mithridates the Great. Pop. 9740.

**Sinople** (sin'ô-pli), red ferruginous quartz, of a blood or brownish red color, sometimes with a tinge of yellow. It occurs in small very perfect crystals, and in masses resembling some varieties of jasper.

**Sinter** (sin'ter), incrustations on rocks, derived from mineral waters. Various adjectives are prefixed to the name in order to indicate the nature of the deposit; thus we have *calcareous sinter*, *siliceous sinter*, *ferruginous sinter*, etc.

**Sinus** (si'nus), in anatomy, a term applied to cavities in certain bones of the head and face, and also to certain venous canals into which a number of vessels empty themselves. In surgery, a sinus is an unnatural suppurating canal which opens externally. When it communicates internally with one of the normal canals or cavities of the body it is usually termed *fistula*.

**Sion** (sē-on; German, *Sitten*; ancient, *Sedunum*), capital of the canton of Valais, Switzerland, picturesquely situated near the right bank of the Rhone, 58 miles east of Geneva. It has narrow streets, a Gothic cathedral (end of fifteenth century), episcopal palace, seminary for priests, etc., and is overlooked by two hills crowned by ruined castles. Pop. 6048.

**Siout** (si-ô't'), SIUT or ASSIOUT, the capital of Upper Egypt, near the left bank of the Nile, 229 miles from Cairo by rail. The streets are narrow and unpaved, and the houses are generally mere hovels. It has several handsome mosques, bazaars, and baths. It is celebrated for its red and black pottery, which finds a market all over Egypt. It is much frequented by caravans from the interior of Africa, and the trade with the Sudan has been renewed since the rebellion of the Mahdi was crushed. Pop. 42,087.

**Sioux** (sü) or **DAKOTA INDIANS**, a family of Indian tribes dwelling to the west of the Mississippi, and originally extending from Lake Winnipeg on the north to the Arkansas River on the south. They have several times engaged in hostilities with the United States settlers and troops, chiefly because faith was not kept with them by the government. In 1862 more than a thousand settlers were killed. In 1876 a body of them who had taken up a position in the Black Hills (which see) defeated the United States troops under Gen. Custer. They number about 25,000.

**Sioux City**, a city, capital of Woodbury Co., Iowa, on the Missouri River, about 100 miles above Omaha. It has several notable public buildings, and is the seat of Morningside College and Sioux City College of Medicine. It has extensive packing houses, linseed oil works, breweries, candy factories, and a considerable variety of other industries. There is a jobbing trade aggregating over \$30,000,000. Pop. 47,828.

**Sioux Falls**, a city, county seat of Dakota, on the Big Sioux River, which affords water power. The industries include milling, meat packing, manufacturing and jobbing. Native stone is also extensively quarried. There are six lines of railroads. Pop. 18,168.

**Siphon** (sif'un), a bent pipe, one leg of which is longer than the other, through which a liquid may, by the action of gravity, be transferred from

liquid will flow out of the vessel through the siphon until the surface of the liquid is brought down to the level of the opening of the short leg of the siphon. The water rises by the weight of the atmosphere, and the leg by which it is discharged must always be longer than the other to give a greater weight of water in this leg. Sometimes an exhaust tube is attached to the longer leg for the purpose of exhausting the air by motion and causing the flow to commence; but an equally effectual method is to fill the tube with liquid and then to put it in position while still full, the ends of course being at first stopped. The principle of the siphon has been employed in aqueducts and in drainage works, and is being used on a large scale in the construction of the new aqueduct for the supply of New York city. Water can be siphoned to a height of 32 feet. The chief ordinary use of the siphon is for racking wines and liquors from off their lees.

**Siphon**, the name applied in zoölogy to the tubes through which water has egress from, and ingress to, the respiratory or breathing organs of certain univalve and bivalve molluscs.

**Siphon Barometer**. See *Barometer*.

**Siphonophora** (si-fon-of'o-ra), a subclass of Hydrozoa, otherwise named Oceanic Hydroids, delicate organisms, generally provided with swimming bells.

**Siphonostomata** (si-fon-os-tom'a-ta), the division of gasteropodous molluscs, of which the whelk is an example. The shell possesses a notch or tube for the emission of the respiratory siphon.

**Sipunculus** (si-pun'kü-ius), a genus of Annulosa, often placed among the echinoderms, and including the spoon-worm (which see).

**Sir**, as a title, belongs to knights and baronets, and is always prefixed to the Christian name.—*Sire* is a term of respect by which kings are addressed. The word *sir* is the same as *sire*, and is derived from the old French *senec*, and that from *senior* (Latin, elder), whence also *seignior*, *signor*, similar terms of courtesy.

**Sirajganj** (sê-raj-ganj'), a town of India, in Panna district, Bengal, and the most important river mart in the province. It is situated near the main stream of the Brahmaputra. It was formerly an important jute center or market. Pop. 23,114.

**Sir-Daria**, a Russian district, Central Asia, which lies on both sides of the river Jaxartes or Sir-Daria;



1, Common Siphon. 2, Improved Siphon, with exhausting tube for filling it.

one place to another at a lower level over an obstruction which must be lower than a height which depends on the specific gravity of the liquid. In order to accomplish this the shorter leg is plunged into a vessel containing liquid, and the air in the tube is now exhausted by being drawn through the longer leg, whereupon the

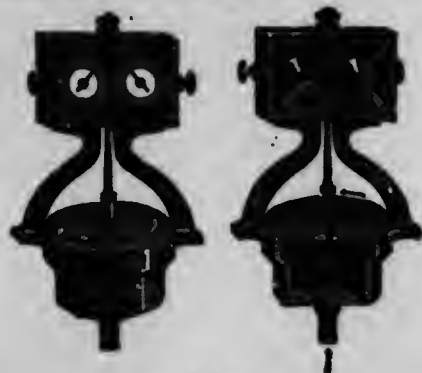
area, 104,863 square miles; pop. 1,470,848. The chief town is Tashkend.

**Sir-Daria**, JAXARTES, or SIHON, a river in Central Asia, which rises in the western slope of the Thian Shan Mountains, and flows through the Russian districts of Ferghana and Sir-Daria into the northeast side of Lake Aral, after a tortuous course of about 1200 miles. It is of little value for navigation, but is largely used for irrigating the oases of Turkestan.

**Siredon** (si-ré'don), the axoloti (which see).

**Siren** (si'ren), or MUD-EEL, a genus of amphibian vertebrates, belonging to the perennibranchiate section of the order Urodela. The *Siren lacertina* of the United States is the familiar species. It is dark brown in color, and has two front limbs, each with four toes. The average length is about 3 feet. There are three external gill-tufts, and the tail is long and slender. It inhabits the rice-swamps of South Carolina. It prefers damp muddy situations, and feeds upon worms and insects.

**Siren** (si'ren), an instrument for producing continuous or musical sounds, and for measuring the number of sound waves or vibrations per second, which produce a note of given pitch. In its original form it consists of a disc with a circular row of oblique holes, revolving close to the top-plate of a wind-chest perforated with corresponding holes of a



Siren.

contrary obliquity, so that the jets of air from the latter passing through the former keep the disc in motion, and produce a note corresponding to the rapidity of the coincidences of the holes in the two plates, the number of coincidences or vibrations in a given time being shown by indices which connect by toothed wheels with a screw on the axis of the disc. See also *Fog-signals*.

**Sirenia** (si-ré'ni-a), an order of marine herbivorous mammals, allied to the whales, having the posterior extremities wanting, and the anterior converted into paddles. They differ from the whales chiefly in having the nostrils placed in the anterior part of the head, and in having molar teeth with flat crowns adapted for a vegetable diet. They feed chiefly on sea-weeds, and frequent the mouths of rivers and estuaries. This order comprises the manatee and dugong (which see).

**Sirens** (si'renz), in Greek mythology, the name of several sea nymphs, who by their singing fascinated those who sailed by their island, and then destroyed them. When Ulysses approached their island, which was near the coast of Sicily, he stuffed the ears of his companions with wax, while he bound himself to the mast, and so they escaped. The Sirens then threw themselves into the sea, where they became formidable rocks. Another story is that they threw themselves into the sea because vanquished in music by Orpheus.

**Siriku** (si-ri-köl'), a lake on the Pamir plateau, Central Asia, 15,000 feet above the sea. It is about 14 miles long by 1 mile broad, and is the source of the chief branches of the Amu Daria or Oxus.

**Sirinagur**. See *Srinagar*.

**Siripul** (si-ri-pöl'), a town in Afghan Turkestan, 100 miles s. w. of Balkh. The inhabitants are chiefly Uzbeks. Pop. about 18,000.

**Sirius** (si'ri-us), the brightest star in the heavens, also called the Dog-star, situated in the mouth of the constellation Canis Major, or the Greater Dog. It is estimated to have more than 12 times the sun's magnitude. See *Dog-days*.

**Sirocco** (si-rok'ó), a hot, relaxing, and oppressive southeast wind, which blows in Sicily and South Italy. See *Simoom*.

**Sirohi** (si-ró'hé), a native state in the Rajputana Agency, India; area, 1964 square miles. The country is much intersected and broken up by hills and rocky ranges, and frequently suffers from drought. Wheat and barley are the staple crops. Pop. 154,544.

**Sirsá** (si'su), a British district in the Punjab, India; area, 3004 square miles. It forms for the most part a barren and treeless plateau. A great cattle fair is held at Sirsá, the chief town, in August and September. It has manufactures of cotton cloth and pottery. Pop. 253,275; of town, 15,800.



**Sisal** (sis'al), or GRASS HEMP, a species of agave yielding a valuable fiber, a native of Mexico, Honduras, Central America, and specially cultivated in Yucatan. It is grown upon stony ground, and the leaves, from which the fiber is prepared, are between 2 and 3 feet long. The pulp is cleaned away from each side of the leaf and the remaining fiber is then washed and sun-dried. It has considerable commercial value in the manufacture of cordage and coarse cloth.

**Siscowet** (sis'ko-wet), or SISKOWIT (*Salmo siscowet*), a species of North American lake-trout, inhabiting chiefly the deep water of Lake Superior and other lakes.

**Siskin** (sis'kin; *Fringilla spinus*), a species of European finch, the plumage of which is chiefly green, particularly on the back and upper parts, with yellow patches on the neck, breast, and behind the ear. These birds are usually seen in small flocks, haunting the margins of streams, and feeding on the seeds of rushes, elder-trees, and other plants. The siskin has a pleasant song, and when interbred with the canary produces a hybrid progeny with a sweet mellow song.

**Sismondi** (sis-mon'di), JEAN CHARLES LÉONARD SIMONDE DE, historian and political economist, the son of a Protestant minister, was born in Geneva, May 9, 1773, and educated at the college of that town. In 1793 the overthrow of the government compelled him to flee with his father to England. On his return, two years after, he was imprisoned, and lost the greater part of his property by confiscation. Similar persecution followed him even in Tuscany, whither he proceeded in 1795; but at length, on his return to Geneva in 1800, he was allowed to live in quietness. His first published work appeared in 1801, and was entitled *Tableau de l'Agriculture Toscane*. In 1803 he published a work entitled *De la Richesse Commerciale, ou Principes d'Economie Politique appliquée à la Législation du Commerce*. This essay was afterwards remodeled so as to form the groundwork of his treatise published in 1819 under the title of *Nouveaux Principes d'Economie Politique*.

In 1807 appeared the first two volumes of his *Républiques Italiennes*, which ultimately reached sixteen volumes, and was not completed till 1818. In 1819 he commenced his *Histoire des Français*, a great work which was to occupy the greater part of his remaining life. He died of cancer, June 25, 1842. His chief works, besides those mentioned, were *De la Littérature du Midi de l'Europe* (four vols.,

Paris, 1813-29); *Histoire de la Renaissance de la Liberté en Italie* (two vols., Paris, 1832); and *Histoire de la Chute de l'Empire Romain et du Déclin de la Civilisation de 250 à 1000*.

**Sissoo.** See *Dalbergia*.

**Sisterhood** (sis'tér-hud), a name given to various religious and charitable orders or associations of women. These are very numerous, and have recently increased in number. Among the more important are:—(1) Sisters of Charity (also called Gray Sisters, Daughters of Charity, Sisters of St. Vincent de Paul), a Roman Catholic order founded in 1634 at Paris by St. Vincent de Paul for the work of nursing the sick in hospitals. The sisters take simple vows of poverty, chastity, and obedience, which are annually renewed; they add a fourth vow binding themselves to serve the sick. They number about 7000 in upwards of 600 houses scattered over all parts of the civilized world. Besides nursing and conducting orphanages, the sisters sometimes undertake the management of poor schools. (2) Sisters of Charity (Irish), a congregation in no way connected with the above, founded in 1815 by Mary Frances Aikenhead, for the purpose of ministering to the sick and poor in hospitals, and at their own homes. The vows are perpetual; the rule is that of the Society of Jesus so far as it is suitable to women. The order has twenty-two houses in Ireland. (3) Sisters of Charity of St. Paul, an order founded by M. Chauvet, a French curé in 1794. These teaching sisters were introduced into England in 1847, and have now upwards of fifty houses there. (4) Sisters of Mercy, an important and flourishing order, founded by Catherine McAuley at Baginbun Street, Dublin, in 1827, for carrying on works of mercy both spiritual and corporal. Other associations receive the same name. They have been introduced into the United States, both in the Roman Catholic and the Protestant Episcopal churches. See *Mercy* (Sisters of).

**Sisters of Charity, Etc.** See *Sisterhoods*.

**Sistine Chapel** (sis'tën; *Capella Sistina*), a chapel in the Vatican, so called from Pope Sixtus IV, by whom it was erected in 1473. See *Vatican*.

**Sistova** (sês-tô'vâ), a town and port of Bulgaria, 35 miles s. w. of Rustchuk, on the right bank of the Danube. It is poorly built, but has an active trade and is an important commercial center. Pop. 13,408.

**Sistrum** (sis'trum), a kind of rattle or jingling instrument used by the ancient Egyptians in their religious ceremonies, especially in the worship of Isis. It consisted of a thin, somewhat lyre-shaped, metal frame through which passed loosely a number of metal rods, to which rings were sometimes attached.



**Sisyphus** (sis'i-fus), a mythical king of Sistrum.

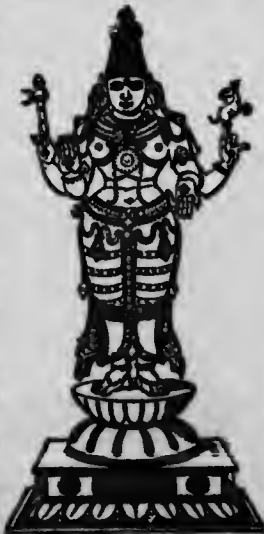
Corinth, who promoted navigation and commerce, but was fraudulent, avaricious, and deceitful. For his wickedness he was punished in the nether world, being obliged to roll a heavy stone to the top of a hill, on reaching which it would always roll back again.

**Sitapur** (sē-tā'pūr), a division of Northwestern British India, prov. of Oudh, North-western Provinces; area, 7555 sq. miles; pop. 2,777,803. Also, a district of this division; area, 2551 square miles. Pop. 958,251.—**SITAPUR**, the capital of the district, is picturesquely situated on the Sarāyan River. Pop. 22,557.

**Sitka** (sit'kā), or NEW ARCHANGEL, until recently the capital of Alaska, on the west coast of Baranoff Island. It has a small but commodious harbor. The inhabitants are chiefly engaged in catching and curing salmon. Pop. (1910) 1039.

**Sitophobia** (sit-ō-fō'bi-ā), the morbid fear of food or of a particular kind of food which is now a recognized disease. The fear may be ascribed to temperament, to education or to environment.

**Siva** (sē'va), the name of the third deity in the Hindu triad (Brahma, Vishnu and Siva), in which he is represented as the destroyer and also as the creator or regenerator. His worshipers (the most numerous of the Brahmanic sects) are termed Saivas, and assign to him the first place in the trinity, attributing to him also many attributes which properly belong to the other deities. His symbol is the



Siva.

lingam or phallus, emblematic of creation. He is frequently represented riding on a white bull, with five faces and two, four, eight, or ten hands, having a third eye in the middle of his forehead pointing up and down, and carrying a trident. Serpents commonly hang about him, and he may be seen with a sort of mace in one hand and an antelope in another. See *Brahmanism*.

**Sivas** (sē-vās'; anciently *Sebaste*), a town in Asiatic Turkey near the center of a large and fertile plain watered by the Kizil Irmak, 410 miles E. S. E. of Constantinople. It has numerous mosques, large and well-supplied bazars, commodious khans, baths, etc. Being on the road from Bagdad, and having easy access to the Black Sea, it commands a considerable trade. Pop. about 50,000.

**Sivash** (sē-vash'), or PUTRID SEA, a lagoon on the N. E. border of the Crimea, South Russia, separated from the Sea of Azov by a narrow strip of land called the Tongue of Arabat. In summer and autumn it becomes a vast marsh giving off pestiferous vapors, hence its name.

**Sivatherium** (siv-a-thē'ri-um), an extinct genus of ruminant animals, the fossil remains of which occur in the Pliocene Tertiary deposits of the Siwalik Hills in Hindustan. A single species (*S. giganteum*) only has been determined. It surpassed all living ruminants in size. It had four horns and a protruding upper lip, and must have resembled a gigantic antelope or gnu.

**Siwah** (sē'wā), or AMMON, an oasis in Egypt, 320 miles W. S. W. of Cairo, 78 feet below the sea-level; 6 miles long by 5 miles broad. It abounds in date-trees, yielding fruit of very superior quality. Here are the ruins of the ancient temple of Jupiter Ammon. Many of the sculptures, including figures of Ammon, with the attributes of the ram-headed god, still remain. Pop. (1907) 3884.

**Six Articles**, STATUTE OF, a law made by 31 Henry VIII chap. xiv., and styled An Act for Abolishing Diversity of Opinions. It was passed on June 7, 1541, and came to be commonly known as the *bloody statute*. It enacted that if anyone did deny the doctrine of transubstantiation (1), he should be burned; and that if anyone preached, taught, or obstinately affirmed or defended that the communion in both kinds was necessary (2), or that priests might marry (3), or vows of chastity be broken (4), or private masses not used (5), or that auricular confession was not

expedient (6), it should be feigny. The act was at first vigorously enforced; but after undergoing some mitigation in 1544, it was finally repealed in 1549.

**Sixtus V** (**FELIX PERETTI**), the greatest ruler and statesman among the popes of the last four centuries, was born in 1521 near Montalto; died in 1590. He entered the Franciscan order in 1534, and distinguished himself in scholastic philosophy, theology, and Latin literature. In 1544 he taught the canon law at Rimini, and two years later at Siena. In 1548 he was made priest, doctor of divinity, and superintendent of the monastic school at Siena. In 1556 he was appointed director of the Franciscan school at Venice, and afterwards inquisitor-general. In 1560 he went to Rome, where the pope conferred upon him several dignities. In 1570 he was created cardinal, and took the name Montalto. Under Gregory XIII he lived a retired life for some years in his villa, and is said to have assumed the mask of pious simplicity and old age in order to prepare himself for the papal chair. On Gregory's death in 1585 he was unanimously elected pope, and immediately manifested himself an able and energetic ruler. He restored order in the States of the Church, cleared the country of bandits, and regulated the finances. He reestablished discipline in the religious orders, and fixed the number of cardinals at seventy. He took a part in most of the great political events then agitating Europe. He supported Henry III against the Huguenots, and Philip II against England. The great aim of his foreign policy was the promotion of the cause of Roman Catholicism throughout Europe against Protestantism.

**Sizar** (sī'zar), a term used in the University of Cambridge, and at Trinity College, Dublin, to denote a class of students of limited means who usually receive their commons free and are pecuniarily assisted otherwise. They were originally required to perform certain duties of a menial character, but this practice has long ago fallen into desuetude. The corresponding class of students in Oxford are called servitors.

**Size.** See *Glue*.

**Sjælland** (syel'lan). See *Zeland*.

**Skagen** (skā'gen), CAPE, or THE SKAW, the extreme northern point of the province of Jutland, Denmark. A lighthouse, 67 feet high, built by Frederick II in 1564, is situated on the cape. The village of Skagen, close by, has 2000 inhabitants.

**Skager-Rack** (skā'ger-rāk), a broad arm of the German Ocean, which washes Norway on the north, Jutland on the south, and Sweden on the east, where it communicates with the Cattegat; length, W. S. W. to E. N. E., about 150 miles; breadth, 80 miles. Its depth varies from 30 to upwards of 200 fathoms. There are several good harbors on the Norwegian and Swedish coasts.

**Skalds.** See *Scalds*.

**Skagway**, (skag'wā), a town on Chilkat Inlet, Alaska; at the head of Lynn canal, and at the entrance to the White Pass. It is a result of expeditions to the Yukon gold fields in 1897, when the White Pass began to be used as a means of reaching the Klondike and its vicinity. In 1899 the first college in Alaska was opened here. Its name is derived from the Indian name of a river which flows into the sea near the town. A post-office was established here in 1897. Pop. 3117.

**Skate** (skāt), a name popularly applied to several species of the genus of fishes *Raia* or rays. The skeleton is cartilaginous, the body much depressed, and more or less approaching to a rhomboidal form. The common skate (*Raia batis*) agrees with the other members of the genus *Raia* in possessing a flat broad body, the chief portion of which is made up of the expanded pectoral fins, which are concealed, in a manner, under the skin. The tail is long and slender, and the snout pointed, with a prominent ridge or keel. The teeth are arranged in a mosaic or pavement-like pattern. This fish, although commonly seen of moderate dimensions, may attain a weight of 200 lbs. or more.



Skate  
(*Raia marginata*).

**Skate Leech**, a large, spinose, greenish leech, *Pontobdella*



Skate Leech  
(*Pontobdella muricata*).

*muricata*, which is found as a parasite upon skates and sharks.

**Skate, Skating** (skät). A skate consists of a frame shaped somewhat like the sole of a shoe, underneath which is fastened a metallic runner, the whole being intended to be fastened, one under each foot, for gliding rapidly over the ice. Skating seems to be of great antiquity, mention being made of it in the *Edda*, the first skates used being bones tied to the shoes. In Holland, from time immemorial, skates have been used by all classes of people upon the canals and rivers for the facility of locomotion they afford. Great variety in the manufacture of skates has been introduced within a comparatively short period. In the United States about 1865 the skate in general use had a broad iron or steel runner curled up in front of the toe, and fitted with a wooden body-piece in which were slots through which the straps passed. A skate of this kind is still in use to some extent in England, but in the United States it has given way to the steel club-skate, in which the strap is no longer used. This has a runner slightly curved on the skating edge and securely riveted to sole and heel plates in which are slots for adjustable clamps, which are made to grip the sole and heel of the shoe by means of a screw and toggle-lever mechanism. The British and German forms of skates have much lower and flatter runners than those used in this country. The Norwegians use the skee, or snowshoe, more than the skate, and this is also in common use in Canada, where the broad reaches of snow render it preferable. A kind of skates, formerly known as parlor skates, but now, from their common out-door use, usually called roller-skates, is widely in use on pavements and asphalt streets or floors. In these the runner is replaced by four small wheels, attached to a wooden base, which is strapped fast to the shoe. A road-skate, having two wheels, is now in use in England. These are 4 inches in diameter and have rubber tires. There is another 3-wheeled form which resembles a little triangle.

**Skeat** (skët), WALTER WILLIAM, philologist, was born at London in 1835, was educated at King's College School, London, and Christ's College, Cambridge, became a clergyman and in 1878 was elected professor of Anglo-Saxon at Cambridge. He published editions of many early English works, but is best known for his *Etymological Dictionary of the English Language* (1879-82), which marked an epoch in this branch of knowledge, and was published in an abridged form as a *Concise Ety-*

*mological Dictionary of the English Language*. He died October 7, 1912.

**Skeleton** (skel'e-tun), the name applied specially to the hard structures, mostly of bony or osseous nature, which form the internal axis or support of the soft parts in the higher or vertebrate animals. But in comparative anatomy the term *endoskeleton* is applied to the internal hard parts, proper to the Vertebrata, while *exoskeleton* denotes the exterior hard parts both of Vertebrate and Invertebrates, such as the shell of lobster, scales of fishes, etc. The parts of any endoskeleton may generally be grouped under the two heads of the spinal or *axial* skeleton, and the *appendicular* parts. The former includes the skeleton of the head and trunk, the latter that of the limbs. The spinal skeleton involves the consideration of the *skull*; *spinal* or *vertebral column*, composed of its various *vertebrae*; and of the *thorax*, or *chest*, and *pelvis*. The limbs consist of homologous or corresponding parts, and are attached to a series of bones constituting the 'arch,' or support of the upper or fore and the lower or hind limbs respectively. The scapulae or shoulder blades and collar bones or *clavicles* constitute the shoulder-girdle or arch supporting the fore or upper limb, while the lower limb is attached to the pelvic arch or pelvis. See *Skull, Spine, Thorax, Rib, Shoulder, Arm, Hand, Pelvis, Leg, Foot*, etc.

**Skelligs** (skel'igz), THE, three rocky islets off the southwest coast of Ireland, west of Bolus Head, county Kerry. There is here a lighthouse, visible 18 miles.

**Skelton** (skel't'n), a town of England, North Riding of Yorkshire, district of Cleveland, with extensive iron mines. Pop. (with Brotton) 15,202.

**Skelton**, JOHN, an English poet, born about 1460, probably at Norfolk. He studied at both Oxford and Cambridge, and from the former received the laureateship (then a degree in grammar). He was tutor to the Duke of York, afterwards Henry VIII; was rector of Diss and curate of Trompington in 1504, and was appointed *orator regius* to Henry VIII. His satirical attacks incurred the resentment of Wolsey, and Skelton had to take refuge in the sanctuary at Westminster, where the abbot afforded him protection until his death, in 1529. His works comprise among others the drama or morality of *Magnifico*; a satire on Wolsey, entitled *Why Come Ye Not to Court?* the *Tuning* (that is 'the brewing') of



*Elynor Rummyng*, a humorous picture of low life; and the *Book of Phylip Sparrow*.

**Skene** (skēn), WILLIAM FORBES, archaeologist, was born in 1809 at Inverie, Kincardineshire, was educated at the high school, Edinburgh, and in 1831 became a writer to the signet. From that time on he devoted his leisure to archaeological and historical research. His chief works include *The Highlanders of Scotland, Their Origin, History, and Antiquities*; *The Four Ancient Books of Wales*; and *Celtic Scotland, a History of Ancient Alban*. Besides the above he edited various ancient Scottish works. In 1881 he was appointed historiographer royal of Scotland. He died in 1902.

**Skew-bridge** (skū'brīj), a species of bridge which, instead of crossing a road or river at right angles to its course, makes an oblique angle with it, in order that the continuity of the road may be preserved.

**Ski** (ski), large snow-shoes used in Norway and other far-north countries. They are narrow, skate-like gliders, about 8 feet long, necessary for travel during the months of deep snow. Children are trained in their use, and village competitions are held for speed, style and leaping. The ski has become common in Canada and in parts of the northern United States, where 'ski running' has become a popular winter sport, ski tournaments being held.

**Skiagraph** (ski'a-graf), a photographic picture obtained by means of the Roentgen rays; known also as shadowgraph and radiograph. A *skiascope* is an apparatus for making observations of the influence of Roentgen rays on a fluorescent screen, enabling an observer to see through opaque substances when penetrated by these rays.

**Skiathos** (ski'a-thos), a small island in the Grecian Archipelago, off the southeast coast of Thessaly, north of Eubœa, rising to a height of 1400 feet. Pop. 3200.

**Skid, or Skeed**, an iron shoe or socket for checking the speed of a carriage when going down hill; it is attached to the carriage by a chain of such length as will permit the wheel to ride on it instead of revolving. Also a square piece of timber on which something is supported or along which it may be rolled. In nautical language, a skid is a beam of timber used as a support for some heavy body, to prevent its weight falling on a weak part of the vessel's structure. Also timbers that are laid crosswise in a ship's waist, to sus-

tain the larger boats, the launch in particular.

**Skiddaw** (skid'da), a mountain mass in the county of Cumberland, England, distinguished for its grand and romantic scenery; height, 3054 feet. It is 3 miles north of Keswick.

**Skien** (skēn), a town of Southern Norway, 65 miles s. w. of Christiania, on river of same name. Pop. 11,343.

**Skimmer**, same as *Scissor-bill* or *Shearwater*.

**Skin**, the name given to the external layer or tissue of the bodies of most animals, forming at the same time a protective and a blood-purifying organ. Structurally viewed, the skin of all vertebrates consists of two layers—an outer and inner layer. To the outer layer the name of *cuticle*, *epidermis*, or *scarf skin* is popularly given. This layer is destitute of nerves and of blood-vessels, and is thus a non-sensitive structure. The inner layer is, on the contrary, a highly vascular and sensitive layer, and is named the *dermis*, *corium*, or *true skin*. At the lips and elsewhere the epidermis becomes continuous with the more delicate *mucous membrane* which forms the lining membrane of the internal passages. This membrane is to be viewed, however, as a mere modification of the epidermis itself. The epidermis is composed of several layers of epithelial cells. The upper cells of the epidermis, as seen in a vertical section of the skin, are flattened, and of scaly conformation, the lower cells being of rounded or elongated shape. The elongated cells have their long axes arranged vertically to the general skin surface. The deeper portion of the epidermis, or *rete mucosum*, is of softer and more opaque consistence and appearance than the upper layer; and it is in the rete mucosum that coloring matters are present, which give the hue to the skin. The *dermis* or true skin rests upon a layer of adipose and cellular tissue, and is composed of interlacing fibers of fibro-cellular tissue. It is richly supplied with blood-vessels, so that when cut it bleeds; and nerve fibers are likewise disposed in it, conferring sensibility. The surface of the true skin is thrown into a series of elevations, papillæ, or minute prominences, which are specially rich in capillary blood-vessels and nerve endings, and which are thus particularly vascular and sensitive. The special glands of the skin are the sudoriparous or sweat glands; they are in the form of tubes coiled up into balls, and the total number of them in the human skin is estimated at over two millions. There are also sebaceous

glands, which secrete an oily fluid useful for lubrication. Though the most ostensible function of the skin seems to be that it covers in and protects the more delicate structures that lie beneath it, its functions as an excretory organ and as a regulator of the temperature of the body are also of high importance. The hair and nails are modifications of the epidermis, as are also the feathers of birds and the claws of animals. Extensions of skin, as between the toes of ducks, etc., or between the arms and legs of flying squirrels, and as seen in bats, may exist. And pendulous skin-folds, horns, callosities, horny plates, scales, and other modifications of the epidermis, are met with in various animals. The scutes or bony plates seen in the armadillos are dermal structures united to horny plates formed by the epidermis. In many reptiles and in some lizards the two layers of the skin similarly participate in forming the exoskeleton. The scales of fishes are formed by the dermis or true skin; but those of serpents are epidermic in their nature.

**Skin Diseases**, a name for such diseases as eczema, shingles, ringworm, pityriasis, lichen, itch, etc.

**Skin-grafting**, in surgery, a method for the treatment of large ulcerated surfaces by the transplantation of small pieces of skin from another part of the body. It has recently been learned that skin kept in cold storage can be successfully applied for this purpose, thus enabling skin taken from amputated limbs, etc., to be thus kept and used. A late experiment with the membrane of eggs, instead of skin, is said to have proved a complete success.

**Skink**, the common name of small lizards belonging to the genus *Scincus*. They have a long body entirely covered with rounded imbricate scales, and are natives of warm climates.



Adda or Common Skink (*Scincus officinalis*).

One species, the adda (*Scincus officinalis*) is celebrated throughout the East as

being efficacious in the cure of various cutaneous diseases, to which the inhabitants of Egypt, Arabia, etc., are subject. It is about 6 inches in length, has a cylindrical body and tail, and burrows in the sand.

**Skinner** (skin'er), CHARLES MONTGOMERY, author, born at Vletor, New York, in 1852. He wrote *Myths and Legends of Our Own Land, With Feet to the Earth, Do-Nothing Days*, etc. Also the drama *Villon, the Vagabond*, played by his brother, OTIS SKINNER. He died in 1907.

**Skio**. See *Scio*.

**Skipton** (skip'tun), a town in England, county of York (West Riding), near the river Aire, 26 miles N. W. of Leeds. It has manufactures of cotton and woolen goods, and an ancient castle, a spacious quadrangular structure, the greater part of which was erected in the reign of Edward II. Pop. 12,981.

**Skirmishers** (skir'mish-erz), troops serving in loose order in front of an army. Their usual employment is to protect an advancing army from a surprise.

**Skirret** (skir'et; *Sium Sissarum*), a plant belonging to the nat. order Umbelliferae, sometimes cultivated in kitchen-gardens for its roots. It is a perennial plant, a native of China and Japan. The roots are composed of several prongs about the thickness of a finger, joined together at the top. The flowers are white, and the roots, which resemble parsnip, may be used from the end of September onwards.

**Skittles** (skit'lz), a favorite game in England, generally played in covered grounds called skittle-alleys. It is played with a flattish-shaped wooden ball about a foot in diameter, and nine skittles or wooden pins, cigar-shaped and about a foot high. The players try each in turn with how few casts the ball they can knock down all the skittles. There are, however, minor variations in playing the game. It is also known as ninepins, and in the United States as tenpins, ten instead of nine pins being used, while the balls used are round and of several sizes.

**Skobelev** (skö'be-lef), MIKHAIL DIMITRIEVICH, a Russian general, born in 1843, and entered the army as sublieutenant in 1861. He distinguished himself against the Poles in 1866, and afterwards in Central Asia. In 1876 he was appointed military governor of the province of Ferghana. In the Russo-Turkish war Skobelev dis-

tinguished himself at the second battle of Plevna, and also at Loftscha. In 1878 he was created adjutant-general to the emperor. In 1880 he successfully led an expedition against the Tekke Turcomans, and captured Geok Tepe, Jan. 12, 1881. He was then promoted to the rank of general. He died suddenly in Moscow in 1882. He was a brilliant and scientific officer, and much beloved by the troops.

**Skopelos** (sko'pe-lös; anc. *Peparethos*), an island, one of the Northern Sporades, Grecian Archipelago, about 11 miles long and 5 miles broad. The town of Skopelos, on its southeast shore, is a Greek see, and has a number of churches and convents. Pop. about 6000.

**Skowhegan** (skou-hé'gan), a village, capital of Somerset Co., Maine, on Kennebec River, 30 miles N. by E. of Augusta. It has good water power, and has paper and pulp mills, oil-cloth, leather, woolens, tools, and other factories. Pop. 5341.

**Skua-gull** (skū'a), a powerful bird of the gull family, the *Stercorarius* or *Lestris cataraetes*. It is found in the Shetland Islands, the Faroe Islands and Iceland, and displays much courage in making other birds which prey on fish disgorge their newly-caught food. Smaller species are known in Britain as the Arctic skua and long-tailed skua.

**Skull**, the name applied to the skeleton of the head, composed in most vertebrates of a *facial* and a *cranial* portion, and which incloses the

between the eye cavities. The *facial* portion includes fourteen bones—two *nasal* bones G; two *superior maxillary*, or upper jaw-bones F; two *lacrimal* bones H; two *malar* or cheek bones E; two *palate* bones; two *turbinated* bones L M; the *vomer*, dividing into two the cavity of the nose J, and the *inferior maxillary* or lower jaw-bone K. This is the only bone which is movable, a hinge-joint being formed between its strong prominences at P. The left *zygomatic* arch is shown at R. At the base of the occipital bone is the large aperture termed the *foramen magnum*, through which the brain and spinal marrow, become continuous. The two lesser *foramina*, one in either orbit, transmit the optic nerves. The size and shape of the skull vary in the different races of man, and at different ages from infancy to old age. The skulls of most vertebrata differ widely from that of man in the relative development of their various parts. See also special articles, such as *Ichthyology*, *Ornithology*, *Reptilia*, etc., and also *Ear*, *Eye*, *Nose*, etc.

**Skunk** (*Mephitis mephitis* or *putorius*), a carnivorous animal belonging to the weasel family. It inhabits



Common Skunk (*Mephitis mephitis*).



The Human Skull.—1, Front view. 2, Side view.

brain and organs of special sense. The skull of man includes twenty-two bones. In the *cranial* portion there are eight bones, the *occipital* bone O, or hinder portion of the skull; two *parietal* bones B, forming the sides of the head; two *temporal* bones DD'; the *frontal* bone A; the *sphenoid* bone C, mainly in the base of the skull; and the *ethmoid* bone E, between the skull and the face, and

North America, and its average size is about that of a large cat. Its fur is of a dark-brown hue, streaked longitudinally with black and white, and its tail is long and bushy. The skunk is notorious from the potent and disgusting odor which it emits from its anal glands, and which is perceptible a mile away. The secretion of these glands can be forcibly ejected at the will of the animal, and its stench is so persistent that no amount of washing will remove it from clothes impregnated with it. This nauseous secretion has been alleged to possess therapeutical virtues. The skunk is largely hunted for the sake of its fur, which is purified for commercial purposes by heat. There are two other less common species, now classed in separate genera.

**Skunk-cabbage** (*Symplocarpus*

*foetidus*), a plant of the nat. order Araceæ or arums, so named from its smell. The root and seeds are said to be antispasmodic, and have been used as expectorants and as palliatives in asthma. It is common in the northern United States and Canada, where it is one of the earliest spring plants to appear.

**Skye** (ski), the largest of the Hebrides or Western Isles of Scotland, situated on the west of the county of Inverness, of which it forms a part, and from which it is separated by Kyle Rhea and the Sound of Sleat; greatest length, 48 miles; breadth, from 3 to 25 miles; area, about 535 square miles. It is everywhere deeply indented by sea-lochs, and is noted for the grand cliff and mountain scenery around its coasts. The interior may be regarded as one great mountainous moorland, rising in Cuchullin Hills to an altitude of 3200 feet. Numerous streams and fresh-water lochs afford abundance of trout and salmon. The climate is moist and variable. The only arable land lies along the sea-board, and is mostly cultivated under the crofter system. The greater part of the surface is devoted to the rearing of sheep and cattle. The only mineral profitably worked is a crystalline limestone, which furnishes blocks of white and variegated marble. Fishing is the employment of a large number of the population. Portree, a seaport on the east coast of the island, has an excellent harbor. The Gaelic language is mostly spoken. Pop. 14,642.

**Skye Terrier**, a breed of dogs supposed to be the outcome of a cross between the native dog of Skye and a Maltese terrier.

**Skylark**. See *Lark*.

**Sky-rocket**, a firework composed of sulphur and charcoal tightly rammed in a stout paper case, which ascends when the compound is ignited at the lower end. A stick is attached to one side of the case to steady the flight.

**Skyros** (ski'ros), or SKYRO, an island in the Grecian Archipelago, about 25 miles east of the island of Eubœa; greatest length, N. N. W. to S. S. E., about 18 miles; breadth, 7 miles. It belongs to the nomarchy of Eubœa, and is rocky and not very fertile, but exports corn and fruits. Pop. about 3500.

**Sky-scraper**, the name often given to the very tall office buildings now numerous in all the large American cities. They are strong

structures, with riveted steel frames, resting on bed-rock or great cantilevers sunk far below the surface.

**Slag**, a secondary product of the processes of extracting metals from their ores. It is mainly a compound of silica with alumina or lime, or both, together with various other substances in small quantity. It always contains more or less of the metal from the extraction of which it results. The presence of silica gives a glassy appearance to the mass. Slag is sometimes cast into blocks, and used for road-making and building, and when reduced to powder it is used in making mortar, and in some parts of Europe to impart a glaze to bricks. It is also utilized in the manufacture of glass. *Slag phosphate meal* is a fertilizer made from basic slag (which see).

**Slander**. See *Libel*.

**Slate** (slät), or CLAY-SLATE, called sometimes *argillite*, a well-known hard variety of rock which splits into thin plates, the type being roofing slate. The lamination of slate is not that of its bedding, but is often at right angles to it. It is produced by lateral pressure, and is confined to disturbed and metamorphosed rock. The prevailing color is gray, of various shades; it yields to the knife, but varies considerably as respects hardness in its different varieties. Slate occurs in all countries where there are metamorphic rocks. It is commonly divided into elevated beds of various degrees of thickness; and from the natural divisions of the rock they often form peaked and serrated mountains. The finest variety which is used for the covering of roofs is generally embedded in other slate rocks of a coarser kind. Quarries of slate of this description are worked extensively in various localities in the United States and England. Those slates which contain a large proportion of quartz are called *whet-slate*. The most valuable kinds come from Sonnenberg in Meiningen, and Saalfeld. *Chlorite* or *talc slate* are those kinds which contain a large percentage of talc. *Drawing slate*, or *black chalk*, is slate containing 8 to 10 per cent. of carbonaceous matter. It comes from Italy, Spain, and Bayreuth. *Polishing slate*, which is composed of the skeletons of infusoria, occurs at Pianitz near Zwickau, and near Billin in Bohemia. It is used for polishing metals. *Slate-pencils* are made of certain varieties of soft slate.

**Slater** (slä'ter), the popular name of the Oniscide or wood lice fam-



ily of crustacea, belonging to the order Isopoda. The common wood-louse or slater (*Oniscus* or *Porcellio scaber*) is usually found beneath stones, among damp moss, and in similar situations. The color is a dull leaden hue, which sometimes exhibits white-spots. The land slater (*Oniscus asellus*), is another familiar species, and is spotted yellow and white. The water-slaters, genus *Asellus*, are found in fresh-water streams and ponds.

**Slave Coast**, the west of Africa, on the Guinea Coast, extending between the Volta and Akinga, a stretch of about 240 miles. It consists mainly of long narrow islands. The principal towns on the coast are Badagry and Whydah. A large traffic in slaves was formerly carried on at the ports of this region, hence its name. The Slave Coast is divided into sections which belong to Germany, France and Great Britain.

**Slave Lake**, GREAT, a large lake in Northwestern Canada, between Hudson's Bay and the west coast. It is of extremely irregular form, and has an estimated area of 12,000 square miles. It receives the waters of Lake Athabasca by the Slave River on the south, and discharges its own waters by the Mackenzie at its western extremity. The banks of Slave River are in many parts well wooded; numerous rapids and falls occur in its course.—LESSER SLAVE LAKE lies about 270 miles southwest of Lake Athabasca, in the district of Athabasca. It is about 60 miles long, and its greatest breadth about 12 miles.

**Slave River**. See *Slave Lake, Great*.

**Slavery**, the system by which certain persons are kept as the property of others, a system of great antiquity and formerly of wide prevalence. Among the Hebrews the system of slavery was one of great mildness. Native Hebrew slaves were released every seventh year, and their owners were enjoined to treat them kindly. Among the Greeks and Romans slavery was a rooted institution. At Athens the slaves were commonly treated with mildness, but at Sparta they are said to have been dealt with very harshly. The slaves of the ancient Romans were either captives or debtors that were unable to pay. In Rome the slave had originally no rights at all. He could be put to death for the smallest misdemeanor. Slaves were exceedingly numerous, and in time almost monopolized all the various handicrafts and occupations, those of the clerk, the doctor and the literary man included. In the time of

Augustus a single person is said to have left at his death over 4000 slaves. Hosts of slaves were employed in the gladiatorial exhibitions. Slave revolts occurred in 134 and 102 B.C. in Sicily, and a revolt in Italy led by the gladiator Spartacus, in 73 B.C. was put down only with considerable difficulty. Slaves, however, were often set at liberty, and these freedmen were a well-known class at Rome. But it was not till the time of the empire that any great change took place in the condition of the slaves. Augustus granted the slave a legal status, and Antoninus took away from the masters the power of life and death over their slaves. The early Christian church did much to diminish slavery, but slavery and the slave trade continued to exist for 1000 years in the Christian nations of Europe that rose on the ruins of the Roman Empire. It was not till the thirteenth century that the scourge of slavery began to die out in Europe. The Koran expressly permits the Moslems to acquire slaves by conquest, but this method of acquiring slaves was not resorted to until the Crusades. Previous to the Crusades they kept negro slaves imported from Africa. Subsequently the Mohammedans began to obtain white slaves not only by war but also by purchase, even from parts of Western Europe. The Mohammedans of the Barbary States also obtained white slaves by piracy in the Mediterranean.

After slavery had become all but extinct in Europe, it had a new birth in the American colonies of European origin. The Portuguese were the first to hunt negroes in the interior of Africa for use as slaves in the colonies. The first shipment of negroes to the New World took place in 1503, when the Portuguese landed some in St. Domingo. From that time to the present century a traffic in negroes across the Atlantic was carried on by all the Christian colonial powers. In 1562 the English first took part in the trade, and in course of time outdid all other nations in the extent to which they carried this traffic, as also, it is said, in the cruelty with which they conducted it. About 1770 nearly 200 English vessels were engaged in the trade.

The first persons who liberated their slaves, and labored to effect the abolition of the slave trade, were some Quakers in England and the United States early in the eighteenth century. In 1783 a petition was addressed to the British parliament for the abolition of the trade, which Wilberforce supported. But the soul of all the efforts for the abo-

## Slavery

## Slavs

lition of the traffic was Thomas Clarkson. In 1788 Pitt presented a petition against the trade to the House of Commons, but the merchants of Liverpool and Bristol resisted its abolition so violently that Pitt, Fox, Wilberforce, and others could effect nothing but the passage of some provisions for diminishing the hardship of confinement on shipboard.

A bill passed the House of Commons for the abolition of the slave trade in 1792, but it was rejected by the Lords. On February 4, 1794, the French National Convention declared all the slaves of the French colonies free. Wilberforce brought in a bill with a like object in 1796, but it was rejected. The African Society, founded by Wilberforce and Clarkson, now redoubled its efforts to procure the suppression of this traffic, and in March, 1807, the famous Abolition Act was passed. January 1, 1808, was fixed as the time when this trade, on the part of the British, should cease. The same date was fixed in the Constitution of the United States for the suppression of the slave trade. The abolition of the slave trade by most of the European powers was gradually provided for by treaty. The abolition of slavery itself gradually followed that of the trade in slaves. In the United States all the Northern States in which slaves were held passed laws for the immediate or gradual emancipation of the slaves at various dates between 1777 and 1804. In 1831 the British government emancipated all the slaves of the crown, and in 1833 a bill was passed for the emancipation of all the slaves in British colonies. By this bill the slaves were to receive their freedom on August 1, 1834, and a compensation of £20,000,000 was to be distributed as a gift among the slave holders, to compensate them for any loss they might sustain by the arrangement. The greatest slaveholding nation within recent times was the United States, in which, however, slavery had become confined to the Southern States. As a result of the Civil war it was abolished by proclamation in 1863, and by constitutional amendment in 1865. In 1873 the Spanish government abolished slavery in Porto Rico, and in 1886 abolition in Cuba took place. In Brazil slavery existed till 1888. A decree for its abolition in China was announced in 1910.

The efforts which were constantly being made to suppress the slave trade on the east coast of Africa only slowly led to satisfactory success. In 1817 a treaty for its suppression was concluded with Madagascar, and in 1822 with

the Imam of Muscat (ruier of Oman); but the slave trade continued as active as ever along the whole coast. These chiefly engaged in the trade were Arabs, who sold the slaves in the African countries bordering on the Mediterranean and at the ports of the Red Sea. They were all ultimately destined for Mohammedan masters. The suppression of the trade was one of the objects of Sir Samuel Baker's expedition up the Nile in 1870-73; and much more vigorous and effective measures were carried out by General Gordon in 1877 and subsequent years. In May, 1873, a treaty was signed stipulating for its suppression within the dominions of the Sultan of Zanzibar; and the slave-market at Zanzibar was thereupon closed. Even as late as 1894, though Britain and Germany were unceasing in their efforts to put down the traffic in the interior of the country, it still continued alive. It was carried on chiefly by so-called Arabs, and the cruelties perpetrated by and under the direction of these ruffians in their raids for slaves were appalling. Since then, however, the control of most of the coast by European nations has fairly put an end to this deplorable traffic.

**Slavonia** (sla-vō'ni-a; German, *Slavonien*), a district of the Serb-Croat-Slovene state of Jugo-Slavia; formerly a crownland of Hungary, forming with Croatia an autonomous province within Austria-Hungary. A branch of the Carnian Alps traverses it, and forms the watershed between the Drave and the Save, tributaries of the Danube. Along the rivers extend fertile plains, where large crops of wheat and corn are raised, and immense herds of cattle and swine are reared. Flax, hemp, fruit (peaches, chestnuts, almonds, figs), tobacco and wine are produced. Manufactures are not extensive. The inhabitants are mostly of the same race with the Servians; and on the defeat of Austria, in 1918, at the end of the European war (q. v.) they joined with the Servians and Croats and established the Serb-Croat-Slovene state known as Jugo-Slavia (q. v.). Pop. 378,000.

**Slavs** (slavs), a branch of the Aryan family of nations, among which it is most nearly allied to the Lithuanian and more distantly to the Germanic branch. In the fourth century Slavs lived in great numbers in the neighborhood of the Carpathians, and thence they appear to have spread northward to the Baltic and southward to the Adriatic. About the beginning of the sixth century they are found on the northern banks of the Lower Danube, whence they passed

over to the southern banks, occupying *Mosia* and *Thrace*; at this time Slavs also peopled *Bohemia* and *Moravia*, and before the end of the century they had penetrated into *Transylvania*, *Hungary*, *Upper Austria*, *Styria*, *Carinthia*, and *Carniola*. The Slavonic tribes of *Chorvati*ans (Croats) and *Servians* settled probably between 634 and 638 in *Dalmatia* and the whole of ancient *Illyricum* (what is now the *Serb-Croat-Slovene* state of *Jugo-Slavia*). Finally, Slavonic tribes spread from their first settlements also to the north and east, over the remainder of modern *Russia*. Of this wide territory the *Slavonians* again lost in process of time the *Elbe* and *Oder* regions, *Upper Austria*, and part of *Carinthia* and *Styria*, of all of which they were deprived by Germanic tribes; large parts of *Transylvania* and *Hungary*, which fell to *Roumanians* and *Magyars*; and parts of the regions on the south of the *Danube*, which fell to *Greeks* and *Turks*.

The Slavs form three groups: (1) *the Eastern group*, *Great Russians*, *Little or Malo Russians* (including *Ruthenians* and *Ukrainians*), and *White Russians*; (2) *the Western group*, *Poles*, *Czechs* (comprehending *Czechians* in the narrower application, *Moravians*, and *Slovaks*), and *Sorbs*, or *Wends* (*Lusatians*), divided into *Upper* and *Lower Sorbs*; (3) *the Southern group*, *Slovenians*, *Serb-Croats*, and *Bulgarians*. The total number of Slavs is said to be about 160,000,000. They adhere to the *Greek Orthodox* or the *Roman Catholic Church*.

The peace of 1919 (see *Treaty*), following the European war, 1914-18, resulted in new boundary lines for the countries inhabited by the Slavic peoples, the *Serbs*, *Croats* and *Slovenes* being united in the new state of *Jugo-Slavia*; the *Czechs* and *Slovaks* joining to create the state of *Czechoslovakia*; and the *Poles* winning independence and the reconstruction of the state of *Poland*. (See the articles under these headings.)

**Sledge** (siedj), a vehicle moved on runners or on low wheels, or without wheels, for the conveyance of loads over frozen snow or ice, or over the bare ground; called also a *sled*. Also a kind of travelling carriage mounted on runners, otherwise called a *sleigh*; much used in *Russia*, *Canada*, and other northern countries during winter, instead of wheel-carriages, also in the *United States* for pleasure purposes.

**Sleep** (siēp), the state in which the activity of the senses and cerebrum or brain proper appears to be naturally and temporarily suspended.

This state is consistent with a kind of passive activity of these nervous centers, as seen in the acts or phenomena of dreaming, as well as in other concomitant phenomena of sleep. All parts of the body which are the seat of active change require periods of rest. In the case of the brain it would be impossible that there should be short periods of activity and repose, that is, of consciousness and unconsciousness, hence the necessity of sleep, a condition which is an unusually perfect example of what occurs at varying intervals in every actively working portion of our bodies. Sleep, therefore, affords the interval during which nervous energy expended during the waking hours is renewed. The respective influences of habit, age, temperament, and occupation have much to do with the induction and maintenance of sleep in different individuals. An abnormal condition of irritability caused by great mental effort or strain for a considerable time, frequently results in preventing the access of sleep when it is desired. This indicates a revolt of the nervous centers, which may prove dangerous if the cause of it be not speedily done away with. Sleep often occurs in very different degrees in different parts of the nervous system. The phenomena of *dreams* and *somnambulism* are examples of differing degrees of sleep in different parts of the cerebro-spinal nervous system. Physiologists are all agreed that the dreamless sleep is the most refreshing, the lighter sleeper being liable to be disturbed by the most trifling noises. In some cases of diseased conditions sleep may be prolonged for indefinite periods, although obviously the distinction between coma and sleep is only made with great difficulty in such cases; while, on the contrary, periods of active wakefulness may occur and extend for days, weeks, or even months, without a single interval of sleep or repose. Insensibility is generally produced by a deficient and an excessive quantity of blood within the cranium; but it was once supposed that the latter offered the truest analogy to the normal condition of the brain in sleep, and, in the absence of any proof to the contrary, the brain was said to be during sleep congested. Direct experimental inquiry has led, however, to the opposite conclusion. The condition of the brain during sleep is one of considerable bloodlessness. There seems to be both a diminished quantity of blood circulation through the brain, and the speed of its movement is much lessened. See *Dreams*, *Somnambulism*.

**Sleeping Sickness**, a deadly African disease, transmitted by the bite of the tsetse fly, which introduces tripanosomata into the human system. It produces a lethargy which is almost certain to end in death. It made its way within recent years from Central Africa to Uganda, where the mortality became very great, ranging from 20,000 to 80,000 a year. It has been found that the fly is confined to certain fixed localities, one being in the strip of timber along the shore of the Victoria Nyanza. By removing the inhabitants from these districts the mortality was reduced in 1908 to less than 2000, and these probably persons infected before removal. No cure for the disease has yet been found, though vigorous efforts are being made to discover some means of combating it.

**Slesvig.** See *Schleswig-Holstein*.

**Slibovitz** (slib'o-vitz), a kind of spirit distilled in Austria-Hungary from the fermented juice of plums.

**Slidell** (slid'el), JOHN, statesman, born at New York about 1793, practiced law in New Orleans after 1819. He was made U. S. district attorney for Louisiana in 1834; elected to Congress in 1843; was minister to Mexico 1845; United States Senator 1853-61. He joined the Confederate cause in 1861 and was sent in November, with James M. Mason, as a commissioner to France. The commissioners were seized on the English mail-steamer *Trent* by Captain Wilkes, of the *United States*. This seizure threatened to lead to war with England. He was released in January, 1862, and went to France, but failed in the principal object of his mission, that of obtaining recognition of the Confederacy. He died in 1871.

**Slide-rest**, an appendage to the turning-lathe for holding and resting the cutting-tool, and ensuring accuracy in its motion. The slide-rest imparts motion to the cutting-tool in two directions, the one being parallel and the other at right angles to the axis of the lathe.

**Slide-valve**, a contrivance extensively employed in regulating the admission or escape of steam or water in machinery. A familiar example of the slide-valve is found in the ordinary steam-valve of a steam-engine.

**Sliding-rule**, a mathematical instrument or scale, consisting of two parts, one of which slides

along the other, and each having certain sets of numbers engraved on it, so arranged that when a given number on the one scale is brought to coincide with a given number on the other, the product or some other function of the two numbers is obtained by inspection. The numbers may be adapted to answer various purposes, but the instrument is chiefly used in gauging and for the measuring of timber.

**Slieven** (sliv'en), a town of Eastern Roumelia, at the foot of the Balkans, with manufactures of cloth, otto of roses, etc. Pop. 20,803.

**Sligo** (slig'o), a seaport town of Connaught province, Ireland, capital of county Sligo, 134 miles N. W. of Dublin, near the mouth of the Garvogue (which drains Lough Gill) in Sligo Bay. It is the most important seaport in the N. W. of Ireland, and has a large trade, chiefly with Liverpool, Glasgow, Londonderry, and a few foreign ports. The exports consist chiefly of provisions, cattle, grain, flour, etc.; and the imports, colonial produce, timber and coals. Pop. 10,870.—The county has an area of 707 sq. miles, and is more pastoral than agricultural in its industries. The surface is partly level and partly mountainous, the Ox mountains rising to nearly 1800 feet high. There are several lakes, including the beautiful Lough Gill, Lough Arrow and Lough Gara. The principal crops are oats and potatoes. Coarse woollens and linens are manufactured for home use. The coast fisheries are extensive. Sligo is the only town of any size. The population has decreased from 189,900 in 1841 to about 84,083 at the present time.

**Sling**, an instrument for throwing stones or bullets, consisting of a strap and two strings attached to it. The stone or bullet is lodged in the strap, and the ends of the strings being held in the hand the sling is whirled rapidly round in a circle, and the missile thrown by letting go one of the strings. The velocity with which the projectile is discharged is the same as that with which it is whirled round in a circle, having the string for its radius. The sling was a very general instrument of war among the ancients. With a sling and a stone David killed Goliath. The name is also given to a kind of hanging bandage in which a wounded limb is sustained; and to a device for holding heavy articles, as casks, bales, etc., securely while being raised or lowered.

**Slip**, an inclined plane upon which a vessel is supported while building,



or upon which she is hauled up for repair; also, a contrivance for hauling vessels out of the water for repairs, etc. One form of slip consists of a carriage or cradle with truck-wheels which run upon rails on an inclined plane. The ship is placed on the carriage while in the water, and the carriage together with the ship is drawn up the inclined plane by means of wheels and pinions wrought by men or steam power.

**Slips**, PROPAGATION BY, a mode of propagating plants, which consists in separating a young branch from the parent stock, and planting it in the ground. Slips from trees of which the wood is white and light, such as willow, poplar, or lime, succeed best. A slip succeeds more certainly when two or three young buds are left on the lower part of it under ground.

**Sliven**. See *Slieven*.

**Sloane** (sion), SIR HANS, a distinguished naturalist, and founder of the British Museum, was born in the north of Ireland in 1660; studied medicine in London, Paris, and Montpellier, and died at Chelsea in 1753. In 1684 he settled in London in the practice of his profession, and in 1685 was admitted a fellow of the Royal Society, of which he was appointed secretary in 1693, and president in 1727. His *Natural History of Jamaica* (1707-25) was the result of his observations in that island during a visit in 1687-80. George I created him a baronet and physician-general to the forces in 1716, and on the accession of George II he was named physician in ordinary to his majesty. See *British Museum*.

**Slobodskoi** (slâ-bât-skoï'), a town of Russia, government of Viatka, on the right bank of the river Viatka. Pop. 10,052.

**Slocum** (sio'kum), HENRY WARNER, soldier, born at Delphi, New York, in 1827. He was graduated from West Point Academy in 1852, resigned from the army in 1856, but entered the service as colonel of volunteers in 1861. He was appointed brigadier-general in the autumn of 1861, fought in the battles before Richmond, was made major-general in July, 1862, and commanded a corps at Chancellorsville and Gettysburg. He was made a corps commander under Sherman in 1864 and led one of the wings of Sherman's army in its great march through Georgia. He died April 14, 1894.

**Sloe** (sio), or BLACKTHORN (*Prunus spinosa*), a well-known deciduous shrub of the plum genus, with spinose

branches, and possessing a very hard, tough wood. It blossoms with white flowers in the early spring, and has a black, round, austere fruit which is used for preserves, for making a fictitious port wine, and for dyeing black. The sloe abounds in most parts of Europe, and is from 8 to 15 feet high. There are two or three varieties, including double-flowered, variegated-leaved, and egg-shaped fruited forms.



Flower and Fruit of Sloe (*Prunus spinosa*).

**Slonim** (sio'nyem), a town in the government of Grodno, Russia, and 70 miles southeast of the town of Grodno. Pop. 15,803.

**Sloop** (slop), a small vessel furnished with one mast and a fixed bowsprit. It is fore-and-aft rigged, and usually carries a main-sail, fore-sail (jib-shaped), a jib, and a gaff-sail. It is a common rig for yachts. A sloop-of-war in the older American navy, was a vessel below the size of a corvette, and above that of a brig. Sloops of war carried from ten to eighteen guns.

**Sloth** (sioth), the name applied to several genera of edentate mammals inhabiting South and Central America and forming the family Bradypodidae. This family is distinguished by the flat short head, and by the elongated legs, furnished with powerful claws of compressed and curved shape. No incisor teeth exist, but simple molars are developed. The stomach is of somewhat complex nature. The fore-limbs are longer than the hind-limbs, and have a powerful muscular organization. The palms and soles of the feet are turned inwards, and the claws are bent inwards towards the soles, so that the sloth's movements on the ground are both awkward and painful; but in their natural habitat amid the trees, the curved and inwardly-disposed claws and limbs are seen to be admirably adapted for locomotion in their characteristic fashion, back downwards, through their native forests. Of the sloths the best-known species is the ai (*Bradypus tridactylus*), which has three toes and is of a brownish-gray color, with darker tints on the face and limbs. The fur is of very coarse character. The unau, or two-toed sloth (*Choloepus didactylus*), has an average length of about 2 feet, and its color is a lighter gray

## Sloth Bear

## Smalley

than that of the al. The tail in both species is either wanting, or at the most is of rudimentary character.

**Sloth Bear.** See *Asiatic*.

**Slot Machine,** an apparatus in which a coin of fixed denomination and weight, dropped through a slot, by its weight sets the internal machinery in operation to the production of a certain effect, such as passing out candy or other material to the operator. These machines have been adapted to the sale of postage stamps, to the setting free of a fixed quantity of illuminating gas, and to numerous other purposes, some of them of a gambling character.

**Slough** (slou), a town of England, in Buckinghamshire, 20 miles west of London and 2 northwest of Windsor. At Slough Sir William Herschel erected his large astronomical telescope, and made some of his most important discoveries. Pop. 14,085.

**Slovaks** (slô'vak), the name of the Slavonia. inhabitants of Northern Hungary, so found in Moravia in the districts adjoining Hungary, and in detached settlements in Lower Austria, Bukovina and Slavonia. The Slovaks possess in their own dialect a number of beautiful popular songs, collections of which have been published at different times. The total number of Slovaks is under 2,000,000.

**Slovenians** (slô-vê'ni-anz), the native name of some Slavonian tribes in Styria, Carinthia, Carniola and Hungary, numbering about 1½ million. The language of the Slovenians is closely allied to the Servian. It possesses some very old and valuable literary monuments.

**Slow-match,** a match made so as to burn very slowly. The commonest kind of slow-match is a piece of slightly twisted hemp rope dipped in a solution of saltpeter, sugar of lead, etc. Slow-matches are chiefly used to fire mines or blasts, the object of using them being to allow the person who fires them to escape to a safe distance before the explosion takes place.

**Slow-worm.** See *Blind-worm*.

**Sloyd,** SLÖJD (sloid; a Scandinavian *sleight*), a system of manual training for pupils in elementary and higher schools, much in vogue on the Continent and practiced in some English educational establishments, in which the pupils are accustomed to the use of tools in a handicraft, which is not necessarily intended to form their future exclusive or main

occupation. It is applied to any useful handicraftwork such as carpentry, metal-work, basket-work, fretwork, bookbinding, etc., but is usually confined to wood-sloyd, or the use of the knife and carpenter's tools. There is a training school for Sloyd near Gothenburg, which is attended by teachers from all countries. It is already practically introduced into America under the name of manual training.

**Slug,** the name applied to several genera of gasteropodous molluscs, included in the pulmoniferous (or 'lung-bearing') section of the class, and resembling the snails, but not having an external shell. The typical slugs form the family Limacidae, and possess a rudimentary shell, internal in its nature, and generally concealed more or less completely by the mantle. The body is elongated, depressed, and attenuated backward, the head and tentacles retractile. The latter are four in number, the eyes being borne on the tips of the larger pair. Of this genus the great gray slug (*Limas antiquorum*), the largest British species, and the black slug (*L. aser*) are the two familiar species. The former usually frequents hollow trees, undisturbed heaps of decaying vegetable matter, and like situations. The black slug is more common than the gray species, and is usually of smaller size. Other familiar genera are the *Arion*, represented by the red slug; and the *Testacella*, represented by the little carnivorous *Testacella haliotoides*, which feeds chiefly upon earthworms, and is generally found in the loose soil of gardens.

**Slur,** in music, a sign in the form of a curve, placed over two or more notes on different degrees, to indicate that they are to be played *legato*.

**Smack,** a small decked or half-decked vessel rigged as a cutter, sloop, or yawl, used in the coasting trade and in fishing.

**Smalkaldic League.** See *Schmal-kalden* (League of).

**Small-arms,** a general name for all portable fire-arms. (See *Musket, Rifle, Revolver*, etc.). The name of small-arms factories is given to certain government establishments for the manufacture of small-arms.

**Smalley** (smal'li), GEORGE WASHBURN, journalist, born at Franklin, Massachusetts, in 1833. He served as war correspondent of the *New York Tribune* during the Civil war, the German-Austrian and the Franco-German wars, was London correspondent of the *Tribune* 1867-85, and became American correspondent of the *London Times* in

1895. He gained an eminent position in journalism. Died in 1916.

**Smallpox**, an infectious disease, characterized by a pustular eruption accompanied by high fever. The first symptoms of the disease appear about seven days after infection, when a feverish shivering pervades the body, followed about three days later by the appearance of red spots on the face, breast, hands, and gradually over the whole body. After about three days these spots develop pustules, which become inflamed and suppurate. About the eleventh day the pustules begin to dry up and form a crust. Commonly the smallpox virus infects but once, and then only those persons who have a certain susceptibility for it. This disease is first mentioned by Arabic writers. It is not certain how it was introduced into Europe, but from the thirteenth century downwards it raged with great destructiveness among the Western nations, until it was checked by the introduction of vaccination. It is more fatal on its first appearance in a country, and commits greater ravages, than after having prevailed for some time, as it did in Iceland in 1707, and in Greenland in 1733. The violence of the disorder is lessened when it is produced artificially by inoculation with the smallpox virus. Inoculation was introduced into Western Europe from Turkey by the celebrated Lady Montagu; but it has been entirely superseded by vaccination, which is safer. See *Vaccination*.

**Smalt** (smalt), a combination of common glass with the protoxide of cobalt which imparts a deep blue tinge to the glass. When reduced to an impalpable powder it is employed in painting and printing upon earthenware, and to give a blue tint to writing-paper, linen, etc. It was discovered by a Bohemian glass-blower in the sixteenth century.

**Smart** (smärt), CHRISTOPHER, an English poet, born in 1722, and educated at Pembroke College, Cambridge, where he obtained a fellowship in 1745. He devoted himself to literary work, and, having settled in London, he became intimate with Pope, Johnson, and Garrick. He was improvident and of a convivial disposition. He died within the rules of the King's Bench prison for debtors in 1771. His most remarkable production was the *Song to David* (1763), written on the walls of a lunatic asylum, where he was temporarily confined. He translated into Latin Pope's *Ode on St. Cecilia's Day* and *Essay on Criticism*, the *Works of Horace* into English prose and verse (1765 and 1767), and pub-

lished the *Parables of Christ* done into verse (1765).

**Smart**, SIR GEORGE, musician, son of a music-seller in London, born in 1776; died in 1867. By industry and careful study he rose to be composer and organist to the Chapel-Royal, St. James's, and directed the music at the coronation of William IV and Queen Victoria. He was knighted in 1811. He conducted the principal musical festivals, and was the first to introduce Mendelssohn's oratorio *St. Paul* and Rossini's *Stabat Mater*. Among his pupils were Madame Sontag and Jenny Lind.

**Smeaton** (smé'tun), JOHN, civil engineer, son of an attorney, was born in 1724 at Austhorpe, near Leeds, England. He at first followed his father's profession, but abandoned it for engineering. In 1751 he invented a machine for measuring a ship's way at sea, and also a new form of compass. In 1753 he was elected a fellow of the Royal Society, and was awarded the Copley medal in 1759. In 1755 he was intrusted with the rebuilding of the Eddystone lighthouse, which was completed in October, 1759. It stood till 1882, when it was replaced by a new structure. Smeaton was subsequently employed on many works of great public utility, including the Forth and Clyde Canal and Ramsgate harbor. He also perfected Newcomen's engine. (See *Steam-engine*.) He died in 1792.

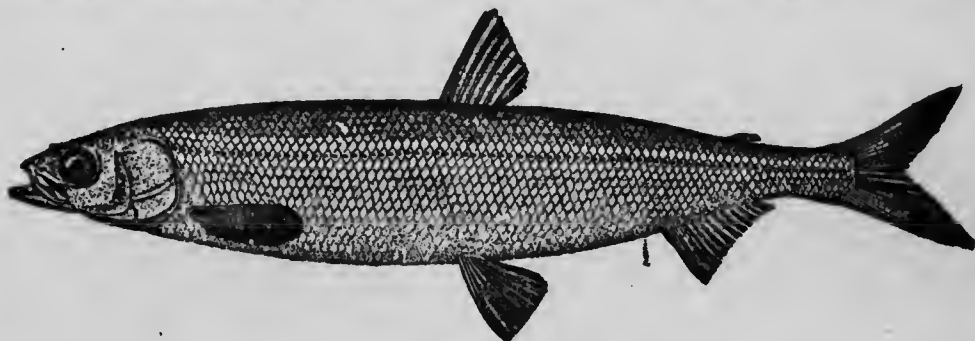
**Smedley** (smed'li), FRANCIS EDWARD, novelist, son of Francis Smedley, high-bailiff of Westminster, born at Marlow, England, in 1819; died at London in 1864. He was a hopeless cripple from his infancy, and was unable to take active exercise of any kind. He was the author of *Frank Fairleigh* (1850), *Lewis Arundel* (1852), *Harry Coverdale's Courtship* (1854), etc.

**Smell**, the sense exercised in the perception of odors, through the functions of the olfactory nerves. The sense is one of the special senses in that the nerves devoted to the appreciation of odors exercise that function alone, and are not affected by any other kind of impressions; while again, no nerves are capable of receiving the particular impressions of odors but the olfactory filaments. The sense of smell is derived exclusively through those parts of the nasal cavities in which the olfactory nerves are distributed. (See *Nose*.) The matters of odor must in all cases be dissolved in the mucus of the mucous membrane before they can be immediately applied to or affect the olfactory nerves; thus for the perception of odors the

mucous membrane of the nasal cavity must be moist. In animals living in the air it is also requisite that the odorous matter should be transmitted in a current through the nostrils. This is effected by an inspiratory movement, the mouth being closed. The voluntary nature of the act of smelling is also thus exemplified, since by interrupting the respiration or breathing, the sense cannot be duly exercised. The delicacy of the sense of smell is most remarkable; it can discern the presence of bodies so minute as to be undiscoverable even by spectrum analysis: three one-hundred-thousandth of a grain of musk can be smelt. The olfactory nerves form the first pair of cranial nerves, or those given off directly from the brain as a center. The facility with which different odors are smelled varies in different animals. Thus carnivorous mammalia are more susceptible to the odors of other animals than herbivor-

of *Buffon's Natural History*. He wrote a number of treatises on various subjects relating to natural history, which in a collected or emended form were published under the title of the *Philosophy of Natural History*; also memoirs of Lord Kames, Dr. John Gregory, and David Hume.

**Smelt**, a small but delicious European fish, the *Osmérus eperlanus*, allied to the salmon, inhabiting the salt water about the mouths of rivers. It is of a silvery-white color, the head and body being semi-transparent, and is from 4 to 8 inches long. It inhabits fresh water from August to May, and after spawning returns to the sea. When first taken out of the water smelts have a strong smell of cucumber. It is called also the *sperling*, or *sparling*. The American smelt is the *Osmérus viridescens*, which inhabits the coasts of New England: but the name is given in America



Surf Smelt.

ous forms; and the latter in their turn are more readily affected by the smell of plants. Although the sense of smell in man is less acute than that of many animals, yet his sphere of susceptibility to various odors is more uniform and extended. The influence of *habit* is very marked in the exercise of this sense, custom enabling the individual to inhale odors which at first might be distasteful or nauseous to him. Certain diseases of the brain may produce anomalous effects on the olfactory sense.

**Smellie** (smel'i), WILLIAM, naturalist and general writer, born at Edinburgh about 1740; died there in 1795. In 1765 he commenced business as a printer on his own account, and compiled and conducted the first editions of the *Encyclopædia Britannica*, which began to be published in numbers at Edinburgh in 1771, and was completed in three vols. quarto. In 1780 he gave to the world the first part of his translation

also to other fishes. The name of *sand smelt* is given to the *Atherina presbyter*, a small fish allied to the mullets and climbing perches. It averages about 6 inches in length, and is of a pale pink color, with black spots on the head and back. This fish is most plentiful on the southern coasts of Britain, and is sought after chiefly for bait, but also as a food-fish. The flesh is very delicate.

**Smelting**, the process by which a ore in a melted state by applying great heat. Iron is smelted in lofty furnaces known as *blast-furnaces*.

**Smethwick** (smeth'ik), a manufacturing town in the parliamentary division of Staffordshire, England, 3½ miles N. W. of Birmingham. It has extensive glass-works, chemical works, engineering and machine works, iron-foundries, rivet and tube works, safe manufactories, and others. Pop. 70,681.



**Smew** (smû; *Mergellus albellus*), a swimming bird, nearly allied to the goosanders but with a shorter bill. It is abundant on the north coast of Asia and in some parts of Europe. It flies well, but has an awkward gait on land. Its average length is from 15 to 18 inches.

**Smilacæ** (smī-lā'se-ē), a nat. order of endogenous plants, belonging to the subclass Dictyogenæ, or those having reticulated leaves. They are mostly climbing plants, with woody stems and small unisexual flowers. They are found in small quantities in most parts of the world except in Africa. The genus *Smilax* embraces the various species of sarsaparilla. The tubers of *Smilax China* and of *Rosburghia vivida-flora* are used for food.

**Smiles** (smīlz), SAMUEL, author, was born at Haddington, Scotland, in 1816, and educated for the medical profession. He practiced for some years as a surgeon at Leeds, when he became editor of the Leeds Mercury. In 1845 he became secretary to the Leeds and Thirsk Railway, and in 1852 to the South-eastern Railway, from which he retired in 1866. He was author of many works on industrial enterprise, the chief of which are: *Life of George Stephenson* (1859); *Self-Help* (1860); *Workmen's Earnings, Strikes and Wages* (1861); *Lives of the Engineers* (1862); *Industrial Biography* (1863); *Lives of Boulton and Watt* (1865); *The Huguenots, their Settlements, Churches, and Industries in England and Ireland* (1867); *Character* (1871); *The Huguenots in France after the Revocation of the Edict of Nantes* (1874); *Thrift* (1875); *Self-Effort* (1889). These works are characterized by their good moral teaching, they are written in a clear and simple style, and many of them have been translated into various European languages. The University of Edinburgh conferred the degree of LL.D. on Smiles in 1878. He died in 1904.

**Smirke** (smerk), ROBERT, an English painter, born in 1752; died in 1845. He was elected a member of the Royal Academy in 1792. His pictures are generally of small size, and a large proportion of them are illustrations for books, the Scriptures, Shakespeare, English history, *Don Quixote*, etc., furnishing subjects.—His sons, SIR ROBERT SMIRKE (1780-1867), and SYDNEY SMIRKE (1799-1877), had considerable reputations as architects.

**Smith**, ADAM, a distinguished writer on political economy and on morals, was the only son of Adam Smith,

a controller of the customs at Kirkcaldy, where he was born June 5, 1723, a few months after the death of his father. After leaving Kirkcaldy school he proceeded in 1737 to the University of Edinburgh, and to Balliol College, Oxford, in 1740. In 1748 he took up his abode in Edinburgh, and in 1751 he was appointed professor of logic at Glasgow, and in the next year of moral philosophy at the same university. His first publication, *The Theory of Moral Sentiments*, appeared in 1759, and was most favorably received. His theory makes sympathy the foundation of all our moral sentiments. To this work he afterwards added an *Essay on the Origin of Languages*. In 1764 he attended the Duke of Buccleuch on his travels, and during a long stay in France became acquainted with Turgot, Necker, D'Alembert, and others. On his return to Scotland in



Adam Smith.

1766 he retired with his mother to Kirkcaldy, where, after ten years of close study, he wrote his celebrated *Inquiry into the Nature and Causes of the Wealth of Nations* (two vols. 4to, 1776). This work may be deemed the formal precursor of the modern science of economics. (See *Political Economy*.) About two years later he obtained the lucrative post of commissioner of customs in Scotland. In 1787 he was chosen rector of Glasgow University. He died in July, 1790. Adam Smith was a man of much simplicity of character, and of a kind and benignant disposition. Numerous editions both of the *Moral Sentiments* and the *Wealth of Nations* have been published. Of the former the sixth edition, published in the year of the author's death, contained considerable additions and corrections. This work was translated into French by the Marquise de

**Condorcet.** A volume of additions and corrections to the first two editions of the *Wealth of Nations* appeared in 1784, and was included in the third edition, published in the same year. The best edition of this work is that with a life of the author, an introductory discourse, notes, and supplementary dissertations by John Ramsay Macculloch (four vols. 1828, often reprinted). The *Wealth of Nations* has been translated into most European languages.

**Smith, ALBERT,** an English writer, born at Chertsey in 1816, and educated at Merchant Taylors' School. After studying and devoting himself to the practice of medicine for some time, he turned his attention to literature, and produced a number of humorous works, such as *The Adventures of Mr. Ledbury*; *The Scattergood Family*; *Christopher Tadpole*; *The Pottleton Legacy*, etc. But his greatest success was achieved in his entertainments, his panorama of Mont Blanc being an especial favorite. He died in 1860.

**Smith, ALEXANDER,** poet and essayist, was born at Kilmarnock, Scotland, in 1830; died at Wardie, near Edinburgh, in 1867. His father was a pattern-designer, and the son adopted the same occupation, and removed to Glasgow for employment and intellectual improvement. Before he had reached his twentieth year he had written, and in 1851-52 he published, his *Life Drama*, a work which attracted (deservedly) a good deal of attention. In 1854 he was appointed secretary of the University of Edinburgh, and the following year produced, in conjunction with Sydney Dobell, a volume of *Sonnets on the War*. This was followed in 1857 by his *City Poems*, to which succeeded his longest and best poetical work, *Edwin of Deira* (1861). He subsequently became an active contributor to magazine literature. In 1863 he published a collection of papers entitled *Dreamthorp*, which was succeeded by *A Summer in Skye* (1865) and *Alfred Hagart's Household* (1865). He also edited the Globe edition of Burns's works, and wrote for it an excellent memoir of the poet.

**Smith, CHARLES EMORY,** journalist, born at Mansfield, Connecticut, in 1842. He was an editor in Albany 1865-80, and was engaged on the *Philadelphia Press* after 1880, becoming proprietor of this paper. He served as United States minister to Russia 1890-92, and was made postmaster-general in 1898. He died Jan. 19, 1908.

**Smith, FRANCIS HOPKINSON,** author and engineer, was born at

Baltimore, Maryland, Oct. 23, 1838. He studied mechanical engineering, and did some notable work as an engineer, building the Race Rock lighthouse of New London and the foundation for the colossal statue of Liberty in New York harbor. He also won considerable reputation as a water-color artist and an illustrator and lecturer on art. His highest fame, however, rests upon his able novels, among which are the popular *Colonel Carter of Cartersville*, *Tom Grogan*, *The Fortunes of Oliver Horn*, *The Romance of an Old-Fashioned Gentleman*, etc. He produced also various other works, such as *Gondola Days*, *Venice of To-Day*, *American Illustrators*, etc. He died April 7, 1915.

**Smith, GEORGE,** a distinguished Assyriologist, born about 1840; began life as an engraver, but having studied the cuneiform inscriptions of Nineveh, obtained an appointment in the British Museum (1867). A few years later he published the *Annals of Assurbanipal*. In 1872 he made known his striking discovery of a series of tablets in the British Museum containing, among other records, the Babylonian legend of the flood. This led to his making two expeditions to the site of Nineveh, resulting in the finding of inscriptions completing portions previously discovered. Particulars of these journeys are recorded in his *Assyrian Discoveries*, published in 1875, and other results were contained in his *Chaldean Account of Genesis* (1876). In 1876 he made another journey to the East for the purpose of continuing his explorations, but died at Aleppo. He wrote, among other works, concise histories of Assyria and Babylon.

**Smith, GERRITT,** philanthropist, born at Utica, New York, in 1797; was graduated from Hamilton College in 1818, and studied law. Inheriting a very large landed estate, he distributed nearly 200,000 acres of it among the poor, without distinction of color. He was also an ardent advocate of temperance and other reforms and an active member of the Anti-Slavery Society. He was twice nominated for governor of New York, was a member of Congress 1853-54, and gave pecuniary aid to John Brown, though he does not seem to have taken part in the affair at Harper's Ferry. With Horace Greeley he signed the bail-bond of Jefferson Davis in 1867. He died December 28, 1874.

**Smith, GOLDWIN,** an English historical writer, born at Reading, Berks, in 1823, was educated at Eton and Oxford, where he was graduated first-class in classics in 1845 and became fel-

low of University College in 1847. He also held the post of regius professor of history in the university from 1858 to 1868. As a lecturer he attracted great attention both on account of his strongly democratic views and his striking originality. Having during the American Civil war strongly defended the cause of the North, he was at the close of the war invited to visit the States to deliver a course of lectures, and his visit resulted in his accepting the professorship of history at Cornell University, New York. He resigned the appointment in 1871, and was appointed member of the senate of the University of Toronto, where he afterward resided. Among his chief works are: *Lectures on Modern History* (1861); *The Empire*, a series of letters (1863); *Speeches and Letters on the Rebellion* (1865); *Three English Statesmen* (Pym, Cromwell, and Pitt) (1867); *Political History of the United States* (1893); *Guesses at the Riddle of Existence* (1897); *The United Kingdom* (1899). He died June 7, 1910.

**Smith,** HORACE and JAMES, the joint-authors of the celebrated *Rejected Addresses*, were born in London, James in 1775, and Horace in 1779. James was a lawyer, Horace a stockbroker, but both were of a literary turn, and frequently contributed to periodicals. In 1812 the competition started by the management for the best poetical address to be read at the opening of Drury Lane Theater, when rebuilt after the fire, suggested to the Smiths the idea of producing a collection of parodies of the most noted writers of the day, under the designation of the *Rejected Addresses*. The work was hailed with enthusiastic applause, and rapidly ran through numerous editions. Horace also wrote several novels. James died in 1839, Horace in 1849.

**Smith,** SIR JAMES EDWARD, an English botanist, born in 1759; died in 1828. He studied medicine at Edinburgh, took the degree of M.D. at Leyden, and practiced his profession at London, and subsequently at Norwich. The Linnæan Society, of which he continued president till his death, was founded by him in conjunction with others in 1788. He was knighted in 1814. His principal works are *English Botany*, *Flora Britannica*, and the *English Flora*.

**Smith,** JOHN (commonly known as Captain John Smith), one of the founders of the English colony in Virginia, was born at Willoughby, Lincolnshire, in 1580. After many adventures as a soldier of fortune in Europe, Asia, and Africa, he joined in the project

to colonize Virginia. The first expedition, which left London in 1606, consisted of three ships and about 180 colonists and sailors. Dissensions broke out before they had reached their destination, and Smith was condemned to be hanged; but he escaped this fate, and became an active member of the colony. He made important geographical discoveries, obtained supplies from the natives, and was finally intrusted with the guidance of the colony, which he managed with much skill and energy, and to him was largely due its success. For a time he was a prisoner among the Indians; but the story of Pocahontas connected with this, like others of Smith's adventures, has been much questioned. In 1609 an accident obliged him to return to England. He subsequently visited the New England coast for the purpose of trade, and was taken prisoner by a French ship. He died in 1631. He published *A True Relation of the Events Connected with the Colonization of Virginia*; *Map of Virginia with a Description of the Country*; *Description of New England*; *General History of Virginia*, etc.

**Smith,** JOHN PYE, an English divine and theologian, born in 1774, became an Independent clergyman, and was long connected with the theological academy at Homerton; died in 1851. He wrote treatises on the *Divinity of Christ*; *On the Harmony of Geology with Revealed Religion*; *Scripture Testimony to the Messiah*, etc.

**Smith,** JOSEPH, founder of the Mormons. See *Mormons*.

**Smith,** ROBERT ANGUS, born at Glasgow in 1817; died in 1884. He was educated at Glasgow, and subsequently studied chemistry under Liebig at Giessen. After his return to England he made an important report on the sanitary condition of the towns of Lancashire, and his report to the British Association (1848) on the air and water of towns brought the subject into great prominence. Another report of his was on the state of the atmosphere in metaliferous mines. His special investigations into the quality of the air of towns led to his appointment as inspector-general of the alkali works of the United Kingdom. He was also inspector under the Rivers Pollution Act for England and Scotland. The degree of LL.D. was conferred upon him in 1882 by the University of Edinburgh. He wrote a *Life of Dalton*, and *History of the Atomic Theory up to His Time*; *Air and Rain*; *Beginnings of a Chemical Climatology*; *Loch Etive*, and *the Sons of Uisnach*; *Science in Early Manchester*, etc.

**Smith, SAMUEL FRANCIS**, Baptist divine, born at Boston in 1808; died November 16, 1895. He edited the *Christian Review* and the *Missionary Magazine*, and was the author of the national song *America*. He also wrote *The Morning Light is Breaking* and other popular hymns and songs.

**Smith, SYDNEY**, an English clergyman, noted for his wit and humor, was born at Woodford, Essex, in 1771; died in February, 1845. Educated at Winchester School, Sydney in 1789 entered New College, Oxford, where he took his degree of M.A. In 1796, becoming fellow a few years afterwards. In 1797 he obtained the curacy of Netheravon, a village on Salisbury Plain, where he passed a secluded life for about two years. He then went to Edinburgh as tutor to a young gentleman, continued there for five years, and was one of the founders in 1802 of the *Edinburgh Review*, being also one of its most influential contributors. In 1804 he removed to London, about the same time married, and became renowned as one of the witliest and most genial of men. In 1806 he was presented to the living of Foston-le-Clay, in Yorkshire. In 1807 appeared anonymously his celebrated *Letters of Peter Plymley*, intended to further the cause of Catholic emancipation. His liberal views on politics excluded him for a long time from church preferment; but in 1828 he was presented to the rectory of Combe Florey, in Somersetshire, and in 1831, during the ministry of Earl Grey, he became one of the canons of St. Paul's, London, where he thenceforth resided. A few years before his death a collected edition of his writings was published under his own supervision, including papers contributed to the *Edinburgh Review*, *Sketches of Moral Philosophy*, etc.

**Smith, THOMAS SOUTHWOOD**, physician and sanitary reformer, was born at Martock, Somersetshire, in 1778, and studied medicine at Edinburgh. He first settled as a physician at Yeovil, but in 1820 went to London, and was in 1825 appointed physician to the London Fever Hospital, and somewhat earlier to the Eastern Dispensary. He spent several years visiting the wards of the former, and the squalid houses of the patients of the latter, and embodied his experience in a *Treatise on Fever* (1830), which has been described by a competent authority as the best work on the subject that has ever been written. In 1832 he was appointed one of the commissioners to inquire into the condition of factory children, and his report led to the

passage of the Factory Act, which put an end to the inhuman treatment to which children had been subjected in factories up to that time. His inquiry into the condition of children and young persons employed in mines led to the exclusion of children and women from British mines. In 1846 his report on the means requisite for the improvement of the health of the metropolis resulted in the Public Health Act of 1848. He also did immense service to the cause of science by his reports on cholera and quarantine. Dr. Smith died at Florence in 1861.

**Smith, WILLIAM**, the 'father of English geology,' was born at Churchhill, in Oxfordshire, in 1769; died at Northampton in 1839. Acting successively as land surveyor, mining surveyor, and canal engineer, he was led to indulge in many speculations of a geological nature. He became convinced that each stratum contained its own peculiar fossils, and might be discriminated by them, and in 1815 he was able to submit a complete colored map of the strata of England and Wales to the Society of Arts, and received the premium of £50 which had for several years been offered for such a map. His fame as an original discoverer was now secure; but becoming involved in pecuniary difficulties he was obliged to part with his geological collection to government for £700. Subsequently a pension was granted to him by government.

**Smith, WILLIAM**, classical scholar, was born at London in 1813. He edited the well-known series of *Classical and Biblical Dictionaries*, and wrote many educational books. He was for some time classical examiner in the University of London, and professor of classics in New College, London, and after 1867 was editor of the *Quarterly Review*. He died October 7, 1893.

**Smith, WILLIAM ROBERTSON**, biblical scholar, was born at Kelso, Aberdeenshire, in 1844, and educated at the University of Aberdeen, subsequently spending some time at the New College, Edinburgh, and at the Universities of Bonn and Göttingen. From 1868 to 1870 he held the post of assistant-professor of physics at Edinburgh. Appointed in 1878 professor of Hebrew in the Free Church College, Aberdeen, he was removed from the post by the General Assembly in 1881 on account of his critical views on the Old Testament. From 1881 Professor Smith was connected with the editorship of the *Encyclopædia Britannica*, and after the death of Professor Baynes was editor-in-chief. He was a member of the Old Testament Re-



vision Committee, in 1879-80 traveled in Arabia, in 1883 succeeded Professor Palmer as professor of Arabic at Cambridge, and in 1886 was appointed librarian of Cambridge University. He was the author of several works relating to Jewish history. He died in 1894.

**Smith, Sir William Sidney**, born at Westminster, England, in 1765; died in 1841. He entered the navy at the age of twelve, received his lieutenancy at sixteen, and when nineteen was created post-captain. After serving with distinction as a volunteer in the Swedish navy against Russia, and then against France under Lord Hood, he returned to England, and received the command of the *Diamond*, for the purpose of cruising with a small flotilla against the French. He was made prisoner in an attempt to cut out a vessel at Havre, and was detained in confinement for two years, but contrived to make his escape. Appointed then to the *Tiger*, Sir Sidney did good service in Syria, and subsequently in Egypt against Bonaparte, receiving a severe wound at the battle of Alexandria. On his return to England various marks of distinction were bestowed on him, and in 1802 he entered parliament as member for Rochester. He was created rear-admiral of the blue in 1805, and in 1806, as commander of a small squadron, inflicted signal injuries on the French off the coast of Naples. Next year he accompanied Admiral Duckworth to the Dardanelles, where he distinguished himself by the destruction of a Turkish squadron. He was made vice-admiral in 1810, admiral in 1821, and in 1830, on the accession of William IV, succeeded him as lieutenant-general of marines. As a reward for his services he received a pension of £1000 a year and the decoration of K.C.B.

**Smith College**, a non-sectarian educational institution for women, founded in 1871 at Northampton, Massachusetts. It had in 1911, 138 instructors and 1500 students and an endowment of \$1,200,000.

**Smithfield** (smith'feld), a square in London, a little north of Newgate and west of Aldersgate, in which, until a few years ago, the only market in London for live stock was held. It was outside the old city walls, and before the days of Tyburn was the place of public executions. In the time of religious intolerance it obtained an evil repute for its burnings in the name of religion. Bartholomew Fair, so often mentioned in English literature, was held at Smithfield. (See *Bartholomew Fair*.) A cattle market was held here as far

back as 1150. On the site of the old market there has been erected a fine meat and poultry market.

**Smith's Falls**, a town of Ontario, Canada, 41 miles s. w. of Ottawa. It has varied manufactures. Pop. 6551.

**Smithsonian Institution**, a scientific institute in Washington, organized by Act of Congress in 1846, to carry into effect the provisions of the will of James Smithsonian, the founder. Smithsonian was a natural son of the Duke of Northumberland; was educated at Oxford, and was in 1790 elected a fellow of the Royal Society. He died at Genoa in 1829, leaving his property (worth £120,000) to his nephew, with the condition that if the latter died without issue the property was to go to the United States to found an establishment for the increase and diffusion of knowledge. In 1835 the nephew died childless, and in 1838 the sum of \$515,169 was paid into the treasury of the United States. In 1846 the interest on this sum (the principal itself must remain untouched) was applied to the erection of a suitable building, with apartments for the reception and arrangement of objects of natural history, including a geological and mineralogical cabinet, a chemical laboratory, a library, a gallery of art, and the necessary lecture-rooms. The building is one of the finest in Washington, and the collections of natural history, ethnological and other material of the highest value. The United States Weather Bureau grew out of its department of meteorology and the Fish Commission was founded in connection with its work on ichthyology. A portion of the funds of the institution is devoted to scientific researches and the publication of works too expensive for private enterprise. Three series of publications are issued: *Contributions to Knowledge*, *Miscellaneous Collections*, and *Annual Reports*. The institution embraces the National Museum, which is, however, wholly maintained by the government. The institution is administered by regents, composed of the chief-justice of the Supreme Court, three members of the Senate and three of the House of Representatives, with six other persons not members of Congress. The president, vice-president, and members of the cabinet for the time being have the position of governors or visitors of the institution, the president being *ex officio* at the head.

**Smoke** (smök), the exhalation or visible vapor that arises from a burning substance. In its more extended

sense the word smoke is applied to all the volatile products of combustion, which consist of gaseous exhalations charged with minute portions of carbonaceous matter or soot; but, as often used in reference to what are called smoke-consuming furnaces, the term is frequently employed to express merely the carbonaceous matter which is held in suspension by the gases. Many efforts have been made to prevent nuisance from smoke in cities, but much still needs to be done before this will be effectually accomplished, especially in Pittsburgh, Pennsylvania, and other manufacturing cities in which only bituminous coal is used.

**Smokeless Powder**, an explosive advantage over ordinary gunpowder of burning without residue and thus emitting no smoke. The dense clouds of smoke given off by gunpowder have long been a serious disadvantage in warfare, and it has been generally replaced by this new kind of explosive. Smokeless powder also burns much more quickly than gunpowder and by its rapid action gives higher velocity to projectiles. Nearly all smokeless powders consist essentially of gun-cotton or other lower forms of nitro-cotton, there being three kinds of the powders: gun-cotton, or nitro-cellulose; the same mixed with nitro-glycerine; and the same again with a nitro-derivative of hydrocarbons, such as picric acid and the various picrates. Most of modern nations have adopted some variety of smokeless powder, known variously as Cordite, Indurite, Ballistite, Schultze Powder, Cannonite, Amberite, Walsrode, etc. In addition to artillery ammunition, smokeless powders are made for military and sporting rifles.

**Smoke-plant**, a beautiful deciduous *Rhus cotinus*, nat. order Anacardiaceae, yielding the yellow dyewood called young fustic, and used also in tanning.

**Smolensk** (små-lyensk'), a government in Russia, west of Moscow; area, 21,632 square miles; pop. 1,762,400. It consists of extensive plains, and belongs partly to the basin of the Baltic, but much more to the Black Sea. The climate, though cold, is healthy, and the soil tolerably fertile, producing good crops of rye, hemp and flax, hops and tobacco. The pastures are excellent, and the forests yield excellent timber.—**SMOLENSK**, the capital, is situated on the Dnieper, 250 miles w. s. w. of Moscow, and is surrounded by old walls and towers. The interior contains much open ground, partly occupied as gardens. The principal buildings are the

cathedral, episcopal palace, a diocesan seminary, gymnasium, etc. The manufactures consist of linen, leather, hats, carpets, and soap; and the trade is chiefly in corn and hemp. Smolensk was a place of importance as early as the ninth century, and was partly burned by the French in 1812. Pop. 57,405.

**Smollett** (smol'et), **TOBIAS GEORGE**, novelist and miscellaneous writer, was born near Renton in Dumbartonshire in 1721; died at Monte Nuovo, near Leghorn, in 1771. He was educated at the University of Glasgow, and was apprenticed to a surgeon. In 1740 he went to London and obtained the situation of surgeon's mate to one of the ships that went out in the unfortunate expedition to Carthage in 1741 under Admiral Vernon. Of this affair he gave an account in his *Compendium of Voyages and Travels* (seven vols. 12mo, 1757). Disgusted with the navy, Smollett quitted the service, and resided for some time in Jamaica. On his return to London, in 1746, he heard of the barbarities of the Duke of Cumberland in the north of Scotland, and gave utterance to his indignation in the well-known ode entitled *The Tears of Scotland*. In the same year he published his *Advice: a Satire*; and in 1747 appeared his *Reproof: a Satire*, being the second part of *The Advice*. In 1748 he published his *Adventures of Roderick Random*, a novel which brought him both fame and fortune. He went to Paris in 1750, and about this time wrote his *Adventures of Peregrine Pickle*, which appeared in 1751. He now obtained the degree of M.D., but never succeeded in practice. In 1753 he published his *Count Fathom*, a work neither so ably written nor so popular as its predecessors. In 1755 he brought out a new translation of *Don Quixote*. Soon after this he was induced to take the chief management of the Tory organ, the *Critical Review*. In 1757 he produced *The Reprisal*, a comedy in two acts, which proved a success. In 1758 appeared his *History of England, from Julius Cæsar to the Treaty of Aix-la-Chapelle in 1748*. For a libel in the *Critical Review* he was sentenced to pay a fine of £100 and to suffer three months' imprisonment. During his confinement he composed his *Adventures of Sir Lancelot Greaves* (published in 1762). In 1761, 1762, and 1763 appeared his *Continuation of the History of England down to 1765*, since often reprinted as a continuation of *Hume's History*. In 1766, after a residence of about two years on the Continent, he published his *Travels through France and Italy*; and in 1767

his *History and Adventures of an Atom*. He again visited Italy in 1770, and near Leghorn he wrote his *Humphry Clinker*, which is regarded as the best of all his works. The humor of Smollett is of the broad, full-flavored kind, not seldom degenerating into burlesque; his characters are well marked and varied; and though his work is frequently coarse and vulgar, it has had much influence on English fiction.

**Smolt.** See *Salmon*.

**Smuggling** (smug'ling), the practice of defrauding the revenue by the clandestine introduction of articles into consumption without paying the duties chargeable upon them. It has been a common practice in all countries laying a duty on imported goods, and one that has proved very difficult to break up. Its latest phase in the United States is the bringing in of dutiable goods in the trunks or on the person of travelers. Many methods of thus evading the revenue are practiced, and often with success, despite the vigilance of the officials.

**Smut**, a disease, also called *Dust-brand*, incidental to cultivated grain, by which the farina of the grain, together with its proper integuments, and even part of the husk, is converted into a black, soot-like powder. It does not affect the whole body of the crop. Some attribute the smut to the richness of the soil, and others consider it as a hereditary disease transmitted by one generation to another through the seed. It is produced by a minute fungus, *Ustilago* or *Uredo segetum*. The safest mode for the farmer to pursue to prevent smut, is never to sow grain from a field in which the smut has prevailed. See also *Bunt* and *Ergot*.

**Smyrna** (smér'na; Turkish, *Izmir*), an ancient city and seaport of Asiatic Turkey, on the west coast of Asia Minor, at the head of the gulf of the same name. The appearance of the city from the sea is extremely attractive, but a closer inspection dissipates the illusion. The houses, mostly built of wood, are mean and fragile looking; the streets close and filthy, and filled by intolerable stenches proceeding from the sewers and drains. The city is divided into four quarters—Frank, Turk, Jew and Armenian. There is an English hospital, church, and burying-ground, one or two English schools, and numerous schools for Turks, Greeks, and others; all sects and faiths having complete toleration. Smyrna has been for centuries the most important place of trade in Asia Minor. The chief imports are cotton manufac-

tures, woolen cloths, colonial goods, iron, steel, and hardware goods. The principal exports are dried fruits (especially figs), cotton, silk, goats'-hair, sheep and camels' wool, valonia, madder-root, yellow-berries, sponges and opium. The origin of Smyrna is lost in antiquity. It laid claim to the honor of being the birthplace of Homer, and no doubt was a Greek city as early as the date assigned to the poet. It was afterwards taken by the Lydians, was restored by Antigonius



and Lysimachus, generals of Alexander the Great, became the capital of Antigonius and a flourishing city. During the Roman civil wars it was taken and partly destroyed by Dolabella, but soon recovered. It early received Christianity, and was one of the 'seven churches' of Asia. In the thirteenth century only the ruins of its former splendor were left; but after the Turks became masters of the country it revived. It has repeatedly suffered from earthquake. Pop. estimated at 375,000.

**Smyrna**, GULF OF, formerly the Hermean Gulf, an inlet of the Aegean Sea on the coast of Asiatic Turkey, so-called from the town of Smyrna, which stands at its head. It is 40 miles in length by 20 at its broadest part, and contains several islands and affords good anchorage.

**Snail** (snail), a slimy, slow-moving, air-breathing, gasteropod mollusc belonging to the genus *Helix* of Linnaeus, now raised into the family Helicidae, and differing from the slugs (*Limacidae*) chiefly in having a spiral shell. The head is furnished with four retractile horns or tentacles; and on the superior pair, at the extremity, the eyes are placed. The sexes are united in the same individual, but the union of two

## Snake

such hermaphrodite individuals is necessary for fertilization. The common garden snail (*Helix aspersa*) is the most familiar species of the typical genus. The mischief done by it to garden produce on which it feeds is very extensive. Nearly equally well known is the edible snail (*H. Pomatia*), largely found in France, and cultivated there and elsewhere for food purposes.

**Snake** (snāk), the order of Ophidia, comprises scaly reptiles, without feet, which move by alternate folds of their slender body. There are about 120 American species, of which several are venomous. See *Serpents*.

**Snake-bird.** See *Darter*.

**Snake-eel**, a popular name of the fishes which constitute the family Ophichthidae of some naturalists, but which others class with the true eels in the family Muraenidae, from the tail tapering to a point like that of a snake. They are natives of warm seas. One species (*Ophichthus serpens*), of about 6 feet long, is found in the Mediterranean.

**Snake-fish.** See *Band-fish*.

**Snake Indians.** See *Shoshones*.

**Snake River.** See *Levis River*.

**Snakeroot** (snāk'rüt), the popular name of numerous American plants of different species and genera, most of which are, or formerly were, reputed to be efficacious as remedies for snake bites. See *Aristolochia* and *Senega*.

**Snake-stone**, a popular name of those fossils otherwise called Ammonites. The name is also given to certain small rounded pieces of stone, or other hard substance, popularly believed to be efficacious in curing snake bites.

**Snake-wood**, the wood of the nat. order Loganiaceae, a tree growing in India, Java, and other parts of the East, having a bitter taste, and supposed to be a certain remedy for the bite of the hooded serpent. Also the Demerara letter-wood (*Brosimum Aubletii*), a tree of the nat. order Artocarpaceae. It has this name from the heart-wood being mottled with irregularly shaped dark spots. The timber is excessively hard.

**Snapdragon**, a genus of annual or perennial plants of the natural order Scrophulariaceae. Common snapdragon (*antirrhinum majus*) is much cultivated for flower beds and borders. It is a native of Europe. The name was

## Sneezing

given it because of the peculiarity of the blossoms which, by pressing between the finger and thumb, may be made to open and shut like a mouth. The great snapdragon grows to a height of two feet. It is a very showy garden plant; the flowers are large and pink-colored; the lower lip is white and the mouth yellow, with a gibbous prominence at the base beneath. Other varieties have scarlet and white flowers. Also a game in which raisins are snatched from burning liquor.

**Snapping-turtle**, a species of freshwater tortoise belonging to the genus *Chelydra* (*C. serpentina*), common to all parts of the United States. It feeds on small animals, is bold and fierce, and is so-named from its propensity to snap at everything within its reach. Another tortoise (*Macrochelys Temminckii*) of similar habits, but larger (sometimes weighing 100 lbs.), receives the same name.

**Sneehätten** (snä'het-en; 'Snow-hat'), a mountain in Norway with an altitude of 7500 ft. It rises from the midst of the Dovrefield, an extensive tract of country, from 40 to 50 miles in extent in every direction, and between 3000 and 4000 feet above the sea-level.

**Sneek** (snāk), a town of Holland, in the province of Friesland. It is partly surrounded by a ditch and an earthen rampart, and is intersected by numerous canals. It has roperies, tanneries, foundries, soap-works, boat-building yards, etc. Pop. 12,075.

**Sneeze-wood**, a South African tree (*Pteroxylon utile*), nat. order Sapindaceae, yielding a solid, strong, durable timber rivaling mahogany in beauty. Its dust causes sneezing, so that it is troublesome to work.

**Sneezewort** (snēz'wurt; *Helenium autumnale*) grows in damp places. The flowers are large, numerous, terminal, with drooping rays. The plant is very bitter.

**Sneezing**, is a convulsive action of the respiratory organs brought on commonly by irritation of the nostrils. It is preceded by a deep inspiration, which fills the lungs and then forces the air violently through the nose. Sneezing produced in the ordinary way is a natural and healthy action, throwing off automatically from the delicate membrane of the nostrils whatever irritable or offensive material may chance to be lodged there. When it becomes violent, recourse must be had to soothing the nasal membrane by the application of warm milk and water, or decoction of poppies. The custom of blessing persons when they



sneeze is very ancient and very widely spread.

**Sniatyn** (shnyä'tin), a town of Austria, in Galicia, on the Pruth. It was formerly a frontier stronghold, and has extensive tanneries, and a considerable trade in horses and cattle. Pop. 11,500.

**Snipe** (snip), a common name for those graiitorial birds which form the genus *Scolopax*. The common snipe (*Scolopax gallinago*) of Europe is a beautifully marked bird, about 17 inches long, the bill being nearly 8 inches. It is remarkable for its peculiar heating cry, and the drumming-like noise it makes in summer. The jack snipe (*Scolopax gallinula*) closely resembles the common snipe in its general habits and appearance. In North America there are sev-



Common Snipe (*Scolopax gallinago*).

eral species of snipe, Wilson's snipe (*S. Wilsoni*) being one of the chief. It is about equal in size to the common snipe of Europe and much resembles it in plumage. It is abundant in summer in the North and in winter in the South, and is in much request for the table. The name of sea snipe is sometimes given to the dunlin, while the name summer snipe is applied to the common sandpiper (which see).

**Snipe fish.** See *Belongs-fish*.

**Snizort** (snë'zort), LOCH, a sea loch in the N. W. of the island of Skye, Scotland.

**Snorri Sturluson** (snor'rë stôr'lö-sun), an Icelandic poet and historian, born in 1178. Tracing his descent from the kings of Norway, he early turned his attention to the history of their doings, and made a collection of sagas entitled the *Heimskringla*, or the *Ring of the World*, in which are interspersed songs of his own composing. It contains a record of the Norwegian kings from the earliest time to the death of Magnus Erlingsson

(1177), and was first printed in 1697. It has been translated into several languages. Snorri became chief judge of Iceland, but his ambitions and intriguing character led to his assassination in 1241. His name is also connected with the *prose Edda*. See *Edda*.

**Snow** (snö). Snow-flakes are assemblages of minute crystals of ice; they are formed when the temperature in a region of air containing a considerable quantity of aqueous vapor is lowered below the freezing-point. The particles of moisture contained in the atmosphere are then condensed and frozen, and form flakes, which descend to the earth's surface. Each flake is composed of a number of minute crystals of ice, which present countless modifications of the hexagonal system. They have great diversities of density, and display innumerable varieties of the most beautiful forms. These crystals usually adhere together to form an irregular cluster; and consequently the incident rays of light, which are refracted and reflected so as to present individually the prismatic colors, are scattered after reflection in all directions, and combine to give to the eye the color sensation of white. When sufficient pressure is applied the slightly adhering crystals are brought into true molecular contact, and the snow, losing its white color, assumes the form of ice. Snow answers many valuable purposes in the economy of nature. Accumulated upon high regions it serves to feed, by its gradual melting, streams of running water, which a sudden increase of water, in the form of rain, would convert into destructive torrents or standing pools; and in many countries it tempers the burning heats of summer by previously cooling the breezes which pass over them. In severer climates it serves as a defense against the rigors of winter by protecting vegetation from the frost, and by affording a shelter to animals which bury themselves under it. Even in more temperate climates it is found that vegetation suffers more from an open winter than when the fields, during that season, lie hid beneath a snowy covering. As for what is known as red snow, see *Protococcus*.

**Snow**, a vessel equipped with two masts resembling the main and fore masts of a ship, and a third small mast, just abaft the main-mast, carrying a sail nearly similar to a ship's mizzen.

**Snowball-tree**, the garden variety of the *Viburnum Opulus* which belongs to the natural order Caprifoliaceæ or guelder-rose (which see).

**Snowberry**, the popular name of tropical American shrubs of the genus *Chiococca*, nat. order Rubiaceae, suborder Cinchoneae. The fruit consists of snow-white berries. Also, and in England more usually, applied to *Symphoricarpos racemosa*, a hushy shrub of the woodbine family, a native of North America, bearing white berries.

**Snow-bird**, a popular name applied to several species of birds, such as the *Fringilla nivālis* of Europe, the *Fringilla hiemālis* of America, and the snow-bunting.

**Snow-bunting**, the popular name of *Emberiza* or *Plectrophenax nivālis*, a gregarious passerine bird belonging to the hunting family, a native of the Arctic regions, and common in winter in the United States. It is generally very fat, and is highly esteemed for the table. It visits Northern Europe also in winter, and is supposed to be the harbinger of severe weather. It sings very sweetly, and does not perch, but runs about like the lark.

**Snowdon** (snō'dun), a mountain range in North Wales, stretching N. N. E. to S. S. W. across Carnarvonshire, from the mouth of the Conway to Tremadoc; length, about 24 miles; average breadth, 6 miles. It attains its greatest height in Snowdon proper, whose loftiest summit—Wyddva, 3571 feet—is the culminating point of South Britain.

**Snowdrop**, a well-known garden plant of the genus *Gallanthus*, the *G. nivālis*, nat. order Amaryllidaceae. It bears solitary, drooping, and elegant white flowers, which appear early in spring. It is a native of the Alps, but is quite common in gardens in the Northern United States.

**Snowdrop Tree** (*Halesia tetraptera* and *H. diptera*), a name of ornamental trees of the Southern United States with flowers like snowdrops, belonging to the styrax family.

**Snowflake**. See *Leucojum*.

**Snow-goose** (*Anser hyperboreus*), a species of goose inhabiting the Arctic regions. Its flesh is esteemed excellent.

**Snow-line**, the limit of perpetual snow, or the line above which mountains are covered with perpetual snow. Since the temperature of the atmosphere continually diminishes as we ascend from the lower into the higher strata, there must be in every latitude a certain limit of elevation at which the temperature of the air is reduced to the freezing-point. This limit is called the snow-line, or line of perpetual congelation,

and the mountains which rise above it are always covered with snow. The snow-line varies according to latitude, being highest near the equator and lowest near the poles. Local circumstances, however, affect it, as the configuration of the country, the quantity of snow falling annually, the nature of the prevalent winds, etc. From these circumstances the snow-line is at different heights in the same latitude.

**Snow-plant**. Same as *Protococcus*.

**Snow-plow**, an implement for clearing away the snow from roads, railways, etc. There are two kinds: one adapted to be hauled by horses, oxen, etc., on a common highway; the other to be placed in front of a locomotive to clear the rails of snow. A variety of the latter is adapted to street railways. As now made a rotary motion replaces the plowing motion, cutting into and flinging the snow aside.

**Snow-shoe**, a kind of flat shoe, either made of wood alone, or consisting of a light frame crossed and recrossed by thongs, the broad surface of which prevents the wearer from sinking in the snow. Snow-shoes are usually



Snow-shoe.

from 3 to 4 feet in length, and from 1 to 1½ foot broad across the middle.

**Snow-slide**, western term for avalanche, which see.

**Snowy River**, a river of Australia, in New South Wales and Victoria; length, 240 miles, 160 of which are in New South Wales.

**Snuff**, a powdered preparation of tobacco in which fermentation has been induced by moisture and warmth. The tobacco is well dried previous to grinding, and this is carried sometimes so far as to give the snuff the peculiar flavor of the high-dried snuffs, such as the Irish, Welsh, and Scotch. Some varieties, as the rappees, are moist. The admixture of different flavoring agents and delicate scents has given rise to fanciful names

for snuffs, which, the flavor excepted, are identical. Dry snuffs are often adulterated with quicklime, and the moist kinds with ammonia, hellebore, pearly-ash, etc. See Tobacco.

**Snyders** (sní'ders), FRANS, a Flemish painter, born at Antwerp in 1579, studied the rudiments of his art under Breughel and Van Balen. Later he visited Italy, but in 1600 finally took up his abode at Antwerp, and died there in 1657. Snyders, who is considered never to have been surpassed in his delineation of dead game, fish, fruit, etc., excelled also in hunting scenes and combats of wild beasts. He used to work in concert with Rubens. Choice pieces of his are to be found in the collections.

**Soane** (són), SIR JOHN, an English architect, born in 1752, studied at the Royal Academy, was sent to Rome for three years with the Academy pension of £60 a year, and on his return he was employed on many public works. In 1788 he was appointed architect to the Bank of England, and in 1791 clerk of works to St. James' Palace, the Parliament Houses, and other public buildings. In 1794 he drew up plans for the improvement of the House of Lords, but though they were accepted, James Wyatt was engaged to carry them out. He became professor of architecture to the Royal Academy in 1806. He died in 1837, having bequeathed his collection of works of art and £30,000 to the nation. The *Soane Museum* thus formed is housed at 13 Lincoln's Inn Fields, London, and contains antique sculptures, bronzes, gems, models of ancient buildings, a collection of pictures, etc.

**Soap** (sóp), a chemical compound of common domestic use for washing and cleansing, and also used in medicine, etc. It is a compound resulting from the combination of certain constituents derived from fats, oils, grease of various kinds, both animal and vegetable, with certain salifiable bases, which in household soaps are potash and soda. Chemically speaking, soap may be defined as a salt, more especially one of the alkaline salts of those acids which are present in the common fats and oils, and soluble soaps may be regarded as oleates, stearates, and margarates of sodium and potassium. There are many different kinds of soaps, but those commonly employed may be divided into three classes:—1. Fine white soaps, scented soaps, etc.; 2. Coarse household soaps; 3. Soft soaps. White soaps are generally combinations of olive-oil and carbonate of soda. Perfumes are occasionally added, or various coloring mat-

ters stirred in while the soap is semi-fluid. Common household soaps are made chiefly of soda and tallow. Yellow soap is composed of tallow, resin, and soda, to which some palm-oil is occasionally added. Mottled soap is made by simply adding mineral and other colors during the manufacture of ordinary hard soap. Marine soap, which has the property of dissolving as well in salt-water as in fresh, is made of coconut oil, soda, and water. Soft soaps are generally made with potash instead of soda, and whale, seal, or olive-oil, or the oils of linseed, hemp-seed, rape-seed, etc., with the addition of a little tallow. Excellent soaps are made from palm-oil and soda. Soap is soluble in pure water and in alcohol; the latter solution jellies when concentrated, and is known in medicine under the name of *opodeldoc*, and when evaporated to dryness it forms what is called transparent soap. Medicinal soap, when pure, is prepared from caustic soda, and either olive or almond oil. It is chiefly employed to form pills of a gently aperient antacid action.

**Soap-berry**, the name applied to the fruit of several species of the genus *Sapindus* (nat. order Sapindaceæ) from their rind containing a saponaceous principle, so that when mixed with water they produce an abundant lather. The fruit is globular, as large as a cherry, inclosing a nut of a shining black color when ripe.

**Soap-plant**, a name common to several plants used in place of soap, as the *Phalangium pomaridianum*, a California plant, whose bulb, when rubbed on wet clothes, raises a lather, its smell somewhat resembling that of new brown soap.

**Soap-stone**, steatite. The name is derived from its color, and from the unctuous sensation experienced when the mineral is rubbed between the hands. See *Steatite*.

**Soap-wort** (*Saponaria*), a genus of plants of the nat. order Caryophyllaceæ; so-called because the bruised leaves produce a lather like soap when agitated in the water. Common soap-wort (*S. officinalis*) is a native of many parts of Europe, and is found on waysides, river-banks, and thickets. In the United States it grows by roadsides from New England to Georgia. It has handsome, pink-like flowers.

**Sobieski**, JOHN. See *John III* (*Sobieski*).

**Sobranje**, or **SOBRANYE** (so-brän'ye), the national assembly of Bulgaria (which see).

a leading demagogue; Meletus, a tragic poet, and Lycon, an orator, charging him with not believing in the gods which the state worshiped, with introducing new divinities, and with corrupting youth. The trial took place before a law-court composed of citizen judges. His bold defense is preserved by Plato, under the title of the *Apology of Socrates*. He dwelt on his mission to convict men of their ignorance for their ultimate benefit; declared himself a public blessing to the Athenians; assuring them if his life were spared he would continue in the same course; and regarded the approach of death with utter indifference. He was condemned to death by a majority of his judges; refused help to escape, and thirty days after his sentence drank the hemlock cup with composure, and died in his 70th year (B.C. 399). The account of his last hours is given in full detail in the *Phædo* of Plato. In their accounts of the life of Socrates the two principal authorities, Xenophon and Plato, substantially agree. It should be borne in mind, however, that Plato in his *Dialogues* generally presents his own thoughts through the mouth of Socrates, and that it is often difficult to discriminate between the Platonic and Socratic elements. While the previous philosophes consisted of vague speculations on nature as a whole, combining cosmology, astronomy, geography, physics, metaphysics, etc., Socrates arrived at the conclusion that the knowledge he had gained was of little practical value; and the speculations of philosophers, from Thales downwards, as to the origin of all things out of fire, water, air, etc., he regarded as profitless. Men's strivings after knowledge, he opined, should be directed to the human relationships as involving men's practical concerns. Self-knowledge is the condition of practical excellence. He introduced no formal system of ethics and no reasoned system of dialectics, but he paved the way for other philosophers to take up these subjects and work them out; and thus his teaching was the precursor of Platonism and the Aristotelian logic, and of all the often conflicting systems which rose into more or less importance for ten successive centuries.

**Soda** (*sô'da*), a term applied, in common language, to two or more substances—protoxide of sodium ( $\text{Na}_2\text{O}$ ), hydroxide of sodium ( $\text{NaHO}$ ), and carbonate of sodium ( $\text{Na}_2\text{CO}_3$ ) being known under the name of soda. In scientific language, however, the name is only given to the protoxide of

sodium ( $\text{Na}_2\text{O}$ ), the hydroxide being frequently called *caustic soda*. The protoxide of sodium is formed when sodium is burned in dry air or oxygen. It is a white powder, which attracts moisture and carbonic acid from the air. When this protoxide is dissolved in water there is formed the true alkali or hydrate of sodium, called also caustic alkali ( $\text{NaHO}$ ), which is a white brittle mass of a fibrous texture, having a specific gravity of 2.13. Caustic soda has a most corrosive taste and action upon animal substances; it dissolves readily both in water and alcohol; in the solid form it readily attracts water and carbonic acid from the atmosphere, the final product being an efflorescent carbonate. It forms soaps when boiled with tallow, oils, wax, rosin; dissolves wool, hair, silk, horn, alumina, silica, sulphur, and some metallic sulphides. With acids soda forms salts which are soluble in water, and many of which crystallize. The carbonate of soda ( $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ ) is the soda of commerce in various states, either crystallized in lumps or in a crude powder called *soda-ash*. It is obtained from the ash of plants growing near the sea, from native sources, or by chemical processes. The soda obtained from plants contains from 3 to 30 per cent. of carbonate. It is imported from Spain under the name of *barilla*, from France as *silicar* or *blanquette*, and from Normandy and Brittany as *varec*. Native soda is obtained in great part from the mineral waters of Karlsbad, Aix, Vichy, and the geysers of Iceland; from the Caspian and Black Sea, from California and Virginia. But the amount of soda derived from these sources is as nothing compared with that manufactured every year by chemical processes. In these the first process is the decomposition of common salt (chloride of sodium) by means of sulphuric acid; the second, the conversion of the sulphate of sodium so produced into crude carbonate of soda by strongly heating with chalk and carbonaceous matter; third, the purification of this crude carbonate, either into a dry white soda-ash or into crystals; and, fourth, the treatment of the by-products—hydrochloric acid and calcium sulphide. The chief uses of soda are in the manufacture of glass and of hard soap. The carbonate of soda is used in washing, and is a powerful detergent. It is also used in medicine. Sulphate of soda is Glauber's salt (which see).

**Soda-water**, an effervescing drink ordinary water into which carbonic acid



opened in Chicago and the College Settlement in New York in 1889. Toynbee Hall, the London center, was opened in 1884. The movement has now spread as far as Japan and India. Social clubs are organized, physical exercise developed, libraries, reading rooms, and lectures provided, and esthetic and religious instruction given.

**Social Science**, the science that deals with the social condition, the relations, and institutions which are involved in man's existence and his well-being as a member of an organized community. It concerns itself more especially with questions relating to public health, education, labor, punishment of crime, reformation of criminals, pauperism, and the like. It thus deals with the effect of existing social forces and their result on the general well-being of the community, without directly discussing or expounding the theories or examining the problems of sociology, of which it may be considered as a branch.

### Social Science Association,

the popular name of the National Association for the promotion of Social Science, a British society, established in 1857. The American Social Science Association dates from 1866, and has published about twenty volumes of *Transactions*.

**Society Islands**, an important group of islands of the South Pacific, between lat. 16° 11' and 17° 53' s., and lon. 148° and 155° w.; and between the Low Islands on the east and the Friendly Islands on the west. The group consists of the principal island of Tahiti or Otaheite—which is about 32 miles long, and is divided into two peninsulas by an isthmus about 3 miles broad; area, 412 square miles—and a number of comparatively small islands, Eimeo, Raiatea, Huahine, etc., all now belonging to France. All the islands are elevated, and more or less mountainous. In Tahiti, which consists of an elongated ridge, the loftiest summit, Orohena, is 8500 feet above the sea, while two other summits near it are respectively 7000 feet and 6979 feet. The scenery of this and the other islands is frequently surpassingly beautiful. Cotton, copra, coffee, sugar, pearl-shell, etc., are exported. The Society Islands were first discovered in 1606 by Pedro Fernandez di Quiros, who gave to Tahiti the name of La Sagittaria. In 1767 Captain Wallis, sent by George III to make discoveries in the Pacific, reached Tahiti, and believing himself

the first discoverer, gave it the name of King George Island. Two years later Captain Cook, in company with Sir Joseph Banks and a scientific staff, visited the island for the purpose of observing the transit of Venus. On this occasion Cook discovered several of the northwest group, and gave to the whole the name of Society Islands in honor of the Royal Society. These discoveries excited the deepest interest in Great Britain, and one of its more immediate results was the formation of the London Missionary Society, to civilize and Christianize the natives. They readily came under the influence of the missionaries, and were being rapidly formed into regular Christian communities, when an untoward event happened in the arrival of French priests, whose anxiety to proselytize led first to troubles, and then to the establishment of a French protectorate (1844) over the islands, which since then have become simply a French colony. Pop. estimated at about 18,500.

**Socinians.** See *Socinus* and *Unitarians*.

**Socinus** (so-si'nus), the Latinized name of two celebrated theologians, uncle and nephew, who have given their name to a religious sect, the Socinians, whose modified doctrines are now known as Unitarianism.—**LÆLIUS SOCINUS** (LELIO SOZZINI), born in 1525 at Siena, in Tuscany, and destined for the legal profession, abandoned jurisprudence for the study of the Scriptures. In 1546 he was admitted a member of a secret society at Vicenza, formed for the discussion of religious questions, which arrived at the conclusion that the doctrine of the Trinity was untenable, and that many of the dogmas of the Roman Catholic Church were repugnant to reason. The nature of their deliberations having become known the society was broken up, several of its members put to death, and others, among whom was Socinus, fled the country. He visited France, England, Holland, etc., and resided for some time in Poland, where he found many persons who were in sympathy with his views. He died at Zürich in 1562. He is the author of *Dialogus inter Calvinum et Vaticanum*, *De Sacramentis*, *De Resurrectione Corporum*, and several unfinished works.—**FAUSTUS SOCINUS** (FAUSTO SOZZINI), a nephew of the preceding, born at Siena in 1539, was obliged to leave that town in his twentieth year on account of his heretical notions. On the death of his uncle he came into possession of the manuscripts of the latter, by the study of which he found his former

opinions confirmed. He began to publish his views at Florence (where he lived twelve years at the court of the grand-duke, Francesco de' Medici) in anonymous writings, but afterwards retired to Basel to escape the Inquisition. His opinions were still more fully developed during a residence in Transylvania, and in Poland he had numerous adherents. His death took place in 1604. See *Unitarians*.

**Sociology** (sō-shi-ol'ō-jī), the science which investigates the laws of forces which regulate human society in all its grades, existing and historical, savage and civilized; or the science which treats of the general structure of society, the laws of its development, and the progress of actual civilization. Comte was the first to treat the subject from a scientific point of view. He was followed by Quetelet and Herbert Spencer. See Comte's *Traité de Sociologie* and Spencer's *Study of Sociology* (1874), and *Principles of Sociology* (1876).

**Sock** (Lat. *soccus*), a low shoe or slipper, worn by the Greeks, and also by the Roman women, who had them highly ornamented. They were likewise worn by comic actors, the buskin, or cothurnus, being used in tragedy; hence sock and huskin are used figuratively as equivalent to comedy and tragedy.

**Socorro** (sō-kor'ō), a town of the Republic of Colombia, in a very hot and unhealthy district, 150 miles N. N. E. of Bogotá. It has manufactures of cotton goods and straw hats, and a considerable trade with the surrounding districts. Pop. about 20,000.

**Socotra** (sō-kō'trā), an island in the Indian Ocean, about 150 miles E. N. E. of Cape Guardafui, 71 miles long by 22 miles broad. Aloes, tamarinds, and dates are the chief productions. Cattle, sheep, goats, and asses are plentiful, and the climate is hot and dry, but the valleys are well watered and fertile. The inhabitants are chiefly a mixed race of Arabs, Indians, Africans, and Portuguese. The island was annexed by Britain in 1886. Pop. about 12,000.

**Socrates** (sok'ra-tēz), an ancient Greek philosopher, born at Athens in or about 469 B.C. His father, Sophroniscus, was a sculptor, and Socrates himself for a time followed this occupation. He served as a common soldier in the campaign of Potidea (432-429 B.C.), fought at the battle of Delium (424), and in 422 he marched with Cleon against Amphipolis. In these campaigns his bravery and endurance

were conspicuous; and he was the means of saving the lives of Alcibiades and Xenophon. After the naval battle of Arginusæ (406) against the Spartans, ten Athenian officers were arraigned for neglecting the sacred duty of burying the slain. The clamor for their condemnation rose so high that the court wished to proceed in violation of all legal forms; but Socrates, the presiding judge at the trial, refused to put the question. Soon after he was summoned by the tyrannical government of the Thirty to proceed with four other persons to Saïamis to bring back an Athenian citizen who had retired thither to escape the rapacity of the new government. Socrates alone refused. After this he declined to take any further share in public affairs, giving as a reason the warnings of an internal voice of which he was wont to speak. Following the promptings of this divine mentor he trained himself to coarse fare, scanty clothing, and indifference to heat or cold, and brought into thorough subjection his naturally impetuous passions. But though a sage, he was wholly removed from the gloom and constraint of asceticism; he indeed exemplified the finest Athenian social culture, was a witty as well as a serious disputant, and did not refrain from festive enjoyment. Of his wife Xanthippe, all that has passed into history is that she bore him three sons, and that she was an ardent shrew. Socrates wrote nothing, and neither sought to found a school nor a system of philosophy. His plan was to mix with men freely in any place of public resort, when he questioned and suggested the right path to real knowledge. Ignorance and pretense could not be hidden when his cross-examination came to bear on them, and he thus created many enemies. Aristophanes attacked him violently in his comedy of *The Clouds* as a sophist, an enemy of religion, and a corrupter of youth. But he had many distinguished friends, such as Plato, Xenophon, Euclid of Megara, Antisthenes, Aristippus, Æschines, and Alcibiades. In 399 B.C. a formal accusation was brought against him by Anytus,



Socrates, from ancient bust.

**Soc** (sok), **SOKE**, in law, the power or privilege of holding a court in a district, as in a manor; jurisdiction of causes, and the limits of that jurisdiction.

**Socage** (sok'ij), or **SOCCAGE**, in law, a former tenure of lands in England by the performance of certain and determinate service; distinguished both from *knight-service*, in which the render was uncertain, and from *villengage*, where the service was of the meanest kind. Socage has generally been distinguished into *free* and *villein*—*free socage*, where the service was not certain but honorable, and *villein socage*, where the service, though certain, was of a baser nature.

**Soccer**, or **SOCKER**, the popular name for Intercollegiate Association Football. It was introduced from Great Britain, taken up by Haverford College, Pa., in 1901, and soon adopted by all the leading colleges. It is now regulated by the Intercollegiate Association Football League, organized in 1906. The game is fast and clean, and dangerous play is barred. No tripping, kicking, or jumping at an opponent is allowed and no player permitted to use his hands to push or hold an antagonist.

**Sociable** (sô'sha-bl), an open carriage with seats facing each other, and thus convenient for conversation; also a species of tricycle.

**Social Democrats**, an advanced body of socialists. They originated and are chiefly represented in Germany, where they form a strong political party. The Social Democratic Working Men's Party was established in 1869. In 1875 they formulated a programme, which sets forth that labor is the source of all wealth and all culture, and that the emancipation of labor must be the work of the laboring classes. The party aims at the development of a free state and a socialistic society, the removal of all social and political inequality, the administration of justice free and impartial by the people, and the establishment of a gratuitous and universal system of education. Religion is to be regarded as a private concern merely. The social democrats are a growing body in England and America.

**Social Insects**, the name applied generally to the species of bees, wasps, hornets, ants, white-ants or termites, etc., which live in communities, and evince in the order of their life a close analogy to societies of mankind.

**Socialism** (sô'shal-izm), the name applied to various theories

of social organization, having for their common aim the abolition of that individual action on which modern societies depend, and the substitution of a regulated system of coöperative action. The word socialism, which originated among the English communists, and was assumed by them to designate their own doctrine, is now employed in a larger sense, not necessarily implying communism or the entire abolition of private property, but applied to any system which requires that the land and the instruments of production shall be the property, not of individuals, but of communities, or associations, or of the government, with the view to an equitable distribution of the products. It is looked on by those who believe in it as an evolutionary phase of society, as indeed a natural development—slavery gave way to feudalism, feudalism to capitalism, and the latter in turn to fall before the latest stage, socialism. The earliest and most concrete forms of socialist philosophy are those promulgated by Robert Owen, St. Simon, and Fourier, some account of which and of the unsuccessful attempts to test them in practice is given under these names. The literature on the subject is very extensive, and has had an important influence on modern thought, and, indeed, upon constructive legislation. The Socialists have increased enormously in numbers since the advent of the twentieth century, and are fast becoming a power in politics. This is especially the case in Germany, where in 1912 they gained a very large representation in the Reichstag, and in Austria and France, where they are also a power in legislation. M. Briand, late premier, is a Socialist. They are growing rapidly in numbers in other European countries. In Britain they are represented by the Social Democratic Federation, the Socialist League, and the Fabian Society. They have also made a marked advance in the United States, the vote of their Presidential candidate increasing from 87,814 in 1900 to 901,873 in 1912. In 1910 Milwaukee, which had a Socialist mayor, sent a Socialist to Congress. He was the first of his party to reach that body.

**Social Settlements**, institutions for the practice of social service. They consist of houses in the poorer districts of the great cities, where men and women of refinement live, that they may come in contact with and better the condition of those surrounding them. Originated in England about 1875, the movement spread rapidly, and soon reached the United States, where Hull House was

has been forced under pressure. It rarely contains soda in any form. It is usually flavored with fruit or other syrups before being drunk.

**Sodium** (sō'di-um), the metal of which soda is the oxide; symbol Na (from *Natrium*), atomic weight 23. It was discovered by Sir Humphry Davy in the year 1807. Previously the oxide of the metal, soda, was looked on as an elementary body, but Davy succeeded in breaking it up, by the action of electricity, into oxygen and a new metal. Gay-Lussac and Thénard soon afterwards procured it in greater quantity by decomposing soda by means of iron; and Brunner showed that it may be prepared with much greater facility by distilling a mixture of carbonate of soda with charcoal; it is now prepared by the latter process in considerable quantities. Sodium is a silver-white metal, having a very high luster. Its specific gravity is 0.972; it melts at 204° Fahr., and oxidizes rapidly in the air, though not so rapidly as potassium. It decomposes water instantly, but does not spontaneously take fire when thrown on water, unless the water be somewhat warm, or the progress of the globule of sodium upon the surface of the water be impeded. When heated in air or oxygen it takes fire and burns with a very pure and intense yellow flame. It is perhaps more abundant in our globe than any other metal, for it constitutes two-fifths of all the sea-salt existing in seawater, in the water of springs, rivers, and lakes, in almost all soils, and in the form of rock-salt. It is used as an agent in the manufacture of aluminum and magnesium, and as a reagent in chemical operations. Common salt is a compound of chlorine with sodium. Sodium also occurs as oxide of sodium or soda in a good many minerals; and more especially in the form of carbonate, nitrate, and borate of soda. Sodium is contained in sea plants, and in land plants growing near the sea. It occurs also in most animal fluids. The only important oxide of sodium is the protoxide, known as soda. See *Soda*.

**Sodom** (sod'um), the principal of the five cities (Sodom, Gomorrah, Admah, Zeboim and Zoar) described in the book of Genesis as the cities of the plain (i.e., of Jordan). They were overthrown on account of the wickedness of the inhabitants, being destroyed by a rain of fire and brimstone (Gen. xix.), with the exception of Zoar, which was spared at the supplication of Lot. Modern writers are not agreed as to the site of these cities.

**Sodom**, APPLE OF, a fruit mentioned by early writers as growing on the shore of the Dead Sea, which was beautiful to the eye, but when eaten filled the mouth with ashes; supposed to have been a gall produced on dwarf oaks by an insect, or the fruit of a species of *Solanum*.

**Sodo'ma**. See *Razzi*.

**Soerabaya** (sō-rā-bū'yā). See *Sourabaya*.

**Soest** (sōst), an ancient town of Prussia, in the province of Westphalia, with dark winding streets, several interesting churches, including a Byzantine cathedral and a fine pointed Gothic church. It has puddling works and rolling-mills, tanneries, breweries, distilleries, soap-works, etc. Pop. 17,394.

**Sofala** (sō-fā'lā), a town or village belonging to the Portuguese since 1505, on the southeast coast of Africa, on the Mozambique Channel, a miserable assemblage of mud huts. Pop. about 1300.—The same name is given to the district lying on the coast between the mouths of the Zambesi on the north and Delagoa Bay on the south, and extending inland for about 150 miles. It belongs to the Portuguese province of Mozambique.

**Soffit** (sof'it), in architecture, any ceiling divided into square compartments or panels; also the lower sur-



s s. Soffits.

face of an architrave, an arch, a balcony, a cornice, etc.

**Sofia** (sō'fē-yā), SO'PHIA, the capital of the principality of Bulgaria, situated in a plain on the river Bogana, near the foot of the north side of the Balkan Mountains, 310 miles W. N. W. of Constantinople. It consists for the most part of mean houses and narrow dirty streets; is the see of a Greek archbishop and a Catholic bishop; and has several mosques, very extensive bazaars, and a considerable trade, chiefly in the hands of Greeks and Armenians. Sofia was built by the Emperor Justinian on the ruins of the ancient Sardica. Pop. (1910) 102,812.



**Sofism.** See *Sufism*.

**Softa.** (soft'a), in Turkey, a person withdrawn from the world and devoted to the study of Mohammedan law and religion; mostly a bigot opposed to all reforms.

**Soft-grass.** See *Holcus*.

**Sogdiana** (sog-di-ā'na), anciently the most northern province of the Persian empire, reaching to the Jaxartes.

**Sognefjord** (sog'nā-fe-ord), an extensive fjord on the west coast of Norway penetrating the country to a distance of 136 miles. It is noted for its gold rock and glacier scenery.

**Sohar** (sō-hār'), an important seaport of S. E. Arabia, on the coast of Oman. It is noted for its gold and silver manufactures. Pop. about 5000.

**Soignies** (swān-yē), a town of Belgium, in the province of Hainaut, with regular streets and well-built houses; Romanesque church of the twelfth century, and a town-hall in the Spanish style. Pop. 10,480.

**Soil,** mold, or that compound earthy substance which furnishes nutriment to plants, or which is particularly adapted to support and nourish them. Wherever the surface of the earth is not covered with water, or is not naked rock, there is a layer of earth more or less mixed with the remains of animal and vegetable substances in a state of decomposition, which is commonly called the *soil*. In uncultivated grounds soils generally occupy only a few inches in depth on the surface; in cultivated grounds their depth is generally the same as that to which the implements used in cultivation have penetrated. The stratum which lies immediately under the soil is called the subsoil, which is comparatively without organized matter. Soil is composed of certain mixtures or combinations of the following substances: the earths, silica, alumina, lime, magnesia; the alkalis, potassa, soda, and ammonia; oxide of iron and small portions of other metallic oxides; a considerable proportion of moisture, and several gases, as oxygen, hydrogen, carbonic acid. Besides these every soil contains vegetable and animal matters, either partially or wholly decomposed. See *Agriculture*, *Manures*.

**Soiling** (soil'ing), in agriculture, the practice of supporting animals in the summer season with green food of different sorts, cut daily, and given to them in racks in the stalls or

yards, instead of sending them to the fields.

**Soissons** (swā-sōi'), a city of France, in the department of the Aisne, and on the river Aisne, 51 miles northeast of Paris. It is a fortress of the second rank. In the great war of 1914-18 the town fell into the hands of the Germans, but was retaken by a combined Franco-American attack on August 2, 1918. It was the culminating point in a series of counter-assaults delivered by Marshal Foch upon the German troops between Rheims and Soissons, which destroyed the great salient stretching to the Marne and drove the Germans back to the Vesle (see *European War*). The old town of Soissons held many interesting relics, including a cathedral begun in the twelfth century and the remains of an abbey. The population in 1914 was 14,460.

**Sokoto** (sō'kō-tō), or SACK'ATOO, a large town in Central Africa, on the Sokoto or Rima, which falls into the Niger. It is surrounded by lofty walls, is fairly well built, and has regular streets, a royal residence, several mosques, manufactures of cotton cloth, and carries on an extensive trade. Pop. given at about 10,000.—The same name belongs to an extensive Feilata kingdom, of which the town was formerly the capital, though Wurno has now that rank; area, about 170,000 sq. miles. Pop. estimated at about 10,000,000. The country is now being opened up to British trade.

**Solanaceæ** (soi-a-nā'se-æ), a natural order of monopetaious exogenous plants, composed of herbs or shrubs, natives of most parts of the world, and especially within the tropics. They have alternate leaves, terminal or axillary inflorescence, and regular, or nearly regular, monopetaious flowers. The nightshade, potato, capsicum, tomato, egg-plant, and tobacco, are all of this order, the typical genus being *Solanum*, which contains the potato, nightshade, egg-plant, and numerous other species. The general property of the order is narcotic and poisonous. This prevails to a greater or less degree in all the members, although certain parts of the plants, when cultivated, are used for food.

**Solander** (so-lan'der), DANIEL CHARLES, a Swedish botanist, born in 1736, studied under Linnæus, settled in England in 1760, became connected with the British Museum, accompanied Sir Joseph Banks in Cook's first voyage round the world in 1768-71, and died in 1782.

**Solan Goose.** See *Gannet*.

**Solanine** (sol'a-nin;  $C_{25}H_{45}NO_7$ ), a vegetable alkaloid obtained from various species of *Solanum*, as *S. Dulcamdra*, *S. nigrum*, *S. tuberosum*, etc. It forms a crystalline powder, very bitter and acrid, and highly poisonous. It is insoluble in water, but soluble in alcohol. With acids it forms salts which are uncrystallizable.

**Solar Corona.** See *Corona*.

**Solar Cycle**, in chronology, a term applied to one of those artificial periods made use of in chronological researches. It comprehends a period of 28 years, compounded of 7 and 4, the number of days in a week, and the number of years in the interval of two leap years. This cycle remained undisturbed till the end of the nineteenth century; but in consequence of the year 1900 not being reckoned as a leap year, the whole cycle was thereby overthrown.

**Solar Day.** See *Day*.

**Solar Engine**, an apparatus for utilizing the heat of the sun as a motive power, by causing it, through the medium of a reflecting metallic mirror, to heat the water in a small boiler and convert it into steam. Various efforts have been made to produce a satisfactory engine of this kind, a successful one being constructed at Pasadena, California, in 1901. In this a large mirror was built up of small pieces of glass, accurately adjusted. The mechanism was made to turn automatically, following the sun's motion, and yielded heat enough to operate a 10 horse-power pumping engine. The reflector was a zone 33½ feet in larger, and 15 in smaller diameter, being made up of 1788 small mirrors. Improvements have recently been made in these machines and large hopes are entertained concerning them.

**Solar Microscope**, an instrument by means of which a magnified image of a small transparent object is projected on a screen, the light employed being sunlight. It is really a magic lantern, in which the microscopic object is affixed to a clear glass plate, and the light employed bright sunlight reflected into the instrument.

**Solar Plexus**, in anatomy, a nervous center at the upper part of the abdomen behind the stomach and in front of the aorta and the pillars of the diaphragm. It is the largest of the pre-vertebral centers. Called also the epigastric plexus.

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**Solar Prominences**, red flame-like masses seen in the atmosphere of the sun at a total solar eclipse. See *Sun*.

**Solar System**, in astronomy, that system of which the sun is the center. To this system belong the planets, planetoids, satellites, comets, and meteorites, which all directly or indirectly revolve round the sun, the whole being bound together by the mutual attractions of the several parts. See *Astronomy*, *Planets*, *Sun*, *Moon*, *Gravitation*, etc.

**Solar Time**, time as indicated by a sun-dial. The successive hours so indicated are not equal intervals of time. See *Day*, *Equation of Time*.

**Soldanella** (sol-da-nel'a), a genus of plants, nat. order Primulaceæ. The species are small herbs of graceful habit, natives of alpine districts of Continental Europe. One of them, *S. alpina*, a native of Switzerland, with lovely blue flowers, is well known as an object of culture.

**Solder** (sod'er, sol'der), a metallic cement, consisting of simple or mixed metals, by which ordinarily metallic bodies are firmly united with each other. It is a general rule that the solder should always be easier of fusion than the metal intended to be soldered by it. The usual solders are compound, and are divided into hard and soft. The hard solders are ductile, will bear hammering, and are commonly prepared of the same metal with that which is to be soldered, with the addition of some other, by which a greater degree of fusibility is obtained. Under this head comes the hard solder for gold, which is prepared from gold and silver, or gold and copper, or gold, silver, and copper. The hard solder for silver is prepared from equal parts of silver and brass, but made easier of fusion by the admixture of one-sixteenth of zinc. The hard solder for brass is obtained from brass mixed with a sixth, or an eighth, or even one-half of zinc, which may also be used for the hard solder of copper. The soft solders melt easily, but are partly brittle, and therefore cannot be hammered. Of this kind are the following mixtures: tin and lead in equal parts; bismuth, tin, and lead in equal parts; one or two parts of bismuth, of tin and lead each one part. In soldering, the surfaces to be united must be made perfectly clean and free from oxide. This is commonly effected by scraping the surfaces; and in order that the formation of any oxide may be prevented during the process

borax, sal ammoniac, or rosin is used, either mixed with the solder, or applied to the surfaces.—*Autogenous soldering* is the union of two pieces of metal without the intervention of any solder, by fusing them at the point of junction by jets of flame from a gas blow-pipe or by other means.

**Soldiers' Insurance.** See *Insurance*.

**Sole** (söl; *Solēa vulgaris*), a marine fish belonging to the Pleuronectidae or flat-fishes, of an oblong or oval form. These fish abound on all the coasts of Europe except the most northern, where the bottom is sandy. They furnish a wholesome and delicious article of food. They sometimes ascend rivers, and seem to thrive quite well in



American Sole.  
Under side of *Achirus Lineatus*.

fresh water. The sole sometimes grows to the weight of 6 or 7 lbs. The name is also given in America to certain other flat-fishes. The sole is at its worst from February to the end of March, this being the spawning season. It is usually captured by the trawl-net.

**Solemn League and Covenant.**

See *Covenant*.

**Solen** (söl'en). See *Razor-shell*.

**Solenhofen** (söl'en-hö-fen), or SOLNHOFEN, a village of Bavaria, near Eichstadt, noted for its famous deposit of limestone of the Upper Oölite age, which, from its fine grain and homogeneous texture, is admirably adapted for lithographic purposes.

**Solenoid** (söl'en-oid), a simple form of electro-magnet, made use of in electrical experiments. A helix of stout copper wire has the ends of the wire turned in so as to pass along the axis of the helix to the middle, where they are brought out between two of the

turns and attached to the terminals of a battery. The different parts of the helix are insulated from each other. While the current passes the solenoid acts in every respect like an ordinary magnet.

**Solent** (söl'ent), that part of the British Channel separating the northwest shore of the Isle of Wight from the mainland of Hampshire, and extending between the Needles and West Cowes. It has a width varying from 2 to 5 miles, and affords a safe and well-sheltered roadstead.

**Solesmes** (so-lām), a town of France, department of the Nord, arrondissement of Cambrai, with manufactures of sugar, etc. Pop. 6081.

**Soleure** (so-leur; German, *Solothurn*), a canton of Switzerland, bounded on the north by Baseland; west, south, and southeast by Bern; and east by Aargau; area, 301 square miles. It is traversed throughout by the Jura. The whole canton belongs to the basin of the Rhine, which receives the greater part of its drainage through the Aar. The climate is on the whole remarkably temperate, and not only in the lower grounds but on many of the mountain-slopes nearly all the ordinary cereals and large quantities of fruit are raised. Immense numbers of cattle, both for feeding and dairy purposes, thrive in the meadows and pastures. Limestone is extensively quarried; and when susceptible of high polish or variegated it is called Soleure marble. The inhabitants are mostly Roman Catholic, and speak German. Education is compulsory. Pop. 100,762.—SOLEURE, the capital, is situated on the south side of the Jura chain, on both sides of the Aar. It is well built; has a cathedral, built in 1762-73; a clock-tower, of Burgundian origin (fifth to sixth century); town-house; arsenal, with collection of ancient armor, etc. Pop. 10,030.

**Sol-fa System.** See *Tonic Sol-fa System*.

**Solfatara** (sol-fa-tā'ra), the Italian name for volcanic vents found in various parts, which give out sulphurous gases and vapors.

**Solfeggio** (sol-fej'ō). See *Solmization*.

**Solferino** (sol-fe-rē'nō), a village and commune of Italy in the province and 18 miles northwest of Mantua. In 1796 the Austrians were here defeated by the French prior to the siege of Mantua; it was here also, on June 24, 1859, that a battle was fought between the French and Sardinians on the one side and the Austrians on the

other, resulting in the defeat of the latter, and the subsequent treaty of Villafranca. Pop. 1350.

**Solicitor** (so-lis'i-tur), a legal practitioner whose business it is to commence, carry on, or defend suits at law on behalf of persons who employ him, and who usually also carries on conveyancing and other non-contentious business. In England the term was formerly applied distinctively to agents practicing before the courts of chancery, attorneys being those who practiced in the courts of common law; but by the Judicature Act of 1873 all persons practicing before the supreme courts are now called solicitors, and the term attorney is practically obsolete. In the United States a solicitor is a person employed to follow and take charge of suits depending in courts of chancery. A solicitor, like an attorney, will be required to act with perfect good faith toward his clients. See *Barrister*.

**Solicitor-general**, an officer of the British crown, next in rank to the attorney-general, with whom he is in fact associated in the management of the legal business of the crown, and public offices. The solicitor-general of Scotland is one of the crown-counsel, next in dignity and importance to the lord-advocate.

**Solidago**. See *Golden-rod*.

**Solidification** (so-lid-i-fi-kā'shun), the passage of a body into the solid state. A body, on solidifying from the liquid state, gives up a quantity of heat without exhibiting a decrease of temperature. Two laws are recognized in the solidifying of bodies from a state of fusion:—(1.) *A substance begins to solidify at a temperature which is fixed if the pressure is fixed; at ordinary atmospheric pressure this temperature is the temperature or point of fusion for the particular substance.* (2.) *From the moment solidification commences till it is completed the temperature of the liquid portion is constant.* There are some substances, such as glass and iron, which become plastic before liquefying, and therefore possess no definite point of fusion; and for such substances the above laws do not hold. Solidification is called *crystallization* when crystals which may be seen are formed. When water solidifies the resulting ice is about  $\frac{1}{11}$  larger than the volume of water which produced it, and on this account ice floats on the surface. Cast-iron is larger, at the temperature of the fusing-point, in the solid than in the liquid state; so also is bronze and

other metals which give good sharp castings. In many cases, however, a substance contracts in the act of solidifying.

**Solidungula** (sol-i-dung'gū-la; 'Single-hoofed'), a division of the mammalian order Ungulata, containing the horse, ass, etc.

**Solidus** (sol'i-dus), a Roman coin originally called aureus. See *Aureus*.

**Soliman' II.** See *Solyman II.*

**Solingen** (zō'ling-en), a town of Prussia, in the Rhine province, with manufactures of iron and steel ware, especially swords; copper and brass ware, cutlery, surgical instruments, etc. Pop., including Dorp, 49,018.

**Solis** (sō'lēs), ANTONIO DE, a Spanish poet and historian, born at Placenza, in Old Castile, in 1610. He is principally known as an historical writer. Having been appointed historiographer of the Indies, he drew up a work entitled *Historia de la Conquista de Mejico*, which passed through many editions, and of which an English translation was published in 1724. He died in 1686.

**Solitaire** (sol'i-tār), a bird belonging to the dodo family, but having a smaller bill and shorter legs. *Pezophaps solitarius*, the only species of whose existence there is any evidence, is now, like the dodo, extinct, and became so since 1691, when the island of Rodriguez, situated about 300 miles to the east of the Mauritius, where alone it was found, was first inhabited.

**Solitaire**, a game played by one person on a board indented with thirty-three or thirty-seven hemispherical hollows, with an equal number of balls. One ball is removed from the board, and the empty hollow thus left enables pieces to be captured singly as in draughts. All the pieces but one must be taken without moving over more than two spaces at a time. Also card games played by one person. Of these there are a large number, played with one or more packs.

**Solmization** (sol-mi-zā'shun), in music, an exercise for acquiring the true intonation of the notes of the scale, first by singing them in regular gradation upwards and downwards, and then by skips over shorter or longer intervals. To facilitate this various expedients have been devised, the most popular being the association of the several sounds with certain syllables, such as *ut, re, mi, fa, sol, la*, said to have been first used by Guido of Arezzo in the eleventh century—an additional syllable, *si*, for the seventh of the scale, being



introduced at a much later date. In the tonic sol-fa method these syllables are thus modified—*doh, ray, me, fah, soh, lah, te*. See *Tonic Sol-fa*.

**Solo** (*so'lo*), a tune, air, or strain to be played by a single instrument or sung by a single voice without or with an accompaniment, which should always be strictly subordinate.

**Solomon** (*sol'a-mun*; Hebrew, *Shel-omoh*, the Prince of Peace), son of David, king of Israel, by Bathsheba, formerly the wife of Uriah, was appointed by David to be his successor in preference to his elder brothers. By his remarkable judicial decisions, and his completion of the political institutions of David, Solomon gained the respect and admiration of his people; while by the building of the temple, which gave to the Hebrew worship a magnificence it had not hitherto possessed, he bound the nation still more strongly to his throne. The wealth of Solomon—accumulated by a prudent use of the treasures inherited from his father, by successful commerce, by a careful administration of the royal revenues, and by an increase of taxes—enabled him to meet the expense of erecting the temple, building palaces, cities, and fortifications, and of supporting the extravagance of a luxurious court. Fortune long seemed to favor this great king; and Israel, in the fullness of its prosperity, scarcely perceived that he was continually becoming more despotic. Contrary to the laws of Moses, he admitted foreign women into his harem; and from love of them he was weak enough in his old age to permit the free practice of their idolatrous worship, and even to take part in it himself. Towards the close of his reign troubles arose in consequence of these delinquencies, and the growing discontent, coming to a head after his death, resulted in the division of the kingdom, which his feeble son Rehoboam could not prevent. The forty years' reign of Solomon is still celebrated among the Jews, for its splendor and its happy tranquillity, as one of the brightest periods of their history. The writings attributed to Solomon are the *Book of Proverbs*, *Ecclesiastes*, and the *Song of Solomon*, with the apocryphal book the *Wisdom of Solomon*; but modern criticism has decided that only a portion of the *Book of Proverbs* can be referred to Solomon.

**Solomon Islands**, (1) a chain of Western Pacific, east of New Guinea, and between New Britain and New Hebrides. The natives, still in a savage state and cannibals, are partly of Malay and partly of Negrito blood. In consequence of an

agreement entered into between the British and German governments in 1885, the northern part of the group is within the German sphere of influence; the southern under the British Western Pacific Protectorate. (2) A group of small islands with no permanent inhabitants, in the Indian Ocean, dependencies of Mauritius.

**Solomon's Seal**, the common name of plants of the genus *Polygonatum*, a genus of illiaceous but not bulbous plants, with axillary cylindrical six-cleft flowers, the stamens inserted in the top of the tube, and the fruit a globose three-celled berry. Species



Solomon's Seal (*Polygonatum vulgare*).

are found throughout Europe, and there are two species in the United States, one (*P. giganteum*) of large size.

**Solomon's Song** (called also the *SONG OF SONGS*, or *CANTICLES*), one of the canonical books of the Old Testament. From the earliest period this book has been the subject of voluminous controversies. It seems to have been a recognized part of the Jewish canon in the time of Jesus. Till the beginning of the last century the author of the book was almost universally believed to be Solomon. Modern critics, however, attribute it to an author of Northern Israel, who wrote it about the middle of the tenth century B.C., shortly after the death of Solomon, in a spirit of protest against the corrupt splendor of the court of Zion. The unity of the poem is sufficiently evidenced by the continuity of names, characters, and subject, and is taken for granted by the majority of critics. The main subject of dispute has been as to its interpretation. The various theories in regard thereto are too numerous to specify; but they naturally fall into two classes, the literal and allegorical. The highest form of allegorical significance contended for is

## Solon

the mystical or spiritual interpretation, by which the whole poem becomes a figurative representation of the hopes and aspirations, together with the trials and difficulties, of a spiritual life. This interpretation, whether applied individually or collectively to the church or nation of Israel, was almost universally received both by Jews and Christians until recent times. The most favored literal interpretation is that originally given by Jacobi, that the poem represents the temptation and triumph of virtuous love. The supporters of the allegorical interpretation of the book strongly urge the frequency with which the marriage relation is employed, both in the Old and New Testament, to represent the relation of Jehovah to Israel in the old, and of Christ to the church in the new dispensation. Yet there seems to be nothing in the book itself to give warrant to this interpretation.

**Solon** (sô'lun), one of the seven wise men of Greece, and great legislator of Athens, born about B.C. 640. He was of good family, and acquired a wide knowledge of the world in commerce and travel. One of his earliest public transactions was in stirring the Athenians up to the recovery of Salamis, after which he was chosen chief archon (B.C. 594) and invested with unlimited powers, the state of parties in Athens being such as to threaten a revolution. He established a new constitution, divided the citizens according to their wealth, and added to the powers of the popular assembly. He made many laws relating to trade, commerce, etc. He either entirely abrogated all debts, or so reduced them that they were not burdensome to the debtors; and abolished the law which gave a creditor power to reduce his debtor to slavery. When he had completed his laws he bound the Athenians by oath not to make any changes in his code for ten years. He then left the country, to avoid being obliged to make any alterations in them, and visited Egypt, Cyprus, and other places. Returning after an absence of ten years, he found the state torn by the old party hate; but all parties agreed to submit their demands to his decision. It soon became evident, however, that Pisistratus would succeed in seizing the sovereignty, and Solon left Athens. Though Athens now fell under the despotic rule of Pisistratus, much of Solon's legislation remained effective. He is supposed to have died, in his eightieth year, about B.C. 558.

**Solothurn** (sol'o-turn), a canton of Switzerland. See *Soleure*.

## Solway Firth

**Solstice** (sol'stis), in astronomy, the point in the ecliptic at the greatest distance from the equator, at which the sun appears to stop or cease to recede from the equator, either north in summer or south in winter. There are two solstices—the summer solstice, the first degree of Cancer, where the sun is about the 21st of June; and the winter solstice, the first degree of Capricorn, where the sun is about the 22d of December. The time at which the sun is at either of these points also receives the same name.

**Solution** (so-lû'shun), the transformation of matter from either the solid or the gaseous state to the liquid state by means of a liquid called the *solvent*, or sometimes the *menstruum*. When a liquid adheres to a solid with sufficient force to overcome its cohesion, the solid is said to undergo solution, or to become dissolved. Thus sugar or salt are brought to a state of solution by water, camphor or resin by spirit of wine, silver or lead by mercury, and so on. Solution is facilitated by increasing the extent of surface in a solid, or by reducing it to powder. Heat also, by diminishing cohesion, favors solution; but there are exceptions to this rule, as in the case of lime and its salts, water just above the freezing point dissolving nearly twice as much lime as it does at the boiling point. If a solid body be introduced in successive small portions into a definite quantity of a liquid capable of dissolving it, the first portions disappear most rapidly, and each succeeding portion dissolves less rapidly than its predecessor, until solution altogether ceases. In such cases the forces of adhesion and cohesion balance each other, and the liquid is said to be *saturated*. Various solids dissolve in the same liquid at very different rates; thus baric sulphate may be said to be insoluble in water; calcic sulphate requires 700 parts of water for solution; potassic sulphate, 16; magnesic sulphate, 1.5. When water is saturated with one salt it will dissolve other salts without increase of bulk. It sometimes happens that the addition of a second solid will displace the first already in solution. It is probable that, in some cases there is chemical combination between the liquid and the dissolved substance.

**Solvay**, a village in Onondaga county, New York, a post-station of Syracuse. Pop. 5139.

**Solway Firth** (sol'wā), an arm of the Irish Sea, forming part of the boundary between England and Scotland, and extending inland in a northeastern direction for above 41

miles, with a breadth diminishing from 20 miles, at its entrance between St. Bees Head in Cumberland, and Rayberry Head in Kirkcudbrightshire, to 7 miles, and finally only to 2 miles. A large portion of the Solway is left dry at ebb-tide. It abounds with fish, and has several valuable salmon fisheries.

**Solway Moss**, a tract of mossland, about 7 miles in circumference, in the N. of Cumberland, W. of Longtown; the scene of a battle between the English and the Scotch in 1542, when the latter were defeated.

**Solyman** (sol'i-man), or **SULEIMAN II**, surnamed the *Magnificent*, Sultan of Turkey, was the only son of Selim I, whom he succeeded in 1520. Having put down a revolt which occurred in Syria and Egypt, and concluded an armistice with Persia, he besieged and took Belgrade in 1521. The next year he captured the island of Rhodes, which had been in the possession of the Knights of St. John for 212 years. Turning his arms now against Hungary, he gained the battle of Mohács, and captured Buda and Pest. In 1529 he advanced on Vienna, but was forced to raise the siege with great loss. His armies next gained considerable territories from Persia. In 1541 he overran a great part of Hungary, but an armistice was concluded for five years in 1547, though war was renewed in 1551. In 1565 he attempted the capture of Malta in vain. Next year he died at the siege of Szigeth, in Hungary, in the seventy-sixth year of his age. See *Ottoman Empire*.

**Soma** (sō'ma), a plant belonging to the nat. order *Asclepiadaceæ*, the *Asclepias acida*; also an intoxicating drink obtained, it is supposed, from the plant, which the ancient Aryans believed was pleasing to the gods as a sacrifice. They went so far in their adoration of soma that they personified it as one of their highest gods.

**Somaj**. See *Brahmo-somaj*.

**Somatic Life** (sō-mat'ik), the name applied to the inherent vitality of the tissues and organs of the body, as distinguished from the more active sense in which the word 'life' is applied to that of the organism as a whole.

**Somauli** (sō-mā'le), **SOMALI LAND**, a country on the eastern coast of Africa, bounded on the north by the Gulf of Aden; on the east by the Indian Ocean from Cape Guardafui to lat. 7° 45' N. Its other boundaries are indefinite. Two ranges of mountains traverse the peninsula southeast to north-

west, between which lies the Wadi Nogal, of which the natives speak in the most glowing terms. Several varieties of gum-trees occur, and the mimosa, tamarisk, wild fig, and several species of the cactus and aloe are abundant. The wild beasts include the elephant, lion, leopard, hyena, wolf, and jackal. Several varieties of deer, jerboas, and squirrels are common, Somaliland being one of the richest game sections of Africa. The Somali are a fine race, mainly Mohammedans, though still in a barbarous state. The principal articles of trade or produce are myrrh, ivory, ostrich leathers, hides and horns, coffee, indigo, and gum-arabic. The northern section of the country, containing the ports of Berbera and Zailah, is now held as British territory, while the eastern section is claimed by Italy. France claims a small northwestern section.

**Sombrerete** (sōm-brā-rā'tā), a small town of Mexico, about 80 miles northwest of Zacatecas, and in the province of that name, with rich mines of silver. Pop. 10,082.

**Sombrero Island** (som-brē'rō), a small rocky British island midway between Anguilla and the Virgin group, West Indies. It has a lighthouse, and large deposits of phosphate of lime.

**Somers** (sum'ers), **JOHN, LORD**, an English lawyer and statesman, born at Worcester in 1652, who took a prominent part in the opposition to the tyrannical measures of Charles II and James II, and acquired great credit for his share in the defense of the seven bishops.



Lord Somers.

ops. He was chairman of the committee which framed the Declaration of Rights, and sat in the Convention Parliament. After filling many legal offices, he became lord chancellor in 1689, with the title Lord Somers, Baron Evesham. Although so sturdy a Liberal, Lord Somers won the

## Somerset

esteem of many of the Tory party by his high character, his great ability, his consistency and courage, and his unfailing courtesy. After the death of William III he withdrew into retirement, but was recalled by Anne, who made him president of the council. He fell again with the Whigs in 1710. Science and letters found a warm patron in Lord Somers, who was one of the first to recognize Addison's ability. He died in 1761.

**Somerset** (sum'er-set), a county of England, bordering on the Bristol Channel; area, 1615 sq. miles. Part of the coast is low and marshy, and part lined with lofty slate cliffs. The interior is intersected by several ranges of hills, including the Mendip Hills, which in some parts exceed 1000 feet in height, and the Quantock Hills, occupying the west part of the county, attaining a height of 1270 feet. In the northeast the prevailing strata belong to the Oolite formation, and contain the quarries which furnish the famous Bath stone. The chief minerals worked are lead, iron, and slate. The principal rivers are the Avon and Parret. Wheat and cattle of excellent quality are raised. The manufactures are mostly woollen and worsted goods, gloves, silk, linen, crape, and lace. Fisheries are carried on to some extent in the Bristol Channel. The county contains the cities of Bath and Wells, part of the city of Bristol, and the municipal boroughs of Bridgewater, Chard, Glastonbury, Taunton, and Yeovil. Pop. (1911) 458,074.

**Somerset, DUKE OF.** See *Seymour*.

**Somerset, ROBERT CARR, EARL OF**, a favorite of James I, born in Scotland in 1589; died in 1640. He was at first a page to James, and followed him to England when he succeeded Elizabeth in 1603. The king became greatly attached to him, made him treasurer of Scotland, and gave him a seat in the upper house with the title of Viscount Rochester, and then of Earl of Somerset. In the height of his greatness he married the divorced wife (with whom he had previously had an improper intimacy) of the young Earl of Essex, contrary to the advice of his friend and secretary, Sir Thomas Overbury. The countess never forgave Overbury for this; and on her suggestion he was sent to the Tower for some trivial offense, and after a few months despatched by poison. The murder was discovered, and all the parties to it were condemned. The tools in the crime were executed, but Somerset and his wife were kept in the Tower. After a few years' imprisonment the unhappy

pair obtained their freedom and spent the rest of their days in obscurity and disgrace.

**Somerset House**, Strand, London, stands on the site of a palace commenced by the Protector Somerset, and after being the residence of several royal personages, made way for the present buildings. It contains the offices of the registrar-general of births, deaths, and marriages, the exchequer and audit departments, etc.

**Somersworth** (sum'ers-wurth), a city of Strafford Co., New Hampshire, 5 miles N. of Dover. It has manufactures of cottons, yarns, woollens, boots and shoes. Pop. 6704.

**Somers Islands.** See *Bermudas*.

**Somerville** (sum'er-vil), a city of Massachusetts, on the Mystic River, and a suburb of the city of Boston. It has extensive meat-packing establishments, office-furniture factory, jewelry works, tube works, and other industries. It contains some notable public and charitable institutions. Pop. 80,000.

**Somerville, MARY**, writer on the physical sciences, born at Jedburgh, Scotland, in 1780; died at Naples in 1872. She was the daughter of Admiral Fairfax, and was to a great extent self-educated, but acquired a respectable knowledge of Greek and Latin. It was only, however, when she became acquainted with mathematics that she discovered the true bent of her genius, and in this study she made rapid progress. Married to Samuel Greig, consul for Russia, in 1804, she had only three years of wedded life, when her husband died. In 1812 she married her cousin, William Somerville. At the request of Lord Brougham, and with the object of popularizing Laplace's *Mécanique Céleste* for the Society for the Diffusion of Useful Knowledge, she, in 1827, prepared her first work, *Mechanism of the Heavens*. It proved above the class for whom it was intended, and was published independently in 1831. This work brought her many honors, including the honorary membership of the Royal Astronomical and other learned societies, and a pension from government. She wrote a preface to this work on the relation of the sciences, which was afterwards expanded into a separate work—*The Connection of the Physical Sciences* (1834). This work was translated into the principal European languages. Her other works included a popular one on physical geography and one entitled *Molecular and Microscopic Science*.

## Somerville



**Somerville**, a borough, capital of Somerset Co., New Jersey, 36 miles w. s. w. of New York. It has several collegiate institutions, and various manufactures. Pop. 5060.

**Somerville**, WILLIAM, an English poet, born in 1677, and educated at Oxford. His chief work, a didactic poem in blank verse, entitled *The Chase*, was published in 1735. He died in 1742.

**Somme** (sôm), a department of France, bounded on the northwest by the English Channel; area, 2443 square miles. The chief river is the Somme; the capital is Amiens. The department was formed mainly out of the old province of Picardy. Many battles were fought here during the European war which began in 1914. From June, 1916, to April, 1917, a well-planned Anglo-French campaign pushed back the German line, capturing town after town, including Bapaume and Peronne, with great losses to the enemy. The tide of war turned in the spring of 1918, and the German forces again swept over the fields of Picardy and menaced Amiens. The apparent plan was to drive the British toward the north and the French toward the south and reaching the mouth of the Somme separate the two armies. Foiled here they struck southward, but were stopped at Chateau Thierry by the Americans. Pop. 520,161.

**Somnambulism** (som-nau'bu-lizm), a peculiar perversion of the mental functions during sleep, in which the subject acts automatically. The organs of sense remain torpid and the intellectual powers are blunted. During this condition some instinctive excitation may take place, and there may be the production of impulses, in consequence, of different kinds. Walking in sleep is the most palpable, but not the most marvelous characteristic of this condition. The person affected may perform many voluntary actions implying to all appearance a certain degree of perception of the presence of external objects. The somnambulist gets out of bed, often dresses himself, goes out of doors, and walks frequently over very dangerous places in safety. On awaking maybe he is either utterly unconscious of having stirred during the night, or may remember it as a mere dream. Sometimes the strange proceedings of the somnambulist are carried much further; he will mount his horse and ride, or go to his usual occupation. In some cases somnambulists are capable of holding conversation. Somnambulism occurs in the sensitive and excitable, often in conjunction with other nervous affections, and is heredi-

tary. Artificial somnambulism is induced by hypnotism, and the consciousness is for the time entirely absorbed by one set of ideas.

**Somnath** (som-nî't'), a town of India, Bombay Presidency, Gujerat, on the coast of the Peninsula of Kattywar. It is in the form of an irregular quadrangle, inclosed on all sides except the west, where the sea washes it, by a ditch and a wall of great strength and solidity. The space inclosed is far too large for the present inhabitants, who live amid splendid ruins, telling of a grandeur which has long since passed away. The ruins of the great temple, to which the place was mainly indebted for its celebrity, stands on an eminence northwest of the town, and so completely overtops all the other buildings that it can be seen at the distance of 25 miles. Pop. 8341.

**Somnus** (som'nus; Latin, 'sleep'), or HYPNOS (Greek), in ancient mythology, the god of sleep, son of Nox (night) and twin brother of Mors (Death).

**Sonata** (so-nâ'ta), in music, a term originally applied to any kind of composition for instruments, in contradistinction to vocal compositions, which were called *cantatas*. The name was subsequently, however, restricted to compositions for solo instruments (generally the pianoforte). Sonatas are of a certain form, consisting of several movements—at first three, the allegro, adagio, and rondo, to which afterwards a fourth was added, the minuetto or scherzo—which differ from each other in time and sentiment, but are held together by their general character.

**Sonchus**. See *Sow-thistle*.

**Sonderburg** (zôn'dér-bûrk), a town of Prussia, in Schleswig-Holstein, on the island of Alsén. Pop. (1905) 7047.

**Sondershausen** (zôn'dêrz-hou-sen), a town of Germany, the capital of Schwarzburg-Sondershausen, 34 miles N. W. of Weimar. It is walled, has four gates; a palace, with gardens, and a rich cabinet of natural history. Pop. (1905) 7383.

**Sondrio** (sôn'drê-ô), a town in North Italy, capital of the province of the same name, on the Mallero, near its junction with the Adda, at the south foot of the Rhaetian Alps, with considerable trade, and some textile manufactures. Pop. 4425.—The province of Sondrio lies between the Grisons and the Tyrol, and has an area of 1257 square miles. Pop. 125,565.

**Song**, a little poem intended to be sung; a lyric. The term is applied to either a short poetical or musical composition, but most frequently to both in union. As a poetical composition a song may be defined as a short poem divided into portions of returning measure, and turning upon some single thought or feeling. As a union of poetry and music, it may be defined as a brief lyrical poem, founded commonly upon agreeable subjects, to which is added a melody for the purpose of singing it. As denoting a musical composition, it is generally confined to an air for a single voice — airs for more than one voice being, however, sometimes called part-songs.

**Song-ka.** See *Red River*.

**Sonneberg** (zōn'ne-berh), a town of Germany, in the Duchy of Saxe-Meiningen, on the Röthen. Its chief industry is connected with the manufacture of toys, chiefly dolls, of wood or papier-maché, which go to all parts of the world, but especially to Britain and America. Pop. (1905) 15,003.

**Sonnenburg** (zōn'en-börh), a town of Prussia, district of Frankfort, with silk weaving and other industries. Pop. 5261.

**Sonnet** (son'et; Italian, *sonetto*), a species of poetical composition, consisting of fourteen rhymed verses, ranged according to rule. It is of Italian origin, and consists of two stanzas of four verses each, called the *octave*, and two of three each, called the *sestette*. The *octave* of the proper sonnet consists of two quatrains, the rhymes of which are restricted to two — one for the first, fourth, fifth, and eighth lines; the other for the second, third, sixth, and seventh. In the *sestette*, which is commonly made up of two tercets, the rhymes may be two or three, variously distributed. This is the Petrarchan or Italian form, but the verses may also be arranged in the Shakespearean form of three quatrains of alternate rhymes clinched by a couplet, or in the irregular form practiced by Coleridge and others. The sonnet generally consists of one principal idea, pursued through the various antitheses of the different strophes. The lightness and richness of the Italian, Spanish, and Portuguese languages enable their poets to express every feeling or fancy in the sonnet; but in English it has been found most suitable to grave, dignified, and contemplative subjects. Among the most successful writers of English sonnets are Shakespeare, Milton, Drummond of Hawthornden, Bowles, Wordsworth, and Rossetti.

**Sonometer** (so-nom'e-ter), an apparatus for illustrating the phenomena exhibited by sonorous bodies, and the ratios of their vibrations, by the transverse vibrations of tense strings or wires. Also an apparatus for testing metals by bringing them in contact with an induction coil, with which is associated a telephone and microphone. Each metal, acting differently on the coil, produces a different sound.

**Sonora** (sō-nō'ra), one of the states of Mexico, lying on the Gulf of California, on which it has several good ports. It is generally hilly, and abounds in mineral wealth. Gold is found in washings and mines, and the silver mines are rich and numerous. Corn, maize, beans, peas, tobacco, and the sugar-cane are largely cultivated. Guaymas is the principal port, and has a splendid harbor. The capital of the state is Ures. Area, 70,000 sq. miles; pop. 221,682.

**Sonsonate** (sōn-so-nl'tā), a town of Salvador, Central America, about 50 miles w. s. w. of San Salvador, with a trade in sugar and shell-work. Pop. 17,010.

**Sons of America, Patriotic Order of**, a society first organized in Philadelphia in 1847, as the 'Junior Sons of America,' and afterwards reorganized under its present name. Its objects are principally patriotic and benevolent, and its membership is confined to male persons 'born on the soil or under the jurisdiction of the United States of America.'

**Sons of Liberty**, an American secret society which arose during the Revolution and rendered great aid in the struggle for liberty. The first blood spilled in the war was at the Battle of Golden Hill in New York City, January 19 and 20, 1770, between the Sons of Liberty and the British soldiers. It was at meeting of the Sons of Liberty, held in New York in 1774, that Alexander Hamilton (q. v.), then a youth of seventeen, made his first speech. It had branches in all the 13 colonies. Paul Revere was a leader in New England.

**Soo-chow-foo** (sū-chā-fū), a town of China, in the province of Kiangsoo, on a lake in the line of the Imperial Canal, 125 miles southeast of Nankin. It consists of the town proper, with walls 10 miles in circuit; is intersected by numerous canals; and is celebrated for the splendor of its edifices, the beauty of its gardens, the luxury and refinement of its inhabitants, the excellence of its manufactures, and the extent

of its trade. It was in great part destroyed by the Taiping rebels in 1860; was made a treaty-port in 1896. Pop. above 500,000.

**Soodras** (sū'dras; *Sádras*), the lowest of the four great castes of India—Brahmans, Kshatriyas, Vaisyas, Soodras. They are chiefly farmers, gardeners, artisans, and laborers of every kind.

**Sooloo.** See *Sulu*.

**Sooranjee** (sū-ran'jē), or MORINDIN, a drug used for dyeing, prepared from the root of the *Morinda citrifolia*. See *Morinda*.

**Soosoo** (sū'sū), a cetaceous mammal, the *Platanista gangeticus*, which resembles the dolphin in form, and attains the length of about 12 feet. It inhabits the Ganges; is most abundant in the sluggish waters of its delta, but is found also as far up the river as it is navigable.

**Soosook.** See *Susuk*.

**Soot** (sut, sūt), a black substance formed by combustion, or disengaged from fuel in the process of combustion, rising in fine particles and adhering to the sides of the chimney or pipe conveying the smoke. The soot of coal and that of wood differ very materially in their composition, the former containing more carbonaceous matter than the latter. Coal-soot contains substances usually derived from animal matter; also sulphate and hydrochlorate of ammonia; and has been used for the preparation of the carbonate. It contains likewise an empyreumatic oil; but its chief basis is charcoal, in a state in which it is capable of being rendered soluble by the action of oxygen and moisture; and hence, combined with the action of the ammoniacal salts, it is used as a manure, and acts very powerfully as such. The soot of wood has been minutely analyzed, and found to consist of fifteen different substances, of which ulmin, nitrogenous matter, carbonate of lime, water, acetate and sulphate of lime, acetate of potash, carbonaceous matter insoluble in alkalies, are the principal.

**Sophia** (sō-fi'a). See *Sofia*.

**Sophia**, CHURCH OF ST., in Constantinople, the most celebrated ecclesiastical edifice of the Greek Church, now used as a mosque, was built by the emperor Justinian, and dedicated in 558. It is in the Byzantine style of architecture, has a fine dome rising to the height of 180 feet, and is richly decorated in the interior. With the principal dome

are connected two half domes and six smaller ones, which add to the general effect. The mass of the edifice is of brick, but is overlaid with marble; the floor is of mosaic work, composed of porphyry and verd antique. The great piers which support the dome consist of square blocks of stone bound with hoops of iron. The numerous piliars supporting the internal galleries, etc., are of white and colored marbles, porphyry, granite, etc., and have capitals of various peculiar forms. The interior of the church is 243 feet in width from north to south, and 269 in length from east to west, and its general effect is singularly fine.

**Sophists** (sof'ists), the name of a school or congeries of schools of philosophical teachers or 'thinkers,' who appeared in Greece in the period immediately preceding and contemporary with Socrates in the latter part of the fifth century B.C. It was a period of political decline and social corruption, and the sophists were men who, although often able and sometimes well meaning, were not strong enough to rise above the unwholesome influences under which they were placed. Their philosophy (if it can be so called) was one of criticism of those that had gone before; there was nothing creative in it, nothing even formative. The tendency of the teaching of the sophists was mainly skeptical as regards previous philosophical speculation; and while the chief point of convergence of their teaching was in an ethical direction, the influence of their ethical teaching was mostly mischievous. But the sophists rendered considerable service to science and literature, and even indirectly to philosophy. They belonged to all the liberal professions; they taught all the usual branches of knowledge. Some of them were distinguished as rhetoricians and grammarians, others as men of science. Rhetoric, to which they gave undue importance, was systematically studied by them, and they supplied some of the earliest models of good Greek prose. They are accused, however, particularly the later sophists, of being not only superficial in their attainments, but mercenary, vainglorious, and self-seeking in their aims.

**Sophocles** (sof'o-clēs), the second in order of time of the three great Greek tragic dramatists, was born at Colonus, a village in the immediate vicinity of Athens, in the second year of the seventy-first olympiad, B.C. 496. The rank of his family is not known, but he received an education equal to that enjoyed by the sons of the best Athenian families. Sophocles first appeared as a

dramatist in B.C. 468, when he took the first prize in competition with *Æschylus*. *Æschylus* retired to Sicily, and only returned to enter again for a brief period into the lists with Sophocles. Sophocles accordingly held all but undisputed supremacy until the appearance of Euripides, who took the first prize in 441. Sophocles, however, excelled both his rivals in the number of his triumphs. He took the first prize some twenty-four times, the second frequently, the third never. In B.C. 440 he was chosen one of the ten generals in the war against the aristocratic party of Samos. In his old age he suffered from family dissension. His son, Iophon, jealous of the favor he showed to his grandson Sophocles, and fearing he himself should suffer from it in the disposition of his property, summoned him before the judges, and charged him with being incompetent to manage his affairs. In reply Sophocles read a part of the chorus of his *Edipus at Colonus*, which he had just composed,



Sophocles, from ancient bust.

and at once proved that his faculties were unimpaired. He died about the age of ninety. One hundred and thirty plays in all are ascribed to him, of which seventeen are supposed to be spurious. Eighty-one of his dramas, including the seven now extant, were brought out after he had attained the age of fifty-five. The chronological order of the existing plays is given as follows: *Antigone*, *Electra*, *Trachiniae*, *Edipus Tyrannus*, *Ajax*, *Philoctetes*, *Edipus at Colonus*. Sophocles brought the Greek drama to the highest point of perfection of which that form of art is susceptible. His subjects are human, while those of *Æschylus* are heroic, and in his management he shows himself a perfect master of human passions. The tendency of his plays is ethical, and he subordinates the display of passions to an end. He also introduced scenic illustration and a third actor. (See *Drama*.) No tragic poet in ancient or modern days has written with so much elevation and purity of style. The versification of Sophocles stands alone in dignity and elegance, and his iambs are

acknowledged to be the purest and most regular. One of the best English translations of Sophocles is that by E. H. Piumptre.

**Sophonisba** (sō-fō-niz'ba). See *Masi-nissa*.

**Sophora** (so-fō'ra), a genus of plants, nat. order Leguminosae. The species are ornamental shrubs and trees, found chiefly in central and tropical Asia and the tropical and subtropical parts of South America. They have pinnate leaves, and terminal racemes or panicles of whitish flowers. The species best known in the United States are *S. japonica* and *S. chinensis*.

**Soprano** (so-prā'nō), the highest register of female voices. Its ordinary range is from C below the treble staff to A above it, though some sopranos may go as high as E. The mezzo-soprano register is from A to F, that is, a third lower than the soprano.

**Sora** (sō'ra), a town of Sicily, province Caserta, on the Garigliano, see of a bishop. Pop. of town 6149; of commune, 16,022.

**Soracte** (sō-rak'tē), a celebrated mountain of Italy, 27 miles north of Rome, now called Monte Sant' Oreste; height, 2420 feet.

**Sorata** (sō-rā'tā), or ILLAMPU, one of the highest of the Andes, a volcanic cone in Bolivia, on the east side of Lake Titicaca; height, 21,484 feet.

**Sorau** (zō'rou), a town of Prussia, in the province of Brandenburg, 50 miles s. s. e. of Frankfurt. It has a church dating from about 1200, a castle of 1207, manufactures of woollen and linen cloth, dye-works, etc. Pop. 16,410.

**Sorb-apple**, the fruit of the sorb-tree or service-tree. See

*Service-tree*.

**Sorbine** (sor'bin), SORBITE, a crystalline unfermented sugar (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>), isomeric with grape and milk sugar, existing in the ripe juice of the mountain-ash berries (*Pyrus Aucuparia*).

**Sorbonne** (sor-bon), a theological institution founded in connection with the University of Paris in 1252 by Robert de Sordon, chaplain and confessor of Louis IX. It exercised a high influence in theological and ecclesiastical affairs from the fourteenth to the seventeenth centuries, but was suppressed during the first revolution. At the reconstruction of the university in 1808 the building erected for it by Richelieu was given to the theological faculty in connection with the faculties of science and belles-lettres; and the Sorbonne is still part of the University of France.



**Sorel** (sô-rel'), a town and river port of the dominion of Canada, in the province of Quebec, on Lake St. Peter, at the mouth of the Richelieu River, with some manufactures and a considerable trade. It has docks, barracks, an arsenal, Roman Catholic college, convent, etc. Pop. (1911) 8420.

**Sorel'**, AGNES, mistress of Charles VII of France, born in Touraine, in 1409; died at Jumièges in 1450. She acquired great influence over the king, and was the means of rousing him from his habitual sloth to resist the English invaders.

**Soresina** (sô-râ-sê'nâ), a town of Northern Italy, in the province of Cremona, and 14 miles north of the town of that name, between the Oglio and the Adda. Its chief industries are the vine and silk culture. Pop. 8021.

**Sorgho** (sor'gô), a species of grass, the *Holcus* or *Sorghum saccharatum*.

**Sorghum** (sor'gum), a genus of grasses, some species of which are known by the general name of millet. They are tall grasses with succulent stems, and are found in the tropical parts of Asia, whence they have spread to other warm regions. *S. vulgare* is the largest of the small cereal grains, and is called Guinea-corn and Indian millet. The different kinds are called jowar in India, where many of the inhabitants live upon these small dry grains, as upon rice. It is the dhurra and Kaffir corn of Africa.

*Sorghum vulgare*  
(Indian millet).

*Sorghum* has been introduced into the south of Europe where it is chiefly used for feeding cattle and poultry, but it is also made into cakes.

**Soria** (sô'rê-â), a town of Northeastern Spain, capital of the province of that name, on the Douro. Pop. 7151.—The province of Soria has an area of 3836 sq. miles, and a pop. of 150,462.

**Soricidae** (sor-is'i-dê), a family of insectivorous mammals, comprehending the shrews, shrew-mice, muskrats, etc.

**Soroki** (sâ-rô'kê), a town of Russia, gov. Bessarabia, on the Dnieper. Pop. 25,523.

**Sorrel** (sor'el; *Rumex acetosa*), a plant belonging to the nat. order Polygonaceæ. The leaves have an acid taste, and have long been used in

salads. The stems are upright, 1½ or 2 feet high, provided with a few arrow-shaped leaves on the inferior part of the stem, and lanceolate ones above. The sheep's sorrel (*R. acetosella*) is of much smaller size than the preceding, with different shaped leaves, but resembles it in habit. Wood-sorrel is of the genus *Oxalis*.

**Sorrel-tree** (*Oxydendrum arboreum*), a tree belonging to the nat. order Ericaceæ. It inhabits the range of the Alleghenies from Virginia to Georgia. The leaves are 4 or 5 inches long, oval-acuminate, finely toothed, and strongly acid in taste. The flowers are small, white, and disposed in long one-sided racemes, clustered in an open panicle.

**Sorrento** (sôr-en'tô), a seaport of Italy, on the south side of the gulf and 17 miles s. s. e. of the city of Naples. It is delightfully situated, is surrounded by decayed walls, and has a cathedral and various other churches. It has manufactures of silk, and is frequented for sea-bathing, and as an agreeable place of residence in summer. Pop. of town 6969; of commune 8832.

**Sothorn** (suth'ern), EDWARD HUGH, an American actor, son of Edward Askew Sothorn, a famous English comedian, born in London December 6, 1859, and first appeared in a small part with his father in 1879. In 1896 he married Virginia Harned, and in 1911 Julia Marlowe. He has starred in many plays, including Shakespearean.

**Sothic Period** (soth'ik), in ancient Egyptian chronology the period of 1461 years in which the year of 365¼ days circled in succession through all the seasons. The tropical year, determined by the rising of Sirius, was almost exactly the Julian year.

**Sotteville-lez-Rouen** (sot-vêl-lâ-rô-an), a town of France, on the Seine above Rouen, with manufactures of soap, glue, chemical products; railway works, etc. Pop. 18,535.

**Souari-nut** (sô-â-rê), the fruit of *Caryocar nuciferum*, a native of British Guiana. It is spherical in form, of a reddish-brown color, and measures 5 to 6 inches in diameter. It contains four or fewer seeds embedded in a white pulp. They contain a nutty, oily kernel, which is pleasant to eat, and is exported under the name of butternuts (which see).

**Soubise** (sô-bêz), BENJAMIN DE ROHAN, SEIGNEUR DE, a famous Huguenot captain, born at Rochelle in 1583, brother of Henri de Rohan, chief of the Protestant party under Louis



XIV. He learned the trade of arms under Maurice of Orange; and when the religious wars again broke out in 1621 he was intrusted with the chief command in Brittain, Anjou and Poitou. He conducted the war with much spirit, but was eventually obliged to seek refuge in England. In 1625 he made a dashy attack upon the royalist fleet in the river Blavet, seized a number of vessels, and captured the islands of Oleron and Ré. He was active at Rochelle during its siege in 1627 and 1628. He died in England in 1642.

**Soudan**, or **SUDAN** (sü-dan'), is the Arab name given to the vast and imperfectly defined extent of country in Central Africa which lies between the Sahara on the n., Abyssinia and the Red Sea on the e., the countries draining to the Congo basin on the s., and Senegambia on the w. Its area is roughly estimated at 2,000,000 sq. miles, and its pop. at from 7 or 8 to 30 millions. It is also known as Nigritia. The inhabitants comprise numerous nations of different races, chiefly the Negro, together with Arab colonists and traders. The Western and Central Soudan are divided into a number of semi-independent states: Bambarra, Gando, Sokoto, Adamawa, Bornu, Baghirmi, Wadai, and others. This section is included in the French and British territories or spheres of influence. The Eastern Soudan includes Darfur, Kordofan, Senaar, etc., now under Egyptian control. Egyptian rule was first extended to the Eastern Soudan in the early part of the nineteenth century by Mohammed Ali, under whom Ibrahim Pasha carried it as far south as Kordofan and Senaar. An Egyptian expedition under Sir Samuel Baker in 1870 led to the conquest of the equatorial regions on the Nile farther south than the Soudan proper, of which General Gordon was appointed governor-general in 1874. On the fall of Ismail Pasha of Egypt, Gordon was recalled, and hordes of Turks, Circassians, and Bashi-Bazouks were let loose to plunder the Soudanese. Egyptian misrule then became intolerable, and in this crisis appeared Mohammed Ahmed of Dongola, who gave himself out to be the Mahdi, the long-expected redeemer of Islam, and who overran that whole region. (For its succeeding history see *Egypt and Gordon*, Charles George.) In 1878 Emin Pasha (Eduard Schnitzer) was appointed governor of the Equatorial Province on the Upper Nile, north of the Albert Nyauza, by Gordon, and he continued to hold his ground here till 1889, when he was relieved by Henry M. Stanley. A British and Egyptian expedition, under Gen. Kitchener, was sent to recon-

quer the Soudan in 1898, and captured the Dervish capital of Omdurman, opposite Khartoum, on Sept. 2, after a battle in which the Dervish army suffered immense losses. Since that date the Eastern Soudan has been held by Egypt.

**Soul** (söl), the rational and spiritual part in man, which distinguishes him from the brutes, the indwelling spirit of man, which is both immaterial and immortal. Soul is sometimes used as synonymous with *mind*, but generally it is used in a wider sense as being a whole to which pertain the faculties that constitute mind. Soul and *spirit* are more nearly synonymous, but each is used in connections in which it would be improper to use the other. Nearly all philosophies agree in regarding the soul as that part of man which enables him to think and reason, and which renders him a subject of moral government; but they differ when it comes to a question of origin and detail. Many philosophers maintain the indestructibility as well as the immateriality of the soul; but a whole host of others, both in ancient and modern times, have assigned a material basis to consciousness, and all that we regard as belonging to the soul. Modern materialists usually make the soul, or what others regard as such, merely a result of organism. A common set of arguments regarding the soul are as follows:—We know that the soul, as an individual intelligence, has had an origin, for it originated with the beginning of our organized life. We know that it was not self-originated, for nothing could originate in that which had no previous existence. We know that it could not have originated in anything or any number of things without intelligence, for intelligence cannot spring from non-intelligence, which is its contradictory. We know that our soul is related to a bodily organism, which it is capable in many ways of controlling, and through which it is related to the entire physical universe; that in that universe it discovers a uniformity of laws through which it exercises an indefinite control over physical objects, extending in some measure to all with which it comes into communication. We believe, therefore, that this universe is under the control of the Intelligence in whom our soul originated; in other words, that there is one Supreme Being, who is the author of all the harmony of being with which we are by our own participation in it made partially acquainted. We are thus also enabled to return a rational answer to the question as to the immortality of the soul. If the soul has had an intelligent originator it is evident we can know nothing as

to its duration without knowing the design or will of its originator. Psychology, therefore, furnishes the conditions of the problem of immortality, but does not answer it; it refers it to the higher science of theology. The end of philosophy is thus religion. If it does not end here it leads inevitably into skepticism. It is, then, to the views of God supplied either by natural or revealed religion that we must look for light upon the question of the soul and the soul's immortality, and it was from this source that the best and purest arguments of such men as Socrates and Plato were drawn. It must be stated, however, that a large body of scientists, the material section, combat this argument as having no foundation in ascertained fact, and deny the separate existence of the soul and body, maintaining that the mind is a resultant of the forces of the material organism, and that the soul, as a distinct entity, has no existence.

**Sölul** (söl'ul), capital of Corea, about 27 miles from the sea, not far from the right bank of the Han River, a tributary of the Yellow Sea. The city proper is surrounded by walls, has narrow and dirty streets, and houses generally low and mean. The royal palace and its grounds occupy a great area, and are surrounded by a lofty wall. Silk, paper, fans, mats, etc., are manufactured. Pop. (1912) 278,958.

**Souls**, CURE OF, is an ecclesiastical charge in which parochial duties and the administration of sacraments are included. In the Church of England the cure of souls in each diocese is primarily vested in the bishop, the clergy of each parish acting as his deputies.

**Soult** (sölt), NICOLAS-JEAN DE DIEU, Duke of Dalmatia and Marshal of France, was born of humble parentage at Saint Amans la Bastide, in the department of Tarn, in 1769, and in 1785 entered an infantry regiment as a common soldier. Raised from the ranks, he became successively lieutenant and captain in his regiment. At that time he served on the Upper Rhine, and greatly distinguished himself at Kalserslautern, Welsenburg, Fleurus, and other places, and after successive promotions was named general of division by Masséna, to whose army he was attached. In the unsuccessful campaign in Italy he was wounded and taken prisoner, but obtained his liberty after the victory of Marengo, in 1800. In 1803 he had the command of one of the three camps of the army intended against England, that at St. Omer. He was one of the marshals created immediately after the formation of the em-

pire in 1804; and in the Austrian war in 1805 distinguished himself at Ulm and Ansterlitz. He acquired new fame in the Prussian campaign; and in 1807, after the battle of Friedland, took Königsberg. From 1808-12 he fought in Spain, but, over-matched by Wellington, was unable to gain many laurels. In 1813 he was recalled, in consequence of Napoleon's disasters, to take the command of the fourth corps of the grand army, and commanded the infantry of the guard at Lützen. On the news of Wellington's victory at Vittoria he was sent back to reorganize the French force in Spain, and did his utmost to oppose Wellington's triumphant career



Marshal Soult.

till Napoleon's abdication. Soult gave in his adhesion to Louis XVIII, who appointed him commander of the thirteenth military division; and in 1814 made him minister of war. On Napoleon's return he joined his standard, and held the post of major-general of the army in the campaign of Waterloo. After the second restoration he took up his residence at Düsseldorf, but was permitted to return to France in 1819; and in 1827 was raised to the peerage. After the July revolution of 1830, and on two subsequent occasions, he held ministerial office, and in 1846, on retiring from public life, was created grand-marshal of France. He died in 1851.

**Soumy** (sö'mi), or SUMY, a town of Russia, in the government of Kharkov, with a large trade in spirits and agricultural produce, and four large annual fairs. Pop. 26,622.

**Sound.** See *Acoustics* and *Har.*

**Sound,** THE, a strait which connects the Kattegat and Baltic Sea, and separates the Danish Island of See-

land from Sweden. Its length, nearly due north and south, is 66 miles, and its greatest breadth, measured from Copenhagen, eastward, is 17 miles. The name Sound, however, is more properly applied to the narrow part of the passage, which, between Elsinore and Helsingborg, has a width of only 3 miles. Formerly by almost immemorial custom, sanctioned by treaties, and finally confirmed by the Congress of Vienna in 1815, all merchant vessels passing the Sound had to pay duty to Denmark at Elsinore. But in 1857 the duties were abolished by treaty, England paying one-third of the indemnity. See *Elsinore*.

**Sounding**, the operation of trying the depth of water and the quality of the bottom, especially by means of a plummet sunk from a ship. In navigation two plummets are used, one called the *hand lead*, weighing about 3 or 9 lbs.; and the other, the *deep-sea lead*, weighing from 25 to 30 lbs. (See *Lead*.) The former is used in shallow waters, and the latter at a distance from shore. The nature of the bottom is commonly ascertained by using a piece of tallow stuck upon the base of the deep-sea lead, and thus bringing up sand, shells, ooze, etc., which adhere to it. The scientific investigation of the ocean and its bottom has rendered more perfect sounding apparatus necessary, and has led to the invention of various contrivances for this purpose, among the most simple and common of which is Brooke's sounding apparatus. Some of the deepest soundings yet obtained that can be relied on were obtained during the expedition of the *Challenger*. See *Ocean*.

**Soup** (sôp), a decoction of flesh in water, properly seasoned with salt, spices, etc., and flavored with vegetables and various other ingredients. There are very many kinds of soup, the introduction of a different ingredient furnishing the occasion for a distinctive name, but they may all be divided into two classes—clear soup and thick soup. *Maigre* soup is a soup made without meat.

**Sourabaya** (sô-râ-bû'yâ), a seaport of Java, capital of a province of the same name, on the Strait of Madura. It possesses a large and secure harbor; a building-yard, graving dock, and an extensive trade in exports of native produce, and imports a large number of European manufactures. Pop. 146,944.

**Sourakarta** (sô-râ-kâr'tâ), or **SOLO**, a town of Java, capital of the province of the same name, 140 miles w. s. w. of Sourabaya. It has man-

ufactures of cotton and other tissues, leather, etc. Pop. 109,459.

**Sour-gum.** See *Tupelo*.

**Sour-sop.** See *Anona*.

**Sousa**, JOHN PHILIP, American band-master and composer, born in Washington, D. C., in 1856. In 1892 he organized his own band, with which he earned fame both in Europe and America. His compositions, especially his marches, are popular throughout the world.

**Sousdal**, or **SUSDAL** (sôs'dai), a town of Russia, in the government of Vladimir, in a fertile plain on the Kamanka. Pop. 8000.

**Soutane** (sô-tân'), the common outer garment worn by the clergy in the Roman Catholic Church.

**South**, ROBERT, a celebrated divine of the Church of England, the son of a London merchant, born at Hackney in 1633, and educated at Westminster School and Christ Church, Oxford. In 1660 he was chosen public orator of the University of Oxford; in 1663 he was appointed a prebendary of Westminster; in 1670 canon of Christ Church; in 1676 he went to Poland as chaplain to the English ambassador, and on his return became rector of Islip. He died in 1716.

**South African Union.** See *Union of South Africa*.

**South Amboy**, a borough of Middlesex county, New Jersey, on Raritan Bay, at the mouth of Raritan River, 27 miles s. w. of New York. It has manufactures of pottery, asphaltum and clay products, and has large shipments of coal. Pop. 7007.

**South America**, is a vast peninsula of a roughly triangular form, with its apex pointing southward, extending in length from lat. 12° 30' N. to Cape Horn in lat. 55° 59' S. Its greatest length is 4592 miles; its greatest breadth 3230 miles; area, nearly 7,000,000 sq. miles. Some of the general features and relations of South America to North America are already described under *America*, but supplementary particulars are here given.

**Physical Features.**—South America is united to North America by the Isthmus of Panama. Its coast-lines, especially that of the west, are comparatively little broken or interrupted by indentations, and in this respect resemble those of Africa. Towards the southern extremity is a group of islands, forming the archipelago of Tierra del Fuego. They are penetrated in every direction by bays and narrow inlets, ending often in glaciers.



The mountainous and elevated tracts of the continent are chiefly limited to the borders of the Pacific and Atlantic Oceans, the intervening space being occupied by a great series of plains, reaching from one extremity of the continent to the other, at an elevation generally less than 1000 feet above the level of the sea. There are four chief mountain systems, the most remarkable of which is the Andes, that stretch along the whole of the west coast from south to north for a distance of 4500 miles. They are of inconsiderable width comparatively, but attain great elevations, ranking in this respect next to the Himalaya Mountains; the highest known peak, Aconcagua, in Chile, being 22,860 feet high. (See *Andes*.) The second system is that of Parima, also called the Highlands of Guiana, in the northeast; culminating point, Maravaca, about 10,500 feet high. The third system is near the north coast, and is known under the general name of the Coast Chain of Venezuela; culminating point, the Silla de Caracas, with an elevation of 8600 feet. The fourth is that of Brazil, in the southeast; culminating point, Itatiaia, 10,040 feet high. There are altogether upwards of thirty active volcanoes in South America. They all belong to the Andes, and consist of three separate and distinct series: the series of Chile, of Peru and Bolivia, and of Quito. The loftiest is Gualateiri in Peru, which reaches a height of 21,960 feet. The immense plains are one of the remarkable features of South America, sometimes stretching for hundreds of miles without exhibiting the slightest perceptible inequality. They are variously designated, being known as *pampas* in the south, as *seltas* in the Amazon region, and as *llanos* in the north. All the South American rivers of any magnitude carry their waters to the Atlantic. The principal rivers are the Amazon, the Orinoco, and the Plata (which see), the first being the greatest as regards volume of water among the rivers of the world. One of the most singular features in the hydrology of South America is the water connection existing between the Orinoco and the Amazon through the natural channel of the river Cassiquari. As explained under *Brazil* (which see) it would not be difficult to establish inland communication by water from the Orinoco to the Plata. The lakes of any considerable size are few; the largest, Lake Titicaca, in the Andes, 12,500 feet above sea-level, covers an area of above 4000 square miles.

*Climate and Productions.*—Naturally there are considerable diversities of cli-

mate in the different parts of the continent, but only in comparatively few are the extremes of heat and cold very great, and on the whole South America is neither very hot nor unhealthful, though so much of it is within the tropics. Over great part of it the rains are adequate, and in many parts abundant; but on the west coast there are small regions where rain seldom or never falls. The most distinguishing feature of the vegetation of South America is its prodigious forests, which cover about two-thirds of the whole continent, and yield valuable timber, ornamental woods and dyewoods, cinchona, india-rubber, vegetable ivory, etc. In the tropical regions vegetation is on the grandest scale, grandeur also being combined with great beauty. Fruits abound, including oranges, limes, pineapples, mangoes, bananas, pomegranates, and many others. Southward of the line coffee, sugar-cane, maize, and cacao are among the chief products. The most valuable vegetable products exported are coffee, cotton, wheat, and cacao. Among plants specially belonging to South America are cacao, cinchona, coca, and Paraguay tea. The domesticated native animals of South America are the llama and alpaca, both used as beasts of burden, and yielding a kind of hair which is exported and manufactured into tissues. Wild animals of many species abound, some of them, as the sloths, the armadillo, etc., peculiar and interesting. Horses, at first imported, and cattle now roam wild over the southern plains. Large numbers of sheep are also reared, and wool, hides and skins, live animals, meat, etc., are now exported. Gold and silver, copper, nitre, guano, and precious stones are also important products of South America.

*People.*—The aborigines of South America are undoubtedly of the same race as those of North America, as there exists a very striking general physical resemblance between the native races throughout the whole of the American continent, from Cape Horn to Behring's Straits. (See *America* and *Indians*.) They are almost all of a copper color, with long black hair, deep-set black eyes, aquiline nose, and often handsome slender form. In South America these red men are far more numerous than in North America, and though many are half-civilized, a greater number are in a state of barbarism. A considerable portion of the population also consists of persons of Spanish and Portuguese blood, and along with these a far greater number of mixed Indian and European blood, civilized, and forming an important element in the various states of the continent. To these are

now being added considerable numbers of Spanish and Italian immigrants.

**Divisions.**—South America comprises the republics of Colombia, Ecuador, Venezuela, Peru, Bolivia, Chile, Argentina, Brazil, Paraguay, and Uruguay, besides the colonies of British, French, and Dutch Guiana and the Falkland Islands (British). For the areas and populations of these see the separate countries.

**Discovery, etc.**—The first discoverer of the continent of South America was Christopher Columbus, who reached the mouth of the Orinoco in his third voyage (1498). The adventurer next to follow was Alonso de Ojeda, a Spaniard, who examined the coast of Venezuela. Ojeda was accompanied by Amerigo Vesputi, a native of Florence, who, on his return to Spain, published an account of his voyage, which led to his name being gradually given to the continent. Brazil was discovered in 1500 by Vincent Yanez Pinzon, who explored the mouths of the Amazon. Later in the year Alvarez Cabrai reached the coast of Brazil farther south than the point touched by Pinzon, and took possession of the country in the name of the King of Portugal. In 1513 Vasco Nufiez de Balboa crossed the Isthmus of Darien, and discovered the Pacific Ocean. In 1531 Pizarro embarked at Panama with a small force, and made himself master of Peru. Almagro, a companion of Pizarro, pushed southwards into Chile, and in 1537 the country between Darien and Peru was traversed by Valdivia, and Quito was soon after taken possession of by the Spaniards. In 1540 Gonzales, the brother of Pizarro, crossed the Andes and came upon the Amazon, which Oreliana, one of his officers, descended to the ocean. In the meantime Juan de Solis had discovered the La Plata in 1515, and Fernando Magellan sailed along the southeast coast and through the strait that bears his name into the Pacific (1520). In 1526 Sebastian Cabot ascended the Paraná and Paraguay, and established two or three forts, and in 1536 the city of Buenos Ayres was built. The discoveries of the Spanish and Portuguese gave the possession of almost the whole of South America to these nations—Portugal holding Brazil, while Spain held the remainder. The colonial system of Spain was a highly vicious and oppressive one, and the colonies seized the first opportunity to cast off their allegiance to the mother country, early in the nineteenth century, when Spain was in difficulties from Napoleon's conquests. The Spaniards attempted to bring them back to their allegiance by force, and a series of struggles took place

between the colonial and Spanish troops which lasted till 1824, when the independence of the colonies was finally secured. Brazil became independent of Portugal in 1822 and a republic in 1889, all the Spanish colonies having also become republics.

**Southampton** (south-amp'tun), a borough and seaport town of England, in the county of Hants, on a peninsula at the mouth of the Itchen, near the head of Southampton Water, 18 miles N. W. of Portsmouth, and 79 miles S. W. of London. It is built on rising ground, and consists of an old and a new town, the former at one time surrounded by walls flanked with towers, of which portions still remain; and entered by several gates, of which three, still standing, bear the names of West Gate, South Gate, and Bar Gate. The last, a remarkable structure, and large enough to contain the town-hall in the upper part of it, is now, in consequence of the growth of the town, nearly in its center, and being placed across the principal street, divides it into two parts, the part to the north being named Above-bar, and that to the south Below-bar, or High Street. The streets in the older quarters are very irregular, while those in the more modern portion present many fine ranges of building. St. Michael's, the oldest of the churches, situated in the west part of the town, is a spacious Norman structure with many interesting features. Other buildings of interest are the Southampton College, the Hartley Institution, the guild-hall, custom-house, audit-house, the theater, philharmonic rooms, assembly-rooms, ordnance map office, baths, etc. The first tidal-dock was opened for business in 1842, and the docks are now of great extent. There is ample dock accommodation, and Southampton is the most important mail-packet station in the kingdom. The manufactures are chiefly confined to brewing, coachbuilding, iron-casting, sugar-refining, and shipbuilding. Southampton claims to be a borough by prescription, but its earliest known charter was granted by Henry II. Pop. (1911) 119,039.

**Southampton, EARL OF, THOMAS WRIOTHESLEY**, first earl, born about 1490, and educated at Cambridge, became lord-chancellor of Henry VIII in 1544. He was one of the executors of the will of Henry, and was created Earl of Southampton by Edward VI. Died in 1550.—**HENRY WRIOTHESLEY**, third earl, grandson of the preceding, born in 1573, was a patron of Shakespeare, who dedicated to him the poems of *Venus and Adonis*, and the *Rape of*

**Lucress.** He was a friend of the Earl of Essex, and was accused of complicity in the latter's treasonable designs. He was convicted and sentenced to death and attainder; but the death sentence was remitted by Elizabeth, and the attainder was removed by parliament after the accession of James. He was a firm supporter of liberty, and in 1621 was committed to close custody by the king, but was released through the influence of Buckingham. He aided the Dutch in their struggle against Spain, and died at Bergen-op-Zoom, November, 1624.—**THOMAS WHIOTHESELEY**, fourth earl, son of the preceding, born in 1600, was at first a supporter of the Commons in resisting the encroachments of Charles I, but with Strafford went over to the royal side, and was made a privy-councillor. Being one of the leaders of the moderate party, he lived unmolested in England during the Commonwealth. Upon the restoration of Charles II he was made lord high treasurer. He died in 1687.

**Southampton Water**, an inlet of the sea, in the south of England, about 11 miles in length, running from the Solent into Hampshire in a N. W. direction. It receives the rivers Anton, Itcher, and Hamble. At its head is Southampton.

**South Australia**, a state in the Commonwealth of Australia, forming the central and southern part of the continent, bounded by Western Australia on the west, Queensland, New South Wales and Victoria on the east, and Northern Territory on the north. Formerly Northern Territory was included in South Australia, but was constituted a separate division in 1911. The state has an area of 380,000 square miles. The southern coast line, which is more indented than in any other part of the commonwealth, extends about 1500 miles from N. W. to S. E., embracing Spencer's and St. Vincent Gulfs, with Eyre Peninsula and Kangaroo Island. Several short ranges of mountains are distributed over the state, culminating in Flinders Range, on the northeastern side of Spencer Gulf. The Gawler Range extends from near Port Augusta to Streaky Bay, crossing the Eyre Peninsula. The highest point in any of these ranges is not much more than 3000 feet. The tableland in Eyre Peninsula, west of Spencer Gulf, averages 1900 feet in height. The Murray, which has its rise in the Australian Alps, pursues the lower part of its course in South Australia, and is the only navigable river in the southern part of the state. Small streams, however, are abundant. Lakes are plentiful, the largest of them being Lakes Gairdner, Torrens and Macfarlane.

There are great areas of excellent agricultural land and extensive, well-wooded mountain ranges, interspersed with barren plains, stony or sandy, or covered with scrub. The climate is generally characterized by great dryness; the very hot months are December, January, February, and March; the other eight months are more enjoyable, although the temperature is never very low. Large portions of the barren area are being reclaimed by means of artesian wells and waterworks. The soil and climate of the south are admirably adapted for the growth of wheat, and barley also yields a good return. Many parts are suitable for the growth of the vine, the olive, the mulberry, the orange, and other fruits; and these are now extensively cultivated. The short-horn breed of cattle thrives well, but the rearing of live stock is chiefly confined to sheep, of which there are nearly eight millions. For purposes of exploring the arid plains of the interior camels have been introduced and breed fast. The mineral resources of South Australia have not yet been thoroughly explored, but it has been found to possess deposits of copper, iron, and silver-lead, with small quantities of gold, tin, and bismuth. The chief exports are wool, wheat and flour, copper ore, wine and brandy.

South Australia was first occupied in 1836 by emigrants from Great Britain sent out by a colonization association. They found a convenient landing place in the Gulf of St. Vincent (now Port Adelaide), and selected the site of Adelaide, their future capital, some seven miles inland upon the Torrens River. Adelaide, incorporated in 1840, was the first proclaimed city of Australia. South Australia was made a crown colony in 1841. Under the lavish administration of the early governors the colony incurred state debts and got into financial difficulties, but judicious retrenchment and especially the discovery, in 1843, of copper deposits helped to secure the prosperity of the colony. This prosperity was seriously retarded by the migration which took place when gold was discovered in Victoria in 1851. Since then, however, the general prospects have improved, the agricultural, pastoral and mineral industries being now in a flourishing condition. In 1857 Sir Robert Richard Torrens introduced his Real Property Act (see *Torrens System*), which provided for the registration of titles to real estate, a system that is now employed in Great Britain, parts of Canada and some of the United States and Territories. The first representative constitution was adopted in 1851. The Northern Territory was annexed to South Australia in 1863 and continued as a part

## South Bend

## South Carolina

of the original colony till 1911, when the separation took place. The railroads, telegraphs and telephones are in the hands of the government. South Australia took a leading part in the federation of the Australian colonies, which were merged under the name of the Commonwealth of Australia in 1901. (See *Australia*.) The state government consists of an upper and lower house, known as the Legislative Council (20 members elected for 6 years) and the House of Assembly (46 members elected for 3 years). South Australia was the first state in the commonwealth to adopt woman suffrage. The population in 1916 was 430,000, exclusive of aborigines. The capital is Adelaide; pop., including suburbs, 205,000.

*Northern Territory*, formerly included in South Australia but now erected into a separate state, extends from the 26th parallel of south latitude to the Indian Ocean; area, 523,620 square miles. Port Darwin, the capital, has an excellent harbor. The state is sparsely populated, there being only 4956 white inhabitants according to the 1916 estimates, with 30,000 to 50,000 aborigines.

**South Bend**, a city of Indiana, county seat of St. Joseph county, is located on the St. Joseph River 86 miles east of Chicago. It is an important railroad and industrial center. Notre Dame University and St. Mary's Academy adjoin the city. It has extensive manufactures of vehicles, plows, sewing-machine cases, watches, underwear, shirts, furniture, toys, farming implements, etc. It has many fine public buildings and points of historical interest. Pop. 60,387. The city was laid out in 1831; incorporated in 1835; and chartered as a city in 1865.

**South Bethlehem**, a city of North Pennsylvania, a township Co., on the Lehigh River, opposite Bethlehem, 56 miles N. by W. of Philadelphia; served by four railroads. It is the seat of Lehigh University; also of Bishopthorpe School, and St. Luke's Hospital. It is one of the most important iron and steel manufacturing points in the Lehigh Valley, and has brass works, knit goods, metal polish, hosiery, cigar and silk factories. Pop. 24,000.

**Southbridge** (south'brij), a village of Southbridge township (town), Worcester Co., Massachusetts, on the Quinebaug River, about 32 miles E. of Springfield. Its manufactures include cotton and optical goods, shoe-knives, general cutlery, shuttles, etc. Pop. of town 14,000.

**South Carolina**, one of the South Atlantic States

and of the thirteen original members of the American Union, is bounded N. and N. E. by North Carolina, S. E. by the Atlantic Ocean, W. and S. W. by Georgia. Its greatest length from east to west is about 275 miles; greatest breadth 210 miles; area 30,989 sq. miles. It is separated from Georgia by the Savannah and Chattooga rivers, and is of roughly triangular shape. The surface features closely resemble those of North Carolina. For 100 miles inland from the coast the land is low and level, the soil sandy, with numerous swamps and extensive pine forests; west of this lies a tract of low sand hills, with moderately productive soil. On the western edge of this belt the land rises abruptly, continuing to rise until it terminates in the Blue Ridge mountain range, the highest peak of which within the State is Rich Mountain, 3569 feet high. The swamp lands have an area of over 1,000,000 acres and the pine forests of 6,000,000 acres. From Little River Inlet to the Savannah the coast extends about 200 miles in a S. W. course, with a number of harbors, the only first-class ones being those of Charleston and Port Royal. The chief rivers are the Great Pedee, Santee and Savannah, the latter on the southern border. The rivers Ashley and Cooper flow into Charleston harbor. Within the range of sea islands that line the coast there is a safe and tranquil passage for river steamers. These islands are mainly devoted to the growth of sea-island cotton and rice, and the tidal swamps to rice. Corn and cotton are cultivated in the forest region, and rice, cotton, Indian corn and vegetables in the swamp lands, when drained. Rice, cotton and corn thrive best in the southwestern counties and corn, wheat, barley, oats, tobacco and fruits in the northwest. Figs and pomegranates thrive in the lower counties, and the peach and grapes over the State generally. Strawberries are abundant and a great variety of fruits are grown. The most important crop is cotton, of which 1,188,000 bales were raised in 1910. The State is also a leading one in rice cultivation.

The mineral wealth of South Carolina includes gold and silver, both mined to a small extent, iron, manganese, copper and lead. But the mineral of greatest importance is phosphate rock, which occurs abundantly in the lowlands and river beds near Charleston and is mined for fertilizing purposes. The granite industry also is important and there are immense beds of porcelain clay. Of the manufacturing industries of the State that of cotton is much the most im-



portant, lumber and timber products ranking second in value. Tar, turpentine, cotton-seed oil, woollens, flour, machinery, and leather tanning and currying are other industries of some importance. Stock raising and wool-growing are carried on with profit and the fisheries are of value. Commerce is mainly confined to Charleston, Georgetown and Beaufort, the exports consisting of cotton, phosphate and other products of the State. There were about 9000 miles of railroad in 1910. The climate of the pine regions is dry and healthful, and the mountain region has a delightful summer climate and is much visited by tourists.

The first settlement of South Carolina was made at Port Royal about 1670, but a permanent settlement was not made until 1680, when Charleston was founded. In 1695 the cultivation of rice was introduced, and that of cotton followed. The Carolinas were divided into North and South Carolina in 1729, and the latter State took an early and active part in the revolution. The State asserted its right to secede from the Union in 1852, and was the first to secede in 1860, the firing on Fort Sumter, in Charleston harbor, being the opening event in the Civil war. Capital, Columbia. Pop. 1,515,400.

**Southcott** (south'kut), JOHANNA, a religious fanatic, whose extravagant pretensions attracted a numerous band of converts in London and its vicinity. She was born in the west of England about the year 1750, of parents in very humble life, and, being carried away by a heated imagination, gave herself out as the woman spoken of in the Book of Revelations. She announced herself as the mother of the promised Shiloh. She died in 1814. Her followers numbered at one time 100,000, but are now extinct.

**South Dakota**, a northwestern American State, bounded N. by North Dakota, E. by Minnesota and Iowa, S. by Nebraska, and W. by Montana and Wyoming. Length, east to west, nearly 360 miles; width, about 240 miles; area 77,615 sq. miles. Its principal river is the Missouri, which divides the State into two nearly equal portions, and is navigable for boats up to 600 tons burden. That portion of the State east of the Missouri is mostly rolling prairie. Through this section run two parallel plateaus, and between them flows the James or Dakota River, which furnishes much irrigation. West of the Missouri the plain is more uneven, with many hills and buttes,

finally culminating towards the southwest in the Black Hills, a rugged region of upheaval with more than 8500 sq. miles within the State. Its elevation is about 4000 feet, rising to 7210 in Harney Peak. South of these hills are the Bad Lands, so-called from their difficulty of travel rather than from barrenness. This region is well adapted to stock-raising. The Black Hills contain rich gold mines and also yield tin, silver, copper, iron, coal, gypsum, marble, petroleum, and other minerals. They are largely forested, and with the aid of irrigation much of the region might be adapted to agriculture.

In most sections of the State the soil is highly fertile and agriculture is the leading pursuit. Wheat and corn are the staple crops, the fine quality of the wheat giving it a world-wide reputation. In the south, corn is the most important crop. Other crops are oats, barley, potatoes, flax, hay, vegetables, and fruits. Stock-raising is profitable in all parts of the State, the wool crop being large, while the abundant growth of corn makes hog-raising remunerative. The climate is dry and bracing, with comparatively mild winters, though the annual range of temperature may vary from 40° below to 100° above zero. In 1910 the wheat yield was 46,720,000 bushels; corn, 65,270,000 bushels; oats, 35,075,000 bushels. The length of railroad in 1910 was about 4000 miles.

The region of the Dakota was part of the Louisiana Purchase of 1803; it was organized into a Territory in 1861; the discovery of gold in the Black Hills gave it a great increase of population, and in 1889 it was divided into North and South Dakota and admitted as two States to the Union. Capital Pierre. Pop. 583,888.

**Southend** (south'end), a seaport and watering-place of England, on the estuary of the Thames, Essex, 42 miles E. of London by rail. It is a popular resort of Londoners, both on account of its facilities for sea-bathing and for its pleasant outlook over the Thames. Its pier is the longest in England (nearly 1½ mile). Pop. (1911) 62,723.

**Southern** (suth'ern), THOMAS, an English dramatist, born in Ireland about 1600; educated at Trinity College, Dublin. He was called to the bar at the Middle Temple but soon abandoned the law for dramatic literature. He wrote in all ten plays, of which the most popular were *Isabella*, or *the Fatal Marriage*, and *Oroonoko*. He died in 1746.

**Southern Bulgaria.** See *Eastern Roumelia, Bulgaria.*

**Southern Cross,** a constellation of the southern hemisphere, composed of four stars, one of which is of the first, and two of the second magnitude; they form an elongated figure, lying parallel to the horizon, nearly at the height of the pole. The largest of the four is the pole-star of the south.

**Southernwood.** See *Wormwood.*

**Southey** (sou'thi), ROBERT, an English poet and miscellaneous writer, was the son of a linen-draper of Bristol, where he was born in 1774. He was sent to Westminster School in 1788, and soon gave proof of distinguished talents. He was dismissed, however, in 1792 for a satirical paper on flogging published in a school journal, *The Flagellant*, and shortly afterwards entered Balliol College, Oxford, with the view of studying for the church. For this, however, the ultra-liberal opinions which he had formed were very ill adapted, and he turned his attention to medicine, but soon gave it up also. He left Oxford in 1794, and having formed an acquaintance with Coleridge, they were married on the same day to two sisters in 1795. A quixotic scheme to revive the golden age in America having been abandoned for want of means, Southey, after selling his *Joan of Arc* for £50, sailed for Portugal with his uncle, the chaplain to the English factory at Lisbon. After his return to England he (1798) entered Gray's Inn, with the view of studying law, but never made any progress in it. He again visited the Peninsula in 1801. Previous to this time he had published several poems, including a violent democratic piece entitled *Wat Tyler*. But he had now renounced his democratic opinions, and gone to what many considered an opposite extreme. His first poem which attracted much notice was *Thalaba the Destroyer*, a metrical romance published in 1802. In 1804 he fixed his permanent residence at Greta, near Keswick, in the heart of the English lake district, where he had Wordsworth and Coleridge for neighbors. From this period his intellectual activity was untiring, and he continued for a period of almost forty years to issue annually at least one, and often several works, besides contributing largely to different periodicals. Having lost his first wife, he, in 1839, married Caroline Anne Bowles (1786-1854), herself a writer of some eminence. Soon after

he sank into a state of mental imbecility, and died March 21, 1843. In 1807 Southey received a pension from government, and in 1813 was appointed poet-laureate. The University of Oxford conferred on him the degree of LL.D. in 1821, and in 1835 he received an augmentation of his pension. Among his poetical productions may be mentioned—*Joan of Arc; Thalaba; Madoc; The Curse of Kehama; Roderick, the Last of the Goths; a Poet's Pilgrimage to Waterloo; and a Vision of Judgment*. Several of his minor pieces show to more advantage than his larger poems. His prose works are remarkable for their excellent style. Among others may be mentioned his *Life of Nelson*, which is almost a perfect model of its kind; *Life of Wesley, History of Brazil, The Book of the Church and the Doctor*.

**South Georgia,** a barren snow-covered island in the South Atlantic, 500 miles E. S. E. of the Falkland Islands, to which it is regarded as belonging.

**Southington** (suth'ing-tun), a borough of Hartford Co., Connecticut, on Quinepiac River, 22 miles N. of New Haven. It has a well endowed academy and manufactures of cutlery, hardware, slot-machines, etc. Pop. 6516.

**South Kensington Museum,** an institution in London originated by Prince Albert in 1852, and under the direction of the Committee of Council of Education. It contains a rare collection of ancient and modern art as applied to manufactures, a gallery of British art, an extensive collection of water-color paintings, a collection of sculpture, reproductions of ancient sculptures, and an art library. Other departments contain collections of substances used for food, and of materials employed in building and construction.

**South Milwaukee,** a city of Milwaukee county, Wisconsin, about 10 miles S. S. E. of Milwaukee. It has manufactures of steam dredges, light hardware, malleable castings, mineral-wool, etc. Pop. 6092.

**South Norwalk,** a city of Fairfield county, Connecticut, at the mouth of Norwalk River, 42 miles N. E. of New York and 2 miles S. of Norwalk. It has large industrial works, including air compressors, corsets, fur and straw hats, also iron products, locks, woolen goods, gas stoves, etc. Pop. 8968.

**South Omaha,** a city of Douglas county, Nebraska, ad-

## South Orange

joining Omaha, and on the Union Pacific, Burlington, North Western, Rock Island, and other railroads. South Omaha has, in addition to a large number of the biggest packing establishments in the country, numerous smaller manufacturing concerns. Pop. 30,000.

**South Orange**, a town of Essex co., New Jersey, 4 miles w. of Newark and adjoining Orange and East Orange. It contains many fine residences of New York business people, and the Seton Hall College (Catholic), organized in 1856. Pop. 6014.

## South Polar Expeditions,

exploring expeditions in the Antarctic regions. The first discovery of land in the proximity of the Antarctic circle was made accidentally in 1599, by Dirk Cherrits, a Dutch navigator, who, in endeavoring to enter Magellan's Straits, was driven southward to lat. 64°, where he discovered the South Shetland Islands. Captain Cook is the first who is known to have sailed within the Antarctic circle. He reached the southernmost point attained by him on January 30, 1774, in 71° 10' s. and 107° w. In 1821 the Russian Bellingshausen discovered Peter the Great and Alexander Islands. Enderby Land and Kemp Land were discovered by Blasco in 1831-33. The first of these is the easternmost point of a supposed continuous coast, and lies in lat. about 67° 30'. Sabrina Land and Balleny Islands were discovered in nearly the same latitude by Balleny in 1839. In 1840 two important exploring expeditions, one French, the other American, reached the southern seas. The French expedition, under Dumont d'Urville, found traces of what was believed to be a continuous coast from 136° to 142° E., to which they gave the name of Adélie Land. The American expedition, under Charles Wilkes, passed very near the southern magnetic pole, the position of which at the time he calculated to be lat. 70° s., lon. 140° E., and traced land from lon. 154° 27' to 97° 30' E., which he concluded to be continuous. An English expedition under James Clark Ross in 1839 passed the Antarctic circle about lon. 178° E., and in 172° 38' E. lon. and 70° 41' s. lat. found a continuous coast trending south, with mountain peaks 9000 to 12,000 feet in height. He gave the country the name of South Victoria Land. In 77° 32' s. lat., 167° E. lon., he discovered an active volcano, Mount Erebus, 12,400 feet high. Ross reached the farthest south point attained to that time. The Belgic, under command of Lieut. Adrian de Gerlach, sailed from

## South Sea Bubble

Antwerp, Belgium, in 1897, to attempt the discovery of the South Pole. Gerlach made important discoveries, but failed in his main object. In 1900 Captain Borchgrevink, heading an English expedition, reached Ross Bay, 78° 35' s., from which he made a sledging trip over the ice to 78° 50'. Another expedition was sent out in 1901, under Captain Scott, which wintered 400 miles farther south than had ever been done before, and also coasted 150 miles along the ice barrier beyond where Ross had stopped 60 years before. A sledging party ascended a glacier to a height of 9000 feet and saw a level icy plain stretching far southward. The latitude reached was 80° 17', 670 miles from the pole. In 1908 Lieutenant Shackleton, of the British navy, far surpassed all previous explorers, discovering the south magnetic pole and reaching a point only 111 miles from the south pole. Another British expedition under Captain Scott sailed in early 1911. On January 18, 1912, Captain Scott and four of his men reached the south pole, but perished on the return journey. The previous year, Roald Amundsen, a Norwegian explorer, projected a voyage in the 'Fram' to the Arctic Sea, but instead sailed to the Antarctic, and on December 14, 1911, succeeded in reaching the south pole.

**Southport** (south'pört), a fashionable watering-place in Lancashire, England, 18½ miles by rail north of Liverpool. Among the attractions are the Pavilion and Winter Gardens, which include a concert-hall, aquaria, botanic gardens, public park, Free Library, Art Gallery, Victoria Baths, and a long pier. Pop. 71,747.

**South Portland**, a city of Cumberland Co., Maine, on Casco Bay, opposite Portland. It has government fortifications, a soldiers' monument, a State reform school for boys, and manufactures of iron and steel, marine equipment, etc. It has a good harbor and is popular as a summer resort. Pop. 7471.

**South Sea Bubble**, a disastrous financial speculation which arose in England in the beginning of the eighteenth century. It originated with the directors of a joint-stock company, which, in consideration of certain exclusive privileges of trading to the South Seas, offered the government easier terms for the advance or negotiation of loans than could be obtained from the general public. In 1720 the proposal of the company to take over the entire national debt (at this time about £31,000,000), in consideration of receiving

## South Sea Islands

annually 5 per cent. was accepted, and the company promised in return for this privilege (as it was regarded) a premium in their own stock of £7,500,000. Professing to possess extensive sources of revenue, the directors held out promises to the public of paying as much as 60 per cent. on their shares. It became soon apparent that such magnificent promises could never be fulfilled, and in a few months' time a collapse came which ruined thousands. The directors had been guilty of fraudulent dealings, and the chancellor of the exchequer and others in high positions were implicated.

**South Sea Islands.** See *Polynesia*.

**South Sharon,** a borough in Mercer county, Pennsylvania, near Sharon. It has steel, wire, and tin-plate works. Pop. 10,190.

**South Shetlands,** a group of islands in the Southern Ocean, south of South America, on the Antarctic circle, originally discovered by a Dutch seaman named Dirk Cherrits in 1599. The islands are uninhabited, and covered with snow the greater part of the year.

**South Shields.** See *Shields*.

**Southwark** (south'ark), a division of London south of the Thames, in Surrey, a metropolitan parliamentary borough, directly opposite the city of London.

**Southwell** (south'wel, suth'l), a city of England, in the county of Nottingham, giving name to a diocese comprising the counties of Notts and Derbyshire, the first bishop of which was appointed in 1884. Its cathedral is an ancient edifice of considerable architectural interest. Pop. (1911) 119,595.

**Southworth** (south'wurth), EMMA DOROTHY ELIZA, novelist; born in Washington, D. C., in 1818; died June 30, 1899. She was a prolific writer, her first novel, *Retribution*, appearing in 1849. Her novels mostly relate to Southern life, and were widely read, though lacking in literary value.

**Souvalky** (sü-vä'ke), SUWALKI, a town of Russian Poland, capital of the government of the same name, with considerable trade, some manufactures, and has a pop. of 27,165.

**Souvestre** (sü-ves-tr), EMILE, a popular French novelist and dramatist, born at Morlaix, Finistère, in 1806. After editing a liberal paper at Brest for some time he settled in Paris (1836), where he attracted attention by his sketches of Brittany, and was soon

## Sowing-machines

recognised as one of the foremost writers of the day. Among his best works are *Les Derniers Bretons*, *L'Homme et l'Argent*, *Confessions d'un Ouvrier*, and *Utopie sous les Toits*. He died 34.

**Sovereign** (sov'rin, sov'e-rin), the person in whom is vested the highest governing power in a monarchy. **Sovereign**, a gold coin, the standard of the English coinage.

It exchanges for twenty shillings sterling, and has a standard weight of 123-274 grains, being of 22 carats fineness, and coined at the rate of 1800 sovereigns from 40 lbs. troy of gold.

**Soviet** (sö'v'yet), the name given to a group movement in Russia, as distinguished from the Duma, which was the official parliament, and the Zemstvo, the rural common council. The Soviet is a development of the Russian Mir, or mass meeting. (See *Mir*.) It was an unofficial assembly, but following the revolution of 1917, when there was no elected parliament and the reins of government were assumed by a few men of the radical Socialist party, the Bolsheviki (q. v.), the Soviet came again into prominence; and the peace treaty with Germany which the Bolsheviki had negotiated was ratified by an all-Russian congress of Soviets held in Moscow in 1918. For this congress one delegate was allowed for every 90,000 population.

**Sowbread.** See *Oxolamen*.

**Sowing-machines** (sö'ing), machines for sowing grain. Among the simplest and earliest forms of sowing-machines is a cylindrical vessel with small holes at regular intervals round its circumference for sowing round seed, such as turnip-seed. The machine is placed on wheels, and drawn over the land at a regulated speed, when by its mere revolution the seed is delivered with tolerable uniformity. Another class of machines consists of those having a fixed seed-box, the delivery from which is regulated by internal revolving machinery. The holes for delivery are placed at regular intervals near the bottom of one side of the seed-box. One of the best modes of delivery is that in which the delivery is regulated by cups attached to projecting arms on a revolving disc. The cups dip into the seed and lift successive portions, which they deliver at the height of their revolution into a funnel placed for its removal to the ground. Another mode of delivery is by an oscillating movement given to a false bottom of the seed-box. The real and the false bottom are both



provided with holes, and when the holes correspond the seed falls. An objection is made to these machines that they are liable to cut the seed. In broadcast machines no special apparatus is needed for conveying the seed to the ground, the intervals of the holes causing it to fall evenly on the ground. In the machines called drills the funnel into which the seed is dropped is designed to convey it accurately into the row in which it is to be sown, the rows being parallel to the course of the machine. For this purpose the funnel terminates in a heavy coulter, which opens a channel of uniform depth for the deposit of the seed, which is then covered by a harrow. By further improvements drop drills and dibbling machines have been contrived, which not only deposit the seed in rows but at regular intervals within the rows. The regular delivery of manure is also secured by similar machines.

**Sow-thistle**, the vulgar name given to a species of a genus of composite plants (*Sonchus*). There are about fifty species, mostly herbaceous, but some forming shrubs or small trees. Some of the first may be considered cosmopolitan, while the woody sorts are almost restricted to the Canaries and the island of Madeira. The best known European species is the common sow-thistle (*Sonchus oleraceus*). It is very abundant as a weed, is greedily fed upon by many animals, and is sometimes used as a pot-herb. The *S. alpinus* forms a tall and fine plant, with fresh and sharply-defined foliage, and large heads of beautiful blue flowers. The *S. arvensis* is found in Massachusetts and Southern New York.

**Soy** (sol), a dark-colored sauce prepared by the Chinese from the seeds of a sort of bean (*Dolichos soja*). It is made by boiling the seeds until they become soft, and mixing with them an equal weight of wheat or barley meal coarsely ground, a certain proportion of salt and water being added. The seeds are, besides, employed in China and Japan as food.

**Soymi'da**. See Redwood.

**Spa**, or SPAA (spä), a town of Belgium, in the province of Liège and 16 miles south of the town of Liège. Its chief importance is due to its effervescent, chalybeate, saline, mineral waters, which are much used by visitants on the spot, and also extensively exported. It has long enjoyed celebrity, and has given its name to many mineral springs. There are many fine buildings and numerous attractions for visitors. In the

eighteenth century it was the most fashionable resort in Europe. Pop. 7759.

**Spaccaforno** (späc-ka-for'nō), a town of Sicily, prov. of Syracuse. Near it are some curious prehistoric artificial caves. Pop. 10,617.

**Space** (späs), in philosophy, extension considered independently of anything which it may contain, extension considered in its own nature. Aristotle defines it as the possibility of motion, and possessing the quality, therefore, of being — potentially, not actually — divisible *ad infinitum*. Space and Time are two of the so-called innate ideas. According to one school these ideas are intuitive to the mind; according to another they are the result of experience. Locke maintained that we acquire the idea of space by the senses of sight and touch. Space and Time, according to Kant, are the ultimate forms of external and internal sense, and these forms are contained *a priori* in the human mind. Space is the form of external sense by means of which objects are given to us as existent without us, and as existent also apart from and beside one another. If we abstract from all that belongs to the matter of sensation (in any perception), there remains behind only space, as the universal form into which all the materials of the external sense dispose themselves. Herbert Spencer, while making no attempt to analyse the notion of space, says: 'It will be sufficient for present purposes to say that we know space as an ability to contain bodies. I am aware that this is no definition properly so-called, seeing that as the words, contain and bodies both imply ideas of space, the definition involves the thing to be defined. But leaving out as irrelevant all considerations of the mode in which we come by our ideas of space, and of bodies as occupying space, it will, I think, be admitted that the antithesis between bodies and an ability to contain bodies truly represents the contrast in our conceptions of the sensible non-ego (matter) and the insensible non-ego (space).'

**Spada** (spä'dü), LIONELLO, an Italian painter, Bolognese school, born at Bologna in 1576; died at Parma in 1622. He became the pupil of Caravaggio, with whom he traveled. On his master's death he returned to Bologna, and spent his latter days at the court of the Duke of Parma. Among his works (which are well known in European galleries) *St. Dominic burning the Heretical Books* and an altar-piece in the church of St. Domenico at Bologna, are considered his best.

**Spadix** (spá'diks), in botany, a form of the inflorescence of plants, in which the flowers are closely arranged round a fleshy radius, and the whole surrounded by a large leaf or bract called a spathe, as in palms and arums.

**Spagnoletto** (spán-yo-let'tó; 'little Spaniard'), a celebrated painter, whose true name was Giuseppe Ribera, or Ribeira; born at Xativa, in Valencia, in 1588; died at Naples, in 1656. He was at first a pupil of Caravaggio, but afterwards improved himself by the study of the works of Raphael and Correggio, at Rome and Parma. Settling in Naples he was appointed court painter, in which post he took the leading part in an infamous plot against his rivals Carracci, D'Arpino, Guldo, Menenichino, etc. Ribeira excelled in the representation of terrible scenes, such, for example, as the *Flaying of St. Bartholomew*. His works are not uncommon in European galleries.

**Spahis** (spá'héz), or SIPA'HS, the name given to the irregular Turkish cavalry, which is said to have been organized by Amurath I, and which gave place in 1826 to regular cavalry. Their usual arms were the saber, lance, and javelin. The French call a body of light cavalry raised in Algeria by the name of spahis. The name *sepoys* given to the native troops in British India is the same word.

**Spain** (spán; Spanish, *España*), a country in the southwest of Europe, forming with Portugal the great southwestern peninsula of Europe. It is separated from France on the northeast by the chain of the Pyrenees, and is otherwise bounded by Portugal and the Atlantic and Mediterranean. In greatest breadth N. and S. it measures 540 miles; greatest length E. and W., 620 miles; total area, 194,700 sq. miles; pop. 18,607,674. Besides the Balearic and Canary Islands, which are reckoned European territory, Spain held until 1898 a portion of her once magnificent colonies, including the islands of Cuba and Porto Rico in the West Indies; also the Philippine and some adjacent islands. It now holds only a strip on the west coast of the Sahara, the island of Fernando Po, the Balearic and Canary Islands, and some small possessions on the coast of Morocco. Spain formerly



a, Spathe, and b, Spadix of *Arum maculatum*.

comprised the kingdoms and provinces of New and Old Castile, Leon, Asturias, Galicia, Estremadura, Andalusia, Aragon, Murcia, Valencia, Catalonia, Navarre, and the Basque Provinces. These since 1834, for administrative purposes, have been divided into forty-nine provinces, including the Balearic and Canary Islands. The capital is Madrid; next in population are Barcelona, Valencia, Seville, and Malaga.

**Physical Features.**—The coast-line is not much broken, but sweeps round in gentle curves, presenting few remarkable headlands or indentations. The interior is considerably diversified, but its characteristic feature is its central tableland, which has an elevation of from 2200 to 2800 feet, and a superficial extent of not less than 90,000 sq. miles. It descends gradually on the west towards Portugal; but on the east, towards the provinces of Catalonia and Valencia, it presents an abrupt steep or line of cliffs, with the character of an ancient sea margin. It is bounded on the N. by the Asturian and Cantabrian Mountains, reaching an elevation of about 8500 feet; on the S. by the Sierra Morena; and is crossed from east to west by the rivers Douro, Tagus, and Guadiana. Between these limits it is intersected by two important ranges of mountains running nearly E. and W., the northern being the Guardarrama with its continuations, separating the valleys of the Douro and Tagus, and attaining in one of its peaks a height of 8200 feet; and the southern, the Sierra de Toledo and its continuations between the Tagus and the Guadiana. South of the Sierra Morena is the valley of the River Guadalquivir. On the northern boundary is the chain of the Pyrenees, which, though partly belonging to France, presents its boldest front to Spain and has its loftiest summits within it. The highest peak in this range is La Maladetta or Pic de Netou (11,165 feet); but the highest peak in Spain is Mulhacem (11,705 feet), belonging to the Sierra Nevada in the far south. The latter chain possesses some of the wildest scenery in Europe. The chief rivers enter the Atlantic, but in the northeast is the Ebro, a tributary of the Mediterranean. The Douro, Tagus, and Guadiana belong partly to Portugal. The lakes are few and unimportant. The whole country teems with mineral wealth, the minerals including in greater or less quantities gold, silver, quicksilver, lead, copper, iron, zinc, calamine, antimony, tin, coal, etc. The exploitation of the minerals has, however, in recent times been mostly ac-

complicated by foreign capital, while most of the ore is exported to foreign countries in its raw state.

*Climate, Vegetable Products, etc.*—The climate varies much in different localities. On the elevated table-land it is both colder in winter and hotter in summer than usual under the same latitude. In the plains and on the coasts the hot summer is followed by a cold rainy season, terminating in April in a beautiful spring. The mean temperature at Malaga in summer is 77° F., in winter 57°; at Barcelona 77° and 50°; and at Madrid 75° and 44.6°. The rainfall is small; in the interior between 8 and 12 inches per annum. In some parts of the south the climate is almost tropical. The hot south wind of Andalusia, known as the *solano*, and the cold north wind called the *gallego*, are peculiar to Spain. About one-sixth of the acreage is under wood; the more remarkable trees being the Spanish chestnut and several varieties of oak, and in particular the cork-oak. Fruits are extremely abundant, and include, in addition to apples, pears, cherries, piums, peaches, and apricots, the almond, date, fig, orange, citron, olive, and pomegranate; and in the lower district of the south, the pineapple and banana. The culture of the vine is general, and great quantities of wine are made, both for home consumption and exportation. The more important farm crops are wheat, rice, maize, barley, and legumes. In the south cotton and the sugar-cane are grown. Hemp and flax, esparto, the mulberry for rearing silk-worms, saffron, licorice, are also to be mentioned. The only large animals in a wild state are the wolf, common in all the mountainous districts, and the bear and chamois, found chiefly in the Pyrenees. Domestic animals include the merino sheep in great numbers, horses, mules, asses, horned cattle, and pigs.

*Manufactures, Trade, etc.*—The manufactures of Spain are not as a whole important, but considerable advances have been made in recent times. The most important industries are the manufactures of cotton, of woollens and linens, of cutlery and metal goods, paper, silk, leather, tobacco and cigars, besides wine, flour, and oil. The chief articles of export are wine (by far the first), fruits (especially oranges and raisins), cork, lead, iron ore, oils, soap, and agricultural produce (including cattle and wool). The chief trade is with France, next to which is Britain. The country is imperfectly provided with roads; the rivers are of little use for navigation; and though railways have considerable aggre-

gate length, much is still required. The chief denomination of money is the *peseta*, of which 25 are nearly equivalent to \$5.

*Government, etc.*—The present constitution dates from 1876, and enacts that the government be a constitutional monarchy, the legislative power resting 'in the Cortes with the king,' the executive being vested, under the monarch, in a council of nine ministers. The Cortes consists of two independent bodies—the Senate and Congress, the former consisting of 360 members, one-half of whom are elected by corporations and similar bodies, the other half being life senators nominated by the crown, and 'senators by their own right.' The Congress is formed by deputies in the proportion of one to each 50,000 of the population. The various provinces, districts, and communes are governed by their own municipal laws with local administration. Each commune has its affairs directed by an elected *ayuntamiento*, and each province has its *diputacion provincial*, or parliament, whose members are elected by the *ayuntamiento*. The revenue, raised chiefly by direct and indirect taxation, stamp-duties, government monopolies, income from state property, etc., in 1914–15 was estimated at \$232,071,000; the expenditure, \$216,452,000; while the debt, funded and floating, amounted to \$1,817,674,327.

*Army and Navy.*—The army consists of (1) a permanent army, in which all above the age of twenty are liable to serve for three years; (2) an active reserve with three years' service; and (3) a sedentary reserve, with service for other six years. By the payment of \$300 exemption from service may be obtained. For military purposes the country, with the islands, is divided into fourteen districts, and the strength of the army (exclusive of the reserve) is 150,000 in peace and 1,180,000 in war. The navy has been of small importance since the destruction of its chief ships in the war of 1898.

*People, Religion, etc.*—The people of Spain are of very mixed origin, the most ancient inhabitants, the Iberians (now represented probably by the Basques or Biscayans of the northeast), being afterwards mingled with Celts, Phœnicians, and Carthaginians, Roman colonists, Goths, Jews, and Arabs or Moors. They are generally of medium height and a spare habit, with black hair, dark eyes, and sallow complexion. Under the constitution, the state binds itself to maintain the Roman Catholic religion, but a restricted liberty of worship is permitted to Protestants, of whom, however, there

are very few. There are nine archbishops, the Archbishop of Toledo being primate. Houses for monks no longer exist, having been abolished by law in 1841. In 1857 an elaborate scheme of education (including compulsion) was proclaimed by the government, but never enforced; and thus education is in a very backward state. Recently, however, there has been a more efficient supervision, and the number of pupils in the public schools has much increased. There are government schools for engineering, agriculture, fine arts, music, etc., and ten universities.

**History.**—The most ancient known inhabitants of Spain were the Iberians. To these afterwards were joined certain tribes of Celts, and subsequently the two races united. The Phœnicians made settlements at a very early date, having founded Cadiz about B.C. 1100; later the Greeks founded several cities, and then (B.C. 238) the history of Spain may properly be said to begin with the Carthaginian invasion. Hamilcar Barca undertook, with considerable success, to subjugate the tribes of the Peninsula, and in this effort he was followed by Hasdrubal and Hannibal. War between Rome and Carthage brought the Romans to Spain, and (B.C. 205) ended in their driving out the Carthaginians. (See *Rome and Hannibal*.) The Romans then undertook the subjugation of the entire country, but in this they did not completely succeed until after about 200 years. The tribes in the mountains of the north were finally subjugated by Augustus and his generals, and Spain was converted into a Roman province.

In 256 A.D. the country was invaded by the Franks, and after their departure Spain became peaceful until the advent of the Goths. A Visigothic kingdom was established about 418 A.D. But after retaining the mastery of the country for nearly three centuries the Visigoths were in their turn conquered (711 A.D.) by the Saracens under Tarik, and the greater part of Spain became a province of the caliphs of Bagdad. For some years they held it as a dependency of the province of North Africa, but it was afterwards (717) governed by *emirs* appointed by the caliphs of Damascus. Dissensions ultimately arose between the central power and the province, with the result that an independent dynasty was established by Abd al-Rahman at Cordova (756 A.D.), which received additional power and magnificence from Hisham (788) and his son Al Hakam (796). Meanwhile several small independent kingdoms had been formed in the mountainous districts of the Pyrenees, proba-

bly by descendants of the Visigoths. The chief of these were the kingdoms of Asturias, Leon, Navarre, Aragon, and Castile. These states were often at war with each other, and in the struggle for supremacy Castile and Aragon ultimately absorbed all the others. The rise of these two powerful Christian states in the eleventh century was contemporary with the decline and disruption of the Ommyad dynasty of the Moslems, and in a struggle between the two religions a famous part was taken by the 'Cid' (which see). It seemed, indeed, at this time as if the Moslem power in Spain was about to be annihilated, but with aid from Africa, and after the death of the Cid, they regained much of their influence. This power was directed at first by the Almoravides, whose caliphs ruled from Morocco, and then by the Almohades, until the latter were defeated (1212 A.D.) in the decisive battle of Las Navas de Tolosa. To the Moors there now remained only the kingdoms of Cordova and Granada, but even these were soon obliged to admit the supremacy of Castile.

By the marriage (1469) of Isabella, the heir to the crown of Castile, with Ferdinand of Aragon, begins the modern history of Spain. The two States thus united retained their own laws, customs, and administration, but their gradual fusion was promoted and largely accomplished by Cardinal Ximenes. To strengthen the central government and curtail the power of the nobility the *Santa Hermandad*, or Holy Brotherhood, was formed (1476) to act as the administrators of justice; the Inquisition was instituted (1481) to promote religious orthodoxy and unity; the Jews were expelled for heterodoxy; and the Moors were completely subjugated by the conquest of Granada (1492) and afterwards expelled, an act which proved of great industrial injury to Spain. In this same year Columbus discovered the West Indies, and the colonial power of Spain, thus begun, was soon greatly extended.

When Ferdinand died in 1516, his daughter Joanna, who had married Philip, son of Maximilian I, succeeded to the kingdom of Aragon, but her son, Charles I, became regent and ultimately king of the whole of Spain. He was also ruler of the Netherlands, which he inherited from his father, and in 1519 he was proclaimed Charles V, emperor of Germany. As the champion of the Catholic Church he successively declared war with the French, the German Protestants, and the Turks. But as the expense of this vast policy overtaxed his own king-



dom, and was only partially met by the wealth acquired by the conquest of Mexico (1518) and Peru (1531), he finally retired to private life, and was succeeded (1556) by his son, Philip II.

The internal policy of this monarch was characterized by a severe absolutism in matters political and religious, an extension of the power of the Inquisition, and a unification of the peninsula by the conquest of Portugal. By his foreign policy he caused a revolt in the Netherlands (which see) and eventually lost the northern provinces; failed to establish the Spanish influence in France; and sustained defeat from England by the destruction of the Invincible Armada, a great naval demonstration against the island kingdom. He was succeeded (1599) by Philip III, who, by expelling all the Moriscos from his kingdom and engaging in the Thirty Years' war, further impoverished the country. Other disasters overtook Spain on the accession of Philip IV (1621), whose haughty centralizing policy, under the minister Olivarez, brought about civil war in Catalonia, Andalusia, and Naples, the loss of Portugal and French-Comté, and the independence of the Netherlands. Under his son, Charles II (1665), a prince who was feeble both in mind and body, the country declined still more, and at his death in 1700 without an heir there began the war of the Spanish Succession. The succession to the throne lay between the Hapsburgs, whose claim was upheld by the Emperor Leopold I, and the Bourbons, whose claim was maintained by Louis XIV. After a prolonged European war (see *Succession wars*) it was agreed by the Treaty of Utrecht (1713) to acknowledge the Bourbon Philip V as king of Spain, on condition that the Netherlands and the Italian provinces should be given to Austria, while England claimed Gibraltar and Minorca.

Under the able administration of Cardinal Alberoni Spain now regained a large part of its power in Europe. This revival was continued under Ferdinand VI, who succeeded to the throne in 1746; but it received its greatest impulse from Charles III (1759), who developed the agricultural and other resources of his country, and broke the power of the Inquisition by banishing the Jesuits (1767).

The full effect of these and other liberal measures was arrested, however, by the accession of Charles IV (1788), whose policy, directed by Godoy (which see), first brought about a rupture with the French Republic, and then a close alliance with France and a war against the British, resulting in the battle of

Trafalgar (1805), when the naval power of Spain was destroyed. Spain received further humiliation by the success of Napoleon, the Treaty of Fontainebleau, and the occupation of the country by French soldiers. The result was an insurrection and the abdication of the king (1808) in favor of his son, Ferdinand VII. But Napoleon, who had his own intentions regarding the Spanish throne, caused the whole Bourbon family to be set aside and gave the crown to Joseph, his brother. The Council of Castile gave at first a reluctant assent to this arrangement, but soon the provinces declared war and the council entered into an alliance with Great Britain. As the result of this popular rising Madrid was taken by the patriot forces, Joseph Bonaparte retreated, and a junta was formed to govern in the name of Ferdinand VII. On the arrival of Napoleon, however, the Spanish army was destroyed, Madrid retaken, Joseph Bonaparte restored, and the relieving British army under Sir John Moore driven back upon Coruña. The Peninsula was saved from complete subjugation only by the arrival of Wellington with a British army in Portugal, and the determined resistance which he offered during several campaigns to Napoleon's generals. In several battles the British army routed the French and advanced into Spain; but it was not until the spring of 1813 that Wellington was able to clear the Peninsula of French soldiers and to fight his way through the Pyrenees into France. In consequence of this success the Bourbon prince, Ferdinand VII, returned and was proclaimed king (1814), but the country made little progress, owing to the absolute and illiberal policy which he adopted.

During the Napoleonic war the South American colonies had asserted their independence, which they subsequently gained; Florida was sold to the United States in 1819; and those colonial losses were aggravated by the despotic rule of a king who dissolved the Cortes, set aside the constitution, and reestablished the Inquisition. A revolt against this policy took place in 1820 and spread throughout the country, in consequence of which the constitution was reestablished, the Inquisition abolished, and in 1822 a Cortes with a liberal majority, was elected. This movement for liberty, however, was suppressed by the Holy Alliance (which see), under the sanction of which a French army entered Spain (1823) and remained there for four years, during which the royal absolutism was restored. In 1829 Ferdinand abolished the Salic law by a 'pragmatic sanction,' and as the

result of this his daughter was proclaimed queen, on the death of her father in 1833, under the title of Isabella II.

As this queen was only three years old, her mother, Maria Christina, undertook the regency; but she was opposed by Don Carlos, a brother of the late king, and a serious civil war broke out. The Carlist party achieved considerable success at first, but the civil strife was ultimately brought to an end by the triumph of the royalists (1840) under Espartero and O'Donnell. Notwithstanding this the regent, who found it impossible to control the various factions, retired into France, and Espartero was recognized as regent. In 1843 the young queen was declared of age, and her government was carried on by Narvaez, who had superseded Espartero.

More successful was the revolution of 1868, inspired by misgovernment and headed by Generals Prim and Serrano. The latter entered Madrid in command of the revolutionary troops, and Isabella fled to France. The Cortes still declared in favor of the monarchical form of government, and great difficulty was experienced in finding a prince both able and willing to occupy the vacant throne. It was offered to Leopold of Hohenzollern-Sigmaringen, but the jealousy of France caused Napoleon III to demand the withdrawal of this candidate, and the diplomatic difficulties connected with this matter were the ostensible cause of the Franco-Prussian war. The crown was at length accepted by Amadeus, second son of Victor Emmanuel, and in 1870 he was formally elected king by the Cortes. But the various parties, among which the most active were the Carlists and the federalists, made government difficult, and the king, after three years of strife, resigned his task.

Following this event the Cortes declared in favor of a federal republic (1873), and the presidency was intrusted to Castelar; but the outbreak of a Carlist war in the Basque Provinces and the party complications in the Cortes made this form of government impossible. Accordingly Castelar and his ministry resigned (1874) and the government of the country was undertaken by the chiefs of the revolution of 1868, headed by Marshal Serrano. Under this military administration vigorous measures were taken to suppress the Carlist rebellion; and as it had been proved that a republican form of government was impossible, the throne was offered (1874) to the son of the exiled Isabella. In 1875 the young king, with the title of Alfonso XII, landed at Barcelona, and successfully established

his government by a complete defeat of the Carlist insurgents. After this event the country enjoyed comparative quiet until the death of Alfonso in 1885; his wife, Christina of Austria, being proclaimed regent after the birth, in 1886, of her posthumous son, who became king under the title of Alfonso XIII. In April, 1898, war was declared against the United States, the latter claiming that the Spanish rule in Cuba was obnoxious to civilization. It ended most disastrously to Spain, whose forces were defeated in every engagement both ashore and at sea. A peace protocol was signed, August 12, 1898, by which Spain relinquished Cuba and Porto Rico in the West Indies and the Philippine Islands and Guam in the Pacific. During the European war Spain remained neutral.

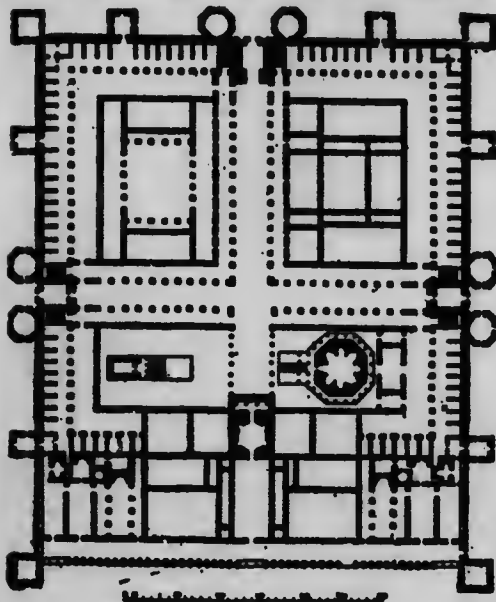
*Language and Literature.*—The Spanish language, which is also the language of Mexico and a great part of South America, belongs to the group known as the Romance or Romanic languages. Its formation was influenced by the lengthened duration in Spain of Roman institutions, by the Teutonic element introduced by the Visigoths, and by words of Arahic origin added during the long occupation of the country by the Moors. A number of different dialects developed themselves at an early date, such as the Galician, Catalan, Asturian, etc., but the Castilian took the lead, and came to be considered as the standard of Spanish. The Castilian idiom, which originated in the mountains of the interior of Spain, is characterized by deep and open tones, which now distinguish the Spanish from the Portuguese. The national literature of Spain dates from the twelfth century, ballads and metrical romances being its earliest products. To this period the *Poema del Cid* is usually ascribed, an epic in which are narrated the adventures of Rodrigo Diaz de Bivar, the national hero. Following this early historical and legendary theme came the didactic verse of the Benedictine monk Gonzalo Berceo (1198-1268). To the same period belong two lengthy narrative poems on *Alexander the Great* and *Apollonius of Tyre*, both of which are written in single-rhyme quatrains. But perhaps the most remarkable piece of writing of this age was *Las Siete Partidas* (1265), a Castilian code of laws published under the patronage of Alfonso X; and to this was added the *Libros de Astronomia* and the *Lapidaria*. The most notable of the Spanish poets of the fourteenth century was Juan Ruiz, arch-priest of Hita (1300-51), whose tales, interspersed with song (*cantigas*),

deal with the vices of his countrymen. Of the same burlesque character were the *Rimado de Palacio* of Pedro Lopez de Ayala (1332-1406) the *Proverbios Morales* of Santob the Jew, and a version of the *Dances of Death*. To this century belong the *Crónica de España*, compiled by order of Juan Fernandez de Heredia; and the authors of the prose chronicles of this period include Pedro de Ayala, Fernan de Gusman, Alfonso de Palencia, Fernando del Pulgar, and Andrés Bernaldes. Along with these historical chronicles may be mentioned the biographies of Pedro Nino, Alvara de Luna, Gonzalvo de Córdoba, and Ruy Gonzalez de Clavijo. In the sixteenth century there was published the *Amadis de Gaula*, the first of the Spanish *caballerias*, or 'books of chivalry'; and allied to it in character, but published later, were the *Amadis de Grecia*, *Don Florisando*, *Don Florisel de Niquea*, etc. At the court of Juan II (1406-54), in Castile, the *gaya ciencia* of the troubadours was established by Enrique, Marques de Villena, who was himself a translator of Virgil, and whose pupil, Lope de Mendoza, Marques de Santillana, wrote numerous sonnets and *serranillas*. It was not, however, until the kingdoms of Castile and Aragon were united under Ferdinand and Isabella that Spanish literature attained its chief distinction. This classic period, influenced by the Renaissance in Italy, found its first expression in numerous tercets, sonnets, and *canciones*, of which the principal writers were Juan Boscan Almogaver, Diego de Mendoza, Garcilaso de la Vega, Fernando de Herrera and Hernando de Acuña. These innovators of the Petrarchian school were opposed by the rhymers of the old Castilian *redondillas*, chief among whom was Cristóbal de Castillejo. But more characteristic of this period was the vigorous development of the *novela*, with a picaresque or rogue for hero. The earlier of these picaresque novels was the *Life of Lazarillo de Tormes*, by an unknown author; and this found imitation in the adventures of *Guzman de Alfarache*, by Mateo Aleman; *Alonso Mozo*, by Geronimo de Alcalá; *Gran Tacaño*, by Quevedo; and numerous other romances. Yet these were all surpassed, and the chivalric extravagance of this period burlesqued to extinction by *Don Quixote* (first part 1605), the masterpiece of Miguel Cervantes de Saavedra. The position in popular favor occupied by the romance was claimed at the end of the sixteenth and beginning of the seventeenth century by the drama. From beginnings in the medieval mystery plays it had developed through quasi-

religious and wholly secular plays of an unimportant nature until the time of Lope de Vega (1562-1635). This writer, with his extraordinary fertility in production and facility in the invention of plot, added greatly to the scope and importance of the Spanish drama. Among the chief imitators and successors of Lope were Valez de Guevara, Gabriel Telles (Tirso de Molina), and Juan Ruiz de Alarcon. But this movement received its full perfection and refinement in the poetical and philosophical dramas of Pedro Calderon de la Barca (1600-81). He also had followers and imitators, among whom may be mentioned Moreto, Solis, and Roxas de Castro. Among the historical writings of this era were the *Historia de España*, by Juan de Mariana; *Guerra de Granada*, by Diego de Mendoza; the *Historia Verdadera de la Conquista de la Nueva España*, by Bernal Diaz del Castillo; and the *Historia de las Indias*, by Bartolomé de las Casas. The mystics were represented by Avila, Santa Teresa, Ribadeneira, and Molina. With the decline in the greatness of the nation, however, there appeared a decadence in its literature. During the eighteenth century the drama lost all virility, while lyric poetry was largely represented by the artificial extravagances perpetuated by the imitators of Gongora (which see). But with the accession of the Bourbons there was introduced from France an element of revival into Spanish literature which was furthered by the *Poetica* of Ignacio de Luzan, the *Retorica*, of Gregorio de Mayans, and the *Teatro Critico* of Benito Feyjoo. This French element had also its influence upon the poets of the latter half of the eighteenth and beginning of the nineteenth centuries, among whom were Valdes, Clen-fuegos, Iriarte, Gonzales, Moratin, de la Rosa, etc.; while the romance was revived in the *Fray Gerundio* of José de Isla, who was also the translator of *Gil Blas*. The romantic movement of France had its Spanish adherents, among whom, as the most notable poets, are to be named Zorrilla, Espronceda, Diaz, Esco-sura, and Pacheco; the chief classicists being Quintana, Reinoso, Calderon, and Carvajal; while as a satirist, José de Lara (Figaro), and as a dramatist Manuel Breton de Herreros, are worthy of mention. More recently the poets Campoamor, Arce, Becquer, de Trueba, and Aguilera, and the novelists Caballero, Valera, Galdos, de Trueba, Gonzales, and Alarcon have attained a certain distinction.

**Spalatro** (spá'tá-trò), or SPÁ'LATO, a seaport of Austria, in

Dalmatia, situated on a bay of the Adriatic, 100 miles southeast of Zara. The whole town was at one time confined within the precincts of the vast palace, covering 8 acres of ground, built by the Emperor Diocletian, and of which many interesting and impressive remains are extant, and most of the buildings



Palace of Diocletian, Spalato.

connected with it have been converted into private houses or public edifices. The manufactures include rosoglio and maraschino. Pop. 27,198.

**Spalding** (spal'ding), a market town of Lincolnshire, England, situated on the Welland River, 15 miles s. w. of Boston. Pop. 10,309.

**Spalding**, MARTIN JOHN, archbishop, was born near Lebanon, Marion Co., Kentucky, in 1810. He was ordained priest in the Roman Catholic Church in 1834; in 1844 was appointed vicar-general at Louisville, and in 1848 coadjutor-bishop. He was appointed archbishop of Baltimore in 1864, and died in that city Feb. 7, 1872. He was one of the most learned, active, and influential prelates of his church in the United States, ranked high as a reviewer, and contributed largely to the Roman Catholic literature of the country.

**Spallanzani** (späl-an-za'nē), LA-ZARO, born at Scandiano, Italy, in 1729; died in 1799. In 1768 he was appointed to the chair of natural history at Pavia, and thenceforth

devoted himself to experimental research. His writings include *Experiments on Animal Reproduction*; *Infusory Animalcules*; *The Phenomena of Circulation*; *Animal and Vegetable Physics*; *Travels in the Two Sicilies*; and *The Transpiration of Plants*.

**Spandau** (span'da), a town in Brandenburg, Prussia, at the confluence of the Spree and Havel, about 8 miles n. w. of Berlin. It has now been made a fortress of the first class, and forms an important part in the general defenses of the capital. The citadel, which is situated on an island in the Havel, contains the imperial military treasure of Germany. The town has manufactures of artillery and small-arms, gunpowder, woolen and linen cloth, etc. Spandau received municipal privileges in 1232. Pop. (1910) 84,855.

**Spandrel** (span'drel), or SPANDELL, in architecture, the irregular triangular space comprehended between the outer curve or extrados of an arch, a horizontal line drawn from its apex, and a perpendicular line from its springing; also a space on a wall, between the outer mouldings of two arches and a horizontal line, or string-course, above them; likewise between similar moldings and the line of another arch rising above and inclosing the two. In Gothic architecture the spandrels are usually ornamented with tracery, foliage, etc.



ss, Spandrels.

**Spangles** (spang'gls), metal ornaments, used chiefly for theatrical dresses, and consisting for the most part of thin circular pieces of gilt or silvered tin.

**Spaniel** (span'yel), the name given to several varieties or breeds of dogs. Their distinguishing characteristics are a rather broad muzzle, remarkably long and full ears, hair plentiful and beautifully waved, particularly that of the ears, tail, and hinder parts of the thighs and legs. The prevailing color is liver and white, sometimes red and white or black and white, and sometimes deep brown, or black on the face and breast, with a tan spot over each eye. The English spaniel is a superior and very pure breed. The King Charles dog is a small variety of the spaniel used as a lapdog. The Maltese dog is also a small species of spaniel. The water-spaniels, large and small, differ from the common spaniel



only in the roughness of their coats, and in uniting the aquatic propensities of the Newfoundland dog with the fine hunting qualities of their own race.

## Spanish - American War.

See *United States*.

**Spanish-broom**, a plant of the genus *Spartium*, the *S. junceum*, allied to the common broom, but of more rush-like growth. It has been cultivated in gardens for upwards of 300 years, bearing handsome yellow flowers. A good fiber is obtained from the macerated twigs, which is made into thread, cord, and a coarse sort of cloth in some of the Mediterranean countries.

**Spanish-brown**, a species of earth having a dark reddish-brown color, which depends upon the sesquioxide of iron.

**Spanish-elm**, an evergreen tree of Mexico and the West Indies, yielding a tough elastic wood of a fine grain (*Cordia gerasacanthus*).

**Spanish Fly**. See *Cantharides*.

**Spanish Language and Literature**. See *Spain*.

**Spanish Main**, the name formerly given to the Atlantic Ocean and coast along the north part of South America, from the Leeward Islands to the Isthmus of Darien.

**Spanish Succession**, WAR OF THE. See *Succession wars*.

**Spanish Town**, OF SANTIAGO DE LA VEGA, a town of Jamaica, on the south side of the island, about 12 miles northwest of Kingston. It was formerly the seat of government, but that has now been transferred to Kingston. Pop. about 5000.

**Spanish-white**, originally a white earth from Spain, used in painting; at present, a pigment prepared from chalk which has been separated in an impalpable form by washing.

**Spanker** (spank'er), a large fore-and-aft sail set upon the mizzen-mast of a ship or barque, the top extended by a gaff, the foot by a boom. It is also called the *mizzen*.

**Span-worm**, a name frequently given in the United States to certain caterpillars, of which the canker-worm is an example.

**Spar**, in mineralogy, a term employed to include a great number of

crystallized, earthy, and some metallic substances, which easily break into rhomboidal, cubical, or laminated fragments



••, Spanker.

with polished surfaces, but without regard to the ingredients. Among miners the term is used for any bright crystalline substance.

**Spar-deck**, nautical, a term somewhat loosely applied, though properly signifying a temporary deck, consisting of spars supported on beams, laid in any part of a vessel. It also is applied to the quarter-deck, gangways, and fore-castle of a deep-waisted vessel, and to the upper entire deck of a double-hanked vessel without an open waist.

**Spargo** (spar'gō), JOHN, an Anglo-American socialist, born at Stithians, Cornwall, January 31, 1876; came to America in 1901. His publications include *The Bitter Cry of the Children* (1906), *The Spiritual Significance of Modern Socialism* (1908), and *Syndicalism, Industrial Unionism and Socialism* (1913).

**Sparidae** (spar'i-dē), a family of acanthopterygious, teleostean fishes, of which the genus *Sparus* is the type. They somewhat resemble the perches in form, are mostly inhabitants of warm climates. They are edible, and the sheep's-head of the Atlantic coast is very highly prized.

**Sparks**, JARED, born at Willington, Connecticut in 1789; died in 1866. He was educated at Harvard, where he became mathematical tutor, and he was subsequently (1819-23) pastor of a Unitarian church at Baltimore. He was afterwards editor of the *North American Review*, and was appointed in 1839 professor of history and in 1849 president of Harvard. He is chiefly known in literature as the author of *Life and Writings of Washington* (twelve

vois., 1834-37); *Diplomatic Correspondence of the American Revolution* (twelve vols., 1829-30); *Library of American Biography* (two series, 25 vols.); and *Works of Benjamin Franklin* (ten vols., 1836-40).

**Sparrow** (spar'ō), a well-known bird of the finch family (*Passer* or *Pyrgita domestica*), which inhabits the British Islands and other parts of Europe, and has been introduced into North America and Australia. In the United States it is a familiar inmate of the cities, and by its pugnacity more desirable birds have been driven out. The amazing fecundity, strong attachment to their young, familiarity, not to say impudence, and voracity of the sparrows are familiar to all. They often do great injury in cornfields and gardens, but they also do great service in destroying grubs, caterpillars, etc. The tree sparrow (*P. montana*), the only other British species, is also very widely distributed. It very closely resembles the common sparrow, but is of smaller size. For the hedge-sparrow, see *Hedge Warbler*. Certain members of the family Emberizidæ or buntings, are called 'sparrows' in America.

**Sparrow-hawk**, the common name of several hawks, a well known European species being the *Accipiter nisus*, or *Nisus fringillarius*,



Sparrow-hawk  
(*Accipiter nisus*).

sparrow-hawk is the *Falco sparverius*. It is similar in size to the European sparrow-hawk, but rather allied to the kestrel. It often preys on the chickens in poultry-yards.

**Sparta** (spär'tā), or LACEDÆMON (now *Spartī*), a celebrated city of ancient Greece, the capital of Laconia and of the Spartan state, and the chief city in the Peloponnesus, lay on the west bank of the river Eurotas, and

embraced a circuit of 6 miles. Sparta was a scattered city consisting of five separate quarters. Unlike Athens it was plainly built, and had few notable public buildings; consequently there are no imposing ruins to be seen here as in Athens, and the modern Sparta is only a village of some 4000 inhabitants. LACONIA, the district in which Sparta was situated, was the southeastern division of the Peloponnesus, bounded on the west by Messenia, from which it was separated by the chain of Taygetus, on the north by Arcadia and Argolis, and on the east and south by the sea. The Eurotas (Vasilopotamo, 'king of rivers') here flows through a picturesque valley and empties into the Gulf of Laconia. The Spartan state was founded, according to tradition, by Lacedæmon, son of Zeus. The most celebrated of its legendary kings was Menelaus. It is said to have been conquered by the Heraclidæ from Northern Greece about 1080, who established a dyarchy or double dynasty of two kings in Sparta. Apart from this legend, it is accepted as a historical fact that the Spartans were the descendants of the Dorians who invaded the Peloponnesus about that period, and that from an early period they followed a set of rigorous laws which they ascribed to Lycurgus. Shortly after their settlement in the Peloponnesus it is probable that the Spartans extended their sway over all the territory of Lacouia, a portion of the inhabitants of which they reduced to the condition of slaves (Helots). They also waged war with the Messenians, the Arcadians, and the Argives, against whom they were so successful that before the close of the sixth century B.C. they were recognized as the leading people in all Greece. Early in the following century began the Persian wars, in which a rivalry grew up between Athens and Sparta. This rivalry led to the Peloponnesian war, in which Athens was humiliated and the old ascendancy of Sparta regained. (See *Greece*.) Soon after this the Spartans became involved in a war with Persia, by joining Cyrus the Younger in his rebellion against his brother Artaxerxes Mnemon (401), but Athens, Thebes, Corinth, and some of the Peloponnesian states, took this opportunity to declare war against the Lacedæmonians. The latter defeated the Thebans at Coronæa (394); but, on the other hand, the Athenian commander Conon gained a victory over the Spartan fleet at Cnidus. This war, known as the Boeotian or Corinthian war, lasted eight years, and increased the reputation and power of Athens. To break the alli-

ance of Athens with Persia, Sparta, in 387 B.C., concluded with the latter power the peace known by the name of Antalcidas; and the designs of Sparta became apparent when she occupied, without provocation, the city of Thebes, and introduced an aristocratical constitution there. Pelopidas delivered Thebes, and the celebrated Theban war (378-363) followed, in which Sparta was much enfeebled. During the following century Sparta steadily declined, although one or two isolated attempts were made to restore its former greatness. The principal of these was made by Cleomenes (236-222), but his endeavors failed, because there were then scarcely 700 of Spartan descent, and the majority of these were in a state of beggary. With the rest of Greece, Sparta passed under the dominion of the Romans in 146 B.C.

The Spartans differed from the other Greeks in manners, customs, and constitution. Their kings (two of whom always reigned at once) ruled only through the popular will, acting as umpires in disputes, and commanding the army. The Spartans proper, that is, the descendants of the Dorians, occupying themselves with war and the chase, left all ordinary labor to the Helots, while the class known as Perioeci, (descendants of the ancient inhabitants of the country) engaged in commerce, navigation, and manufactures. The distinguished traits of the Spartans were severity, resolution, and perseverance, but they were also accounted faithless and crafty. When a child was born, if it proved vigorous and sound the state received it into the number of citizens, otherwise it was thrown into a cave on Mount Taygetus. To accustom the children to endure hunger they gave them but little food; if they stood in need of more they were obliged to steal it; and if discovered, they were severely punished. They wore no outer garment except in bad weather, no shoes at any time, and they were obliged to make their beds of rushes from the Eurotas. The principal object of attention during the periods of boyhood and youth was physical education, which consisted in running, leaping, throwing the discus, wrestling, etc.

**Spartacus** (spar'ta-kus), a political party in Germany, similar to the Bolsheviks (q. v.) of Russia, its platform being extreme socialism. Karl Liebknecht created the Spartacus group in 1915. The name is taken from the famous gladiator (see following article), who armed the slaves against the power of Rome and died gallantly in battle. Following the military defeat of Germany

and the abdication of Kaiser William II, in November, 1918, the Spartacus group, called also 'Spartacides,' endeavored to take control. The more conservative socialists, led by Friedrich Ebert, opposed the extremists successfully and gained control of the government at the January, 1919, elections. Liebknecht was assassinated. See *Assassinations*.

**Spartacus** (spär'ta-kus), a Thracian gladiator, the instigator and leader in a revolt of the slaves in Italy (the Servile war) in 73-71 B.C. He had been compelled, like other barbarians, to serve in the Roman army, from which he had deserted. Being made prisoner Spartacus was sold as a slave, and placed in a gladiatorial school at Capua with 200 other Thracian, German, and Gaulish slaves. There they formed a conspiracy and effected their escape; and being joined by the disaffected slaves and peasantry of the neighborhood, in a few months Spartacus found himself at the head of 60,000 men. Two consuls were now sent with armies against him, but Spartacus defeated them in succession and led his elated forces towards Rome. In this crisis Licinius Crassus, who was afterwards a triumvir, was placed at the head of the army, and managed to hem in the revolted slaves near Rhegium. Spartacus broke through the enemy by night, and retreated, but later had to encounter the army of Crassus. His soldiers were overcome and Spartacus himself fell fighting.

**Spartanburg** (spär'tan-burg), a city, capital of Spartanburg Co., South Carolina, is situated 93 miles N. W. of Columbia. It is in a fertile cotton-growing region, has abundant water-power, and has large cotton mills; also iron-works, manufactures of twine, rope, etc. It has Wofford College (Methodist), the Converse College for Women and a state institution for the deaf, dumb and blind. Pop. 17,517.

**Spartel** (spär-tel'), CAPE, a promontory situated at the entrance to the Straits of Gibraltar, and in height about 1000 feet above the sea.

**Spasm**, in medicine, an abnormal, sudden, and more or less violent contraction of one or more muscles or muscular fibers. Spasm is either *clonic* or *tonic*. In *clonic spasm* the muscles or muscular fibers contract and relax alternately in very quick succession, producing the appearance of agitation, as in epilepsy. In *tonic spasm* the muscles or muscular fibers contract in a steady and uniform manner, and remain contracted for a comparatively long time, as in tetanus.

**Spatangus** (spa-tan'gus), a genus of sea-urchins, otherwise called 'heart-urchins' from their shape. The species are numerous.

**Spathe** (spath), in botany, a large membranaceous bract situated at the base of a spadix, which it incloses as a sheath. It is seen in the greatest perfection in the palms and arums. See *Spadix*.

**Spatula** (spat'u-la), a flat sort of knife with a thin flexible blade, used by druggists, painters, etc., for spreading plasters, working pigments, etc. In surgery, it is a flat instrument, angular or straight, for depressing the tongue and keeping it out of the way in operations about the throat or larynx.

**Spatularia** (spat-u-lar'i-a), or POLYODON, a genus of fishes belonging to the sturgeon tribe. They are remarkable for the form of their snouts,



Spatularia, upper (1) and under (2) view.

which are enormously long and leaf-like in form. The type of the genus is the paddle-fish of the Mississippi.

**Spavin** (spav'in), a disease of horses, affecting the hock-joint, or joint of the hind leg, between the knee and the fetlock. It occurs in two forms. In the first, which is called bog or blood spavin, the joint is distended by joint-oil (synovia). In the other form there is a morbid deposition of bony substance, such as to unite separate bones.

**Spawn** (span), the eggs or ova of fishes, frogs, etc., from which, when fertilized by the males, a new progeny arises that continues the species. In the oviparous fishes with distinct sexes the eggs are impregnated externally, and arrive at maturity without the aid of the mother. The spawn being deposited by the female, the male then pours upon it the impregnating fluid. In the ovoviviparous fishes sexual intercourse takes place, and the eggs are hatched in the uterus. Fishes exhibit a great variety in regard to the number of their eggs. In the spawn of a cod-fish, for example, no fewer than three and a half millions of eggs have been found. In general, before spawning, fish forsake the deep water and approach the shore, and some fish leave the salt water

and ascend the rivers before spawning, and then return again. See *Reproduction*.

**Speaker** (spe'ker), a person who presides over a deliberative assembly, preserving order and regulating the debates. In both the United States House of Representatives and the British House of Commons the speaker is a member elected to act as chairman or president, in putting questions, reading bills, keeping order, controlling the debates of the house, etc. He does not speak upon any question, or give his vote, except in a committee or in case of an equality of votes, when he gives the casting vote. The lord chancellor is speaker of the House of Lords *ex officio*, and the Vice President of the United States presides over the Senate. The speaker of the United States House of Representatives appoints all committees; he exercises the absolute power of recognition of any one among members rising to debate the question before the House. This has long given the speaker a controlling power over legislation, but in 1910 measures were adopted by the House which considerably restricted his arbitrary power.

**Speaking Trumpet**, an instrument used for conveying the sound of the voice to a distance. It consists of a hollow piece of metal, or other material, of a nearly conical form, open at both ends, and slightly turned out at the narrow end to form a mouthpiece.

**Spear** (spër), a long pointed weapon used in war and hunting, by thrusting or throwing; a lance. See *Lance*, *Pike*.

**Spearmint** (spër'mint; *Monarda virginica*), a species of mint found in the United States and Europe and often cultivated for making sauce and in order to obtain a flavoring essence from it.

**Spear-thistle**, a common thistle, the *Cirsium lanceolatum*. It grows on waysides and in pastures. The leaves are downy beneath, and their points long and very sharp, and it has handsome heads of purple flowers.

**Spearwort** (spër'wurt), a plant of the genus *Ranunculus*. The great spearwort is the *R. lingua*, and the lesser spearwort is the *R. flammula*. The latter is an American plant, with lanceolate undivided leaves and yellow flowers, and is found growing in wet localities.

**Special Case**, a statement of facts two or more litigant parties, and submitted for the opinion of a court of jus-



tice as to the law bearing on the facts so stated.

**Special Pleader**, a member of one of the British Inns of Court whose professional occupation it is to give opinions on matters submitted to him, and to draw pleadings and such practical proceedings as may be out of the usual course.

**Specialty Debt**, in common law, a debt secured by deed distinguished from a simple contract debt.

**Species** (spé'shēs), as ordinarily defined, is any one group of animals or plants the members of which bear a close resemblance to each other in the more essential features of their organization, which produce fertile progeny, and which while they may produce individuals varying from the general type of the group, the variation is in all cases of a limited kind. Under this definition the various species or kinds of animals and plants, and their included varieties, used to be comprehended, while naturalists regarded species as unchanging throughout the longest succession of ages, except within narrow and marked limits. Thus Buffon defines a species as 'a constant succession of individuals similar to and capable of reproducing each other'; and Cuvier as 'a succession of individuals which reproduces and perpetuates itself.' Since the publication, however, of Darwin's *Origin of Species* this conception has been greatly modified by the view that, as Haeckel defines it, 'the species is the whole succession of organisms which exhibit the same form in the same environment.' In this conception no absolute standard of what constitutes a species can be set up, nor can the number of species, especially among the transitional varieties of the lowest forms of life, be determined. In mineralogy, chemistry, and such sciences as relate to inorganic substances, species is regarded by some writers as being determined by identity of physical properties, as specific gravity, hardness, etc.; and by others, as constituted by chemical composition, the physical properties going for nothing. In scientific classification species unite to form groups called genera, which are included in orders, the orders forming classes, and so on.—Species in logic is a group of individuals agreeing in common attributes and designated by a common name; a conception subordinated to another conception, called a genus or generic conception, from which it differs in containing or comprehending more attributes, and extending to fewer individuals; thus in logic 'man' is a species

under 'animal' as a genus, and 'man' in its turn may be regarded as a genus with respect to European, Asiatic, and the like.

**Specific Gravity**, is the relative gravity or weight of any body or substance considered with regard to an equal bulk of some other body which is assumed as a standard of comparison. The standard for the specific gravities of solids and liquids is pure distilled water at the temperature of 62° Fahr., which is reckoned unity. By comparing the weights of equal bulks of other bodies with this standard we obtain their specific gravities. Thus the specific gravity of cast-iron is 7.21; that is, any particular mass of cast-iron will weigh 7.21 times as much as an equal bulk of water. The practical rule is to weigh the body in air, then in pure distilled water; the weight in air divided by the loss of weight in water will give the specific gravity of the body. In designating the specific gravities of gases the standard of unity is atmospheric air. See *Hydrometer*.

**Specific Heat** is a term applied to the quantity of heat required to raise equal weights of different substances through equal intervals of temperature. Water is taken as the standard substance in measuring quantities of heat. The thermal capacity of unit mass of cold water is unity, and the number which denotes the thermal capacity of a body expresses the mass of water which has the same thermal capacity as the body. Thus the thermal capacity of unit mass of a substance is called its *specific heat*, and is identical with the ratio of the thermal capacity of any mass of substance to that of an equal mass of water. The specific heats of the metals and of many other substances have been carefully determined, and are tabulated in all the larger books on heat.

**Spectacled Bear** (*Tremarctos ornatus*), the sole representative of the bears in South America, inhabiting the high mountain forests of Chile and Peru. It is so-called from the light-colored rings round the eyes having exactly the appearance of a pair of spectacles; the rest of the face and body being black.

**Spectacles** (spek'ta-kīz), a well-known and invaluable optical instrument supposed to have been invented by Roger Bacon in the thirteenth century, and used to assist or correct some defect in the organs of vision. Spectacles consist generally of two oval or circular lenses mounted in a light

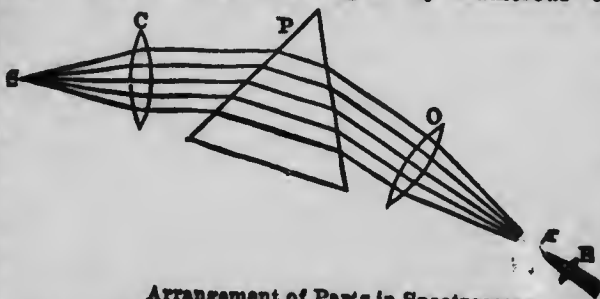
metal frame which is made up of the 'bows,' 'bridge,' and 'sides.' The lenses are usually bi-concave, bi-convex, or concavo-convex, though lenses forming segments of a cylinder are used in some cases of astigmatism. In long-sighted persons the defect of the eye is counteracted by convex lenses, in short-sighted persons by concave lenses. (See *Sight*.) *Divided or bi-focal spectacles* have each lens composed of two semi-circles of different foci neatly united one above the other; one half for looking at distant objects, and the other for examining things near the eye. Another kind, called *periscope spectacles*, has been contrived in order to allow considerable latitude of motion to the eyes without fatigue. The lenses employed in this case are either of a meniscus or concavo-convex form, the concave side being turned to the eye.

**Specter-bats** (*Phyllomystia*) a family of insectivorous Cheloptera, which have simple and fleshy leaf-like appendage to the nose, and a forefinger of two joints. They attain to a considerable size, and the family comprises the vampire-bats (which see).

**Spectroscope** (*spek'tru-sköp*), an instrument employed in spectrum analysis. (See *Spectrum*.) It usually consists of the following parts: 1st, a tube with a narrow slit at one end, and a convex lens at the other, from which parallel rays of light proceed when light is made to pass through the slit, the two forming together what is called the *collimator*. 2d. A prism of dense flint-glass on which the rays fall after emerging from the collimator. 3d. An observing telescope so placed that the rays traverse it after emerging from the prism.

The accompanying figure gives a ground plan of the arrangement; s is the slit, c the collimating lens, p the prism, o the object-glass of the telescope, and e the eye-piece. An image of the slit will be formed at f by rays of given refrangibility, others between f and v by rays of greater refrangibility, and others between f and r by rays of less refrangibility. These differently refracted rays yield a complete spectrum.

**Spectrum** (*spek'trum*), the oblong figure or stripe formed on a wall or screen by a beam of light, as of the sun, received through a narrow slit and passed through a prism, being thus decomposed or separated into its constituent rays. (See *Light*.) This stripe is colored throughout its length, the colors shading insensibly into one another from red at the one end, through orange, yellow, green, blue, indigo, to violet at the other. These colors are due to the different constituents of which solar light is made up, and the stripe seen is formed by an indefinite number of images of the slit ranged in order and partially overlapping. The analysis or decomposition of the beam is due to the different refrangibilities of the component rays, the violet being the most refrangible and the red the least. Besides the colored rays, the spectrum contains thermal or heating rays, and chemical or actinic rays which are not visible to the eye. The heating effect of the solar spectrum increases in going from the violet to the red, and still continues to increase for a certain distance beyond the visible spectrum at the red end, while the chemical action is very faint in the red, strong in the blue and violet, and sensible to a considerable distance beyond the violet end. The actinic rays beyond the violet may be rendered visible by throwing them upon a surface treated with some fluorescent substance. A pure spectrum of solar light is crossed at right angles by numerous dark lines, called



Arrangement of Parts in Spectroscope.

*Fraunhofer's lines*, each dark line being invariable in position. The figure shows the positions of the most conspicuous of these fixed lines, and the letters above them are the names by which they are known, being those assigned to them by the discoverer Fraunhofer. For the proper understanding of the import of these lines, five principles require to be kept in view. *First*, an incandescent solid or liquid body gives out a *continuous spectrum*. *Second*, an incandescent gaseous body gives out a *discontinuous spectrum*, consisting of bright lines. *Third*, each element when in the state of an incandescent gas gives out lines peculiar to itself. *Fourth*, if the light of an incandescent solid or liquid passes through

a gaseous body, certain of its rays are absorbed, and black lines in the spectrum indicate the nature of the substance which absorbed the ray. *Fifth*, each element, when gaseous and incandescent, emits bright rays identical in color and position on the spectrum with those which it absorbs from light transmitted through it. The spectrum of sodium, for instance, shows two bright lines which correspond in position with the double black line at D (the sodium line) shown in figure. Now, applying these principles to the solar spectrum, we find, from the nature and position of the rays absorbed, that its light passes through hydrogen, potassium, sodium, calcium, barium, magnesium, zinc, iron, chromium, cobalt, nickel, copper, and manganese, all in a state of gas, and constituting part of the solar envelope, whence we conclude that these bodies are present in the

object, and must not be confounded with mirrors, which are coated with tin-amalgam on the posterior side.—In surgery the name is given to an instrument used for dilating any passage, as the ear, or parts about the uterus, with a reflecting body at the end, upon which a light being thrown the condition of the parts is shown.

**Speculum Metal**, metal used for making the specula of reflecting telescopes. It is an alloy of two parts of copper and one of tin, its whiteness being improved by the addition of a little arsenic.

**Spedding** (sped'ing), JAMES, born near Bassenthwaite, in Cumberland, in 1810; died from the effects of a cab accident in 1881. He was educated at Bury St. Edmunds and Trinity College, Cambridge, was graduated in 1831, and was long an honorary



Solar Spectrum, showing Principal Lines.

substance of the sun itself, from which they have been volatilized by heat. The moon and planets have spectra like that of the sun, because they shine by its reflected light, while, on the other hand, each fixed star has a spectrum peculiar to itself. It has been already said that the incandescent vapor of each elementary substance has a characteristic spectrum, consisting of fixed lines, which never changes. This furnishes the chemist with a test of an exquisitely delicate nature for the detection of the presence of very minute quantities of elementary bodies. Thus, by heating any substance till it becomes gaseous and incandescent and then taking its spectrum, he is able by the lines to read off, as it were, from the spectrum, the various elements present in the vapor. Several new elements, as rubidium, cesium, indium, and thallium, have thus been detected. See *Spectroscope*.

**Spectrum Analysis.** See *Spectrum*.

**Speculum** (spek'ū-lum), in optics and astronomy, a reflecting surface, such as is used in reflecting telescopes, usually made of an alloy of copper and tin (see *Speculum Metal* below), but frequently now of glass. Those of glass are covered with a film of silver on the side turned toward the

fellow of his college. In 1847 he undertook, with the collaboration of Mr. R. L. Ellis and Mr. D. D. Heath, to prepare a complete edition of Bacon's works; but the former died while the task was unfinished, and the latter only gave occasional assistance. The work, therefore, was almost entirely left to Spedding, who completed and published his labors in seven volumes (1857-61). This done, he published *The Life and Letters of Bacon* (seven vols., 1862-74), and *Reviews and Discussions, Literary, Political, and Philosophical; Evenings with a Reviewer, and Studies in English History*.

**Speech** (spēch), spoken language; uttered sounds intended to convey meaning, and produced by the organs of voice, namely, the larynx, and the mouth and its parts, including the tongue and teeth. In speech two great classes of sounds are produced, these being usually known as *vowels* and *consonants*. Vowels are pronounced by sounds coming primarily from the larynx and passing with comparative freedom through the mouth cavity, though modified in certain ways; while consonants are formed by sounds caused by the greater or less interruption of the current of air from the larynx in the mouth. Vowels can be uttered alone and independently of consonants, and their

sounds can be proionged at will; consonants have no importance in speech as apart from vowels, and are named consonants from being used along with vowels. Both vowel and consonant sounds are very numerous if we investigate the different languages of the world, but any one language only has a fraction of those that may be used. A single sound may convey an idea of itself and thus form a word, or several may be combined to form a word, and if the word is uttered by several distinct successive changes in position of the vocal organs it is a word of so many syllables. Words, again, are combined to form sentences or complete statements, and the aggregate of words used by any people or community in mutual intercourse forms its language. See *Philology, Voice, Vowel, Consonant*, etc.

**Speech, Visible**, the reading of spoken utterances by watching the motion of the lips, larynx, etc., of a speaker, has been scientifically studied for years past and is now taught to the deaf with striking success. This system has definitely replaced the old finger-sign alphabet of the deaf, on which it is a vast improvement.

**Speedwell** (sped'wel), the common name of plants of the genus *Veronica*, nat. order Scrophulariaceae, natives of temperate climates all



Germander Speedwell (*Veronica Chamædrys*).

over the world. The species consist of herbs, undershrubs, or shrubs, with opposite, alternate, or verticillate leaves. The flowers are of a blue, white, or red color, having two stamens, and are arranged in axillary or terminal spikes or racemes. *V. Virginica* has a white corolla. *V. officinalis*, or common speedwell, was once extensively used as a sub-

stitute for tea, and also as a tonic and diuretic. *V. Teucrium*, or germander-leaved speedwell, has much the same properties as common speedwell, and *V. Chamædrys*, or germander speedwell, is a very general favorite, on account of its being among the very first that opens its flowers in the early spring.

**Speke** (spêk), JOHN HANNING, an English traveler, born in 1827; died from a gun-shot accident, in 1884. In 1844 he obtained a commission in the 46th Regiment of Bengal Native Infan'y, and took part in the war of the Punjab. In 1854 he accompanied Burton's party in their expedition to Somali Land, and was wounded in that disastrous affair. In 1857 Speke and Burton again set out, directed by the Royal Geographical Society, their object being to ascertain the position of the great lakes of the interior. The great lake Tanganyika was discovered, and Burton falling sick, Speke proceeded north and discovered the south end of the Victoria Nyanza. For this discovery he was awarded the gold medal of the Royal Geographical Society. In 1862, accompanied by Captain Grant, he explored the western and northern margin of the lake, and found a river flowing north and out of the lake, which proved to be the White Nile. His discoveries and adventures were described by him in his *Journal of the Discovery of the Sources of the Nile* (1863) and *What Led to the Discovery of the Sources of the Nile* (1864).

**Spelling, Simplified**. See *Simplified Spelling*.

**Spelt** (*Triticum spelta*), an inferior kind of wheat, grown in various parts of Europe, and known also as German wheat.

**Spelter**, a name often applied in commerce to zinc.

**Spence** (spens), WILLIAM, an English naturalist, born in 1783; died in 1860. The observation of the habits of animals, more especially insects, early formed a favorite pursuit with him. Having made the acquaintance of the distinguished entomologist, Mr. Kirby, the result was the joint production of the well-known *Popular Introduction to Entomology*. The first volume of this work appeared in 1815, and it was subsequently completed in four volumes in 1826. Mr. Spence was at one time in business at Hull; later he resided in London.

**Spencer** (spen'ser), GEORGE JOHN, EARL, son of the first Earl Spencer, was born in 1758; died in



1834. He was educated at Harrow, and Trinity College, Cambridge. When he had completed his education he traveled, and on his return was elected member of parliament for the county of Northampton. In 1789, by his father's death, he became Earl Spencer. In the House of Lords he voted with the Whigs till the period of the French revolution, when he joined the party of Pitt, and was for some time a member of the Pitt administration. Earl Spencer was president of the Roxburgh Club at its origination, and possessed the largest and richest private library in the world. A catalogue of the rarest and most costly works of the collection was prepared by Dibdin—*Bibliotheca Spenceriana, or a Descriptive Catalogue of the Books Printed in the Fifteenth Century, and of Many Valuable First Editions* (four vols., 1814).

**Spencer**, HERBERT, an English philosopher, born at Derby, April 27, 1820; was educated by his father, a teacher of mathematics, and his uncle, a clergyman; was apprenticed as a civil engineer, and worked several years on railways; contributed several professional papers to the *Civil Engineer and Architect's Journal*, besides a series of letters in 1842, on *The Proper Sphere of Government*, to the *Nonconformist*; became in 1848 subeditor of the *Economist*; published *Social Statics* (1851), and *Principles of Psychology* (1855). About the year 1859 he projected a complete scheme of philosophy, based on the principle of evolution in its relation to life, mind, society, and morals. This ambitious and extensive scheme was fulfilled as follows:—*First Principles* (1862); *Principles of Biology* (1867); *Principles of Psychology* (1872); *Principles of Sociology* (1877); *Ceremonial Institutions* (1879); *Political Institutions* (1882); *Ecclesiastical Institutions* (1885), these latter being parts of his *Principles of Sociology*; *Principles of Ethics* (1893). His other works include *Education* (1861); *Essays: Scientific, Political, and Speculative* (1858-63); *Classification of the Sciences* (1864); *The Study of Sociology* (1873); and *Man versus the State* (1884). Besides his own work he published eight parts of an elaborate *Descriptive Sociology* compiled by other writers, but classified and arranged by himself. Spencer is regarded as one of the most profound thinkers of the present age, and his works have had a great influence upon recent scientific and philosophic thoughts. He died December 8, 1903.

**Spencer**, a city of Worcester Co., Massachusetts, about 12 miles w. of Worcester. Its principal industry is the manufacture of boots and shoes, one of its factories being very large. Woolens, satinets, wire, etc., are also manufactured. Pop. 6740.

**Spencer Gulf**, an extensive inlet of the South Australia; length about 200 miles, breadth at widest about 90 miles, and at inner extremity about 3 miles.

**Spener** (spä'ner), PHILIPP JAKOB, a German Lutheran divine, born in 1635; died in 1705. In 1651 he commenced his theological studies at Strassburg, became in 1654 tutor to the Princess of the Palatinate, and delivered lectures on philosophy and history. In 1664 he was made doctor of theology at Strassburg, and in 1666 he received the office of senior clergyman at Frankfort-on-the-Main. In 1670 he instituted his celebrated *collegia pietatis*, which, against his will, became the origin of *pietism*. From 1686 to 1691 he was preacher to the court in Dresden. He went in 1691 to Berlin, and he took an active part in the foundation of the University of Halle. See *Pietism*.

**Spenser** (spen'ser), EDMUND, a distinguished English poet, was born in London about 1553, and was probably descended from the Spensers of Hurstwood, Lancashire. He was admitted as a sizar of Pembroke Hall, Cambridge, on May 20, 1569, was graduated as B.A. in 1573, and as M.A. in 1576. On leaving the university he is thought to have resided in the north of England, where he unsuccessfully wooed a lady whom he celebrates under the name of Rosalinde in his *Shepherd's Calendar*, published in 1579. The year before he had gone to London, where he was introduced to Sir Philip Sidney, to whom he dedicated this poem. In 1580 he was appointed, through the influence of Sidney, secretary to Lord Grey de Wilton, lord-lieutenant of Ireland, and became clerk of degrees and recognizances in the Irish Court of Chancery. In 1586 Lord Grey, in conjunction with the Earl of Leicester and Sir Philip Sidney, procured for him a grant upwards of 3000 acres in the county of Cork, out of the forfeited lands of the Earl of Desmond. He accordingly fixed his residence at Kilcolman, in the county of Cork, about 1588, in which year he resigned his clerkship in the Court of Chancery. In 1588 he was appointed clerk of the council of Cork, and in the following year received a visit from Sir Walter Raleigh, who,

since the death of Sidney in 1586, had become his most intimate friend. He was then engaged in the composition of his great work, the *Faerie Queene*, of which he had written the first three books. With these he accompanied Raleigh the next year to England, where they were published in 1590, with a dedication to Queen Elizabeth. Raleigh also gained him the favor of the queen, who rewarded his poetry and dedication with a pension of £50. It was probably in the same year that the *Daphnida* was first published, and it is certain that before the close of that year Spenser was again at Kilkoman. He then passed an interval of two or three years in Ireland, where, in 1594, he married. The courtship is celebrated by him in eighty-eight sonnets, and its consummation in his *Epithalamium*. In 1595 he paid another visit to London, and published various volumes such as *Colin Clout's Come Home Again*, and *Astrophel and The Mourning Muse of Thestylis*; his sonnets and *Epithalamium* in one volume; the fourth, fifth, and sixth books of the *Faerie Queene*, together with a new edition of the first three books; his *Prothalamium* or *Spousal* verse on the marriages of the Ladies Elizabeth and Catharine Somerset; and *Four Hymns in Honour of Love, of Beauty, of Heavenly Love, and of Heavenly Beauty*, together with a reprint of his *Daphnida* and *Epithalamium*. It was probably also during this visit that he drew up his *View of the State of Ireland*, which was presented to Elizabeth, but which lay in MS. until printed, in 1633, by Sir James Ware. In 1597 Spenser returned to Ireland, and in September, 1598, he was appointed sheriff of the county of Cork. The rebellion of Tyrone, however, took place in October, and Spenser's house was fired by the populace, and his infant child perished in the flames. The poet arrived in England with body and spirit broken by these misfortunes, and died the following January, 1599. He was interred in Westminster Abbey at the expense of the Earl of Essex, where a monument was afterwards erected by the celebrated Anne, countess of Dorset. As a poet, although his minor works contain many beauties, Spenser will be judged chiefly from the *Faerie Queene*. In the full title the poem is described as 'disposed in twelve books fashioning twelve moral virtues,' and six of these were published, besides two cantos on *Mutability* first published in 1611. It is allegorical in method, but his allegorical characters are treated with a richness,

variety and originality which have given them an enduring place among the creations of English poetry. It is supposed that part of the unfinished poem may have perished when the poet's house was sacked and burned.

**Spenserian Stanza**, the stanza adopted by Edmund Spenser in his *Faerie Queene*. It consists of a strophe of eight decasyllabic lines and an Alexandrine, and has a threefold rhyme, the first and third lines forming one, the second, fourth, fifth, and seventh another, and the sixth, eighth, and ninth the third. It is the stateliest of English measures, and was adopted by Byron in his *Childe Harold*.  
**Spergula** (sper'gū-la), a genus of plants, nat. order *Caryophyllaceæ*. See *Spurrey*.

**Spermaceti** (sper-ma-sē'tī), a fatty material obtained chiefly from cavities in the skull of the sperm whale (which see). During the life of the animal the spermaceti is in a fluid state, forming part of the oily liquid which is found when the head of the whale is opened. On exposure to the air the spermaceti concretes, and deposits from the oil. Some of the larger whales have been known to yield twenty-four barrels of spermaceti, and from seventy to a hundred barrels of oil. After being purified the spermaceti concretes into a white, crystallized, brittle, semitransparent unctuous substance nearly inodorous and insipid. It is bland and demulcent, with considerable nutritive qualities when taken internally. It is chiefly employed externally as an ingredient in ointments and cerates. It is also largely used to form candles.

**Spermatozoa** (sper-ma-tō-zō'a), the microscopic animalcule-like bodies developed in the semen of animals, each consisting of a body and a vibratile filamentary tail, exhibiting active movements comparable to those of the ciliated zoospores of the algae, or the ciliated epithelial cells of animals. Spermatozoa are essential to impregnation.

**Sperm-oil**, the oil of the spermaceti whale, which is separated from the spermaceti and the blubber. (See *Spermaceti*.) This kind of oil is much purer than train-oil, and burns away without leaving any charcoal on the wicks of lamps. In composition it differs but slightly from common whale-oil.

**Spermophilus** (sper-mof'i-ius), the name of a genus of rodentia, common in North America, where they are known generally as goph-

## Sperm Whale

## Sphenodon

ers and ground-squirrels. Eastern Europe produces one species, *S. citillus*, called also the *suslik*.

**Sperm Whale**, or CACHALOT (*Physeter macrocephalus*), a species of cetacea belonging to the section of the whale order denominated 'toothed' whales, generally met with in the Pacific, but occasionally also on the coast of Greenland. The large blunt head in an old male is sometimes 30 feet long, and forms about a third of the total length of the body; while the 'blow-holes' or S shaped nostrils are situated in the front part of the head. The weight of an adult animal is estimated at about 200 tons, and in a male 66 feet long the flipper measured 5 feet 3 inches, and the two-lobed tail-fin had

arsenal, cannon-foundries, various yards, docks, and basins, and is defended by two forts. It has an active trade. Excellent olive-oil and wine are produced in the vicinity. Pop. (1906) 41,773.

**Spezzia** (spet'si-a; ancient, *Tiparënos*), an island in the Grecian Archipelago, at the eastern entrance of the Gulf of Napoli, about 3 miles s. s. w. of the coast of Argolis; length, 4 miles; breadth, about 3 miles. The chief town, bearing the same name, stands on the east shore, and the greater part of the inhabitants are employed in commercial pursuits. Pop. 4432.

**Sphaerularia** (sfë-ru-lä'ri-a), a nematode or round parasitic worm existing in certain species of bees. The female is nearly an inch in



Sperm Whale (*Physeter macrocephalus*).

a breadth of nearly 20 feet. The top of the back is continued almost in a straight line from the upper part of the head; the belly is enormous, but the body thins off towards the wide tail. The color is a blackish-gray, which may exhibit greenish or bluish hues on the upper parts. The teeth of the lower jaw average each about 3 inches in length. This whale is of considerable commercial value alike for its oil and its yield of Spermaceti, *q. v.*

**Spey** (spä), a river in Scotland, issues from a lake of the same name in Inverness-shire, between Loch Laggan and Loch Lochy, flows northeast through the beautiful valley of Strathspey, forming in part of its course part of the boundary between the counties of Elgin and Banff, and falls into the Moray Firth a little below Garmouth, after a course of about 96 miles. It has a very rapid course, is used for floating down timber, and is noted for its salmon fisheries.

**Speyer**, or SPEIER (spi'ër). See *Spire*.

**Spezia** (spät'si-a), a seaport town in Italy, 50 miles E. s. E. of Genoa, on the Gulf of Spezia, which here forms an admirable harbor. It is a great Italian naval station, and has a marine

length, and consists of little else than a mass of fatty tissue with reproductive organs, neither mouth, oesophagus, intestine, nor anus being present. The male is only about the 28,000th part the size of the female.

**Sphagnum** (sfag'num), a genus of mosses, widely diffused over the earth in temperate climates readily recognized by their pale tint, fasciculate branchlets, and apparently sessile globose capsules. They are aquatic plants, and constitute the great mass of our bogs in swampy and moory districts.

**Sphene** (sfën), a mineral composed of silicic acid, titanitic acid, and lime. Its colors are dull yellow, green, gray, brown, and black. It is found both in the amorphous and in the crystalline state. The primary form of its crystal is an oblique rhombic prism.

**Sphenodon** (sfë'nu-don), a peculiar genus of lizards, regarded as forming a family by itself. It was represented by several genera in geologic times. The only extant species (*S. punctatum*) is a native of New Zealand, and, although once abundant, is now being rapidly thinned. Of late it has become the favorite food of the pig, and is eaten by man. It frequents rocky islets, living

in holes in the sand or among stones. It is also called *Hatteria punctata*.

**Sphenoid Bone** (sfē'noid). See *Skull*.

**Sphere** (sfer), in geometry, a solid body contained under a single surface, which in every part is equally distant from a point called the center. It may be conceived to be generated by the revolution of a semicircle about its diameter, which remains fixed, and which is hence called the *axis* of the sphere. A section of a sphere made by a plane passing through its center is called a *great circle* of the sphere; and when the cutting plane does not pass through the center the section is called a *small circle* of the sphere. A sphere is two-thirds of its circumscribing cylinder. Spheres are to one another as the cubes of their diameters. The surface of a sphere is equal to four times the area of one of its great circles, and the solidity is found by multiplying the cube of the diameter by .5236 or  $\frac{1}{6}$  of .7854; or by multiplying the area of a great circle by  $\frac{1}{6}$  of the diameter.

**Spherograph** (sfer'u-graf), a nautical instrument consisting of a stereographic projection of the sphere upon a disk of pasteboard, in which the meridians and parallels of latitude are laid down to single degrees. By the aid of this projection, and a ruler and index, the angular position of a ship at any place, and the distance sailed, may be readily and accurately determined on the principle of great circle sailing.

**Spheroid** (sfēr'oid), a body or figure approaching to a sphere, but not perfectly spherical; in geometry, a solid generated by the revolution of an ellipse about one of its axes. When the generating ellipse revolves about its longer or major axis, the spheroid is *oblong* or *prolate*; when about its less or minor axis, the spheroid is *oblate*. The earth is an oblate spheroid, that is, flattened at the poles, so that its polar diameter is shorter than its equatorial diameter.

**Spheroidal State** (sfēr-oid'al), the condition of a small quantity of liquid when, on being placed on a highly heated surface, as red-hot metal, it assumes the form of a more or less flattened spheroid, and evaporates without ebullition. The spheroid in this condition does not touch the surface of the metal, but floats on a layer of its own vapor, and evaporates rapidly from its exposed surface. It is heated mainly by radiation from the hot surface, because conduction is impossible since the layer of intervening vapor conducts heat

very feebly. The formation of a layer of non-conducting vapor explains why it is possible to dip the wetted wand into molten iron with impunity.

**Sphincter** (sfink'ter), in anatomy, a name applied generally to a kind of circular muscles, or muscles in rings, which serve to close the external orifices of organs, as the sphincter of the mouth, of the eyes, etc., and more particularly to those among them which, like the sphincter of the anus, have the peculiarity of being in a state of permanent contraction, independently of the will, and of relaxing only when it is required that the contents of the organs which they close should be evacuated.

**Sphingidæ** (sfīn'ji-dē), a family of lepidopterous insects, section Crepuscularia. The insects belonging to this division generally fly in the evening or early in the morning, but there are many which fly in the daytime. This family embraces some of the largest moths, as the death's-head hawk-moth, and the privet hawk-moth.

**Sphinx** (sfinks), a fabulous monster which figures both in the Grecian and Egyptian mythologies. The sphinx of the Greeks is represented with a body like that of a lion, with wings, and with the breasts and upper parts of a woman. Hæra, says the fable, provoked with the Thebans, sent the sphinx to punish them. The sphinx proposed a



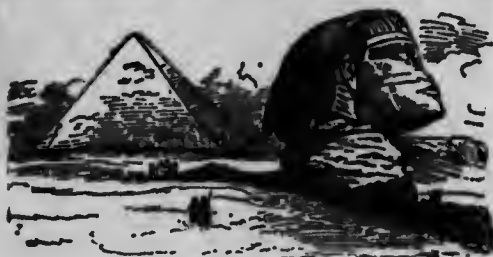
Egyptian Sphinx, from the Louvre Museum.

riddle and devoured anyone who undertook but was unable to interpret its meaning. In this enigma the question proposed was: What animal walked on four legs in the morning, two at noon, and three in the evening. This was at last explained by Œdipus, who said that man walked on his hands and feet when young, or in the morning of life; at the noon of life he walked erect; and in the evening of his days he supported himself upon a



## Sphinx-moth

stick. Whereupon, her riddle being read, the sphinx destroyed herself. The sphinx was used by the Greeks for artistic and decorative purposes, and seems to have been in some sense symbolic. The Egyptian sphinx had a human head (male or female) on the body of a lion (not winged), and was always in a recumbent posture, with the fore-paws stretched forward, and a headdress resembling an old-fashioned wig. The features are like



Sphinx and Pyramid of Gizeh.

those of the ancient Egyptians found in the ancient ruins. The largest sphinx, that near the group of pyramids at Gizeh, is about 240 feet long and 63 feet high; the body is monolithic, but the paws, which are thrown out 50 feet in front, are composed of masonry. There were also sphinx figures in Egypt with rams' heads and hawks' heads. The Egyptian sphinx was probably a purely symbolic figure, having no historical connection with the Greek fable, and the Greeks may have applied the term to the Egyptian statues merely on account of an accidental external resemblance to their own figures of the sphinx.

**Sphinx-moth** (*Sphinx Convoluti*), a species of moth belonging to the family Sphingidae (which see), and deriving its popular name from a supposed resemblance which its caterpillars present when they raise the fore part of their bodies to the 'sphinx' of Egyptian celebrity. The sphinx-moth is common in some parts of the United States.

**Sphrigosis** (sfrig'ô-sis), over-rankness, a disease in fruit-trees and other plants, as turnips, in which the plant tends to grow to wood or stem and leaves in place of fruit or bulb, etc., or to grow so luxuriantly that the nutritious qualities of the plant are injured, as in the potato. Sphrigosis is sometimes due to over-manuring.

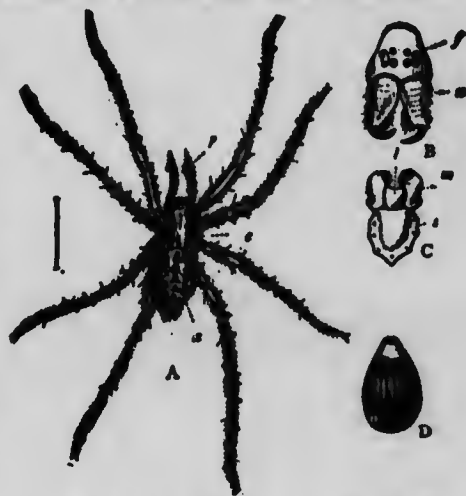
**Sphygmograph** (sfîg'mu-graf), an instrument which, when applied over an artery indicates the character of the pulse as to the force

and extent of undulations, registering them on a strip of paper moved by watch-work. It reveals in a very delicate and beautiful manner, by the tracing of a pencil on the paper, the force of the heart beats, and in making experiments with different kinds of medicines it shows their effect on the nervous system.

**Spice Islands.** See *Moluccas*.

**Spice** (spîs), the name given to all those vegetable substances, having an aromatic odor and a hot and pungent flavor, and used for seasoning food, such as cinnamon, cassia, mace, nutmeg, allspice, pepper, cloves, ginger, vanilla.

**Spider** (spl'der), the common name of insect-like animals, constituting a section of the class Arachnida, order Pulmonaria. The head and chest are united to form one segment known as a cephalothorax; no wings are developed, and breathing is effected by means of pulmonary or lung sacs. For the most part the Arachnida are oviparous. The abdomen is furnished with from four to



A, The male of the common House-Spider (*Tegenaria civilis*) considerably magnified; c, Front portion of the body, consisting of the amalgamated head and thorax; p, Maxillary palpi; a, Abdomen. B, Front portion of the head of the same, showing the eight eyes (f) and the mandibles (n). C, Under side of the head and trunk, showing the true jaws (m), the lower lip (l), and the horny plate to which the legs are attached. D, Diagram of one of the air-chambers or breathing-organs. (Figs. A, B, and C are after Blackwall.)

six cylindrical or conical mammillæ or processes, with fleshy extremities, which are perforated with numberless small orifices for the passage of silky filaments of

## Spider-crab

extreme tenuity, with which they form webs, and which proceed from internal reservoirs. The spider's web is usually intended to entangle their prey (chiefly flies), but spiders also spin webs to make their abodes, and for other purposes. The legs number four pairs, and no antennae are developed. Their mandibles are terminated by a movable hook, flexed inferiorly, underneath which, and near its extremity, is a little opening that allows a passage to a venomous fluid contained in a gland of the preceding joint. After wounding their prey with their hooked mandibles they inject this poison into the wound, which suddenly destroys the victim. The common garden or cross spider (*Epeira diadema*), with its geometrical web, is a very familiar species. The great crab spider (*Mygale cancerides*), and the *M. avicularia* of Surinam, alleged to feed on small birds, are notable forms. To this family also belong the trap-door spiders, which excavate a nest in the ground, and fit to the aperture a curious little door or lid. These are numerous in parts of the western United States. The tarantula (*Lycosa tarantula*) is regarded in Italy as capable of producing a kind of dancing madness by its bite. The English hunting or zebra spider (*Salticus scenicus*) is a pretty little arachnid. The *Clotho durandii*, inhabiting Spain and North Africa, is remarkable as constructing a kind of little tent, in the interior of which the eggs, inclosed in little pouches, are contained. The interesting water-spiders (*Argyroneta aquatica*), denizens of fresh-water pools, lead a subaqueous life, and construct their nests somewhat in the form of diving-bells with the mouth opening downwards, together with thin webs in which their prey is captured.

**Spider-crab**, the name given to Maladæ from the rough general resemblance their bodies and long legs possess to those of spiders. The *Maia squinado*, or common or thornback spider-crab, is quite a familiar species, and is very commonly taken in the crab-pots of fishermen. The four-horned spider-crab (*Arctopis tetradon*) has a triangular body, possessing four horn-like processes in front, the two central ones forming the rostrum or beak.

**Spider-fly**, a dipterous insect of the family Pupipara. There are many species of these found parasitic on birds and quadrupeds.

**Spider-monkey**, a general name species of platyrrhine or New World monkeys, but more especially to the members

of the genus *Ateles*, which are distinguished by the great relative length, slenderness, and flexibility of their limbs, and by the prehensile power of their tails. A familiar species is the chameck (*Ateles Chameck*), which occurs abundantly in Brazil. The body is about 20 inches, the tail 2 feet long, and the color is a general black. The coat is (*A. paniscus*), another typical species, has an average length of 12 inches; the tail measures over 2 feet long, and the fur is of a dark, glossy, black hue.



Spider-monkey (*Ateles paniscus*).

**Spiderwort**, the common name of plants of the genus *Tradescantia*, one species of which, *T. virginica*, is cultivated in gardens.

**Spiegeleisen** (spê-gi-l'zn), a peculiar kind of cast-iron made from specular iron ore, or hæmatite, containing a large percentage of carbon and manganese. Being remarkably free from impurities, as phosphorus, sulphur, silica, it is largely used in the Bessemer process of steel-making for the purpose of reintroducing carbon.

**Spielhagen** (spêl'hä-gén), FRIEDRICH, a German novelist, born at Magdeburg in 1829; entered Berlin University, studied law at Bonn, and taught in the Gymnasium at Leipzig until he adopted the profession of literature. His chief novels are: *Problematical Natures* (1861); *Through Night to Light* (1862); *Hammer and Anvil* (1866); *Ever Forward* (1872); *Storm Floods* (1878); *Uhlenhanns* (1884); *Susi* (1895), and *Faustulus* (1897). He also produced plays, translations, etc.

**Spigelia** (spi-jê-li-a), worm-seed or worm-grass, a genus of plants, nat. order Loganiaceae.

**Spike** (spik), a species of inflorescence in which the flowers are sessile along a common axis, as in the common plantain.

**Spikenard** (spik'nârd), or NARD, a highly aromatic herbaceous plant growing in the East Indies, the *Nardostachys Jatamansi*, nat. order Valerianaceae. The root has a strong smell and a sharp, bitterish taste. This is the true spikenard of the ancients, and it has enjoyed celebrity from the earliest



Spikenard  
(*Nardostachys*  
*Jatamansi*).

period on account of the valuable extract or perfume obtained from its roots, which was used in the ancient baths and at feasts. It is called *jatamansi* or *balchur* by the Hindus, and *sumbul* or *sundul* by the Arabians. It is highly esteemed in the East as a perfume, and is used to scent oil and unguents. The name spikenard is applied to various other plants, as to *Valeriana celtica*, *Andropogon Nardus*, *Lavandula Spica* (see next article). In the United States it is

applied to *Aralia racemosa*.

**Spike-oil**, a volatile oil obtained by distilling *Lavandula Spica* (a species of lavender) with water. It has a less agreeable odor than true lavender-oil, and is specifically heavier. It is obtained from the leaves and stalks of the plant. True lavender-oil is obtained from the flowers.

**Spiking**, the operation of driving a nail or spike into the touch-hole of a cannon so as to make it unserviceable. When the spiking was intended to be only temporary a spring spike was used, which was afterwards released by the stroke of a hammer. In other cases a new touch-hole required to be drilled.

**Spinage** (spin'ij), **SPIN'ACH**, a genus of plants, nat. order Chenopodiaceæ. There is only one species, *Spinacia oleracea* (common spinach), well known on account of its use in the kitchen. It is eaten sometimes in salads, but more frequently cooked in various ways. It is wholesome and agreeable, but contains little nutriment. There are two principal varieties cultivated in gardens—the prickly-fruited and the smooth-fruited. What is called *New Zealand spinach* (*Tetragonia expansa*), a plant of the family Mesembryaceæ is sometimes used instead of common spinach, as is also Australian spinage (*Chenopodium auricomum*). For mountain spinage see *Orach*. Indian spinach is *Basella rubra* and *B. alba*.

**Spinal Cord** (spin'al), the name given in anatomy to the great cord or rod of nervous matter which is inclosed within the backbone or spine

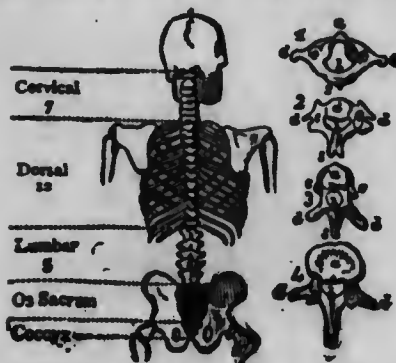
of vertebrates. The spinal cord in man, which is from 15 to 18 inches long, has direct connection with the brain by means of the medulla oblongata, and passes down the back until it terminates in a fine thread at the level of the first lumbar vertebra. (See *Spine*.) Lodged in the bony vertebrae it varies in thickness throughout, and like the brain is invested by membranes called respectively *pia mater* and *dura mater*. Situated between these two are the delicate layers of the *arachnoid* membrane, inclosing a space which contains the cerebro-spinal fluid. Besides these protective coverings there is also a packing of fatty tissue which further tends to diminish all shocks and jars. The spinal nerves, to the number of thirty-one on each side, pass out from the cord at regular intervals, pierce the *dura mater*, escape from the backbone, and ramify thence through the soft parts of the body. Eight pairs pass off in the region of the neck called the *cervical* nerves, twelve pairs are *dorsal*, five are *lumbar*, and five *sacral*, while the last pair comes off behind the *coccyx*. In its structure the spinal cord consists of gray and white matter. The gray matter, which is characterized by large cells, is gathered in the center into two crescent-shaped masses connected at the central part of the cord. The white matter, consisting mainly of fibers, is outside of and surrounds these gray crescents. In its functions the spinal cord forms a tract along which sensory impressions may pass to the brain, and along which motor impulses may travel to the muscles. It is besides a great reflex center. See *Brain*, *Nerve* and *Spine*.

**Spindle** (spin'dil), in *spinning*, a pendant piece of wood for twisting and winding the fibers drawn from the distaff, or the pin used in spinning-wheels for twisting the thread, and on which the thread, when twisted, is wound. It is applied also to a measure of yarn; in cotton a *spindle* of 18 hanks is 15,120 yards; in linen a *spindle* of 24 heers is 14,400 yards.

**Spindle-tree** (*Euonymus*), a genus of small trees or shrubs belonging to the natural order Celastraceæ. The leading species are from 10 to 30 feet in height; and in autumn they become attractive by reason of their great profusion of seed-vessels, which are generally of a delicate pink or white color. The common spindle-tree (*Euonymus europæus*) is found wild throughout the north of Europe. The wood is of a white color, finely grained, and hard. It was once esteemed as a material for musical instruments and spindles, hence its name. *E. Americanus*, the burning

bush, is found growing in moist woods in the United States and Canada.

**Spine** (spin; L. *spina*, a thorn), the term applied to the backbone of a vertebrate animal, and so called from the thorn-like processes of the vertebrae. The human vertebral column is composed, in the child, of thirty-three separate pieces, but in the adult the number is only twenty-six, several pieces having become blended together. These separate bones are arranged one on the top of the other, with a layer of gristle between each which helps to unite them, while this union is completed by partially movable joints and strong fibrous ligaments. The first seven vertebrae, which are called *cervical*, occupy the region of the neck; twelve form the supports from which spring the ribs, and constitute the main portion of the back, being accordingly called *dorsal*; five in the small of the



The Human Spine.

1, Atlas, or vertebra supporting the head. 2, Cervical vertebra. 3, Dorsal vertebra. 4, Lumbar vertebra. a, Body. b, Ring. c, Oblique or articular process. d, Transverse process. e, Spinous process.

back' are denominated *lumbar*; five pieces follow which, in the adult, unite to form the *sacrum*; and four which unite to form the *coccyx*. The vertebral column so arranged presents two forward curves, the first in the neck, the second at the lower part of the back; and two corresponding backward curves. The vertebrae differ in form according as they belong to the cervical, dorsal, or lumbar region, but they have all certain characteristics in common. Each possesses what is called a body, an arch which incloses a ring, and various projections and notches by means of which the bones are articulated. When the vertebrae are in position the rings are all situated one above the other, and so form a cavity or canal in which lies the protected spinal

cord (which see). The disease to which this bony structure is most liable is called *angular curvature of the spine*. Beginning with inflammation it goes on to ulceration (caries), until one or more of the vertebrae becomes soft and breaks down. The result of this is that the vertebrae are crushed together, the backbone bent, and a projection or hump gradually formed behind. The modern method of treatment is to apply to the patient's body, from the hips to the armpits, a continuous bandage of plaster of Paris, which affords to the back a close-fitting support. *Lateral curvature of the spine*, unlike the former, is not so much due to disease of the column as to a relaxed condition of the body. It is most liable to attack young rapidly-growing persons between the ages of ten and fifteen. Treatment by plaster of Paris bandage may be necessary; but strengthening food, regular, moderate exercise, and cold bathing may prove sufficient to effect a cure.

**Spine**, in botany, a sharp process from the woody part of a plant. It differs from a *prickle*, which proceeds from the bark. A spine sometimes terminates a branch, and sometimes is axillary, growing at an angle formed by the branch or leaf with the stem. The wild apple and pear are armed with spines; the rose, bramble, gooseberry, etc., are armed with prickles. The term is applied in zoology to a stout, rigid, and pointed process of the integument of an animal, formed externally by the epidermis and internally of a portion of the cutis or corresponding structure.

**Spinelle**, or SPINEL (spin'el), a species of gem, a sub-species of corundum, which occurs in regular crystals and sometimes in rounded grains. Its colors are red, black, blue, green, brown and yellow. It consists chiefly of alumina, with smaller proportions of magnesia, silica, and protoxide of iron. Clear and finely-colored red varieties are highly prized as ornamental stones in jewelry. The red varieties are known as *spinelle ruby* or *balas ruby*, while those of a darker color are called *Ceylonite* or *Pleonast*. It is found in the beds of rivers in Ceylon, and Siam, and embedded in carbonate of lime in North America and Sweden.

**Spinet** (spin'et), an old stringed instrument with a keyboard for the fingers, somewhat similar to the harpsichord but much smaller in size, one of the precursors of the piano. The strings, which were placed at an angle with the keys, were sounded by means of crow-quill plectra attached.



**Spinning** (spin'ing), is the art of twisting a thread from wool, flax, cotton, or other such material. From remote times this process was accomplished by means of a distaff round which the wool or other fiber to be spun was coiled, and a spindle or round stick tapering at each end and with a notch for fixing the yarn or thread at the upper end as the spinning went on. The spindle was twirled round, for the purpose of twisting the thread, generally by a movement against the right leg, and while the left hand of the spinner guided and supplied the fiber, the right hand fashioned it into a thread between finger and thumb. The earliest improvement on this method was to fix the spindle horizontally in a frame and cause it to revolve rapidly by means of a band passed round a large wheel. At a later period a treadle motion was added, and the spinner's hands were left free (see *Spinning-wheel*); while a further improvement was effected by the introduction of a double spindle-wheel, with twisting arms on the spindles. This was the spinning implement which obtained until the invention, about 1767, of the spinning-jenny. See *Cotton Spinning*.

**Spinning-jenny**, the name given to the first spinning-machine by means of which a number of threads could be spun at once. It was invented about 1767 by James Hargreaves, a Lancashire weaver, and consisted of a number of spindles turned by a common wheel or cylinder worked by hand.

**Spinning-wheel**, a machine for spinning wool, cotton, or flax into threads by the hand. It consists of a wheel, band, and spindle, has a distaff attached, and is driven by foot or by hand, usually the former, a treadle being employed. Before the introduction of machinery for spinning there were two kinds of spinning-wheels in common use, the *large wheel* for spinning wool and cotton, and the *small* or *Saxon wheel* for spinning flax. See *Spinning*.

**Spinola** (spē'no-lā), AMBROSIO, MARQUIS OF, a distinguished general and member of an ancient Italian family, was born at Genoa about 1560; and died in 1630. He joined the Spanish forces in the Netherlands, and when the Archduke Albert of Austria had failed to reduce Ostend after a lengthy siege, he was superseded by Spinola, who was successful (1604). He was thereupon appointed commander-in-chief of all the Spanish and Italian forces in the Netherlands. During the following five years he

frequently encountered Maurice, prince of Orange, with no decisive results, and at length the war was ended by an armistice (1609). Spinola was next actively engaged in the Thirty Years' war. In 1620 he conquered the Lower Palatinate, and when the armistice with Holland was broken he invaded that country. He laid siege to Bergen-op-Zoom, from which he had to retreat; but in 1624 he invested and reduced Breda after ten months' siege. This was his last great military achievement.

**Spinoza** (spē-nō'zā), BARUCH, or as he afterwards called himself, BENEDICT DE SPINOZA, was born in 1632, of Portuguese-Jewish parents, in the then free city of Amsterdam, and died in 1677. He was trained in Talmudic and other Hebrew lore by Rabbi Mortelra; acquired a knowledge of Latin from the free-thinking physician, Van den Ende; came under the influence of the new philosophic teaching of Descartes; ceased to attend the synagogue; refused a pension offered by the rabbis for his



Benedict de Spinoza.

conformity, and was expelled from the Israelitish community; fled from Amsterdam to the suburbs to escape the enmity of the fanatical Jews; removed from thence, after five years' seclusion, to Rynsburg, where he lived until 1663; subsequently went to Voorburg; and ultimately (1671) settled in The Hague, where he died. By his craft as a grinder of optical lenses he maintained a frugal position in the households of the friends with whom he lived. He refused a pension from the French king and a professorship in Heidelberg because their acceptance might hazard that high freedom of thought and conduct which was ever his jealous care; but he accepted a legacy from his friend, De Vries. This annuity

enabled him to devote a large part of his time to the study of philosophy. The first result of his labor was published anonymously in 1670 under the title of *Tractatus Theologico-Politicus*, and, because it put forth a strong plea for liberty of speech in philosophy, it was placed on the Index by the Catholics, and condemned by the authorities in Holland. Such, indeed, was the storm which this treatise occasioned that the author himself published nothing further. After his death all his unpublished writings were conveyed to Amsterdam, and there the *Opera Posthuma* was published (1677). In the *Ethics*, therein included, his system of philosophy was developed; each of its five books being dignified by a series of axioms and definitions after the method of Euclid in his geometry. In all there are twenty-seven definitions, twenty axioms, and eight postulates; and the central conception of the whole system is, that God, who is the inherent cause of the universe, is one absolutely infinite substance, of which all the several parts which we recognize are but finite expressions; that man, being but a part of this greater whole, has neither a separate existence nor a self-determining will; but that he can, by means of knowledge and love, so far control his passions as to enter into the joy which springs from this idea of an all-embracing God.

**Spinthariscopes**, an instrument devised by Sir William Crookes in 1903 to show the luminous effects due to radium. It indicates by scintillations the impacts on a fluorescent screen of the alpha particles given off by radium.

**Spiracle** (spir'a-kl), the name given to the apertures existing on the sides of the body in insects, centipedes, spiders, etc., and through which air is admitted to the breathing organs, which consist of air-tubes. As commonly seen, each spiracle presents the form of a rounded or oval opening, the margin of which is formed by a horny ring. The opening itself may be closed by a kind of grating.

**Spiræa** (spi-rē'a), a genus of plants, nat. order Rosaceæ. The species, which are diffused through the temperate parts of the northern hemisphere, generally consist of small, unarmed shrubs or perennial herbs, with simple or compound leaves and racemes or corymbs of white or reddish flowers. Several North American, Indian, and Japanese shrubby species are in cultivation. There are two species in Great Britain which are known by the name of *meadowsweet*.

**Spiral** (spī'rai), in geometry, the name given to a class of curves distinguished by this property, that they continually recede from a center or fixed point while they continue to revolve about it. The moving point is the *generatrix* of the spiral, the fixed point is the *pole* of the spiral, and the distance from the pole to any position of the generatrix is the *radius vector* of that point.

**Spiral Vessels**, in vegetable anatomy, fine transparent membranous tubes, with one or more spiral fibers coiled up in their interior. They are generally present among the other vessels of plants, and in trees are found chiefly in the medullary sheath surrounding the pith. The fiber may be single or double, or it may be composed of numerous threads. Their function is supposed to be that of the conveyance of air. They are easily discovered on breaking asunder the leaves and stalks of many plants, when the fibers may be unrolled, and present themselves as delicate filaments like the threads of a cobweb.



Spiral Vessels of Rhubarb, with cell tissue on each side — highly magnified.

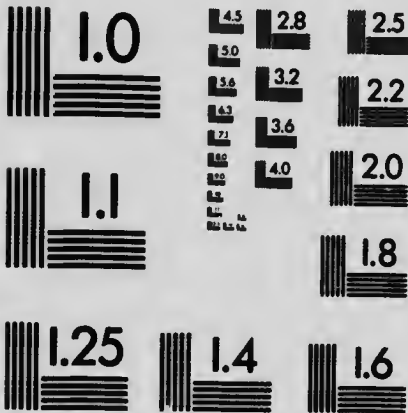
**Spire** (spīr), a term specifically applied to the tapering portion of a steeple rising above the tower, but sometimes loosely applied to the steeple itself. The earliest spires, in the architectural sense, were merely pyramidal or conical roofs, specimens of which still exist in Norman buildings. These roofs, becoming gradually elongated and more and more acute, resulted at length in the elegant tapering spire. The spires of mediæval architecture (to which alone the term is appropriate) are generally square, octagonal, or circular in plan; they are sometimes solid, more frequently hollow, and are variously ornamented with hands encircling them, with panels more or less enriched, and with spire lights, which are of great variety. Their angles are sometimes crocketed, and they are almost invariably terminated by a finial. The term spire is sometimes restricted to signify such tapering buildings, crowning towers or turrets as have parapets at their base. When the spire rises from the exterior of the wall of the tower without the intervention of a parapet it is called a *broach*.

**Spires** (spīrz; German, *Speyer* or *Speier*), a town in Bavaria. Capital of the Rhenish Palatinate. at the



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confluence of the Speyerbach with the Rhine, 10 miles s. s. w. of Mannheim. In early times Spire was a fortified outpost of the Romans, and after Charlemagne it was long the residence of the emperors of Germany and the seat of the Germanic Diet. The prosperity of Spire began to decline in the seventeenth century by a change in the channels of trade, and in 1689 the city was burned and blown up with gunpowder by the soldiery of Louis XIV. For many years it remained a heap of rubbish, but since it came into possession of Bavaria in 1816 the old buildings have been restored. The chief edifice is the cathedral, a Romanesque basilica, a simple but vast and imposing building, begun in 1030 by Conrad II, and completed by Henry IV, in 1061. When the city was burned the blackened walls of this building remained, but the ashes of the eight German emperors buried in the choir were scattered. It was not till the present century that it was repaired and adorned. At the Diet of Spire, held in 1529, the reformers adopted the protest which conferred on them the name of Protestants. Pop. (1905) 21,823.

**Spirit** (spir'it), immaterial intelligence, intelligence conceived of as apart from any physical or corporeal embodiment, or an intelligent being so existing apart; also applied to the soul, to a disembodied soul, a specter, etc.

**Spirit, SPIRITS.** See *Alcohol*.

**Spirit-level**, an instrument employed for determining a line or plane parallel to the horizon, and also the relative heights of ground at two or more stations. It consists of a tube of glass nearly filled with spirit of wine, and hermetically sealed at both ends, so that when held with its axis in a horizontal position the bubble of air which occupies the part not filled with the liquid rises to the upper surface and stands exactly in the middle of the tube. The tube is placed within a brass or wooden case, which is laid on the surface to be tested, and the slightest deviation from the horizontal is indicated by the bubble rising towards the higher end of the tube.

**Spiritualism** (spir'it-u-al-izm), the term used in philosophy to indicate the opposite of *materialism* but now also specifically applied to the belief that communication can be held with departed spirits by means of rappings or noises, writings, visible manifestations, etc. The belief in such manifestations has long obtained, but in its limited and modern form spiritualism

dates from the year 1848. In this year a Mr. and Mrs. Fox, who lived with their two daughters at Hydeville, New York, were disturbed by repeated and inexplicable rappings throughout the house. At length it was accidentally discovered by one of the daughters that the unseen 'rapper' was so intelligent as to be able to reply to various pertinent questions, and so communicative as to declare that he was the spirit of a murdered peddler. When this discovery was noised abroad, a belief that intercourse could be obtained with the spirit-world became epidemic, and numerous 'spirit-circles' were formed in various parts of America. The manifestations thus said to be obtained from the spirits were rappings, table-turnings, musical sounds, intelligent communications, raising of heavy bodies, etc. Part of the peculiarity of these phenomena was that they were always more or less associated with a *medium*, who was supposed to have an organization sensitively fitted to communicate with the spirit-world. The first professional *medium* who came to Europe was a Mrs. Hayden, and she was followed in 1855 by Daniel D. Home, who visited nearly all the courts of Europe. The latter possessed unusual powers, and was said to be able to float up to the ceiling or out of the window and into the next room. Such claims not only attracted the curious, and converted the unthinking, but also received the attention of legal and scientific men. In America Judge Edmonds and Professor Hare undertook to expose their fallacy, but both had to admit the genuineness of some of the evidence; while in England the truth of the phenomena gained the assent of such eminent converts as Alfred Russell Wallace, Sir William Crookes, and Professor De Morgan. The London Dialectical Society appointed a committee to investigate the phenomena, and the report (1871) declares the genuineness of the phenomena, but does not seek to explain their origin. In America the believers in spiritualism are very numerous, and have many newspapers, magazines, and books to explain and enforce their belief. In 1882 a Society for Psychical Research was organized in London for the purpose of making a scientific investigation of psychic phenomena in general, including those of spiritualism. This society is made up of members distinguished in scientific and other circles, and has had for president such well-known persons as Professor J. Balfour, former British premier, Sir Oliver Lodge, and others of equal note. It has made very numerous investigations, and has decided that many of the

manifestations are genuine, some of the leading members accepting them as of spirit origin. The belief generally held by non-investigators is that the phenomena of spiritualism are the result either of self-delusion on the part of believers, unconscious deception on the part of the medium, or clever conjuring. The literature published by the Society named is voluminous. It has branches in the United States, where a similar society has recently been organized and interesting literature published.

**Spirometer** (spi-rom'e-ter), a contrivance for determining the capacity of the human lungs. The instrument most commonly employed consists of an inverted chamber submerged in a water-bath. The breath is conducted by a flexible pipe and internal tube, so as to collect in the chamber, which rises in the water, and is fitted with an index which marks the cubic inches of air expired after a forced inspiration.

**Spirula** (spir'ü-la), a genus of cuttlefishes or cephalopods, comprising only three known species, so named from their very delicate shell being rolled into a spiral form. The shells



1, *Spirula australis*. 2, Its shell.

are very numerous on the shores of New Zealand, but the animal forming them is extremely rare, being seldom found except in a fragmentary state.

**Spitalfields** (spit'al-feldz), an English parish, county of Middlesex, borough of Tower Hamlets, and one of the eastern suburbs of London. After 1685 it was, and still is, occupied by French Protestant silk weavers, and is a great seat of the silk manufacture. It takes its name from the spital or hospital of St. Mary, founded here in the twelfth century. Pop. 33,498.

**Spithead** (spit'hed), the roadstead at the entrance of Portsmouth harbor, which extends about 2 miles N. W. and S. E., with an average width of 1½ mile. See *Portsmouth*.

**Spitzbergen** (spitz-bèrg'en), a group of three large and several small islands in the Arctic Ocean, between lat. 76° 30' and 80° 40' N.; lon. 9° and 22° E.; nearly equidistant between Greenland and Nova Zembla, the largest being West Spitzbergen and Northeast

Land. Very little is known of their interior, but the coasts have been repeatedly explored, and present immense glaciers and mountain chains, some of which exceed 4000 feet in height. The climate is intensely cold; and vegetation is confined to a few plants of rapid growth. For four months in winter the sun is below the horizon, and for an equal period in summer the sun is always above the horizon. The larger forms of animal life are foxes, bears, and reindeer, while sea-fowl are numerous. The minerals are known to include marble and good coal. The group appears to have been discovered in 1553 by Willoughby, the English navigator, and was again visited in 1596 by the Dutch navigator Barentz in endeavoring to effect a northeast passage to India. Among the later explorers are Leigh Smith, Nordenskjöld, Andreasen, and Johannesen.

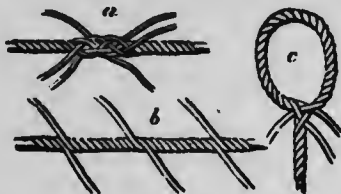
**Spitz-dog**, a small variety of dog, resembling the Esquimaux dog. It has short, erect ears, a pointed muzzle, a curved, bushy tail, long hair, and in color it varies from pure white to cream color, and is sometimes jet black. It is handsome, intelligent, and makes an excellent watch-dog.

**Spleen** (splèn), in man, is the chief of the ductless or blood glands, and its action is supposed to affect the quality of the blood. This gland, which in man is situated in the belly to the left side of the stomach, is an elongated, flattened structure about 5 inches in length, 3 inches broad, and 7 ounces in weight. Its supply of blood is received directly from the aorta by means of the *splenic artery* and, after passing through the organ, is carried off by the *splenic vein* which joins the portal vein. It is composed of a fibrous tissue divided into an irregular network of spaces which contain the *spleen pulp*. This pulp consists of masses of round white corpuscles, some larger and some smaller, which are called the *Malpighian bodies* of the spleen. Through each one of these cellular masses there passes a branch from the splenic artery, and in this way the blood filters through the pulp as though it were a sponge, and is then collected by the veins. The function of the spleen is not clearly known, but it is supposed that the active cells of the pulp either remove old red cells from, or add new white cells to, the blood current in its passage through the organ. The ancients supposed the spleen to be the seat of melancholy, anger, or vexation, and of evil humors generally.

**Spleenwort** (splèn'wurt), the common name of various ferns of the genus *Asplenium*. These

plants were so named because they were supposed to remove disorders of the spleen. They grow in rocky woods.

**Splicing** (spits'ing), the union or joining together of two ropes or parts of a rope by a particular manner of interweaving part of the untwisted strands. The *long splice* occupies a great extent of rope, but by the three joinings being fixed at a distance from one an-



Splices of Ropes.  
a, Short Splice. b, Long Splice.  
c, Eye Splice.

other, the increase of bulk is diminished, hence it is adapted to run through the sheave-hole of a block, etc. The *short splice* is used upon ropes not intended to run through blocks, and the *eye splice* forms a sort of eye or circle at the end of a rope.

**Splint**, in surgery, a thin piece of wood or other substance, used to hold or confine a broken bone when set, or to maintain any part of the body in a fixed position. A *plaster of Paris splint* is made by charging a bandage of muslin or other open material with plaster of Paris, and washing over each layer with water. The plaster hardens rapidly.

**Splint-armor**, a name given to that kind of armor which was made of several overlapping plates, but never came into very general use. Mention of splint-armor first occurs about the reign of Henry VIII.

**Splint-bone**, one of the two small bones extending from the knee to the fetlock of a horse, behind the canon or shank bone.

**Splügen** (spil'gen), a mountain pass which traverses the Rhaetian Alps from the canton of Grisons, Switzerland, into Italy; height, 6940 feet. The modern road was constructed in 1823 by the Austrian government, and is protected from avalanches by three galleries of solid masonry.

**Spohr** (spör), LUDWIG, a German violinist and musical composer, was born in Brunswick in 1784; died in 1859. His operas include *Faust*, *The Alchymist*, *The Crusader*, etc., and his oratorios, *The Crucifixion*, *The Last*

*Judgment*, and the *Fall of Babylon*, take high rank among works of this kind. He wrote many other musical compositions.

**Spofford** (spof'ord), AINSWORTH R., librarian, was born in Gilmanton, New Hampshire, in 1825, and received a classical education. In 1859 he was associate editor of the *Cincinnati Daily Commercial*; in 1861 was appointed first assistant librarian in the Library of Congress; in 1864 librarian in chief. As a librarian Mr. Spofford was widely known for his comprehensive knowledge of books and their contents. He wrote largely for the periodical press, and edited with others a *Library of Choice Literature* (10 vols.); *Library of Wit and Humor* (5 vols.); and *A Practical Manual of Parliamentary Rules*. During his administration the National library grew from 70,000 to over 600,000 volumes. He died August 11, 1908.

**Spofford**, HARRIET PRESCOTT, writer, born at Calais, Maine, in 1835. She first appeared as an author with *In a Cellar*, in the *Atlantic Monthly*, in 1852. Her writings since were mostly poems and tales, including *Sir Rohan's Ghost*, *The Amber Gods* and *The Marquis of Carabas*.

**Spokane** (spō-kan'), formerly Spokane Falls, a city, capital of Spokane County, Washington, on the Spokane River and seven transcontinental railroads. It is an important inland port and commercial center with a large lumber, mining, agricultural and manufacturing business. Its chief factory products include flour, lumber, cement, lime, candy, crackers, ammonia, crayon, paper, etc. Pop. 120,194.

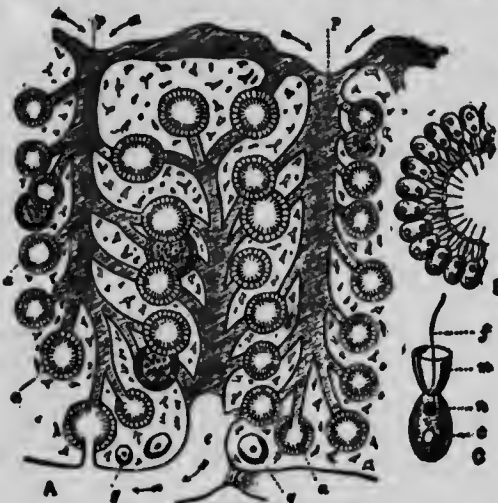
**Spoleto** (spō-lā'tō), an ancient town of Italy, province of Perugia, 61 miles N. N. E. of Rome. Situated on a steep height, the town is approached by a bridge about 290 feet high and 690 feet long, which is also used as an aqueduct. The principal edifices are the cathedral, the Gothic churches of San Domenico and San Giovanni, the collegiate church of San Pietro, and the citadel. Pop. 24,648.

**Spondee** (spon'dē), a poetic foot of two long syllables, used in Greek and Latin poetry.

**Spon'dias**. See *Hog-plum*.

**Sponge** (spunj), the name commonly given to the animals of the class Porifera, a class of organisms representing a distinct morphological type, intermediate between the Protozoa and the Coelenterata. The typical members are composed of two elements,

an internal supporting framework or skeleton, and a soft gelatinous investing substance called *sarcodē*, or 'flesh.' The framework consists of horny, reticulated, elastic fibers, which interlace in every direction, strengthened by calcareous, or, more generally, by siliceous spicula. This framework is the sponge



Structure of Sponges.

A, Vertical section of the outer layer of *Halisarca lobularis*, a Sponge in which the skeleton is wanting, enlarged 75 times (after F. E. Schultze): *pp* 'Pores,' or openings of inhalant canals by which water is conducted to the ciliated chambers (*aa*); *c* Commencement of a larger exhalant canal, conducting from the ciliated chambers to the deeper canals, by which the water is finally carried off to be expelled from the 'oscula'; *gg* Young stages of the reproductive bodies or spores. B, Part of a single ciliated chamber of the same sponge, transversely divided, and enlarged 800 diameters (after Seville Kent), showing the flagellate cells or 'sponge-particles,' with their inwardly directed flagella. C, A single flagellate cell of the same, still further enlarged; *f* Flagellum; *m* Collar round the base of the flagellum; *n* Nucleus; *c* Contractile vesicle.

of commerce. The sponge-flesh investing this framework is composed of an aggregation of organless, protoplasmic and amoebiform bodies, some ciliated and others capable of emitting pseudopodia. A constant circulation of water goes on in the living sponge, and by this circulation the animal is nourished. Reproduction takes place both by germination and true ova. Sponges have been classified into three groups: (a) *Myxospongiae*, few in number, in which no skeleton of any kind exists. (b) *Calcispongiae*, or limy sponges, which

have no horny skeleton, but are composed of limy spicula. (c) *Fibrospongiae*, or those in which a fibrous skeleton exists, strengthened usually by flinty spicula. The name *glass-sponges* is given to certain sponges having a highly ornamental glass-like appearance. The Venus' flower-basket and the glass-rope zoöphytes are examples. In common usage the term sponge is employed to designate the fibrous framework of sponges as sold in our shops. This framework is soft, light, and porous, easily imbibing fluids, and as readily giving them out again upon compression. Burnt sponge was formerly a valued remedy for scrofulous diseases and gonorrhea; but iodine and bromine, from which it derived all its value, are now administered in other forms. Mattresses, etc., are stuffed with sponge; and it is also employed as a filter and a polishing material for fine surfaces. Sponges are usually prepared before they come into the market, by being heated and soaked in dilute muriatic acid, with a view to bleach them and dissolve any adherent portions of carbonate of lime. The kinds most fit for use are found in the seas of warm climates. Two species are chiefly brought from the Levant, and a coarse one from the West Indies and the coast of Florida. Sponges have been artificially cultivated in the Adriatic and in Florida by means of planting cuttings in suitable waters.

**Sponging-house**, the name formerly given in England to a victualling-house or tavern, where persons arrested for debt were kept by a bailiff for twenty-four hours before being lodged in prison, in order that their friends might have an opportunity of settling the debt. Sponging-houses were so named from the extortionate charges made upon prisoners for their accommodation.

**Sponsor** (spon'sur), one who is surety for an infant at baptism, professing the Christian faith in its name, and guaranteeing its religious education; a godfather, or godmother. Up till the ninth century the actual parents were allowed to become sponsors, but this was prohibited by the council of Mainz (1813), and the prohibition still continues in the Roman Catholic Church. The Roman and Greek Catholic churches consider the relation of the sponsor to the godchild a kind of adoption, and therefore forbid marriage between them. The Book of Common Prayer enjoins that there shall be two godfathers and godmothers for a male child, and two godmothers and



one godfather for a female, but this is not rigidly adhered to.

**Spontaneity** (spon-ta-nē'i-ti), the doctrine that there is a tendency, for the various muscular movements called voluntary, to begin without reference to any purpose or end, being prompted simply by the discharge of power from the brain, and being entirely independent of the stimulus of sensations. The great activity of young animals, as puppies and kittens, after refreshment and repose, is a good example of spontaneity.

**Spontaneous Combustion** (spon-tā'ne-us). See *Combustion (Spontaneous)*.

**Spontaneous Generation.** See *Generation (Spontaneous)*.

**Spontoon** (spon-tōn'), the half-pike formerly carried by infantry officers, and used for signalling orders to the regiment. Their use was discontinued in the British army in 1787.

**Spoon** (spōn), a small domestic utensil of various materials, with a bowl or concave part and a handle, used at table for taking up and conveying to the mouth liquids and liquid food. Spoons, when made of silver or plated metals, are generally formed by stamping; while spoons of Britannia metal and similar fusible alloys are formed by casting in brass molds. Formerly great numbers of spoons were made of horn, and in rural localities such spoons are still in use. The old-fashioned *apostle-spoons* were so-called from bearing a figure of one of the apostles.

**Spoonbill**, the popular name of the birds of the genus *Platalea* belonging to the heron family



White Spoonbill (*Platalea leucorodia*).

(Ardeidae), order Grallatores, from the shape of the bill, which is somewhat

like a spoon, being curiously widened out at the tip. They live in society, in wooded marshes, generally not far from the mouths of rivers, and on the sea-shore. The white spoonbill (*P. leucorodia*) inhabits Europe. As winter approaches it migrates to the salt marshes on the Mediterranean coasts. The color is pure white, the breast being yellow, with a naked patch of skin on the throat; the legs are black, and the bill, which is about 8 inches in length, is black, and yellow at the tip. The roseate spoonbill (*P. ajaja*) is an American species, with the plumage of a fine rose color.—The name of spoonbill is also given to a kind of sturgeon (*Polyodon spatula*) found in the Ohio, Mississippi, etc. See *Paddle-fish*.

**Spoon-worm**, a name for various animals of the class worms or Anarthropoda, section Gephyrea, in particular *Thalassëma Neptuni*, so-called on account of the spoon-like appendage to the proboscis, around which is a circle of tentacula. It is much used as a bait by fishermen. All the species of this genus are remarkable for the wonderful power of contraction and expansion possessed by the skin, and the extraordinary manner in which they can alter their shape. Allied spoon-worms belong to the genus *Sipunculus*. All are inhabitants of the sea.

**Sporades** (spor'a-dēz), the general name for a group of small islands in the Grecian Archipelago, lying to the east of the Cyclades. They belong partly to Greece and partly to Turkey. The principal are Scio, or Chios, Samos, Cos, Rhodes, Lesbos, and Patmos.

**Sporadic** (spo-rad'ik), applied to a disease which occurs in single and scattered cases as distinct from epidemic and endemic, when many persons are affected.

**Sporangium** (spo-ran'ji-um), in botany, the case in which the spores or reproductive germs of cryptogams are formed.

**Spore** (spōr), applied in zoölogy to the germs of many of the lowest classes of animals, such as Infusoria, which, together with plant spores, are borne in immense quantities by the atmosphere. The presence and nature of these spores has become of great importance in connection with the propagation of disease. See *Germ Theory*.

**Spore**, in botany, the reproductive body of cryptogamic plants. As a spore does not contain an embryo, but consists merely of one or more cells variously combined together. It is called

a spore to distinguish it from a true seed. Reproduction by spores is anticipated in the single-celled bacteria, algæ and fungi, where the vegetative body divides, each portion developing into an independent plant. In the higher algæ and fungi, spores are formed in special organs or sporangia. Propagation may be asexual or sexual. On the under surface of the fronds of ferns spore-cases may often be seen. These fall to the ground, producing a small green plant called the prothallium of the fern. This in turn produces the sex elements, from the union of which grows a new fern. This indirect mode of reproduction is called the alternation of generations. Spores are sometimes contained in asci or little sacs and called *sporidia*.

**Sporozoa** (spôr'o-zô-a), a class of Protoza, formerly synonymous with *Gregarinida*, but more comprehensive, including many organisms not usually classed with the gregarines. They are parasitic and occur in almost all mammals. Most are very minute. The forms which are found in human blood include those which produce malaria and the sleeping sickness.

**Spot-lens**, in optics, a condensing lens in a microscope, in which the light is confined to an annular opening, the circular middle portion being obstructed by a spot, which forms the dark background behind the semi-translucent illuminated object.

**Spotswood** (spots'wood), ALEXANDER, an American Colonial governor, born in Tangier, Africa, in 1672; died in Annapolis, Md., June 7, 1740. He entered the English army, fought at Blenheim, and in 1710-22 served as governor of Virginia, promoting its good in many ways. He was deputy postmaster-general, 1730-39 and greatly improved mail facilities.

**Spotted Fever**. See *Typhus Fever*.

**Spottiswoode** (spot'is-wud), JOHN, Archbishop of St. Andrews, born in 1565; died in 1639. He was appointed archbishop of Glasgow (1603); afterwards (1615) he was transferred to the archbishopric of St. Andrews, and became primate of Scotland. In 1633 he crowned Charles I at Holyrood, and two years thereafter was made chancellor of Scotland. For his endeavors to force the liturgy and book of canons into Scotland he was deposed by an Assembly held at Glasgow in 1638, whereupon he removed to London. He is the author of a *History of the Church of Scotland*, beginning at 203

A.D. and brought down to the reign of James VI.

**Spottiswoode** (spot'is-wud), ALICIA ANNA, a Scottish poet, the composer of *Annie Laurie* (in its recent form), *Douglas, Douglas, Tender and True*, and other popular songs. She was married in 1836 to Lord John Scott, but resumed her maiden name on succeeding to the estate of Spottiswoode in 1870.

**Spottiswoode** (spot'is-wud), WILLIAM, mathematician and physicist, born at London in 1825; died in 1883. He was educated at Balliol College, Oxford. In 1845 he took a first class in mathematics, and in the following year became manager of his father's printing establishment. He was the author of *A Tarantasse Journey through Eastern Russia* (1857); *Meditationes Analyticae*, a treatise on *The Polarization of Light*; several papers to the Geographical Society, one of which was on *Typical Mountain Ranges*; and a paper to the Astronomical Society on *A Method of Determining Longitude*. He was president of the Mathematical Society (1871), of the British Association (1878), and of the Royal Society (1879).

**Spout-shell**, a name sometimes given to the pelican's foot (*Aporrhais pes-pellicani*), a British mollusc; so-called from the manner in which the aperture of the shell is lengthened into a kind of spout in front. Also a name of several molluscs that squirt out water.

**Sprague** (spräg), WILLIAM BUEL, an American clergyman and prolific writer, born at Andover, Connecticut, in 1795; died in 1876. He was graduated at Yale, studied at Princeton theological seminary, for forty years was pastor of the Second Presbyterian church at Albany, New York. He published many sermons, addresses, lectures, essays, letters, etc., but his principal work is *Annals of the American Pulpit* (1857-69).

**Sprain** (sprän), the violent straining or twisting of the ligaments and tendons which form the soft parts surrounding a joint. The ordinary consequence of a sprain is to produce some degree of swelling and inflammation in the injured part. The best treatment is to give the limb perfect rest, by means of splints or otherwise, and to foment the part for an hour or two with warm water. If the inflammation increases leeches should be applied. When this has passed the joints should be gently rubbed with a liniment of soap

and opium. The joint often remains weak and faint for a length of time, and too great caution cannot be observed in bringing it again into use.

**Sprat**, a small fish of the herring family, *Harengula (Clupea) sprattus*. At one time the sprat was thought to be the young of the herring, pilchard, or shad; but it can be easily distinguished from the young of either of these fishes by means of the sharply-notched edge of the abdomen, the ventral fins beginning beneath the first ray of the dorsal fin, and by the want of axillary scales to the ventral fins. It is found in the North Atlantic and Mediterranean, and on coasts of the southern United States. It is considered as a delicious, well-flavored, and wholesome fish. It is also known by the name of *garvie*, or *garvie herring*.

**Sprat-sucker** (*Lerneatoma spratti*), a genus of parasitic crustaceans, belonging to the Lernæadæ (which see), and so named from its habits of infesting the eyes of sprats.

**Spree** (sprä), a river of North Germany, rises in the east of Saxony, enters the Prussian province of Brandenburg, passes the towns of Spremberg, Kottbus, Lühben, etc., traverses Berlin, and a little below Charlottenburg joins the Havel at Spandau, after a course of about 220 miles, of which over 100 is navigable. The Friedrich Wilhelm Canal connects it with the Oder a short distance above Frankfurt.

**Spremburg** (spräm'berh), a town of Prussia, province of Brandenburg, on the Spree, with woolen and other manufactures. Pop. (1905) 11,188.

**Spring**, one of the four seasons of the year. For the northern hemisphere the spring season commences when the sun enters Aries, or about the 21st of March, and ends at the time of the summer solstice, or about the 22d of June. In common language, spring is usually regarded as commencing with March and ending with May. In the southern hemisphere the astronomical spring begins September 23, and ends December 21.

**Spring**, an outflow of water from the earth, or a stream of water at the place of its source. Springs have their origin in the water which falls upon the earth in the form of rain or snow, and sinks through porous soils till it arrives at a stratum impervious to water, where it forms subterranean reservoirs at various depths. When the pressure of the water which fills the channels through which it has descended

is sufficient to overcome the resistance of the superincumbent mass of earth, the water breaks through the superficial strata and gushes forth in a spring; or it may find some natural channel or crevice by which to issue. In descending and rising through various mineral masses the water of springs often becomes impregnated with gaseous, saline, earthy, or metallic admixtures, as carbonic acid gas, sulphuretted hydrogen gas, nitrogen, carbonate of lime, silica, carbonate of iron, etc. When these substances are present in considerable quantity the springs become what are known as *mineral springs*. Warm and hot springs are common, especially in volcanic countries, where they are sometimes distinguished by violent ebullitions. (See *Geysers*.) Some springs run for a time and then stop altogether, and after a time run again, and again stop; these are called *intermittent springs*. Others do not cease to flow, but only discharge a much smaller quantity of water for a certain time, and then give out a greater quantity; these are called *variable springs*.

**Spring**, an elastic body, the elasticity of which is made practically available. Springs are made of various materials, as a strip or wire of steel coiled spirally, a steel rod or plate, strips of steel suitably joined together, a mass or strip of india-rubber, etc., which, when bent or forced from its natural state, has the power of recovering it again in virtue of its elasticity. Springs are used for various purposes—diminishing concussion, as in carriages; for motive power, acting through the tendency of a metallic coil to unwind itself, as in clocks and watches; or to communicate motion by sudden release from a state of tension, as the spring of a gun-lock, etc.; others are employed to measure weight and other force, as in the spring-balance, as regulators to control the movement of wheel-works, etc.

**Springal** (spring'al), an ancient warlike engine, used for shooting large arrows, pieces of iron, etc. It is supposed to have resembled the cross-bow in its construction.

**Spring-balance**, a contrivance for determining the weight of any article by observing the amount of deflection or compression which it produces upon a spiral steel spring properly adjusted and fitted with an index working against a graduated scale. See *Balance*.

**Spring-beetles**, the name of a group of beetles. See *Elater*.

**Spring-bok**, **SPRING-BOC** (*Antidorcas euchore*), a species of antelope nearly allied to the gazelle, found in vast herds in South Africa, and used as food by the colonists. It is a very beautiful animal, of graceful form and fine colors—fulvous brown on the upper parts, pure white beneath, with a broad band of deep vinous red where



Spring-bok (*Antidorcas euchore*).

the colors meet on the flanks. It is larger than the roebuck, and its neck and limbs much longer and more delicate. The horns curve in a lyre-shape, and are small in the female. It receives its name from its singular habit of leaping perpendicularly to the height of several feet. In 1896 a trek, or periodical migration, of these animals was seen in Cape Colony estimated to contain 500,000 head.

**Springer** (spring'er), in architecture, the impost or place where the vertical support to an arch terminates and the curve of the arch begins; or the lowest voussoir or bottom stone of an arch which lies immediately upon the impost.

**Springer**, a name given to several varieties of the spaniel. The ears are long and pendulous, and the color usually white with red spots. It is employed to start or spring birds from coverts. The chief breeds are the Clumber, Sussex, and Norfolk. See *Spaniel*.

**Springfield** (spring'fēld), a city, capital of Hampden county, Massachusetts, situated on the left bank of the Connecticut, here navigable, about 98 miles w. by s. from Boston. It contains many fine churches and other buildings, and the streets are wide and planted with shade trees. It has an United States armory, established here in 1795 and the most extensive in the United States. In this large numbers of rifles are manufactured, and there is also a government arsenal capable of storing 300,000 stand of arms. The water-power fur-

nished by Mill River has developed large manufactures, including the Smith & Wesson pistol works, railroad car works, and fine paper, envelope and paper collar works, also cotton, woollen and machinery factories and many minor industries. Pop. 88,926.

**Springfield**, the capital of Illinois Sangamon county, 96 miles N. N. E. of St. Louis. Its public edifices include a state-house or capitol, a large and imposing building in the classic style with a dome 334 feet high; a state arsenal, a state museum of natural history, a courthouse and post-office building, and the national monument to Abraham Lincoln, who is buried here, an obelisk nearly 100 feet high. This city is one of the most important horse-breeding centers in the United States, and has productive coal mines in its vicinity. Its manufactures are extensive, including the Illinois Watch Co.'s works, large iron works and many other industries. Pop. 51,678.

**Springfield**, a city, capital of Clark Co., Ohio, on the east fork of Mad River, 43 miles w. by s. of Columbus. It is the seat of Wittenberg College (Lutheran) and a number of prominent public buildings, including the Warder Public Library, the Federal building, and others. There are numerous large manufactures, farming implements being extensively produced. It has also large foundries and machine shops; and works for clothes-wringers, coffins, flour, etc. There is here an imposing soldiers' monument. Pop. 46,921.

**Springfield**, a city, county seat of Green Co., Missouri, on the Ozark plateau, 200 miles s. e. of Kansas City. It is the trade center of a large district, rich in lumber, mineral, farm and dairy products. Here are Drury College, State Normal School, Loretto Academy, etc. Its manufactures are of importance, including wagons, furniture, stoves, structural steel, machinery, clothing, flour, saddlery, and many other products. It is also a great poultry center. Pop. 39,513.

**Spring-tails**, a family of apterous insects belonging to the order Thysanura, and distinguished by the possession of an elastic forked caudal appendage which is folded under the body when at rest, and by the sudden extension of which they are enabled to make considerable leaps; hence their popular name of spring-tails. Their scales are favorite test objects for microscopes.



**Spring-tide**, the tide which happens at or soon after the new and full moon, which rises higher than common tides. At these times the sun and moon are in a straight line with the earth, and their combined influence in raising the waters of the ocean is the greatest. See *Tide*.

**Spring Valley**, a city of Bureau Co., Illinois, on the Burlington and other railroad routes, 10 miles w. of Ottawa. It has coal-mining industries. Pop. 7035.

**Sprit**, a small boom, pole, or spar diagonally from the mast to the upper aftmost corner, which it is used to extend and elevate. Such a sail is called a *sprit sail*. The same name was formerly given to a sail attached to a yard under the bowsprit of large vessels.

**Sprottau** (spröt'tow), a town of Prussia, province of Silesia, district of Liegnitz, at the confluence of the Sprötte with the Bober. Pop. 7846.

**Spruce** (sprüs), the name given to several species of trees of the genus *Abies*. The Norway spruce-fir is *A. excelsa*, which yields the valuable timber known under the name of white or Christiania deal. It is a native of great part of Northern Europe and is a noble tree of conical habit of growth, reaching sometimes the height of 150 feet. The white spruce is *A. alba*, the black spruce-fir is *A. nigra*, both natives of North America. The latter attains the height of 70 or 80 feet, with a diameter of from 15 to 20 inches. Its timber is of great value on account of its strength, lightness, and elasticity, and is often employed for the yards of ships and the sides of ladders. From the young shoots is extracted the *essence of spruce*, a decoction used in making spruce beer. The hemlock spruce-fir is the *A. canadensis*, a noble species, rising to the height of 70 or 80 feet, and measuring from 2 to 3 feet in diameter. It grows abundantly over great part of Canada and part of the United States. The wood is employed for laths, fences, coarse indoor work, etc. The bark is exceedingly valuable for tanning. Douglas' spruce or fir, the *A. Douglasii* of North-western America, is a noble tree, reaching a height of 100 to 180 feet in its native forests.

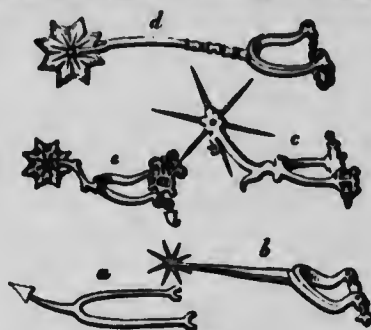
**Spruce-beer**, a fermented liquor made from the leaves and small branches of the spruce-fir or from the essence of spruce, boiled with sugar or molasses, and fermented with yeast. There are two kinds, the brown and the white, of which the latter is con-

sidered the best, as being made from white sugar instead of molasses. Spruce-beer forms an agreeable and wholesome beverage, and is useful as an antiscorbutic.

**Spunging-house**. See *Sponging-house*.

**Spun-yarn**, a small line or cord, formed of two, three, or more rope-yarns twisted together. The yarns are usually drawn out of the strands of old cables, and knotted together. Spun-yarn is used for various purposes, as serving ropes, weaving mats, etc.

**Spur**, an instrument having a rowel or small wheel with sharp points, worn on a horseman's heel, and used for goading the horse. In early times it took the simple form of a sharp-pointed goad, the rowel first appearing in the end of the thirteenth century. Spurs were



Ancient Spurs.

a, Frankish Spur (tenth century). b, Brass Spur (time of Henry IV). c, Long-spiked rowel Spur (time of Edw. IV). d, Long-necked brass Spur (time of Henry VII). e, Steel Spur (time of Henry VIII).

especially the badge of knighthood. Hence, to *win one's spurs*, was to become a knight, and the phrase is now used to indicate the achievement of distinction in one's profession.

**Spurge** (spuri), the common name of the different species of plants of the genus *Euphorbia*. They abound with an acrid milky juice. The caperspurge is the *E. Lathyris*, the oil of the seeds of which is a substitute for croton-oil; the flowering spurge is the *E. Corollata*, in Canada and United States; the petty spurge is the *E. Peplus*, once used as a powerful purgative. See *Euphorbiaceae*.

**Spurge-laurel**, the *Daphne Laureola*, a shrub which possesses acrid properties, generally flowering in March and April. See *Daphne*.

**Spurgeon** (spur'jn), CHARLES HAD-  
DON, evangelist, was born  
at Kelvedon, Essex, England, in 1834.  
He began to preach in London about  
1853 and attracted large audiences by his  
eloquence and popular style of oratory.  
A new chapel, of great dimensions, was  
opened for him in 1861. Besides his  
ordinary ministrations he founded the  
Pastors' College, the Stockwell Orphan-  
age, the Colportage Association, a Book  
Fund, Supplementary Pastors' Aid  
Fund, almshouses, schools, etc. He pub-  
lished several religious works, besides  
many volumes of sermons. He died  
January 31, 1892.

**Spurn Head**, a headland in the S. E.  
of Yorkshire, at the  
mouth of the Humber, 8 miles east of  
Grimsby. On the point are two light-  
houses with fixed lights, and off the point  
is a light-vessel with revolving light.

**Spurred Rye.** See *Ergot*.

**Spurrey** (spur'i), the common name  
for *Spergula*, a genus of  
plants, natural order Caryophyllaceæ.  
The species are found in fields and cul-  
tivated ground, especially on sandy soils,  
all over the world. They have slender  
stems, very narrow often whorled leaves,  
and small white fine-petaled flowers. *S.*  
*arvensis* (corn-spurrey or yarr) is a  
well-known plant growing in cultivated  
grounds from Canada to the State of  
Georgia. Cattle and sheep are fond of  
it; hens also eat it, and are said to lay a  
greater number of eggs in consequence.

**Spur-royal**, a gold coin, first made  
in the reign of Edward  
IV. In the reign of James I its value  
was 15s. It was so named from having  
on the reverse a sun with four cardinal  
rays issuing from it so as to suggest a re-  
semblance to the rowel of a spur. Some-  
times written *spur-rial* or *spur-ryal*.

**Spur-wheel**, in machinery, a wheel  
perpendicular to the axis, and in the di-  
rection of radii. A train of such wheels  
working into each other is called *spur-  
gear*.

**Spur-wing**, the common name for a  
species of wading birds  
of the genus *Parra* (see *Jacana*), having  
the wing armed with a bony spur. They  
inhabit Africa and South America. The  
name is also given to the species of geese  
of the genus *Plectropterus*. They are  
natives of Africa, and have two strong  
spurs on the shoulder of the wing.

**Spurzheim** (spurts'him), JOHANN  
FRIEDRICH KASPAR, a  
German phrenologist, born at Treves, in  
1776; died in 1832. He received a med-

ical education at Vienna, where he be-  
came acquainted with Dr. Gall, who at  
this time began to teach his doctrine of  
phrenology, and with whom he traveled  
on a lecturing tour (1805) through Ger-  
many, France, and Denmark. In 1813  
Spurzheim visited England alone, where  
he popularized the new doctrine. He  
went to America in 1832, and it was  
while lecturing in Boston that he died.  
Among his published writings are: *The  
Physiognomical System of Drs. Gall and  
Spurzheim* (1815); *Essai Philosophique  
sur la Nature Morale et Intellectuelle de  
l'Homme* (1820); *Elementary Principles  
of Education* (1821), and the *Anatomy  
of the Brain* (1826).

**Spy**, a secret emissary sent into an  
enemy's camp or territory to in-  
spect their works, ascertain their strength  
and their intentions, to watch their  
movements, and report thereon to the  
proper officer. By the laws of war  
among all civilized nations a spy is sub-  
jected to capital punishment.

**Spy-Wednesday**, an old name given  
to the Wednesday  
immediately preceding Easter, in allusion  
to the betrayal of Christ by Judas Is-  
cariot.

**Squad** (skwod), a small body of  
troops assembled for drill, in-  
spection, or other purposes. The *awk-  
ward squad* is composed of those recruits  
who have not received sufficient training  
to take part in regimental drill.

**Squadron** (skwod'un), the principal  
division of a regiment of  
cavalry. The actual strength of a squad-  
ron varies with that of the component  
troops, but it ranges from 120 to 200 sa-  
bers. A squadron is divided into two  
troops, each of which is commanded by  
its captain. Each regiment of cavalry  
consists of three or four squadrons. The  
term is applied also to a division of a  
fleet, being a detachment of ships of war  
employed on a particular service or sta-  
tion, and under the command of a com-  
modore or junior flag-officer.

**Squalidæ** (skwa'li-dē), a family of  
elasmobranchiate fishes,  
which includes the various species of  
sharks. The type of this family is the  
Linnæan genus *Squalus*. See *Shark*.

**Squamata** (skwa-mā'ta), the division  
of reptiles comprising the  
Ophidia (snakes) and Lacertilla (liz-  
ards), in which the integument develops  
horny scales, but there are no dermal os-  
sifications.

**Squamipennes** (skwa-mi-pen'ez), a  
family of acanthop-  
terygious (teleostean) fishes, so-named  
on account of their fins being covered

with scales, not only on the parts which have soft rays, but frequently also on those that have spinous ones. They are chiefly small fishes, abundant in the seas of hot climates, and of the most beautiful colors. They frequent rocky shores, and their flesh is, generally speaking, very wholesome and palatable. Called also *Chatodontidae*.

**Square**, in geometry, a quadrilateral figure, both equilateral and equiangular, or, in other words, a figure with four equal sides and equal angles. In measuring superficial areas it is only necessary to multiply one side by itself to have the area of the square, because each of the sides may be considered as the base or as the perpendicular height. Thus a square the sides of which measure 4 feet is equal to 16 square feet, that is, sixteen squares each 1 foot high and 1 foot long. To *square* a figure (for example, a polygon) is to reduce the surface to a square of equivalent area by mathematical means. It has often been attempted to square the circle, but this cannot be done. In arithmetic and algebra the *square* of a number is the number or quantity which is produced by multiplying a number or quantity by itself. Thus 64 is the square of 8, for  $8 \times 8 = 64$ .

**Square**, in military tactics, a body of infantry formed into a rectangular figure with several ranks or rows of men facing on each side, with officers, horses, colors, etc., in the center. The front rank kneels, the second and third stoop, and the remaining ranks (generally two) stand. This formation is usually employed to resist a cavalry charge. Hollow squares are frequently formed with the faces fronting inwards when orders and instructions, etc., are to be read, and the like.

**Square Root**, in mathematics, one of two equal factors of a given number. Thus 2 is the square root of 4,  $x$  of  $x^2$ . The following illustrates the method of finding the square root of 576, which is 24:

$$\begin{array}{r} \sqrt{576} \quad (20 \\ 400 \quad 4 \\ \hline 2 \times 20 = 40 \quad 176 \quad 24 \\ (40 + 4) \times 4 = 176 \end{array}$$

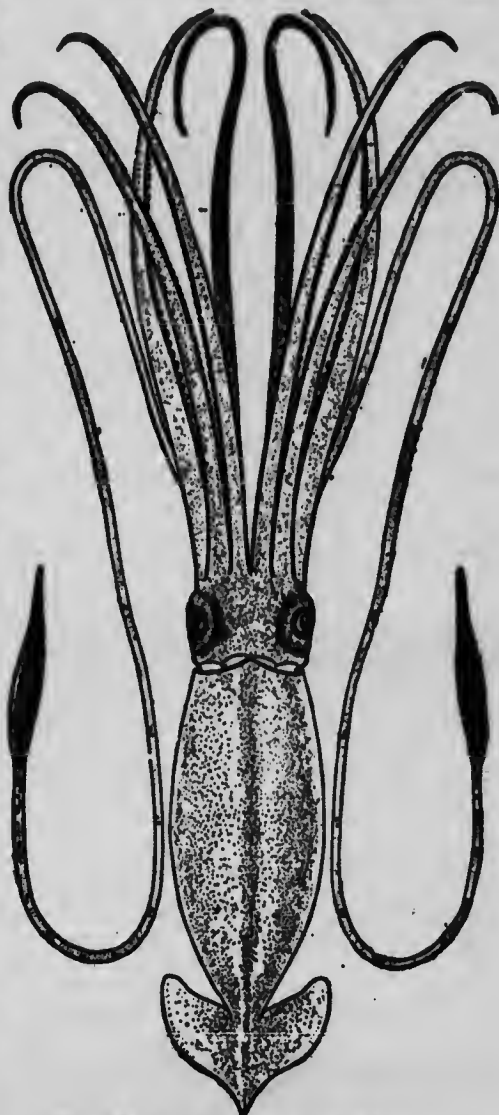
**Squash**, a plant of the genus *Cucurbita* (*C. Melopepo*) and its fruit, cultivated in the United States as an article of food. The name is also given to other species. See *Gourd*.

**Squash-bug**, a name given in North America to several hemipterous insects, best known as de-

stroyers of squash, pumpkin, and other plants.

**Squatina** (skwa-tá'na), a genus of cartilaginous fishes somewhat akin to the rays. The *S. angelus* is the angel-fish or monk-fish. See *Angel-fish*.

**Squatter** (skwat'er), a person that settles on a piece of land, particularly on public land, without a title. In Australia the term is also applied to one who occupies an unsettled tract of land as a sheep-farm under lease from government at a nominal rent.



Giant Squid (*Architeuthis princeps*).

## Squaw-root

The word is sometimes used in a looser and wider sense.

**Squaw-root**, a singular scaly plant (nat. order Orobanchæ), a native of America, found growing in clusters among fallen leaves in oak woods.

**Squeteague** (skwe-tég'), an American fish, the *Otolithus regalis* of Cuvier, very common in the waters of Long Island Sound and adjacent bays, where it is captured in large quantities for the table. It produces a dull sound like that of a drum.

**Squib**, a little pipe or hollow cylinder of paper filled with gunpowder or other combustible matter which being ignited it flies along, throwing out a train of fiery sparks, and hursting with a crack.

**Squid**, a popular name of certain cuttle-fishes belonging to the di-branchiate group of the class Cephalopoda, and included in several genera, of which the most familiar is that of the calamaries. See *Calamary*.

**Squier** (skwí'er), EPHRAIM GEORGE, archaeologist, born at Bethlehem, Pennsylvania, in 1821; died in 1888. His work as an archaeologist began with an account of the ancient monuments of the Mississippi valley and those of New York. They were followed by studies of the same kind in Nicaragua, Central America and Peru. His works were highly esteemed by scientists and he was admitted to many of the learned societies of Europe.

**Squill**, a plant of the genus *Scilla*, nat. order Liliaceæ, nearly allied to the hyacinths, onions, etc. The term squill is more particularly applied

to the *Scilla maritima* (*Urginea Scilla*), officinal squill or sea-onion, which has a large acrid bulbous root like an onion. It is a native of the sandy shores of the Mediterranean. The bulb has been known as a medicine from the earliest ages, and is still used as a diuretic and expectorant. In large doses it causes vomiting, purging, and may

even prove fatally poisonous.

**Squilla** (skwí'lla), a genus of crustaceans, order Stomapoda, the type of the family Squillidæ, having the body long and semicylindric, somewhat resembling that of a lobster. The shell



Squill (*Scilla maritima*).

## Squinting

consists of a single shield of an elongated quadrilateral form, covering the head, the antennæ and eyes excepted, which are placed on a common anterior articulation. The best known of the numerous species is the locust shrimp, mantis-crab, or mantis-shrimp (*S. mantis*) of the Mediterranean.

**Squinch**, **SCONCE**, in architecture, a small pendentive arch (or several combined) formed across an an-



Squinch, Maxstoke Priory, Warwickshire.

gle, as in a square tower to support the side of a superimposed octagon.

**Squint**, in architecture, an oblique opening passing through the walls of many old churches, usually constructed for the purpose of enabling a person in the transepts or aisles to see the elevation of the host at the high altar. Generally they are not above a yard high and 2 feet wide, but sometimes they form narrow arches 10 or 12 feet in height, as at Minster-Lovell, Oxfordshire. The name *hagioscope* is sometimes applied to them.

**Squinting**, or **STRABISMUS**, a defect of the eyes owing to which they cannot both be brought to bear upon the same object at once. It is usually due to one of the lateral muscles of the eye having a longer pull than the other. It may also arise from paralysis of one muscle caused by a blow. There are several kinds of squint, the two chief being inward or convergent and outward or divergent, the axes of the eyes in the one case tending to meet, in the other to separate. For persons so affected, and especially children, it is well not to look too long at small objects or read in ill-lighted rooms, and glasses to correct the sight should be obtained. It is also a good thing to have the sound eye (when there is but one squinting eye) bandaged up for a short



time each day. When these measures fail the muscle can be lengthened by means of a simple surgical operation.

**Squirrel** (skwir'el), a small rodent mammal of the family Sciuridae, the type of which is the genus *Sciurus*, or true squirrels. This family comprehends three groups—the true squirrels (*Sciurus*), the ground-squirrels (*Tamias*), and the flying-squirrels (*Pteromys* and *Sciuropterus*). The true squirrels are distinguished by their strongly compressed inferior incisors and by their long bushy tail. They have four toes before and five behind. The thumb of the fore-foot is sometimes marked by a tubercle. They have in all four grinders, variously tuberculated, and a very small additional one above in front, which very soon falls. In color they are usually of a rich ruddy brown on the upper parts, merging into reddish or grayish-white on the under parts of the body, but the fur varies with the season and climate so that in winter it may be of a gray appearance. The head is large, and the eyes projecting and lively. Several species are enumerated, as the common squirrel, which inhabits Europe and the north of Asia; while the cat-squirrel, gray-squirrel, black squirrel, red squirrel and the great-tailed squirrel are American species. The common (*Sciurus vulgaris*) and several other species are remarkably nimble, running up trees and leaping from branch to branch with surprising agility. They subsist on nuts, acorns, seeds, etc., of which they lay up a store for winter, some of them in hollow trees, others in the earth. Their nest, which consists of woody fiber, leaves and moss, is usually situated in a fork of a tree, and the young, of which there are three or four, are born in June. When engaged in eating they sit on their haunches with their tail thrown upwards on the back, grasp the eatables with their fore-paws, and gnaw with their powerful teeth. The fur of some of the American species is an article of commerce. See also *Ground-squirrel* and *Flying-squirrel*.

**Squirrel-corn**, the American name for the fragrant plant *Dicentra canadensis*, nat. order Fumariaceae, or fumitory.

**Squirrel-monkey**, a monkey of the genus *Callithrix*, whose collective range extends from Costa Rica to Bolivia and Brazil. It resembles in general appearance and size the familiar squirrel. A well-known species is the *C. Sciureus*, which is colored grayish-olive, the under surface being gray, the ears white, and the tail tipped with black.

**Srinagar** (srē-nu-gār'), a city, the capital of the state of Cashmere, in the western Himalayas, situated in the valley of Cashmere, on both banks of the Jehlum, at an elevation of over 5000 feet. The city extends along the river for about two miles, and is exceedingly picturesque. The Jama Masjid, a large mosque said to be capable of containing 60,000 persons, is situated in the city. Srinagar has manufactures of shawl, paper, leather, firearms, otto of roses, etc. Pop. 122,618.

**Stabat Mater** (stā'bat māt'ēr; L. 'the mother stood'), the first words, and hence the name, of a mediæval hymn still sung in the ecclesiastical services of the Roman Catholic Church during Holy Week, and at the festival of the Seven Doiors of the Virgin Mary. It was written in 1268 by an Italian Franciscan friar named Jacobus de Benedictis. It has been set to music by Pergolesi, Rossini, and other famous composers.

**Stability** (sta-bil'i-ti), in physics, a term applied to that condition of a body in which, if its equilibrium be disturbed, it is immediately restored, as when the center of gravity is below the point of support. See *Equilibrium*.

**Stable Fly**, the *Stomoxys calcitrans*, much like the common house fly and frequently mistaken for it in spite of its different habits, structure and distribution. The adult fly feeds exclusively on blood, biting various animals, and less frequently human beings. It does not enter houses as frequently as does the house fly. It appears early in the spring and becomes much more abundant after midsummer, persisting in considerable numbers until later in the fall. Both sexes are blood suckers and become greatly swollen when allowed to feed unmolested. The stable fly has recently attracted considerable attention as the carrier of infantile paralysis. The most important control of this fly must undoubtedly come from the proper disposition of manure in which the fly breeds.

**Staccato** (stak-kā'tō), in music, disconnected; separated; a direction to perform the notes of a passage in a crisp, detached, distinct, or pointed manner. It is generally indicated by dots or dashes placed over the notes. A certain amount of time is subtracted from the nominal value of any staccato note.

**Stachys** (stak'is), a genus of plants belonging to the nat. order Labiatae. The species are very numerous, and are widely distributed through the temperate regions of the globe. Several species are natives of the United States.

**Stack-stand**, a basement of wood or iron raised on props (of iron, stone, or wood), on which a stack, especially a stack of some kind of grain, is built for the purpose of keeping it dry or excluding vermin. There is usually also a hollow upright cone of wood or iron to assist in ventilating the interior of the stack.

**Stacte** (stak'tē), one of the sweet spices which composed the holy incense of the ancient Jews. Two kinds have been described, one the fresh gum of the myrrh-tree (*Balsamodendron Myrrha*), mixed with water and squeezed out through a press; the other kind, the resin of the storax (*Styrax officinale*), mixed with wax and fat. Exod. xxx, 34.

**Stade** (stā'de), a town of Prussia, province of Hanover, on the Schwinge, about 4 miles above its confluence with the Elbe, 21 miles west of Hamburg. It has some shipping and trade. The Stade dues, a toll charged on all cargoes shipped to Hamburg, used to be levied here until they were abolished in 1861. Pop. (1905) 10,837.

**Stadium** (stā'di-um), a Greek measure of 125 paces, or 625 Roman feet, equal to 606 feet 9 inches English; consequently the Greek stadium was somewhat less than our furlong. It was the principal Greek measure of length. This term was also applied to the course for foot-races at Olympia in Greece, which was exactly a stadium in length. The name was also given to all other places throughout Greece wherever games were celebrated.

**Stadtholder** (stat'höl-dēr; Dutch, *stadhouder*, 'city-holder'), a title given in the Netherlands to a governor of a province who was also commander-in-chief of the forces. This title, however, received its special significance in 1580, when the provinces of Holland and Zealand revolted against the authority of Spain, and unitedly accepted William, Prince of Orange, as their stadtholder. The prince was assassinated before he was formally invested with this office, but the title was conferred on his son, Prince Maurice, and remained as the hereditary title of the chief of the state until Holland was annexed by France in 1802. This title was finally dropped in 1814, when the Prince of Orange was recalled from England and declared king of the Netherlands by an assembly of notables. See *Netherlands*.

**Stäel-Holstein** (stäl-hol'stīn), ANNE LOUISE GERMAINE NECKER, BARONESS DE, the only child of Necker, Swiss banker and min-

ister of finance to Louis XVI, was born in 1766; died in 1817. Her education was directed with puritanical severity by her mother, but this was counteracted by the tender indulgences of her father, who encouraged his daughter to converse with the eminent philosophers who frequented his house. In 1786 she published *Sophia*, a comedy, and two tragedies entitled *Lady Jane Grey* and *Montmorency*; while in this same year she married Baron de Stäel-Holstein, Swedish ambassador at the French court. The marriage was not very happy, and she lived for a time apart from her husband. In 1788 she printed her *Lettres sur les Ecrits et le Caractère de J. J. Rousseau*. At the outbreak of the revolution (1789) she exercised considerable political power by reason of her father's high position at court and her own wit and womanly charm; but during the Reign of Terror she fled to Coppet (1792), her father's estate in Switzerland, after vainly endeavoring to save her friends and the royal family. In 1793 she sought refuge in England, where she published *Reflections on the Trial of the Queen*, and *Reflections on the Peace*. During the Directory Madame de Stäel-Holstein returned to Paris, where she again became an influence in politics, and published her essay on *The Passions*. Subsequently she was banished by Napoleon on account of her bold advocacy of liberal views, and her wanderings through Europe are described in her *Ten Years of Exile* ('*Die Années d'Exil*'). Her other writings comprise *De la Littérature Considérée dans ses Rapports avec les Institutions Sociales*; *Delphine* (1802); *Corinne, ou l'Italie* (1807), a novel in which Italian life and scenery are exhibited with thorough knowledge, her most popular work; a work on Germany, *De l'Allemagne* (1810), which shows a want of understanding and appreciation of the German character; and *Considérations sur les Principaux Evénements de la Révolution Française* (1818), etc. Her husband, the baron, died in 1802, but it was found at her death that she had secretly married a M. de Rocca in 1812.

**Staff**, a body of officers whose duties refer to an army or regiment as a whole, and who are not attached to particular subdivisions. Thus in the American army a general's staff consists of six aids, each with the rank of cavalry colonel; that of a lieutenant general of two aids and a military secretary, ranking as lieutenant colonels of cavalry; of a major-general of three aids, ranking as captains or lieutenants; of a brigadier-gen-

eral of two aids, ranking as lieutenants. The army of the United States, as recently reorganized, is under the command of a general staff, the Chief of Staff being Major General Leonard Wood. The staff of the British army includes the general officers commanding divisions, district brigades, etc.;—the officers of the quartermaster-general's and the adjutant-general's departments, called the *general staff*;—officers attached to commanding general officers as military secretaries and aids-de-camp, called the *personal staff*;—officers employed in connection with the civil departments at the war office; and those engaged in recruiting and garrison work.

**Staffa** (staff'a), a small uninhabited island of the Hebrides, belonging to Argyleshire, situated about 55 miles w. of Ohan by steamer;  $1\frac{1}{2}$  miles in circuit; greatest height, 142 feet. The island is covered by a rich soil affording excellent pasture, but it is best known because of its precipitous basaltic cliffs rising in columnar form, and its caves. The largest of these, Fingal's, or the Great Cave, has an entrance 66 feet high at mean tide, a breadth of 42 feet at entrance, and extends backwards 227 feet. Its sides are composed of basaltic columns, from the roof hang clusters of short columns whitened by calcareous stalactite, while the floor is covered by the sea to the depth of 18 feet at the entrance. The most noteworthy of the other caves is called Clam-shell Cave, from the peculiar curve in which the basaltic columns recline. It is 50 feet in height, 16 to 18 feet broad, and 130 feet long.

**Stafford** (staff'urd), a municipal and parliamentary borough of England, the county town of Staffordshire, situated on the River Sow, about 130 miles N. W. of London. It is pleasantly situated and well built; has a county-hall, free library, museum, and a theater; while its chief places of interest are the two old churches of St. Mary and St. Chad. The principal industries are the making of boots and shoes, brewing, and tanning. Pop. 23,385. The county is one of the central counties of England, and has an area of 1170 sq. miles. The surface in the north consists chiefly of wild moorlands, rising in several parts more than 1000 feet above sea-level, while the midland and southern parts consist for the most part of level and fertile lands. The Trent traverses the county from north-west to southeast. There are two valuable coal-fields—one in the north called the Pottery coal-field, and the other in

the south, usually known as the Dudley coal-field, which is remarkable for the thickness and richness of its seams. The chief industries are coal-mining, iron-ore mining, smelting and manufacturing, and North Staffordshire is the chief center in the kingdom for the various earthenware manufactures. The county is well supplied with railways and canals. Capital, Stafford. Pop. 1,359,718.

**Stag**, or RED-DEER, a large and handsome deer (*Cervus elaphus*) which is a native of Europe and Northern Asia. In summer the back and flanks of the stag are of a reddish-brown color, while these parts in winter are gray-brown. A full-sized male stag with antlers well developed stands about 4 feet high at the shoulder, and has horns 3 feet in length, while the female is smaller and has no horns. They feed on grass, buds and young shoots of trees, and in winter they roam in herds. The male is known distinctively as the hart (or stag), the female as the hind. The stag is represented in North America by the wapiti (*Cervus canadensis*), a larger species. See Wapiti.

**Stag-beetle**, a name of lamellicorn beetles of the genus *Lucanus*, family Lucanidae. The common stag-beetle (*Lucanus cervus*) is a characteristic species of the group, and



Stag-beetle (*Lucanus cervus*).

is especially distinguished by the enormous size of the horny and toothed mandibles in the males. It is seen flying about in the evening, in the middle of summer, especially around oak trees.

**Stage** (stāj), a platform elevated above the ground, and specifically applied to the raised floor upon which theatrical performances are exhibited. See Theater.

**Stage-coach**. See Coach.

**Staggers** (stag'erz), the vague and popular name of certain diseases of horses and sheep. In the horse mad or sleepy staggers is due to inflammation of the brain, while grass or stomach staggers arises from acute indi-

gestion, generally the result of overfeeding on wet grass. In sheep the staggers is caused by the presence within the brain of the immature embryo of a species of tape-worm (*Tania Caninus*), which, in its mature state, is found in the intestines of the dog.

**Staghound**, a large and powerful kind of hound formerly used in Europe for hunting the stag or red-deer, and now nearly extinct. It was bred, as is supposed, from the bloodhound and greyhound. The modern staghound is a variety of the foxhound.

**Stahl** (stähl), FRIEDRICH JULIUS, born at Munich in 1802; died in 1861. He was educated at Würzburg, Heidelberg, and Erlangen, and became professor of jurisprudence in the latter place, and at Berlin in 1840. Here he made his mark as an ecclesiastical lawyer. He was a leader of the aristocratic party in the Prussian diet, and the author of *Die Philosophie des Rechts, Ueber den Christlichen Staat*, and *Was ist Revolution?*

**Stahl**, GEORG ERNST, a German physician and chemist, born in 1660; died in 1734. He studied at Jena in 1687, became physician to the Duke of Saxe-Weimar; in 1691 was chosen second professor of medicine at Halle; and in 1716 was appointed physician to the King of Prussia. Stahl was the author of a theory that there resides in the human body a vital force composed of pure fire, and this element he named *phlogiston*. This theory and the medical treatment founded upon it were discredited by the discoveries of Priestley and Lavoisier. His principal works are *Experimenta et Observationes Chymicæ et Physicæ; Disputationes Medicæ; Theoria Medica vera; Fundamenta Chymicæ Dogmaticæ et Experimentalis*.

**Stahr** (stär), ADOLF WILHELM THEODOR, German writer, born in 1805; died in 1876. He was educated at Halle, and was for a number of years co-rector of the gymnasium at Oldenburg, but later resigned this post on account of ill health, and settled in Berlin. His earlier works were connected with Aristotle and his philosophy, but subsequently his literary activity extended over a wide field. His works include translations from Aristotle; books on art, travel, and literary and general history, as *Torso: Art, Artists, and Art-works of the Ancients; Lessing, His Life and Works; Goethe's Female Characters; The Prussian Revolution; Weimar and Jena; A Year in Italy; Paris Studies; A Winter in Rome; Pictures from Antiquity*, etc. In 1854 he married Fanny Lewald, who was also known as an authoress.

13—U—6

**Stained-glass** is glass painted with metallic oxides or chlorides, ground up with proper fluxes and fused into its surface at a moderate heat. See *Glass-painting*.

**Stainer** (stän'er), SIR JOHN, an eminent English musician, born in 1840; died in 1901. He was graduated a Mus. Doc. from Oxford and in 1872 became organist at St. Paul's, London. He won fame as a brilliant performer on the organ, and wrote some excellent music, and works on harmony, etc.

**Staines** (stänz), an old market-town of England, in Middlesex, on the Thames, 6 miles from Windsor, and about 19 miles s. w. of London. Pop. 6688.

**Stair**, LORD. See *Dalrymple, James*, and *John*.

**Stairs**, a succession of steps raised one above the other, affording means of communication between two points at different heights in a building, etc. Originally the stairs were placed from story to story in straight flights like ladders, and were often external, being sheltered by a projection from the roof, but to save space the spiral form was adopted, the stair being contained in a cylindrical building projecting from the outside of the edifice. In this construction a central axis or *newel* reaching from the ground to the roof serves to support the inner ends of the steps, and the outer ends are let into the walls. The spiral form is still used in certain circumstances; but the finest stairs are now constructed in straight sections separated from each other by a wide step or platform called a *landing*. The separate division, open space, or apartment in which the stair is placed is called the *staircase*.

**Stake-net**, a form of net for catching salmon, consisting of a sheet of network stretched upon stakes fixed into the ground, generally in rivers or firths, where the sea ebbs and flows, with contrivances by which the salmon become entangled in the net and are thereby secured.

**Stalactites** (sta-lak'tits), masses of calcareous matter, usually in a conical or cylindrical form, pendent from the roofs of caverns, and produced by the filtration of water containing particles of carbonate of lime through fissures and pores of rocks. Similar masses of small size are frequently to be seen also depending from stone bridges. The water being evaporated leaves a deposit of lime behind it, which, by the continued trickling of the water,



gradually increases in size. Simultaneously with the formation of the stalactite a similar but upward growth, called a stalagmite, takes place at the spot vertically below where the successive drops of water fall and evaporate. This sometimes forms continuous sheets over the surface, sometimes rises into columns, which meet and blend with the stalactites above. Stalactites, by the strange and interesting forms which they often assume and their white color are frequently of great beauty. Famous examples in the United States are those of Mammoth Cave, in Kentucky, and Luray Cave, in Virginia.

**Staleybridge.**

See *Stalybridge*.

**Stalimene** (stă-lim'e-nă). See *Lernænos*.

**Stalk-eyed Crustacea**, in zoology, applied to certain crustacea named Podophthalmata, which have the eyes set at the end of footstalks of variable length. The lobster, shrimp, and crab are examples of this group.

**Stall** (stă), a fixed seat inclosed, either wholly or partially, at the back and sides, in the choir or chancel of a cathedral, college church, etc., and mostly appropriate to the dignity of such churches.

**Stalybridge** (stă'll-hrij), or STALEY-BRIDGE, a municipal and parliamentary borough of England, in the counties of Lancaster and Chester, 7½ miles east of Manchester, on both banks of the Tame. The principal public buildings are the town-hall, the market-hall, the people's institute, the Oddfellows' hall, and St. George's church. Spinning cotton yarns and weaving calicoes are the principal manufactures; but there are also iron-foundries, machine and mill-wright shops, and paper-mills. Pop. (1911) 26,514.



Stalactite, section showing layers of growth.

**Stamboul.** See *Constantinople*.

**Stamens** (stă'menz), in botany, the male organs of fructification in plants, formed principally of cellular tissue. They are situated immediately within the petals, and are each composed, in most cases, of three parts, the filament, the anther, and the pollen (contained in the anther), of which the two latter are essential, the other not.

The stamens and pistils constitute the sexual or reproductive organs of plants. Generally they both exist in the same flower, which is thus said to be *hermaphrodite* or *perfect*.



Inside of Corolla, showing the stamens.

The number of stamens varies in different plants, from one to a hundred or more. With respect to their directions they are named *erect*, *inflexed*, *reflexed*, *spreading*, *ascending*, *declinate*; and their insertions with regard to the ovary are said to be *hypogynous*, *epigynous*, or *perigynous*. It was on the number of stamens and their arrangements and relations that Linnaeus founded the classes of his sexual system of plants. See *Botany*, *Anther*, *Pollen*.

**Stamford** (stam'furd), a market town and municipal borough of England, partly in Northamptonshire and partly in Lincolnshire, on the Welland, about 12 miles northwest from Peterborough. It is an ancient and irregularly built town, containing interesting churches, of which St. Mary's (erected at the end of the thirteenth century) exhibits some fine specimens of early English architecture, and St. John the Baptist's (middle of the fifteenth century) has a fine wooden roof and screen. There are manufactures of agricultural implements, and a considerable trade on the Welland. Pop. 9646.

**Stamford**, a city of Fairfield Co., Connecticut, near the mouth of the Mill River, 33 miles northeast of New York, for the inhabitants of which it is a favorite summer resort. It has a good harbor for vessels of light draft. Its manufactures are of importance, and include large dye-stuffs and licorice works, chocolate, pianos, automobiles, hardware, typewriters, ranges, etc. Pop. 32,000.

**Stammering** (stam'er-ing), an affection of the faculty of speech characterized by irregular, imperfect, or spasmodic actions of the muscles concerned in articulation. It

manifests itself in a difficulty in beginning the enunciation of words, especially such as begin with an explosive consonant, or in a spasmodic and for a time an uncontrollable reiteration of the same syllable after the word is begun; this latter defect being also called *stuttering*. Stammering is always increased by emotional disturbance, and is much mitigated, and often cured, by the patient acquiring confidence in himself, never attempting to speak in a hurry or when the chest is empty of air, or by reading measured sentences slowly and with deliberation.

**Stamp**, a term specifically applied to the public mark or seal made by a government or its officers upon paper or parchment whereon private deeds or other legal agreements are written, and for which certain charges are made for purposes of revenue. The name is also applied to a small piece of stamped paper issued by government, to be attached to a paper, letter, or document liable to duty. See *Stamp Tax*.

**Stamp Act**, an act for regulating duties; especially, an act passed by the British parliament in 1765, imposing a duty on all paper, vellum, and parchment used in the American colonies, and declaring all writings on unstamped materials to be null and void. This act roused a general opposition in the colonies, and was an inciting cause of the Revolution.

**Stamp**, **POSTAGE**, the stamp issued by government to affix to letters and other mailable matter, as an indication that the postage has been paid. The stamps issued by different countries are so numerous and varied that the collecting of them has become an ardent vocation with many persons, large collections being made.

**Stamp Tax**, a tax or duty imposed on pieces of parchment or paper, on which many species of legal instruments are written. (See *Stamp*.) The internal revenue acts of the United States of 1862, etc., required stamps for a great variety of subjects, under severe penalties in the way of fines, and invalidating of written instruments; stamp-taxes were also imposed in consequence of the war of 1898, and stamps for various purposes are still in use. In Britain stamp taxes on legal instruments used to be chiefly secured by prohibiting the reception of them in evidence unless they bore the stamp required by the law. By the Customs and Inland Revenue Act (1888), however, the non-

stamping of bonds, conveyances, leases, mortgages, or settlements, is held to be an offense punishable by a fine of £10.

**Standard** (*stan'dard*), a flag or carved symbolical figure, etc., erected on a long pole or staff, serving as a rallying-point or the like. In a more strict sense the term is applied to a flag which bears the arms, device, or motto of the owner, long in proportion to its depth, tapering towards the fly, and, except when belonging to princes or the blood-royal, silt at the end. The so-called British royal standard is more correctly a banner, being a square flag. The flag of the United States has thirteen horizontal stripes, alternate red and white; on the admission of a new State one star is added to the union of the flag, such addition taking effect on the fourth day of July then next succeeding such admission.

**Standard**, **BATTLE OF THE**, a battle in which David I of Scotland, who had espoused the cause of Maud against Stephen, was signally defeated by the English under the Bishop of Durham. It was fought in the neighborhood of Northallerton, in Yorkshire, on the 22d of August, 1138, and it got its name from the fact that the English forces were gathered round a tall cross mounted on a car, and surrounded by the banners of St. Cuthbert, St. Wilfred, and St. John of Beverley.

**Standard of Money**, in coinage, the proportion of weight of fine metal and alloy established by authority. The standard for gold and silver coins of the United States is 900 parts pure metal and 100 parts alloy. The standard of gold coins in Britain is 22 carats fine gold and 2 of alloy. The standard of silver coins is 11 ounces 2 dwts. of pure silver and 18 dwts. of alloy.

**Standard Time**, a system of time-reckoning chiefly for the convenience of railroads in the United States. The United States, beginning at its extreme eastern limit and extending to the Pacific coast, is divided into four time-sections, Eastern, Central, Mountain and Pacific. The Eastern section, the time of which is that of the 75th meridian, lies between the Atlantic Ocean and an irregular line drawn from Detroit, Mich., to Charleston, S. C. The Central, the time of which is that of the 90th meridian, includes all between the last-named line and an irregular line from Bismarck, N. D., to the mouth of the Rio Grande. The Mountain, the time of which is that of the 105th meridian,

includes all between the last-named line and the w. boundary of Montana, Idaho, Utah, and Arizona. The Pacific, the time of which is that of the 120th meridian, includes all between the last-named line and the Pacific coast. The difference in time between adjoining sections is one hour.

**Standing Stones** are large rough, erect monoliths found not only in all parts of Europe, but also in some countries of the East and even in the New World, and nowhere more common than in Great Britain. They sometimes occur singly, sometimes in groups. The principal purposes of the single standing stones appear to have been to serve as boundary-marks, as memorials of battle, and as sepulchral monuments. A number of these single standing stones are perforated, such as the stone which stands in the center of a circle at Applecross, in the west of Ross-shire; the Clachcharra, or stone of vengeance, at Onich, near Ballachulish, Argyleshire; and another called the Stone of Odin, near the circle of Stennis, in the island of Pomona, in Orkney. The groups of standing stones that exist in various parts of Great Britain, as well as in some parts of the Continent, were thought by antiquaries to be connected with the Druidical worship of the Celts, but, for want of sufficient evidence, this theory has been abandoned. The best preserved of these groups are those of Avebury and Stonehenge in Wiltshire; that of Carnac in Brittany; that of Callernish, near Loch Roag, in Lewis, in the Hebrides; and the circles of Brogar and Stennis in Pomona in Orkney. See *Avebury, Carnac, Stenness, and Stonehenge*; also *Cromleck and Dolmen*.

**Standish** (stan'dish), MILES, born in Lancashire about 1584; died in 1656. He claimed to be the descendant of the Standish family of Duxbury Hall, served as a captain in the Netherlands, and joined the Puritans when they sailed for New England in the *Mayflower* (1620). He took an active part in the early struggles of the colony with the Indians. An interesting tradition regarding his courtship is celebrated in a well-known poem by Longfellow.

**Stanfield** (stan'feld), WILLIAM CLARKSON, marine painter, born of Irish parents at Sunderland, England, in 1794; died in 1867. He began life as a sailor; occupied his spare time in sketching; received an engagement to paint scenery for the Old

Royalty Theater, London; became scene-painter at Drury Lane in 1826; was elected a member of the Society of British Artists, and abandoned scene-painting in 1830. Among his pictures may be mentioned: *Mount St. Michael* (1831); *The Battle of Trafalgar* (1836); *The Body of Nelson Towed into Gibraltar* (1853), and *The Abandoned* (1856). A number of his works were engraved under the title of Stanfield's Coast Scenery.

**Stanford** (stan'furd), CHARLES VILLIERS, an English composer, born at Dublin, in 1852; became organist of Trinity College, Cambridge; conductor of the Cambridge Musical Society; and, in 1887, professor of music in Cambridge. His operas include: *The Veiled Prophet of Khorassan* (1881); *Savonarola*, and the *Canterbury Pilgrims* (1884). He has also written an oratorio, *The Three Holy Children* (1885); an *Irish Symphony*; a choral ode, *The Revenge* (1886); and a setting of Walt Whitman's poem on the *Death of Abraham Lincoln*.

**Stanford**, LELAND, the founder of Leland Stanford, Jr., University, California, was born in Albany county, New York, in 1824. After studying law and practicing in New York State he removed to Wisconsin, then to California, where he took an interest in mining and as a commercial speculator, and realized a large fortune. In 1860 he was elected governor of California, and in 1863 president of the Central Pacific railroad. He was interested, in various capacities, in almost every railroad and steamboat corporation on the Pacific slope. He was elected to the United States senate in 1884, and reelected in 1890. A liberal contributor to charities, his greatest gift has been the Stanford university, established as a memorial to his deceased son, his endowment amounting to about \$20,000,000, including landed property worth \$6,000,000. He died June 20, 1893. His wife, Jane L. Stanford, in 1901 added enormously to the endowment, her gifts swelling it to more than \$45,000,000. See *California*.

**Stanhope** (stan'höp), the name of a noble English family. JAMES, first Earl Stanhope, was born in 1673 and died in 1721. He entered the army, was appointed commander-in-chief of the British forces in Spain, and in 1708 took Port Mahon.—CHARLES, the third earl, born in 1753, was celebrated chiefly as an inventor, a patron of science, and the avowed advocate of republicanism.—PHILIP HENRY, fifth earl,

was born in 1805; and died in 1875. He was best known, under his title of Lord Mahon, as the author of a *History of the Succession War in Spain* (1832), and other works.—LADY HESTER LUCY, daughter of the third Earl Stanhope, was born in London in 1776, and died in Syria in 1839. In 1810 she left England, visited various places in the East, and finally settled in Syria. She adopted the dress of an Arab chief, and by her kindness and masculine energy exercised great influence over the Bedouins. Her *Memoirs* were published in 1845-46.

**Stanhope**, PHILIP DORMER. See *Chesterfield*.

**Stanislaw** (stân'is-lou), a town of Austria, in Galicia, 74 miles S. E. of Lemberg. It is fortified, has various district courts, a gymnasium, and an important general trade. Pop. 30,410.

**Stanislaus Augustus**, STANISLAUS II (stan'is-laws), the last king of Poland, son of Count Stanislaus Poniatowski, was born at Wolczyn, Lithuania, in 1732; died in 1798. Sent by Augustus III of Poland on a mission to St. Petersburg, he became a favorite with the grandprincess (afterwards the Empress Catherine), by whose influence he was crowned king of Poland at Warsaw in 1764. The nobility, however, were discontented with this interference on the part of Russia, and forcibly compelled the king to abdicate (1771). He protested against the various partitions of Poland, formally resigned his sovereignty in 1795, and finally died in St. Petersburg as a pensioner of the Empress Catherine.

**Stanislaus Leszczynski**

(iesh-chin'ski), STANISLAUS I, King of Poland, afterwards Duke of Lorraine and Bar, was born at Lemberg in 1677; died in 1766. His father was grand treasurer to the Polish crown, and he himself was voivode of Posen, when he was recommended to the Warsaw assembly by Charles XII of Sweden as a candidate for the vacant throne of Poland. He was accordingly elected and crowned (1705), but after the disastrous battle of Poltava (1709), when his patron Charles XII was defeated, he had to flee from Poland. He found refuge in France ultimately, where his daughter Maria became wife to Louis XV. Assisted by the French king he sought to establish his claim to the throne of Poland in 1733, but, opposed by the united powers of Saxony and Russia, he had again to retire into

France, where he held possession of the duchies of Lorraine and Bar until his death. His writings were published under the title of *Œuvres du Philosophe Bienfaisant* (1765).

**Stanley** (stan'ii), ARTHUR PENRHYN, son of Edward Stanley, rector of Alderley, was born at Alderley, Cheshire, in 1815; died in 1881. He was educated at Rugby and Balliol College, Oxford; obtained a fellowship, and remained a tutor for twelve years; was appointed in 1845 preacher to Oxford University; presented to the canonry of Canterbury in 1851, and appointed dean of Westminster in 1863. He was a leader of the Broad Church party, and the author of numerous works, of which may be mentioned: *Life of Arnold* (1844); *Commentary on the Epistles to the Corinthians* (1854); *Memorials of Canterbury Cathedral* (1855); *Sinai and Palestine* (1856); *Essays on Church and State* (1870), and *Lectures on the History of the Church of Scotland* (1872).

**Stanley**, HENRY MORTON, born near Denbigh, Wales, in 1840, was placed in the poorhouse of St. Asaph at the age of three; subsequently, in 1855, shipped as cabin-boy to New Orleans, and was there adopted by a merchant, whose name he assumed, discarding his own name of John Rowlands. His adoptive father having died



Henry Morton Stanley (Jan., 1886).

intestate, Stanley enlisted in the Confederate army, where he was taken prisoner, but after his discharge he volunteered into the navy, and became an ensign on the iron-clad *Ticonderoga*. At the close of the war he went to Turkey as a newspaper correspondent, and as war correspondent for the *New York Herald* he joined the Abyssinian expedition of 1867-68. He afterwards traveled in Spain, and it was while there



in 1860 that he was asked by the proprietor of the *New York Herald* 'to go and find Livingstone.' After visiting the Crimea, Palestine, Persia, and India, he reached Zanzibar in the early part of 1871, and from thence he proceeded across Africa in search of Livingstone. He met and relieved this famous traveler at Lake Tanganyika in November of the same year, and returned to England. He then acted as the *Herald's* correspondent during the Ashantee war (1873-74). As correspondent of the *Daily Telegraph* and the *New York Herald* he in 1874 undertook an expedition into Africa, where he explored the equatorial lake region and for the first time traced the Congo River from the interior to its mouth (1877), crossing central Africa from sea to sea. For the purpose of developing this vast region he returned in 1879 under the auspices of the International African Association, founded by the King of the Belgians, planted stations and established steam navigation, the territory being named in 1885 the Congo Free State. In 1887 he organized an expedition for the relief of Emin Pasha, who after the Mahdist rising in the Soudan had become cooped up with his Egyptian followers in the Equatorial Province of Egypt at Wadelai, north of Lake Albert Nyanza. This time he entered Africa on the west by way of the Congo; and after a series of extraordinary marches through a forest region, accompanied with great hardships, he met Emin Pasha in the neighborhood of the Albert Nyanza. After a return journey to bring up the rear-column, which he had left in charge of Major Barttelot on the Aruwimi, Stanley finally, in May, 1889, set out from the Albert Nyanza, and brought the pasha and his followers to Bagamoyo in January, 1890. On his return to Britain he undertook a lecturing tour, and was overwhelmed with honors in all parts of the country. He is the author of *How I Found Livingstone* (1872); *Through the Dark Continent* (1878); *The Congo, and the Founding of its Free State* (1885), and *In Darkest Africa* (1890). He died May 10, 1904.

**Stanley Falls,** STANLEY POOL. See *Congo Free State*.

**Stan'nard,** MRS. ARTHUR, an English novelist, born at York in 1856. She used the nom-de-plume of JOHN STRANGE WINTER, her works including *Boote's Baby*, *Only Human*, *Everybody's Favorite*, and numerous others. She died December 14, 1911.

**Stanovoi** (stā-nō-vol'), or YABLONOL, a mountain-chain in the northeast of Asia, which forms the boundary between Siberia and Manchuria, skirts the sea of Okhotsk, and is continued, though with gradually diminishing height, to the shores of Behring's Strait. The whole length of the chain has been estimated at 3000 miles. The eastern part is often distinctively called Yablonol. This mountain range gives rise to the rivers Amur and Anadir on its south and east side, and to the Yenisei, Lena, Indighirka, and Kolyma on the north and west side.

**Stanton** (stan'tun), EDWIN M'MASTER, an American statesman, was born at Steubenville, Ohio, in 1814; died at Washington in 1869. He acted for three years as clerk in a book shop; attended Kenyon College in 1831-33; subsequently studied law, and was called to the bar in 1836. He acquired a large practice in the Supreme Court at Washington, and after Buchanan was elected president he entered the cabinet (1860). Shortly after the outbreak of hostilities between the North and the South President Lincoln appointed him head of the war department (Jan., 1862), and his acceptance of the office marked the beginning of a vigorous military policy. He selected General Grant for promotion after the victory at Fort Donelson; and it was he who, in 1863, placed Grant in supreme command of the three armies operating in the southwest. In all the important movements of the war Stanton was consulted by the president. After the assassination of Lincoln he had some controversy with his successor, Andrew Johnson, who demanded his resignation. This he refused, and was upheld by the senate. In 1869 he was appointed justice of the Supreme Court, but he died a few days afterwards.

**Stanza** (stan'za), in poetry, a number of lines or verses connected with each other, and properly ending in a full point or pause. A stanza presents in meter, rhymes, and the number of its lines a combination which repeats itself several times in the course of the same poem.

**Stanton,** ELIZABETH CADY, woman's rights advocate, was born at Johnstown, New York, in 1815; died October 26, 1902. She was an ardent student of mathematics, Latin and Greek, but the fact that no college admitted women excited her indignation, and led her into active advocacy of reform. She married the popular anti-slavery lecturer, Henry B. Stanton, in

1839, and from that time forward was one of the most earnest advocates of 'Woman's Rights.' The first Woman's Rights convention was held in 1848, chiefly through her influence, and she was president of the National Woman's Suffrage Association 1865-93 and one of the editors of *The Revolution*. Her eightieth birthday was celebrated at New York in 1895 by an assemblage of 3000 delegates from women's societies.

**Stapelia** (sta-pē'i-a), an extensive and curious genus of plants, nat. order Asclepiadaceæ, or milkweeds. Most of the species are natives of the Cape of Good Hope. They are succulent plants, without leaves, frequently covered over with dark tubercles, giving them a very grotesque appearance. In most instances the flowers give off a very unpleasant odor, like that of



*Stapelia variegata.*

rotten flesh, insomuch that the name of carrion-flower has been given to some of these plants. They are, nevertheless, cultivated on account of their singular and beautiful flowers.

**Staphyle'a.** See *Bladder-nut*.

**Staphylinus** (sta-fil-i'nus), a genus of coleopterous insects, with short wing-sheaths, the type of the family Staphylinidæ; commonly called *rove-beetles*.

**Staphyloma** (sta-fil-ō'ma), a name given to different tumors of the anterior surface of the globe of the eye. Called also *staphylosis*.

**Staple** (stā'pl), according to old usage, a settled mart or market-town where certain commodities were chiefly taken for sale. In England, formerly, the king's staple was established in certain ports or towns, and certain goods, such as wools, skins and leather, could not be exported without being first brought to these ports to be rated and charged with the duty payable to the king or public treasury.

**Star, POLAR.** See *Pole-star*. There is a Swedish order of knighthood so named. It is bestowed specially on those who have distinguished themselves in a civil capacity. Its motto is, 'Nescit occasum.'

**Staraia-Russa** (stil'rá-yá rūs'sá), a town of Russia, in the government and 40 miles south of Novgorod, on the Polista. It has an imperial palace, a military colony, and important salt-works. Pop. 15,234.

**Star-anise.** See *Anise*.

**Star-apple,** the popular name of several species of plants of the genus *Chrysophyllum*, nat. order Sapotaceæ, whose fruit is esculent. *Chrysophyllum Cainito* is the most important species. It is a native of the West Indies. The fruit resembles a large apple, which in the inside is divided into ten cells, each containing a black seed, surrounded by a gelatinous pulp, which is very palatable; known also as custard-apple.



Star-apple (*Chrysophyllum Cainito*).

**Starboard,** the right side of a ship towards the head, stem, or prow. See *Port*.

**Starch** (C<sub>6</sub>H<sub>10</sub>O<sub>5</sub> or C<sub>12</sub>H<sub>20</sub>O<sub>10</sub>), a proximate principle of plants, universally diffused in the vegetable kingdom, and of very great importance. It occurs in seeds, as in those of wheat and other cereal grains, and also in leguminous plants; in roots, as in the tubers of the potato; in the stem and pith of many plants, as in the sago plant; in some barks, as in that of cinnamon; and in pulpy fruits, such as the apple. Finally, it is contained in the expressed juice of most vegetables, such as the carrot, in a state of suspension, being deposited on standing. The starch of commerce is chiefly extracted from wheat flour and potatoes. When pure, starch is a snow-white powder of a glistening appearance, which makes a crackling noise when pressed with the finger. It is composed of transparent rounded grains, the size of which varies in different plants, those of the potato being among the largest, and those of wheat and rice the smallest. It is insoluble in cold

water, alcohol, and ether; but when heated with water it is converted into a kind of solution, which, on cooling, forms a stiff semi-opaque jelly. If dried up this yields a translucent mass, which softens and swells into a jelly with water. It is employed for stiffening linen and other cloth. When roasted at a moderate heat in an oven it is converted into a species of gum employed by calico-printers; potato starch answers best for this purpose. (See *Desfrinc.*) Starch is convertible into sugar by boiling with dilute sulphuric acid. Starch forms the greatest portion of all farinaceous substances, particularly of wheat flour, and it is the chief ingredient of bread.

**Star-chamber**, formerly an English court of civil and criminal jurisdiction at Westminster. It consisted originally of a committee of the privy-council, and was remodeled during the reign of Henry VII, when it consisted of four high officers of state, with power to add to their number a bishop and a temporal lord of the council, and two justices of the courts of Westminster. It had jurisdiction of forgery, perjury, riots, maintenance, fraud, libel, and conspiracy, and could inflict any punishment short of death. Its process was summary and often iniquitous (especially in the reigns of James I and Charles I) and the punishment it inflicted often arbitrary and cruel. This court was abolished (1640) by statute 16 Charles I.

**Starch-hyacinth**, a plant, the *Muscadri racemosa*, of the same nat. order with the hyacinth, and named from the smell of the flower. Called also *Musk-hyacinth* and *Grape-hyacinth*.

**Star-fishes**, a term in its widest application embracing all the echinoderms comprised in the orders Ophiuroidea and Asteroidea, but more commonly restricted to the members of the latter order, of which the common genus *Asterias* may be taken as the type. The star-fishes proper are covered with a tough leathery skin beset with prickles, and have the form of a star, with five or more rays radiating from a central disk. In the middle of the under surface of the disk is situated the mouth, opening into a digestive system which sends prolongations into each ray. If the prickly skin be removed it will be seen to be supported by a series of plates beautifully jointed together. On the under surface of each ray the plates exhibit a series of perforations, through which, in the living state, the ambulacra

or tubular feet can be protruded so as to effect locomotion. Star-fishes are found in almost all tropical, European and



Star-fish (*Uroaster rubens*).

American seas, and some species are found as far north as Greenland.

**Stargard** (*stär'gärt*), a town in the prov. of Pomerania, Prussia, situated on the navigable Ihna, 21 miles E. S. E. of Stettin. It has manufactures of leather, machinery, hats, soap, spirits, etc. Pop. 26,908.—There is another Stargard in West Prussia, 28 miles south by east of Danzig. Pop. 9682.

**Star-gazer**, a species of acanthopercid family, the *Uranoscopus scaber*, inhabiting the Mediterranean, and so-called because the eyes are situated on the top of the head and directed towards the heavens. The name is also applied to fishes allied to the carp, of which *Anableps tetraphthalmus* is the best-known type. It is found in the rivers of Guiana.

**Stark**, JOHN, soldier, was born in New Hampshire, in 1728. He distinguished himself in the French and Indian war, and afterwards in the Revolution at Bunker Hill, Trenton and Princeton. But his great exploit was his signal victory at Bennington over a portion of Burgoyne's army. For this he was made brigadier-general and received thanks from Congress. He afterwards served under General Gates, in Rhode Island, in 1779, and in New Jersey in 1780, and in 1781 was put in com-

mand of the Northern department, with headquarters at Saratoga. He died in 1822.

**Starling** (star'ling), called also **STARRE**, a bird belonging to the conirostral section of the order Passeres, genus *Sturnus* and family Sturnidae, a family of birds widely distributed throughout the world, and allied to the crows. The common starling (*Sturnus vulgaris*) is found in almost all parts of Europe. It is between 8 and 9 inches in length; the color is blackish, with blue, purplish, or cupreous reflections, and each feather is marked at the extremity with a whitish triangular speck, giving the bird a speckled appearance. Starlings live mostly upon insects, build in old walls and hollow trees, and the eggs, usually five, are of a pale bluish tint. These birds are often kept in cages, and may be taught to whistle some tunes, and even to pronounce words and sentences. Allied species are the *Sturnus unicolor*, found in Sardinia, the rose-colored pastor of Asia and Africa, and the red-winged starling (*Agelaius phoeniceus*) which occurs in America.

**Starodoub** (stä-rä-düp'), a town of Russia, in the government of Chernigov, 97 miles northeast of Chernigov. It has manufactures of leather and copper-ware and trade in hemp, tallow, corn, brandy, honey, and wax. Pop. 12,451.

**Star of Bethlehem** (*Ornithogalum umbellatum*; nat. order Liliaceæ), a bulbous-rooted plant with white star-like flowers. It is common in many parts of Europe, and is naturalized in parts of the United States.

**Star of India.** See *Knighthood*.

**Starost** (star'ost), in Poland, the name given to the noblemen who were reckoned among the dignitaries of the land, and who received a castle or landed estate from the crown domains. Some of the starosts had civil and criminal jurisdiction over a certain district (*grod*), others merely enjoyed the revenues of the starosty.

**Star-reed**, a Peruvian plant of the genus *Aristolochia*, the *A. fragrantissima*, the root of which is highly esteemed in Peru as a remedy against dysenteries, malignant inflammatory fevers, colds, rheumatic pains, etc.

**Stars**, the self-shining bodies seen in the heavens at night, situated at immense distances from us, and believed to be constituted like our sun and to resemble it in being the center of

systems similar to our own. To superficial observation stars are distinguished from planets by remaining apparently immovable with respect to one another, and hence they were called *fixed stars*, although their fixity has been disproved in numerous cases, and is no longer believed in regard to any. In order to distinguish the stars one from another the ancients divided the heavens into different spaces containing groups of stars called constellations. (See *Constellation*.) The stars are divided, according to their brightness, into stars of the first, second, third, etc., magnitudes; but no magnitude, in the proper sense of the word, has yet been observed in any star. All the stars beyond the sixth or seventh magnitude are called *telescopic stars*, as they cannot be seen without the aid of the telescope; and these are continued by astronomers down to the sixteenth magnitude. As to the absolute size of the stars little is known; but the light given out by Sirius is estimated at 63 times that of the sun. The colors of the stars vary considerably, white, red, yellow, green, and blue being noticed. The stars are very irregularly distributed over the celestial sphere. In some regions scarcely a star is to be seen, while in others they seem crowded together, this being especially the case in the Milky Way. In some cases a certain number of stars evidently belong to a system by themselves. Of the stars visible to the naked eye at any time the number probably does not exceed a few thousands, but in the telescope their number is so great as to defy all calculation. The distances of the stars from the earth are very great. The shortest distance yet found, that of  $\alpha$  Centauri, a double star in the southern hemisphere, has been calculated at 26 trillions of miles, so that light takes 3.6 years to travel from it to our earth. Many stars have been observed whose light appears to undergo a regular periodic increase and diminution of brightness, amounting, in some instances, to a complete extinction and revival. These are called *variable* and *periodic stars*. It is found that some stars, formerly distinguished by their splendor, have entirely disappeared. Such stars are called *temporary stars*. Many of the stars that usually appear single are found, when observed with telescopes of high magnifying power, to be really composed of two, and some of them three or more stars in close juxtaposition. These are termed *double* and *multiple stars*. By means of spectrum analysis some valuable results regarding the stars have



latterly been obtained; in particular, many of the elements familiar to us have been detected in them, and the spectro-scope has also proved that the star Arcturus is approaching us and Sirius is receding. See *Astronomy*, *Nebulae*, and *Meteor*.

**Star-shoot**, *STAR-SHOT*, a gelatinous substance often found in wet meadows, and formerly supposed to be the extinguished residuum of a shooting-star. It is, however, of vegetable origin, being the common nostoc. See *Nostoc*.

**Star-stone**, a rare variety of sap-phire. When cut, and viewed in a direction perpendicular to the axis, it presents a peculiar reflection of light in the form of a star.

**Star-thistle**, an European plant (*Centaurea Calcitrapa*) which grows in gravelly, sandy, and waste places in the middle and south of England, especially near the sea, and is remarkable for its long spreading spiny bracts. The *yellow star-thistle* (*Centaurea solstitialis*) is occasionally seen in fields and waste places. It is called *St. Barnaby's thistle*. The *C. Americana*, native in Arkansas and Louisiana, has very showy, pale-purple heads.

**Star-point**, a headland near the Devonshire, about 9 miles S. S. W. of Dartmouth, at the entrance to the Start Bay, and having a lighthouse with a revolving light 204 feet above sea-level.

**Starvation** (*stár-vá'shun*), or *IN-ANITION*, is the physical effect produced by the total want of food and water. The symptoms of starvation in man are: an increasing loss of weight, severe pain in the stomach, loss of strength, sleeplessness, great thirst, in some cases stupor, and in other cases nervous excitement with convulsions. Meanwhile the face assumes a haggard expression, the skin is said to become covered with a brown secretion, and at last death occurs in about eight days. With a good supply of water, however, life may be prolonged, in the absence of solid food, for a period of two or three weeks, and a moist atmosphere would even seem to favor the prolongation of life. Certain diseases, such as stricture or cancer of the opening of the stomach, etc., may occasion starvation, and it is to be noted that gradual starvation may result from the continued low percentage of nutritive matter in the daily diet. See *Fasting*.

**Starwort** (*stár'wurt*), the popular name of several plants, some of them belonging to the genus

*Stellaria*, or that of chickweed. See *starwort* is an annual herbaceous plant of the genus *Aster*, the *A. Tripolium*. It has pale blue flowers with a yellow disk, and grows in salt marshes.

**Stassfurt** (*stás'fúrt*), a town of Prussia, province of Saxony, district of Magdeburg, on the Bode, famous for its great deposits of rock-salt and potassium salts (carnallite, kainite, kieserite), etc., the working of which is the most important industry, the products including potash, epsom-salts, glauber-salts, sulphate of potash, chloride of magnesium, bromine, etc. Pop. 18,310.

**Staten Island**, an island of New York, constituting nearly the whole of Richmond county, and separated from Long Island by the Narrows which form the entrance to New York harbor, and from New Jersey by Staten Island Sound, about  $\frac{1}{2}$  mile broad. Its length is 14 miles, and its greatest breadth 8 miles. It now forms a portion of New York City and is given the name of the Borough of Richmond.

**Staten Island**, an island off the southeast coast of Tierra-del-Fuego, separated from the mainland by the Strait of Le Maire.

**States** (*státs*), in politics, divisions of nations associated for public ends; as, the States of the American Union, States of Brazil, Mexico, etc. See, also, *Estates of the Realm*.

**States-general** (French *États Généraux*), thus called to distinguish them from the provincial States (*états provinciaux*), the name given in France till 1789 to the assemblies of the deputies of the three orders of the nation, the clergy, the nobility, and the third estate (*tiers état*). This assembly had little legislative power, its chief function being to register the king's decrees in matters of taxation. States-general were first convoked in 1302 by Philip the Fair; they were convened in 1614 by Louis XIII; and again, for the last time, they met before the Revolution at the summons of Louis XVI. In the latter instance the third estate assumed the title of National Assembly, and the States-general ceased to exist. The name is at the present day applied to the legislative assembly of the Netherlands.

**States of the Church**. See *Papal States*.

**Statice** (*stat'í-sē*), a genus of herbaceous or subshrubby plants, nat. order Plumbaginaceæ. A number are cultivated in Britain, among them being *S. latifolia*, a Siberian species with blue flowers. The root of one species, *S. caroliniana*, a very powerful astringent, is

used in North America, for all the purposes of kine and catechu.

**Static** (stat'iks), that branch of dynamics which treats of the properties and relations of forces in equilibrium—equilibrium meaning that the forces are in perfect balance, so that the body upon which they act is in a state of rest. According to the classification still employed by many writers on the subject the word *statics* is used in opposition to *dynamics*, the former being the science of equilibrium or rest, and the latter of motion, both together constituting *mechanics*. But among more recent authors *mechanics* is used to express not the theory of force and motion, but rather its application to the arts. The word *dynamics* is employed as expressing the science which treats of the laws of force or power, thus corresponding closely to the old use of the term *mechanics*; and this science is divided into *statics* and *kinetics*, the first being the science which treats of forces considered as producing rest, and the second as treating of forces considered as producing motion. See *Dynamics*.

**Stations** (stā'shun), a name variously used in the Roman Catholic Church, but especially applied to the places at which ecclesiastical processions pause for the performance of an act of devotion, and to those representations of the successive stages of our Lord's passion which are often placed round the naves of large churches, and by the side of the way leading to sacred edifices, and which are visited in rotation.

**Statistics** (sta-tis'tiks), a collection of facts relating to a part or the whole of a country or people, or of facts relating to classes of individuals or interests in different countries; especially, those facts which illustrate the physical, social, moral, intellectual, political, industrial, and economical condition or changes of condition, and which admit of numerical statement and of arrangement in tables. The collection of statistics may have the object merely of ascertaining numbers, as is often the case with statistics collected for purely administrative purposes; or it may be undertaken with the view of learning what happens on an average of a great number of cases, as is the case of insurance statistics; or its object may be to detect the causes of phenomena that appear in the consideration of a great number of individual cases—such phenomena, for example, as the decline of a certain trade, the prevalence of a certain disease, etc. In all civilized countries the collection of statistics forms an important part of the

administrative duties of government, and in some cases it is intrusted to a special bureau. The first country to possess an institution of this nature was Belgium, its organizer being the eminent statistician Lambert Quetelet. A congress of statisticians was held at Brussels in 1853, and this has been repeated at intervals. In Berlin a seminary was established in 1862 for the purpose of training statisticians, and in 1874 a professorship of statistics was established in the university there. Several nations now devote much time and labor to the collection and tabulation of their statistics, and this is especially the case in the United States, which is remarkable for the fulness of its census inquiries and the variety and value of the statistics gathered.

**Statius**, PUBLIUS PAPINIUS, a Roman epic poet, born at Naples in the reign of the Emperor Nero, about 61 A.D., and died about 100 A.D. He was devoted by birth and training to poetical composition. His principal productions are two epic poems—the *Thebais*, in twelve books, on the war of the seven Greek princes against Thebes; and the *Achilleis*, in two books, on the achievements of Achilles.

**Statue.** See *Sculpture*.

**Statute** (stat'ut), a law proceeding from the government of a State; the written will of the legislature solemnly expressed according to the forms necessary to constitute it the law of the State. A statute which contravenes a provision of the constitution of a State by whose legislature it was enacted, or of the United States Constitution, is void. Statutes are either public or private (in the latter case affecting an individual or a company); but the term is usually restricted to public acts of a general and permanent character. Statutes are said to be *declaratory* of the law as it stood before their passing; *remedial*, to correct defects in the common law; and *penal*, imposing prohibitions, and penalties. Statutes contained in the revised or compiled statutes of a state or of the United States may be amended or supplemented by subsequent acts. The term *statute* is commonly applied to the acts of a legislative body. In monarchies not having representative bodies, the laws of the sovereign are called *edicts*, *decrees*, etc.

**Staubbach** (stoub'bakh), FALL, or, a water-fall, whose height is about 900 feet, situated in Switzerland, canton of Berne, nearly 6 miles southeast of Interlaken, and about a mile from the village of Lauterbrunnen. The stream is so small that the water is con-

verted into spray long before it reaches the bottom.

**Staunton** (stān'tun), a city, formerly capital of Augusta county, Virginia, in a fertile district on Lewis Creek, 136 miles w. n. w. of Richmond. It has state institutions for the deaf, dumb, and blind, and the insane, the Staunton Military Academy and other educational institutions. Overalls, flour, agricultural implements, liquors, etc., are made. Pop. 10,604.

**Staunton**, a city in Macoupin Co., Illinois, 14 miles s. w. of Litchfield. It is in a farming and stock-raising district. Pop. 6204.

**Staunton**, HOWARD, born in 1810; died in 1874. He was educated at Oxford, and settled in London as editor of the *Chess Players' Chronicle*. In this game he defeated M. St. Amant (1843), the champion of Europe, and he subsequently published various treatises on chess, as the *Handbook* (1847), the *Companion* (1849), *Chess Tournament* (1852), and *Chess Praxis* (1860). He was an eminent Shakespearean scholar, and published an edition of the *Plays and Poems* (three vols. 1857-60), a facsimile of the (1623) first folio, and *Memorials of Shakespeare* (1864). He was also the author of the *Great Schools of England* (1865).

**Stavanger** (stā'vāng-ér), a seaport of Norway, on an arm of the Bukkefiord, 105 miles northwest of Christiansand. It is one of the oldest towns in Norway, and has a remarkable ancient Gothic cathedral, one of the finest Gothic monuments in the country. It has some manufactures, a good harbor, and an active trade in connection with fishing. Pop. 30,541.

**Stavoren** (stā'vō-ren), a village of Holland, in the province of Friesland, 29 miles southwest from Leenwarden, at the entrance to the Zuyder-Zee. It was once an important seaport, but it has now become an insignificant place, the harbor having been sanded up. Pop. 900.

**Stavropol** (stāv'rō-pōl), a government of Russia in the Caucasus, and bordering on the Caspian Sea; area, 26,500 sq. miles. This territory, which is low, flat, and infertile, is watered by the Kuban, Terek, and Kuma, and is subject to sudden inundations. The inhabitants are chiefly Russians, Cossacks, and nomad Turkomans. Pop. 1,023,700.—**STAVROPOL**, the capital of this district, is situated on a plateau, where it is strongly fortified, and has a large trade in horses, cattle, sheep, etc. Pop. 46,965.

**Stawell** (stā'el), a town of Australia in Victoria, 176 miles northwest of Melbourne. The public buildings include a town-hall, courthouse, post and telegraph office, hospital, handsome churches, mechanics' institute, and theater. It is the center of the Pleasant Creek gold-field, and is best known on account of its rich quartz reefs. Pop. about 5500.

**Stay** (stā), in ships, a large, strong rope, extending from the upper end of a mast down to another mast, or to some part of the vessel, with the object of lending support to the mast to whose top it is attached. Those leading forward are called fore-and-aft stays, and those leading down to the vessel's sides and pulling a little backwards are called back stays. A sail extended on a stay is a stay sail. In large vessels there are a number of these of a triangular shape. *To stay* is to tack or bring the ship's head up to the wind for going about; *to miss stays* is to fail in the attempt to go about. *In stays* or *hove in stays* is the situation of a vessel when she is in the act of going about.

**Stays.** See *Corset*.

**St. Bernard**, a village of Hamilton Co., Ohio, 7 miles from Cincinnati. It manufactures fertilizers and cigars. Pop. 5002.

**St. Clair**, a borough of Allegheny Co., Pennsylvania. Pop. 5640.

**St. Clair**, a borough of Schuylkill Co., Pennsylvania, 3 miles n. of Pottsville. Miners' supplies are manufactured. Pop. 6455.

**Stealing.** See *Larceny*.

**Stead** (sted), WILLIAM THOMAS, an English journalist; born at Embleton in 1849. He was editor of the *Review of Reviews*, which he founded in January, 1890. In 1893 he established *Borderland*, a spiritualistic periodical. His writings were of a radical character, such as *If Christ Came to Chicago*. He went down with the 'Titanic' in 1912.

**Steam** (stēm), the vaporous substance into which water is converted under certain conditions of heat and pressure. It may be said, indeed, that water gives off vapor or steam at every temperature, but the term is technically applied to the elastic aeriform fluid generated by heating water to the boiling point. Steam, in its perfect state, is transparent, colorless, and invisible; but when it has been deprived of part of its heat by coming into contact with cold air it suddenly assumes a cloudy appear-

ance, and is condensed into water. When water, in an open vessel, is heated to the boiling point (212° F.) globules of steam are formed at the bottom and rise to the surface, where they pass off in vapor. In this case all the heat which enters into the water is solely employed in converting it into steam of the temperature of boiling water, while the continued and increased application of heat will only cause a more rapid formation of steam until the whole of the water evaporates. When water, however, is confined in a strong close vessel, both it and the steam which it produces may be brought to any temperature; and as steam at boiling point occupies 1642 times the space of the water from which it is generated, it follows that when thus confined it must exercise an enormous expansive force. Steam, as used in the steam-engine, holds water in suspension mechanically, and is called *saturated steam*; while the steam which receives additional heat apart from water is called *superheated steam*, and approximates to the condition of a perfect gas. When the temperature of saturated steam is considerably above 212° F., the steam formed under such conditions is termed *high-pressure steam*, while at 212° F. it is called *low-pressure steam*, and its pressure is equal to that of one atmosphere, or 14.7 lbs. on the square inch. Another element in the constitution of steam is its density, which is expressed by the weight of 1 cubic foot of the steam. This density is increased with an increase of the pressure under which the steam is generated, for the particles of steam become more closely packed together. Thus the density of steam produced at 212° has been found to be equal to .038 lb. or  $\frac{1}{26}$  oz. per cubic foot, from which it follows that the volume of 1 lb. of such steam is equal to 26.36 cubic feet. Like the pressure or expansive force of steam, the density is invariably the same for a given temperature. From the possession of the properties thus briefly stated, steam constitutes an invaluable agent for the production of mechanical force, as shown in the various uses of the steam-engine. It is also employed in distributing the heat used for warming buildings, in heating baths, evaporating solutions, brewing, drying, dyeing, and even for cookery.

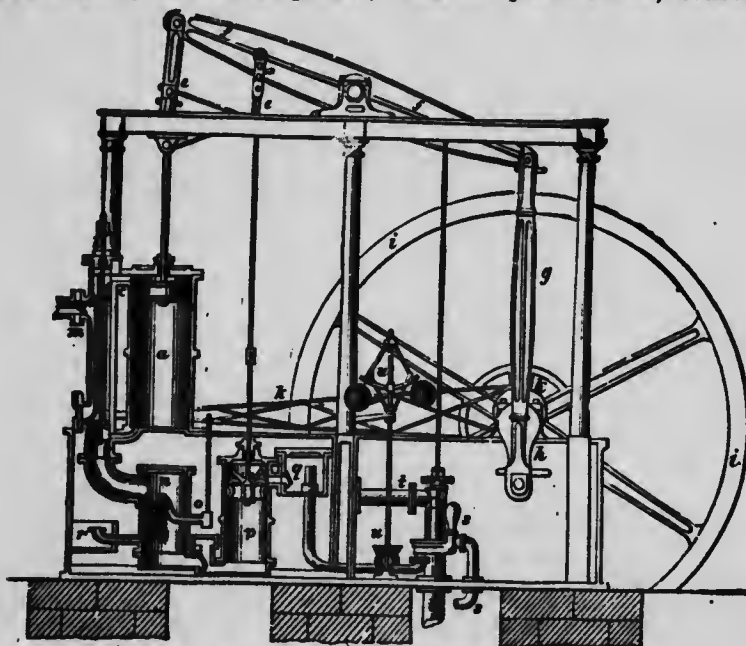
**Steam Engine**, a mechanical contrivance, in which the force arising from the elasticity and expansive action of steam, or from its property of rapid condensation, or from the combination of these qualities, is made available as a source of motive power in the arts and manufactures, and in loco-

motion. The expansive power of steam was known to the ancients, and its earliest use in connection with a mechanical contrivance is noted by Hero of Alexandria (about 130 a.c.) in his *Pneumatica*. In this treatise Hero describes an aeolipile or hollow spherical vessel turning on an axis, supplied with steam, and driven by the reaction from the escaping jets of steam, much in the same way as Barker's mill (which see) is driven by escaping water. This invention had no practical result, and it was not until the 17th century that the power of steam was again recognized by Giovanni Battista della Porta (1601), Solomon de Caus (1615), Giovanni Branca (1629), and the Marquis of Worcester (1663). Their various inventions were an adaptation of the principle that a mechanical power is obtained by the pressure of steam acting on the surface of water placed in a closed vessel. This principle was put to practical use by Captain Thomas Savery (1698) in a steam engine which he constructed for the purpose of raising water out of mines; and with the elevation of water by pressure he also combined the principle of obtaining a vacuum by condensation. This principle, however, was made more practically effective by Denis Papin (1690), who constructed a steam engine in which a piston was forced down through the vacuum made by condensation. This first conception of a piston working in a cylinder was further developed by Newcomen (1705) and his assistant, Cawley. In their engine the boiler and furnace were separated from the cylinder and piston, and its chief characteristic was an oscillating beam connected on one side with the piston and on the other side with a pump-rod in the mine. When a vacuum was made under the piston in the cylinder by the injection of a jet of water, causing condensation, the piston was driven down by the pressure of the atmosphere, and as that end of the beam was lowered, the other end attached to the pump-rod was raised with its load of water. Various improvements were made upon this atmospheric steam engine by Smeaton and others, but its greatest development was effected by James Watt (1769). His improvements consisted in condensing the steam, not in the cylinder, but in a separate condenser, thus preventing the waste occasioned previously by the chilling and heating of the cylinder. Besides this, he preserved the heat in the cylinder by surrounding it with a layer of hot steam inside of an external casing; and with the same object he employed steam, instead



of air, to press down the piston from above. Thus he obtained the *double-acting engine*, which is so named because both the up-stroke and the down-stroke are produced by means of steam. Further, he devised a crank motion which converted the alternating motion of the oscillating beam into a continuous rotatory motion; but as this invention was pirated he patented the 'sun-and-planet' wheel as a substitute for the crank, returning afterwards to the crank. To these improvements he subsequently added a fly-wheel, in order to equalize the motion so as to drive the crank past the dead-points;

is the manner in which steam is now used expansively. It was Jonathan Hornblower (1781) who first adopted the principle of expanding steam in two cylinders of different sizes. This form of *compound engine*, as it was called, was employed by Woolf (1814) in the Cornish mines, while it was improved by M'Naught (1845), and adapted by Elder (1854) to the use of marine engines. In the compound engine the steam receives the greater part of its expansion in a second cylinder of much larger diameter than the first, and by this means greater steadiness of piston-stroke, economy of fuel,



Beam Condensing Steam Engine.

*a*, The steam-cylinder; *b*, the piston; *c*, the upper steam-port or passage; *d*, the lower steam-port; *e e*, the parallel motion; *f f*, the beam; *g*, the connecting-rod; *h*, the crank; *i i*, the fly-wheel; *k k*, the eccentric and its rod for working the steam-valve; *l*, the steam-valve and valve-casing; *m*, the throttle-valve; *n*, the condenser; *o*, the injection-cock; *p*, the air-pump; *q*, the hot-well; *r*, the snifting-valve for creating a vacuum in the condenser previous to starting the engine; *s*, the feed-pump for supplying the boilers; *t*, the cold-water pump for supplying the condenser cistern; *u*, the governor.

a governor, whose purpose was to regulate the quantity of steam passing into the cylinder; an indicator, to measure the pressure upon the piston; and a slide-valve, moved automatically by an eccentric, the object of which was to regulate the action of the steam in the cylinder. The steam engine, as thus developed by Watt, was in nearly all essential points the same as the present-day engine. Probably the only improvement of primary importance which has been made in the steam engine since the time of Watt

and increased driving power have been obtained. The use of expanded steam has been especially notable in the marine engine, where it is now expanded successively in three or even four cylinders.

The accompanying illustration represents a sectional elevation of a *beam condensing steam engine*, and shows the principles embodied in Watt's steam engine. The pipe conveying the steam from the boiler opens into the part marked *l*, which incloses a movable valve by means of which the steam may be alternately ad-

mitted into the cylinder *a* by the upper port *c* and lower *d*; between these points the piston *b* works steam-tight. The valve *l* is so contrived that while it allows steam to pass into the cylinder through one of the ports, it shall at the same time open a communication between the opposite side of the piston and the condenser *n*, which is a hollow vessel kept constantly immersed in cold water, a portion of which is admitted into it by the injection-cock *o*; consequently, the steam thus admitted is instantly deprived of its heat, and reconverted into its original form of water, thereby forming a vacuum. Thus it will be seen that, on the communication being opened up between the boiler and either side of the piston, the latter will ascend or descend in the cylinder unimpeded by the resistance of the atmosphere against the other side, and with a force proportional to the pressure of the steam; and as the motions of the steam-valve *l* are regulated by the engine itself, the above action is kept up continuously. The alternating rectilinear motion thus generated within the cylinder is transmitted, by means of a rod attached to the piston, to a strong beam *f f*, movable upon a central axis, a system of jointed rods *e e*, called the *parallel motion*, being interposed for the purpose of neutralizing the disturbing action which the circular path of the beam would otherwise exert upon the piston. The reciprocating motion of the beam is now, through the intervention of the connecting-rod *g* and crank *h*, converted into a circular or rotary motion, which is rendered continuous and uniform by the fly-wheel *i*, to the axis of which the machinery to be impelled is connected. The air-pump *p* for withdrawing the vapor and water from the condenser, the feed-pump *s* for supplying the boilers, and cold-water pump *t* for supplying the condenser cistern, are all worked by rods from the beam; and the governor *u*, for maintaining uniformity of motion, is driven by a band from the crank-shaft. The above description refers more immediately to that class of steam engines called *low-pressure* engines.

The various forms of the steam engine have received a varied form of classification. There are the general divisions into *condensing* and *non-condensing* engines, *compound* and *non-compound*, and *single*, *double*, or *direct-acting*. Again there is the classification connected with the position of the cylinder, as in the *horizontal*, *vertical*, and *inclined* cylinder engines. Another classification, and that which is adopted here, is to divide steam engines into the uses to which they are applied.

(1) *Stationary Engines* comprise all

such engines as are permanently fixed for the purpose of driving the machinery in a factory, pumping water, etc. For a long time the favorite engine for these purposes was of the beam condensing type adopted and improved by Watt. But this has now, for the most part, been superseded by an engine the cylinders and connections of which are horizontal. In the most modern type the cylinder is fixed endwise to a base plate at one extremity, the crank-shaft has its bearings on the same base at the other extremity, and the piston-rod driven horizontally is guided by means of a crosshead, the ends of which slide between two parallel bars fixed on the frame. The Corliss engine is a well-known type of horizontal engine, its characteristic feature being the system of reciprocating valves by which the steam is passed to and from the cylinder. In some engines, especially such as are used as *winding* engines, a pair of coupled horizontal cylinders are now used; and in the larger form of horizontal engine two cylinders of high and low pressure are placed either side by side or one before the other. In cases where the cylinders are vertical the other general arrangements are much the same as in the horizontal engine.

(2) In *Portable Engines* the boiler and engine go together, the boiler being undermost; and the whole is supported upon four wheels, by means of which it is moved from place to place. The chimney is turned down over the boiler when not in use. A kind of engine known as *semi-portable* consists of a boiler and engine placed together, but without wheels.

(3) The *Road-locomotive* was first suggested by William Symington in Scotland, and developed for practical purposes about 1800 by Oliver Evans in America and Trevethick in Wales. It was used to propel carriages from town to town, but the badness of the turnpike roads and the subsequent introduction of railways brought the road-locomotive, as a means of transit, into disuse. In a modern form it is employed to draw heavy loads along the highway or over fields in farming operations. The chief characteristic of this *traction engine*, as it is called, is the great width of the wheels, which are now supplied by some makers with protected india-rubber tires to prevent slipping. It can be made to run backwards and forwards by means of reversing gear, while its course is guided by a steering wheel acting upon a vertical shaft.

(4) The *Railway-locomotive* is a steam engine and boiler placed upon wheels and employed to transport a train of wagons

or carriages upon a railway. Various attempts had been made to construct a steam engine to run upon rails by Blenkinsop (1811), Blackett (1812), Hedley (1813), Dodds & Stephenson (1815), and others. It was not, however, until the opening of the Liverpool and Manchester Railway in 1825 that the modern high-speed locomotive came into use. Upon that occasion a prize of £500 was offered for the best locomotive, and this was gained by an engine called the 'Rocket,' built by George Stephenson. This locomotive, which ran on four wheels, weighed 4 tons 5 cwt., and the tender, consisting of a simple cask, 3 tons 4 cwt.; the steam cylinders were 8 inches in diameter with  $16\frac{1}{2}$  inches of stroke; the driving-wheels were 4 feet  $8\frac{1}{2}$  inches in diameter; the total gross weight drawn was about 17 tons; and the speed attained was an average of 14 miles per hour, with an occasional speed of 29 miles per hour. In his engine of the 'Rocket' there were brought together the three primary elements which, having been developed, make the efficiency of the modern locomotive—viz.: the internal water-surrounded fire-box and the multitubular flue in the boiler; the blast-pipe, from which the waste steam of the engine was exhausted up the chimney; and the direct connection of the two steam cylinders, one on each side of the engine, with the driving-wheels, on one axle. From this early locomotive the two modern types, differentiated by the position of the cylinder, have been developed. In the *inside cylinder* locomotive the cylinder is situated within the framing, under the boiler, with the main driving-axle cranked at two points to receive the power from the two cylinders; while in the *outside cylinder* locomotive the cylinder is external to the framing and connected, not to the axle, but to the crank-pins fixed between the spokes of the wheels in connection with the nave. Another point of advance on the early locomotive is in the number of the wheels. These now vary from six to twelve, and in some locomotives, where heavy loads are drawn on inclines, a greater tractive power is secured by coupling three or even four wheels together upon one side. A system has been recently adopted of putting four wheels in front of a locomotive on a small truck or *bogie*, which turns upon a central pivot and adapts itself to the curves of the lines, so that the tractional resistance is lessened. The principle of the expansion of steam in high-pressure and low-pressure cylinders has also been adopted, in order to save fuel, in some recent locomotives. The express pas-

senger engine of the modern type now forms a striking contrast to the engine of the 'Rocket'; it weighs from 50 to 100 tons; its cylinders are from 17 to 19 inches in diameter, with a stroke of about 26 inches; the driving-wheels are from 7 to 8 feet in diameter; and the speed attained, 50 to 60 miles per hour. The modern freight engine is still heavier and has an enormous drawing power.

(5) The earliest forms of *Marine Engine* seem to have been devised by Rumsey and Fitch of the United States and Miller and Symington of Scotland, the earliest successful one being that of Robert Fulton, which he used in the 'Clermont' (see *Steamboat*). In Great Britain the first passenger steam vessel was the 'Comet,' built (1812). It had side paddle-wheels and was driven by a kind of inverted beam engine, with a single vertical cylinder, developing four or five horsepower. These early marine engines were constructed in a manner similar to Watt's land engine, but the position of the beam so high above the deck was soon recognized as a defect, especially in sea-going steamers. Instead, therefore, of a beam placed above the cylinder and piston, two beams or levers were placed below, one on each side of the engine, and the connecting-rod conveyed the power to the crank upwards instead of downwards. This design, however, was soon afterwards discarded in favor of an arrangement by which the cylinder was placed beneath and connected directly with the crank. A further improvement was secured by an *oscillating cylinder*, which moved right and left with the swing of the crank and enabled the piston-rods to be connected directly with the cranks. When the paddle-wheel was superseded by the screw-propeller a totally different type of marine engine was required. In this case the cylinder was inverted and placed above the shaft of the screw near the deck, and the connection with the crank was formed by means of an ordinary connecting-rod. In ships-of-war a horizontal direct-acting engine was adopted in order to keep the machinery below the water-line and out of danger from the enemy's guns. This took various forms, a recent one being the inverted vertical direct-acting engine, used in nearly all the large ocean steamers. These engines were commonly constructed with a two-cylinder compound arrangement, but this has been rapidly superseded by a three-crank triple-expansion engine first designed in 1874 by Mr. A. C. Kirk. This form of marine steam-engine has been found to effect a considerable saving in fuel, and the principle of expanding the steam has even been

used in a four-cylinder quadruple-expansion engine with success. Within the present century a tendency has developed to supplant the steam engine with the steam turbine (which see).

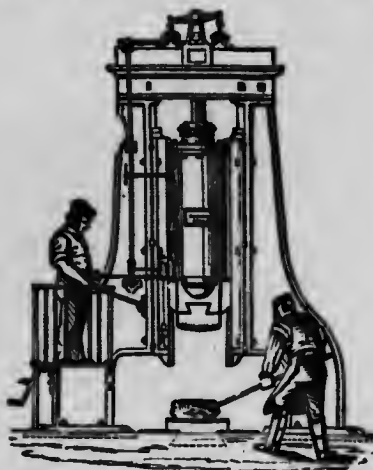
**Steamer Duck** (or **RACE-HORSE DUCK**), (*Micropterus brachypterus*), a species of marine duck from 35 to 40 inches in length, distinguished by its small, short wings, and the swiftness with which it paddles over the surface of the water. It is found in Patagonia and the Falkland Islands.

**Steam-gauge.** See *Gauge*.

**Steam-hammer,** a machine employed in making large iron and steel forgings, and consisting usually of a steam-cylinder and piston with a metal striker placed vertically over an anvil. In the hammer invented by James Nasmyth, about 1839, and patented in 1842, the first steam-hammer to come into practical use, the cylinder is fixed, and the hammer-head attached to the lower end of the piston-rod delivers its blows by the direct action

the blow. By means of the valves and valve gearing the person in charge of the machine has complete control over the slightest movement of the hammer. In Condie's steam-hammer the piston-rod is attached to the top of the hammer frame, and the cylinder is movable; the hammer-head is attached to and falls with the cylinder, which thereby adds an additional weight to the blow. In the duplex steam-hammer patented by Ramsbottom the anvil is discarded, and two hammer-heads of equal weight deliver their blows upon the forging horizontally. From the increased size of gun forgings the steam-hammer has now attained enormous proportions, hammers having been used of 100 tons or more in weight. Powerful hydraulic presses have, in recent years, been substituted for the steam-hammer in heavy forging work, but the hammer is preferred for lighter work.

**Steam Navigation,** the navigation of ships in which steam is the sole or main propelling power. As early as 1736 Jonathan Hulls in England patented a method of propelling a vessel by steam by means of a stern wheel. In America James Rumsey and also John Fitch succeeded in 1786 in constructing each a vessel that was actually driven by steam; and in Scotland in 1788 Patrick Mills and William Symington constructed a steamboat in which paddle-wheels were used. This idea was improved upon by Robert Fulton (1807), the success of whose boat has given him the reputation of being the inventor of the steamboat. A number of steam-vessels on the model of Fulton's *Clermont* were soon after plying on American waters and steamboats in the following years increased rapidly in numbers, both in the United States and in Europe. In 1819 a steamship, the *Savannah*, made the voyage to Liverpool from America in twenty-six days, its capacity as a sailing vessel being partly aided by steam. It was not until 1838, however, that regular steamship communication was established across the Atlantic. In that year the *Sirius* steamed from London to New York in seventeen days; and a few months afterwards the *Great Western* made the voyage from Bristol to New York in fifteen days. These were all paddle-steamers, and that type of vessel culminated in the *Scotia* (1861) of the Cunard line, which made the passage to New York in nine days. The measurements of this vessel were: length 366 feet, breadth 47 feet 6 inches; cylinder diameter 100 inches with a stroke of 12 feet, and the engines were of the side-lever type. Meanwhile various experi-



Condie's Steam-hammer.

of the steam in the cylinder. In operation the steam is introduced into the cylinder immediately below the piston, and it raises the hammer between the guides to the required height. The steam being then cut off, and the exhaust-valve opened, the hammer descends with a velocity augmented by the compression of the air above the piston. In 1861 Robert Wilson, who had made various improvements in the Nasmyth hammer, adopted the plan of admitting steam above the hammer, thus greatly increasing the force of





*Courtesy of Bucyrus Company.*

**STEAM SHOVELS AT WORK, PANAMA CANAL**

The machine in the foreground is a 95 ton Bucyrus steam shovel loading dirt in Culebra Cut. It is one of the most powerful machines used on the Panama Canal.

## Steam-shovel

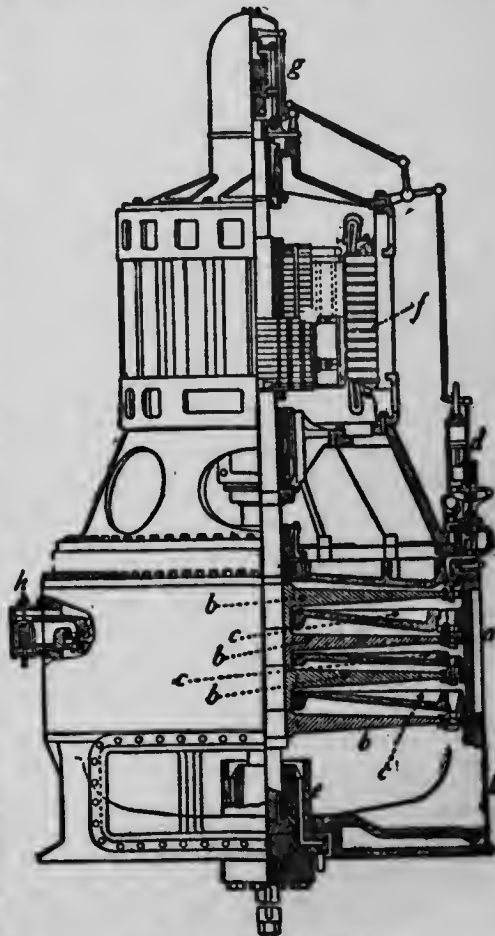
ments were made with the screw-propeller (which see). Modern vessels, and especially men-of-war, are frequently fitted with a pair of screws, the advantages being that the necessary propelling area may be got at a lower depth; while, by reversing one and letting the other go ahead, the vessel may be turned without a rudder and without steerage way. Working independently, one screw may be used without the other. Three and four screws have also been fitted. The modern type of ocean steamer is built of steel, and remarkable speed has been attained, the length of a voyage from England to New York having decreased from 9 days in 1856 to less than half that time. The most important development of the twentieth century in steam navigation has been the introduction of the turbine and internal combustion engines.

**Steam-shovel**, a machine employed in large operations for excavating earth or loose material of any kind. It is essentially a locomotive crane adapted for operating a mammoth dipper or bucket. The bucket is made of iron or steel and is carried on a boom so arranged that the bucket can be swung in any desired direction and can be run in or out, being carried at the end of a strong beam called the dipper-handle. The cutting-edge of the dipper is furnished with pointed teeth to allow it to dig into hard material and to protect the edge when working in rock. The bottom of the dipper is hinged and is released by a cord attached to a catch that holds it closed while the dipper is being filled. The capacity of the bucket is from three-quarters of a cubic yard to five cubic yards. In operation, rails are laid, over which the steam-shovel can travel up to the face of the cutting. The wheels of the car on which the shovel is mounted are then blocked. The bucket is held up to the face of the work by compensating gear. The mechanism is set in motion, and the bucket enters the earth. The dipper is pushed forward and upward, becoming filled; it is then swung round and emptied into a wagon, railway car or whatever means are employed for disposing of the material. A shovel of this type can handle from four to five thousand cubic yards of rock or ore per day. A performance is recorded of 32,000 cubic yards of material in six consecutive days of ten hours each. Steam-shovels were of great service in the work of excavating for the Panama Canal, sixty-three of them being in use there at one time. In fact, without the steam shovel it is unlikely that the construction of the canal would have been undertaken, as it is certain that it could not have been brought to completion in

## Steam-turbine

anywhere near the time it actually was finished. The accompanying illustration gives an excellent idea of its general appearance and method of operation.

**Steam-turbine** (turbin), an application of the turbine principle to steam engines, which has recently been applied with much success to ocean steamers of the greatest size. In this type of engine no cylinder is employed, the motion being produced



Curtis Vertical Steam-turbine.

a, Turbine-chamber or casing; b, b, b, revolving disks, or turbine-bucket elements of the rotor; c, c, c, guide-disks, or fixed elements of the stator forming the stages of the turbine; d, valves admitting steam to the nozzles (these are controlled by linkage to the governor g); e, footstep, carrying the vertical weight of turbine, generator, and shaft; f, dynamo or electric generator; g, governor to control speed and power; h, by-pass adjusting-valve; k, outlet to condenser, carrying away used steam.

by the pressure of the steam on the rims of a revolving turbine wheel. Long used economically in connection with water power, the turbine first came into competition with the ordinary steam engine in 1884, when the Parsons' steam turbine was first employed. De Laval's invention came into the market in 1889, and some others of importance have since been made. The most effective of the steam turbines consist of a long series of rings of moving blades, between which are rings of fixed blades. The latter serve as guides to direct the steam against the moving blades. As a result, the revolving drums on which these are mounted are set in swift rotation. When used in vessels, this gives rapid rotary motion to the propeller shaft. First tried as a marine engine on the torpedo boat *Turbinia* in 1897, it has since been applied to vessels of various kinds, these increasing in size until the great ocean steamships *Mauretania* and *Lusitania* were reached. The steam turbine is also used as a source of power for many other purposes. To obtain the highest efficiency it must be rotated at great speed, and a reduction of this speed by gearing is a matter of importance, especially in the case of steamship propellers. An invention recently made by Rear Admiral G. W. Melville, formerly chief engineer of the United States Navy, and J. H. McAlpine, is said to produce the desired effect.

**Steam-whistle**, an arrangement connected with the boiler of a steam-engine for the purpose of making a loud whistling sound. In the locomotive steam-whistle a tube, fixed to the head of the boiler and opening into its interior, is commanded by a stop-cock; the tube ends in a portion perforated with holes and surrounded by a thin brass cup; and the tube and cup are so adjusted as to leave a narrow opening all round. Above this opening a thin brass cup is fixed in an inverted position so as to present a sharp edge to the orifice. When the stop-cock is opened the steam rushes through this orifice with great violence, and in coming in contact with the sharp edge of the cup it produces a loud, shrill sound. Steam-whistles can be made to give off musical tones by graduating the length of the pipe or cup.

**Steam-winch** (wins'), a form of hoisting apparatus in which rotary motion is imparted to the winding axle of the winch from the piston-rod of a steam-engine.

**Stearic Acid** (sté'a-rik;  $C_{18}H_{36}O_2$ ), is one of the most important and abundant of the fatty acids.

As stearine it exists, in combination with glycerine, in beef and mutton fat, and in several vegetable fats. Stearic acid, which is inodorous, tasteless, insoluble in water but soluble in alcohol, forms white scaly crystals, and combines with alkalies, earths, and metallic oxides to form stearates. It burns like wax, and is used in making candles.

**Stearine**, **STEARIN** (sté'a-rin;  $C_{18}H_{36}O_2$ ), the chief ingredient of suet and tallow, or the harder ingredient of animal fats, oleine being the softer one. It is obtained from mutton suet by repeated solution in ether and crystallization. It may also be obtained by pressing tallow between hot plates, and afterwards dissolving in hot ether, which on cooling deposits the stearine. It has a pearly luster, is soft to the touch, but not greasy. It is insoluble in water, but soluble in hot alcohol and ether. When treated with superheated steam it is separated into stearic acid and glycerine, and when hotted with alkalies is saponified, that is, the stearic acid combines with the alkali, forming soap, and glycerine is separated. When melted it resembles wax.

**Steatite** (sté'a-tit), or **SOAPSTONE**, a sub-species of rhomboidal mica. It is of two kinds, the common and the pagodite or lardstone. It is a compact stone, white, green of all shades, gray, brown or marbled, and is soapy or unctuous to the touch. It is used in the manufacture of porcelain, in polishing marble, in diminishing friction in machinery, and as the basis of rouge and other cosmetic powders.

**Stedman** (sted'man), EDMUND CLARENCE, poet, born at Hartford, Connecticut, in 1833; died January 18, 1908. He studied at Yale, engaged in journalism, and in 1884 became a stock-broker in New York. He edited *Victorian Poets*, *Poets of America*, *Victorian Anthology*, and was joint editor in the *Library of American Literature*. Some of his own poems were highly esteemed.

**Steel** (stél), the term applied to metallic iron when combined with carbon; but as the proportion of carbon can be graded continuously from wrought-iron, which contains almost no carbon, up to cast-iron, which may contain as much as 10 per cent., the position of steel lying between these is necessarily indefinite. (See *Iron*.) Besides the essential elements of iron and carbon, steel may also contain small quantities of silicon, phosphorus, manganese, and sulphur. In steel used for ordinary purposes the carbon amounts from about 0.5 to 1.5 per cent.; the toughness, tenacity,

and hardness being increased with the increase of the carbon, while the elasticity decreases with the increase of hardness. In a red-hot condition steel can be welded almost as easily as bar-iron. It is a bright grayish white in color, the texture is granular, and in specific gravity it varies from 7.62 to 7.81. In commerce it takes various names: as when it is called *blister-steel* from its surface acquiring that character in the process of cementation, *shear-steel* when blister-steel is rolled or beaten into bars, and *cast-steel* when it is melted or cast into ingots. *Natural* or *German* steel is an inferior steel procured from cast-iron or obtained at once from the ore. When it is produced from cast-iron in the refining-house it is called *furnace-steel*, and when it has undergone the refining process only once it is known as *rough steel*. The value of steel depends greatly on the readiness with which it can be *tempered*. It is found that the higher the temperature to which steel is raised and the more sudden the cooling the greater is the hardness; hence any degree of hardness can be given to steel by applying the necessary conditions of heat and cold. The color of steel varies according to the degree of hardness to which it is tempered, and these colors at one time served to guide the workmen in tempering, but now a thermometer, with a bath of mercury or oil, is used.

In producing steel various methods have been employed in order to obtain (either by extraction or addition) a metal with the required amount of carbon. Among these may be mentioned (1) *The direct reduction of iron ores*. In this process the iron ore is mixed with charcoal and heated until metallic iron is produced, after which more charcoal is added and the material further heated until steel is produced. The disadvantage of this process is that it yields an irregular mixture of steel and iron. (2) *The adding of carbon to malleable iron*. In this process, which is usually called cementation, the bars of iron are placed in fire-brick chambers between layers of charcoal and there subjected to heat from a furnace underneath. The fire is usually maintained for six or eight days, and the degree of heat to which it is raised depends upon the degree of carbonization required. When the bars, now become steel by the addition of carbon, are withdrawn they are brittle and covered with blisters. In the United States it is common to melt the iron, in which state it absorbs carbon from the charcoal very rapidly. (3) *The Bessemer process*. In this method, which was

adopted by Mr. Bessemer in 1850, the carbon is first removed from the pig-iron by blowing a stream of compressed air through the metal when in a molten condition. When this is accomplished the exact amount of carbon required is afterwards added in the form of *spiegeleisen*, or some other variety of iron rich in carbon. Briefly, the process is conducted as follows:—The charge of molten pig-iron is run from the furnace into the *converter*. This latter is a vessel shaped like a bottle with the neck slightly bent sideways, formed of boiler-plate, and lined internally with a compact kind of sandstone called 'ganister.' The converter is then swung back into a vertical position, and in doing this the air-blast is automatically turned on. In a few minutes the carbon is all blown out of the metal, the blast is shut off, a quantity of molten spiegeleisen is run in, and then the whole contents of the converter is poured out into the casting ladle. (4) In the *Heaton process* the object desired is to oxidize the sulphur and phosphorus found in cast-iron and remove them in the slag. To produce this result nitrate of soda is placed at the bottom of an iron vessel and covered with a perforated iron plate. When the molten cast-iron is run in the iron plate becomes melted, and the chemical action set up by the nitrate of soda underneath destroys the silica and removes a large part of the phosphorus. (5) In the *Siemens-Martin process* it is sought to decarbonize pig-iron by mixing it with malleable iron. Thus the pig-iron is run off into a furnace heated to a very high temperature by gas from a Siemens' regenerative gas furnace. Then molten wrought-iron in small quantities is added until the decarbonization of the pig-iron is complete. When this is accomplished a fresh quantity of pig-iron is added to supply the exact amount of carbon required. The whole mass is then heated for a short time until ready to be run off into ingot molds. In the more modern 'Siemens' process a much larger relative quantity of pig-iron is employed, and although scrap-iron is generally worked in the process can be completed without it. (6) In the '*basic*' process, known also as the *Thomas-Gilchrist process*, it is sought to remove the phosphorus from certain highly phosphoretic ores. To effect this the ordinary Bessemer converter is lined with a mixture of magnesian lime, silica, alumina, and oxide of iron, a quantity of the latter being also added to the charge when the blast is in progress. This lining supplies a base, in combination with which the phosphorus in the



molten metal becomes oxidized and converted into phosphates. There is also an *acid process*, in which the furnace is lined with sand.

A very important method of steel production now largely in use and competing very effectively with the Bessemer process, is the *Open Hearth process*, which yielded three-fifths of the United States product in 1910. In its essential features this consists in melting high quality pig-iron in a regenerative furnace until a 'bath' of molten metal is produced. To this pieces of wrought iron or Bessemer steel (scrap coming from shearing the ends of rails, edges of plates, etc.), are gradually fed, these readily melting when added in small quantities, though very difficult to fuse if added largely. *Spiegeleisen* or ferro-manganese is next added to supply the requisite carbon, the result being tested by ladle samples. When the desired quality is attained a portion is run off, leaving a sufficient quantity of the molten metal to continue the process. By selecting scrap of fine quality a high degree of purity may be attained, and very fine 'homogeneous metal' has thus been produced, resembling wrought iron in softness and toughness and with some degree of the tenacity of cast-steel. *Acid* and *basic* processes are used in this as in the Bessemer method. As a result of the many improved methods of manufacture the cost of steel has been considerably reduced, and it is now rapidly displacing wrought-iron in almost all the uses to which it was applied. Its employment in the making of various kinds of instruments, edge-tools, springs, etc., is well known, but it is now extensively used in the manufacture of plates and rails, and is rapidly superseding iron in the building of ships. The United States is much the largest steel producer of the world, its annual output of nearly 25,000,000 metric tons being almost half that of all countries. Germany stands second with about 12,000,000 tons.

**Steel-bow**, a term in Scots law, *steel-bow goods* consisting in corn, cattle, straw, implements of husbandry, delivered by the landlord to his tenant, by means of which the tenant is enabled to stock and labor the farm, and in consideration of which he becomes bound to return articles equal in quantity and quality at the expiration of the lease. The origin of the term is uncertain.

**Steele** (stē'), SIR RICHARD, an English essayist, was born at Dublin in 1672, where his father was an attorney; he died in 1729. By the influence of his uncle, who was secretary to

the Duke of Ormonde, Steele was educated at the Charter-house, where he formed a friendship with Addison, and at Oxford. After three years spent at the university he left without taking his degree, and in 1694 enlisted as a private in the Royal Horse Guards. He soon after gained the favor and patronage of Lord Cutts, colonel of the Coldstream Guards, who made him his secretary and aid-de-camp, and appointed him an ensign in his own regiment. In 1702 he obtained a captaincy in Lord Lucas's newly-raised regiment of fusiliers. Shortly before this time (1701) he published a prose treatise called *The Christian Hero*, the object of which was to reform the manners of the time. Its severe morality, however, brought ridicule upon its author (who was by no means over-strict in his own conduct), and, to establish his character as a wit, he wrote the comedies of *The Funeral*, *The Lying Lover*, *The Tender Husband*, and a number of years afterwards he added to these *The Conscious Lovers*. In 1707 he was appointed, by the influence of Addison, to the editorship of the *Gazette*. Two years later he started, and was afterwards aided by Addison in maintaining, a light miscellany called *The Tatler*, which, with its successors *The Spectator* and *The Guardian*, established the fame of the two friends as the first of English essayists. As a zealous Whig Steele entered parliament, but he was expelled (1714) for the alleged sedition of his pamphlet called *The Crisis*. In the following year his fortunes improved when the Hanoverian party came into power, and he became deputy-lieutenant of Middlesex, and was knighted. Various were the journals which he started, such as *The Reader*, *The Englishman*, *Town Talk*, and *The Plebeian*, and among his pamphlets was an *Apology for Myself and My Writings* (1714). Notwithstanding the lucrative positions which he held under the government, and the fact that he received a fortune with both his wives, the impulsive free-handedness of Steele brought him constantly into financial difficulties. For this reason he was obliged to retire from London into Wales, where he died. See Addison.

**Steel Engraving.** See Engraving.

**Steell** (stēl), SIR JOHN, a Scottish sculptor, was born at Aberdeen in 1804; received his art education in the Royal Academy, Edinburgh, and also in Rome. In the competition for a statue of Sir Walter Scott he gained the prize with the figure now seated in the Scott Monument in Edinburgh, and from the

time of its completion (1846) his success was assured. Among his better-known works, also in Edinburgh, are the statues of Wellington (1852), Professor Wilson, Allan Ramsay, Thomas Chalmers, Queen Victoria, and the Scottish memorial to the Prince Consort, on the inauguration of which in 1876 he was knighted. He died in 1891.

**Steelton** (stēl'tun), a borough of Dauphin Co., Pennsylvania, on the Pennsylvania Railroad, 3 miles from Harrisburg, has extensive steel-works, producing steel rails, forgings, bridge and architectural steel; has also hosiery mills and brick-yards. Pop. 14,246.

**Steelyard** (stē'i'yard), formerly a factory in London belonging to the Hanse merchants, who had long valuable trading privileges, and a certain measure of self-government, the internal discipline of their factory being half monastic and half military. Their factory was walled, and to this the Hanse merchants more than once owed their safety in popular risings, when Flemings and other foreigners were massacred. After the decline of the Hanse Towns (which see) the Steelyard remained in the possession of the free towns of Lübeck, Hamburg, and Bremen till 1853, when it was sold to some private speculators.

**Steelyard**, or ROMAN STEELYARD. See *Falance*.

**Steen** (stān), JAN, a Dutch painter, born at Leyden about 1626; died in 1679. He studied under Nicholas Knipfer and Van Goyen, and married the daughter of the latter. From the conflicting accounts of his career it appears that he was at one time a tavern-keeper, and the tradition is that he led a drunken and dissolute life; but in disproof of this his numerous paintings attest that he must have been a laborious and careful worker. He stands in the foremost rank among Dutch painters alike as regards execution, composition, and color, and the action, gestures, and expression of his figures. In the British National Gallery he is represented by *The Music Master*, but his chief paintings are to be seen in the galleries of The Hague and Amsterdam.

**Steenbok**. See *Steinbok*.

**Steeple** (stē'pl), any tower-like structure attached to a church, whether a tower proper or spire or a combination of tower and spire or tower and lantern.

**Steeple-chase**, a kind of horse-race across a difficult

tract of country in which ditches, hedges, fences, and other obstacles have to be jumped as they come in the way. It is said that the name is derived from the fact that originally any conspicuous object, such as a church-steeple, was chosen as a goal, towards which those taking part in the race were allowed to take any course they chose. The steeple-chase course of the present day is marked out by flags, between which the rider must pass before he can win the race.

**Steering Apparatus**, the contrivance by which a vessel is steered, usually composed of three parts, viz: the rudder, the tiller, and the wheel, except in small vessels, where the wheel is unnecessary. The rudder or helm is a long and flat piece or frame suspended edgewise down the hind part of a ship's stern-post, where it turns upon a hinge to the right or left, serving to direct the course of a vessel, as the tail of a fish guides the body. The tiller is a bar of timber or iron fixed horizontally to the upper end of the rudder and projecting within the vessel. The movements of the tiller are effected in small vessels by hand, assisted by a tackle called the tiller-rope. In larger vessels there are, properly speaking, two ropes, or more commonly chains, which being wound about the axis or barrel of a wheel, act upon the tiller with the powers of a windlass. In large vessels a ponderous system of braces and tackle become necessary to assist the working of the wheel. This was remedied by the introduction of electric or steam-steering apparatus, which is a device connected with the tiller and controlled by the steering-wheel. There are numerous forms of apparatus, and manual labor at the wheel is now reduced to a minimum.

**Steevens** (stē'vens), GEORGE, a Shakespearean scholar, born in 1736; died in 1800. He collaborated with Dr. Johnson in an annotated edition of Shakespeare's works which was long the standard.

**Stefansson** (stē'fān-sōn), VILHJALMUR, a Canadian explorer, born at Arnes, Manitoba, November 3, 1879. He conducted several archaeological and ethnological Icelandic and Arctic expeditions; discovered the blond Eskimo found on both sides of Dolphin and Union Straits and Coronation Gulf; and in June, 1913, as commander of the Canadian Arctic Expedition, set out for four years' exploration north of Canada and Alaska, where he discovered new land in 73° 5' N. latitude, 115° 43' W. longitude. See *North Polar Expeditions*.

**Stein** (stin), **HEINRICH FRIEDRICH KARL, BARON VON**, a German statesman, born at Nassau in 1757; died in 1831. He studied at Göttingen, entered the mining department of the Prussian government, became head of the mines and manufactures (1784) department in Westphalia, visited the mining districts of England in 1786, became president of the provincial chambers of Westphalia in 1796, and a minister of state in 1804. For the severity of his criticisms on the administration he was dismissed (1807), but in a few months he was recalled, with power to introduce his reforms. Accordingly he abolished serfage by edict, made military service obligatory on all classes, and rearranged the financial and administrative affairs. By means of these reforms he laid the basis of Prussia's future greatness, but in less than a year he was proscribed by Napoleon and dismissed from office. He afterwards visited St. Petersburg, and was instrumental in bringing about the coalition which crushed Napoleon. When the military struggle was over he spent his life in retirement. See *Prussia*.

**Steinbock** (stin'bok), **STEENBOK** (stän'bok; *Nanotragus oryx*), a small antelope found in South Africa. It is ashen gray on the sides, white underneath, stands about 2 feet in height, and its flesh is much esteemed. The male alone has short horns. The name is also applied in Europe to the ibex (which see).

**Stela**, **STELE** (sté'la, sté'lé), the Greek name for a vertical slab or pillar of marble or stone. A small column without base or capital, serving as a monument, a milestone, etc.

**Stelvio** (stél'vë-ô), **PASS OF THE**, a military road leading over the Rhaetian Alps between the Tyrol and Lombardy, constructed by the Austrian government and completed in 1821.

**Stem**, a curved piece of timber or combination of timber to which the two sides of a ship are united at the fore end, or the similar portion of an iron or steel vessel. The outside of the stem is usually marked with a scale of feet showing the perpendicular height from the keel.

**Stem**, in botany, the axis of growth of a plant above ground. The stem may be either herbaceous or woody, solid or hollow, jointed or unjointed, branched or simple, upright or trailing, etc. In some plants the stem is so short as to seem to be wanting, the leaves and flower-stalks appearing to spring from the top of the root. There are also stems, such as the rhizome and tuber,

which, being subterranean, have been mistaken for roots. See *Botany*.

**Stencil** (stin'sil), a thin plate of metal, leather, or other material, used in painting, marking, etc. The pattern is cut through the material composing the stencil, which is applied to the surface to be painted. The brush then being brought over the stencil, only the interstices representing the pattern receive the colors.

**Stendal** (sten'däl), a town in Prussia, province of Saxony, on the Uchte, 40 miles N. N. E. of Magdeburg. It has a cathedral of the fifteenth century, and manufacture of woollens, cottons, etc. Pop. (1906), 23,281.

**Stenness** (sten'nes), or **STENNIS**, a loch in Orkney, a few miles N. E. of Stromness, 14 miles in circumference. It is remarkable for the two groups of standing stones, somewhat similar to those of Stonehenge, which are found on its shores. The smaller group, of which only two remain erect, belong to an area 100 feet in diameter with an outside ditch 50 feet in width. The larger group, known as the Ring of Brogar, consists now of fifteen stones in an inclosure 340 feet in diameter. See *Standing Stones*.

**Stenography**. See *Shorthand*.

**Stentor** (sten'tur), a genus of infusorial animalcules. They are among the largest of the Infusoria, and are usually found adhering to the stems and leaves of aquatic plants.

**Stephen** (sté'ven), King of England, son of Stephen, Count of Blois, by Adela, a daughter of William the Conqueror, was born about 1105. His uncle, Henry I, gave him the earldom of Mortaigne, in Normandy, and large estates in England, in return for which he took the oath for securing the succession to Henry's daughter, the Empress Matilda. Yet when his uncle died he hastened from France to England and laid claim to the crown for himself (Dec., 1135), and was crowned in London. Nevertheless his seat on the throne, by reason of the disaffection of many of the nobility, was very insecure. Besides this, in 1138, David of Scotland invaded England to secure the claims of his niece, but in the battle of the Standard he was defeated by the northern barons (Aug. 22). In the following year the empress herself landed in England with her half-brother, the Earl of Gloucester, and a civil war ensued, in which Stephen was taken prisoner and Matilda acknowledged queen. The conduct of the new sovereign, however, excited an insurrection

against her government; and, being shut up in Winchester Castle, she escaped with difficulty, while the Earl of Gloucester was taken prisoner. Stephen was exchanged for the earl, and the war was renewed. When Matilda retired to Normandy (about 1147) the contest was taken up by her son Henry. Finally the struggle was brought to an end in 1153 by the Treaty of Wallingford, in which it was agreed that Stephen should reign to his death, and that he should be succeeded by Henry. He died the following year.

**Stephen, SIR JAMES**, was born in London in 1780; died in 1850. He was educated at Cambridge, practiced as a barrister, became secretary of state (1834) for the colonies, and on his retirement he was appointed professor of modern history in Cambridge University. He was the author of *Essays in Ecclesiastical Biography* (1840), and *Lectures on the History of France* (1851).—His brother, **SIR GEORGE** (1794-1879), after studying medicine, became an attorney, and later a barrister; distinguished himself as an advocate for the abolition of slavery, and in bringing about reforms in connection with the police force and pauper relief; and was knighted in 1837.—**SIR JAMES FITZ-JAMES STEPHEN**, son of Sir James above, born 1820; died 1894. He was educated at Trinity College, Cambridge; called to the bar in 1854; became recorder of Newark-on-Trent (1859); legal adviser to the Indian Council (1860); professor of common law at the Inns of Court (1875); and a judge of the High Court of Justice (1879). He was the author of *Essays of a Barrister* (1862); *General View of the Criminal Law of England* (1863); *Liberty, Equality and Fraternity* (1873); *A Digest of the Law of Evidence* (1876); *A Digest of the Criminal Law* (1877); and a *History of the Criminal Law of England* (1883).—**LESLIE STEPHEN**, brother of the foregoing, born at Kensington in 1832; was educated at Eton, King's College, London, and Trinity Hall, Cambridge; was graduated in 1857, and became a fellow and tutor. Subsequently devoting himself to literature, he became the editor of the *Cornhill Magazine* (1871-82), and was the author of the *Playground of Europe* (1871); *Essays on Freethinking and Plain Speaking* (1873); three series of *Hours in a Library* (1874-79); *History of English Thought in the Eighteenth Century* (1876); *The Science of Ethics* (1882); *Lives of Pope, Swift and Johnson in the English Men of Letters*

series; and a *Life of Henry Fawcett* (1885). Was also editor of the *Dictionary of National Biography*. He died February 22, 1904.—**HENRY JOHN**, a cousin of Sir James and Sir George, born in 1787, died 1804, was author of *New Commentaries on the Laws of England* (four vols., 1841-45), often republished and quoted as a standard authority.

**Stephen, ST.** There are three saints of this name in the calendar, viz.: (1) The martyr whose death is recorded in the Acts of the Apostles, chapters vi and vii, and whose festival is held on Dec. 26; (2) Stephen, a pope from 253 to 257 (his day is the 2d. of August); and (3) Stephen the king (Stephen I of Hungary), a popular saint in Hungary and South Germany.

**Stephen Bathori.** See *Bathori*.

**Stephens, STEPH'ANUS** (English and Latin forms of *Estienne* or *Etienne*), the name of a notable French family of printers and scholars, the founder of which was Henry Stephens, who established himself in Paris about 1502. He was succeeded by his son **ROBERT** and grandson **HENRY**.

**Stephens, ALEXANDER H.**, statesman, born near Crawfordville, Georgia, in 1812. In 1834 he was admitted to the bar; was elected to the Georgia legislature in 1836 and to Congress in 1843, where he at once assumed prominence as a fearless advocate of the Union. In 1850 he opposed the secession movement. In 1860 he opposed the secession of Georgia, but after it was declared he joined the secession cause and in 1861 was made Vice-President of the Southern Confederacy. In 1866 he delivered a strong reconstruction speech and plea for the new freedmen. From 1874 to 1882 he was a member of Congress; in the latter year was elected Governor of Georgia. He died March 4, 1883.

**Stephens, ANN S.**, novelist, born at Derby, Connecticut, in 1813; died in 1866. She wrote many tales and novels, among them being *The Heiress of Greenhurst*, *The Old Homestead*, and *Fashion and Famine*.

**Stephens, JOHN LLOYD**, an American author, was born at Shrewsbury, New Jersey, in 1805; and died in 1852. He was graduated in 1822 at Columbia College; studied law, and practiced for eight years at the bar in New York. To recruit his health he made an extended journey through Europe and the East, an account of which he supplied in letters to Hoffman's



*American Monthly Magazine*, and afterwards published in fuller narrative form under the title of *Incidents of Travel in Egypt, Arabia Petræa, and the Holy Land* (1837), and *Incidents of Travel in Greece, Turkey, Russia, and Poland* (1838). In the following year he was sent by the United States government to negotiate a treaty with the government of Central America; and as the result of his experiences and investigations in that country he published *Incidents of Travel in Central America, Chiapas, and Yucatan* (1841); and after further explorations he issued *Incidents of Travel in Yucatan* (1843), both of which were valuable contributions to our knowledge of the ruined cities and monuments of this part of America. He was afterwards chiefly associated with the company which constructed a railway across the Isthmus of Panama.

**Stephenson** (stê'vn-sun), GEORGE, engineer, was born at Wylam, near Newcastle, England, in 1781; and died in 1848. In his fourteenth year he became assistant to his father, who was fireman at a colliery, and in 1812 he was appointed to manage



George Stephenson.

the engine at Killingworth Colliery. Meanwhile he had been educating himself, chiefly in the science of mechanics, with the result that he obtained permission from Lord Ravensworth to construct a traveling engine for the colliery tramway. This he accomplished in 1814, and next year he introduced a great improvement in the shape of the steam blast. In 1822 he succeeded in inducing the projectors of the Stockton and Darlington Railway to adopt an improved locomotive. He was then em-

ployed to construct the Liverpool and Manchester Railway, the directors of which accepted his locomotive called the 'Rocket,' which at the trial trip in 1830 ran 29 miles in an hour. He was afterwards identified with numerous railway undertakings, and he was also the inventor of a miner's safety-lamp.—ROBERT, his son, born in 1803; died in 1859. He was educated at Newcastle; apprenticed to a coal-viewer at Killingworth, and attended the science classes in Edinburgh University. Afterwards he assisted his father in the survey of various lines; and was subsequently employed in railway undertakings both at home and abroad. His most notable engineering achievements were the construction of the high-level bridge at Newcastle-on-Tyne, the railway bridge at Berwick-on-Tweed, the tubular bridge over the Menai Straits, and the Victoria tubular bridge over the St. Lawrence in Canada.

**Stepniak** (step'ni-ak), the *nom-de-plume* of SERGIUS MICHAEL DRAGOMANOFF, a Russian revolutionist, born in the Ukraine in 1841. He became a professor of Kieff in 1870, but was forced to flee on account of his free utterances in 1876. He afterwards resided in Geneva and London, where he published *Underground Russia, Nikiliism As It Is*, and other works. He was killed by a railway train in 1895.

**Steppes** (steps), (from the Russian *stepi*, a waste), the name applied to those extensive plains which, with the occasional occurrence of low ranges of hills, stretch from the Dnieper across the southeast of European Russia, round the shores of the Caspian and Arai Seas, between the Altai and Ural chains, and occupy a considerable part of Siberia. In spring they are covered with verdure, but for most of the year they are dry and barren.

**Sterculiaceæ** (ster-kû-ii-â'se-ê), a nat. order of poly-petaious exogens, allied to Malvaceæ. The plants of this order are trees or shrubs, with alternate, stipulate, simple, and often toothed leaves, with a variable inflorescence. They are natives of tropical and sub-tropical regions. The most important member of the order is the cacao-tree; others are the kola tree, the baobab, the durian, and the silk-cotton tree. The species here illustrated, a native of South and Central America, yields edible seeds as large as a pigeon's egg.

**Stère** (stâr), the French unit for solid measure, equal to a cubic meter, or 35.3156 cubic feet.

**Stereobate** (ster'e-u-bāt), in architecture, a kind of continuous pedestal at the bottom of a plain wall: distinguished from a *stylobate*, under a series of columns or pilasters.



*Sterculia Chicha.*

## Stereographic Projection

(ster'e-u-graf-ik), that projection of the sphere which is represented upon the plane of one of its great circles, the eye being situated at the pole of that great circle.

**Stereopticon** (ster-e-op'ti-kon), a magic lantern having two objective tubes that can be focused on the same part of a screen, and by the alternate projection of pictures from the separate tubes produce the well-known phenomenon of 'dissolving views.' The stereopticon has been successfully adapted to the projection of instantaneous photographs of moving objects, producing the same effect of motion on the screen as observed in the kinetoscope.

**Stereoscope** (ster'e-u-skōp), an optical apparatus which enables us to look at one and the same time upon two photographic pictures nearly the same, but taken under a small difference of angular view, each eye looking upon one picture only; and thus, as in ordinary visions, two images are conveyed to the brain which unite into one, the objects being thus represented under a high degree of relief. A reflecting form of stereoscope was invented by Wheatstone in 1838. Subsequently Brewster invented the refracting stereoscope, based on the refractive properties of the halves of double-convex lenses. This is the one now in general use. There are many forms of it, but it is generally a kind of small box furnished with two tubes containing each the half

of a lens through which the eyes look upon the two pictures at the back of the box. When the tubes are adjusted to suit the eye the observer takes the one picture into the right eye and the other into the left eye, but the perceptive faculty apprehends only one image, and that in bold substantial relief and intensity.

**Stereotype** (ster'e-u-tip). See *Printing*.

**Sterilized Milk** (ster'il-lzd), milk which has been subjected to a process that destroys the bacteria causing lactic or butyric acid fermentation and the germs of disease.

**Sterlet** (ster'let), a ganoid fish of the Caspian and various rivers in Russia. See *Sturgeon*.

**Sterling** (ster'ling), a city in Whiteside Co., Illinois, on Rock river, 109 miles w. of Chicago. The river affords extensive water power, and there are large manufactures of iron goods, farming implements, etc. Pop. 7467.

**Sterling**, an epithet by which English money of account is distinguished, signifying that it is of the fixed or standard national value; as, a pound *sterling*.

**Sterling**, JOHN, a poet and essayist, born at Kames Castle, Ireland, and of Bute, in 1806; died in 1844. He was the son of Edward Sterling, subsequently editor of the *Times*; received his education at Glasgow and Cambridge Universities; became for a short time editor of the *Athenaeum*; took orders in the church and was ordained (1834) curate to Julius Hare at Hurstmonceux; subsequently went abroad for his health and published a volume of poems (1839), as also the tragedy of *Stratford* (1843), also novels, poems, and essays. He is known chiefly as the subject of Carlyle's *Life of John Sterling* (1851), which was in some sort a reply to the *Memoir of Sterling* written by Archdeacon Hare.

**Stern**, the posterior part of a ship, or that part which is presented to the view of a spectator standing behind the vessel.

**Sternberg** (stern'burh), a town of Austria, in Moravia, 10 miles N. N. E. of Olmütz. It has important manufactures of linen, cotton, hosiery, sugar, bricks, and liquors. Pop. 15,196.

**Sternbergia** (stern-ber'ji-a), a fossil plant, probably monocotyledonous, allied to the Pandanaceae or screw-pines, occurring in the sandstones of the coal-measures.

**Sterne** (stern), LAURENCE, an English humorist, son of a lieutenant in the army, was born at Clonmel, Ireland, in 1713; died in London in 1768. He lived for part of his boyhood in Ireland, and afterwards being handed over to the care of a relative in Yorkshire, was put to school at Halifax in 1722, whence he removed to Jesus College, Cambridge. He took his degree of M.A. in 1740, received holy orders, and, through the interest of Dr. Jacques Sterne, his uncle, a prebendary of Durham, he obtained the living of Sutton, in Yorkshire, and also a prebend of York. Subsequently, by the interest of his wife, whom he married in 1741, he obtained the neighboring living of Stillington, at which and at Sutton he performed the clerical duties for nearly twenty years. During this period he was quite unknown as an author. In 1759 appeared the first two volumes of his longest work, *The Life and Opinions of Tristram Shandy*, which, by their humor, whimsicality, and happy audacity of tone and treatment, gained instant popularity. A third and fourth volume appeared in 1761, a fifth and sixth in 1762, a seventh and eighth in 1764, and a ninth, singly, in 1766. From the publication of the first volumes of *Tristram Shandy*, Sterne lived mostly in London or on the Continent, for a considerable time apart from his wife and daughter, who also were not with him at his death. His other writings are *A Sentimental Journey through France and Italy* (1768), and a number of sermons, besides letters published after his death. Though disfigured by indecency Sterne's *Tristram Shandy* and *Sentimental Journey*, especially the former, contain some of the finest humor in English literature.

**Sternhold** (stern'hoid), THOMAS, one of the writers of the first metrical version of the Psalms. He was educated at Oxford, became groom of the robes to Henry VIII, and died in 1549. The principal coadjutor of Sternhold in this work was John Hopkins.

**Sternum** (ster'num), in anatomy, the name of the breast-bone of vertebrate animals. In man the sternum forms the front boundary of the thorax or chest in the middle line, and to it the first seven pairs of ribs are attached. It consists in the adult of three pieces, named the *manubrium*, the *gladiolus*, and the *ensiform cartilage* or *xiphoid appendage*. It has a concave surface posteriorly, gradually decreases in breadth from above downwards, and averages about 6 inches in length. See *Thorax*.

**Stethoscope** (steth'u-sköp), an instrument used by medical men for distinguishing sounds within the thorax and other cavities of the body. In its simplest form it consists of a hollow wooden cylinder with one extremity funnel-shaped, the other with a comparatively large circular ivory plate. In using it the funnel-shaped extremity is placed upon the body of the patient, and the ivory plate to the ear of the listener, this broad plate helping to exclude foreign sounds. See *Auscultation*.

**Stettin** (stet-tën'), capital of Pomerania and the chief seaport in Prussia, situated on the Oder 17 miles from its entrance into the Stettiner Haff, 30 miles from the Baltic Sea, and about 90 miles by rail from Berlin. The principal part is built on the left bank of the river, while on the right bank are the suburbs of Lastadie and Silberwiese, connection being maintained by several bridges, one of which is a large railway swing bridge. The town has greatly expanded recently, especially since the removal of the extensive fortifications by which it was surrounded. Among its more notable features are the old royal palace, now occupied as government buildings, the new town-hall, two monumental gateways, several Gothic churches, exchange, theater, etc. Its industries, which are numerous and important, include iron-founding, shipbuilding, machine-making, the manufacture of chemicals, cement, sugar, etc. It has been a port of some importance since the twelfth century. Pop. 224,078.

**Steuben** (stü'ben), BARON VON, born in Prussia in 1730; acquired renown during the Seven Years' war; was made adjutant-general of the king's staff, but resigned and tendered his services to Washington in 1777, doing greatly in drilling and organizing the army at Valley Forge. In the following year he became an American major-general, and took an active part, chiefly as organizer, in the War of Independence until its close. Then he received from Congress a pension and a large grant of land in New York. He died in 1794.

**Steubenville** (stü'ben-vil), a city, capital of Jefferson Co., Ohio, on the west bank of the Ohio River, 43 miles below Pittsburgh. It has very large manufacturing industries, embracing iron, glass, pottery, tin, paper, etc. There are rich mines of bituminous coal in the neighborhood. Pop. 22,391.

**Stevens** (stë'vens), ALFRED, artist, born at Blandford, Dorsetshire, in 1817; died in 1875. His great

work is the monument to the Duke of Wellington in St. Paul's.

**Stevens**, ROBERT NIELSON, dramatist and novelist, born at New Bloomfield, Pennsylvania, in 1867. His plays are *An Enemy to the King*, and *The Ragged Regiment*; his novels *The Continental Dragoons*, *Philip Winwood*, etc.

**Stevens**, THADDEUS, statesman, born in Danville, Vermont, April 4, 1793. He was graduated at Dartmouth College, studied law, and as a lawyer was employed in many important suits. Removing to Pennsylvania, he served several terms in the legislature, and in 1835 succeeded in having the public school system adopted in that State. He was elected to Congress in 1848 and served for many years in that body where, as one of the Republican leaders, he was the chief advocate of emancipation and representative of the radical section of his party. Though he attacked his adversaries with bitter denunciation and sarcastic taunt, he was noted for uniform acts of charity. He died in 1868.

**Stevenson** (sté'ven-sun), ROBERT, engineer, born in Glasgow, in 1772; died in 1850. When nineteen he was intrusted with the erection of a lighthouse on the island of Little Cumbrae, and constructed twenty-three lighthouses round the coasts of Scotland, the most notable of which was the Bell Rock Lighthouse. He wrote an account of the latter, and published several important articles in the *Edinburgh Encyclopædia* and the *Encyclopædia Britannica*.

**Stevenson**, ROBERT LOUIS BALFOUR, author, grandson of the preceding, was born in Edinburgh, Nov. 13, 1850. Educated as an engineer, he studied law, and afterwards made literature his profession, becoming one of the most notable of recent novelists. He first attracted attention by two charming works, *An Inland Voyage* and *Travels with a Donkey*. Following were: *New Arabian Nights*, *Treasure Island*, *Prince Otto*, *The Strange Case of Dr. Jekyll and Mr. Hyde*, *Kidnaped*, *The Master of Ballantrae*, *The Wrecker*, *David Balfour*, *A Child's Garden of Verses*, and a number of sketches, etc. In his later years he resided in the Samoan Islands, and there died, December 3, 1894.

**Stevenson**, ADLAI E., Vice-President of the United States, was born in Christian Co., Kentucky, Oct. 23, 1835. In 1874 and 1878 he was elected a member of Congress from Illinois by the Democratic party in a

strong Republican district, showing his personal popularity. In 1885 he was appointed First Assistant Postmaster-General, and in 1892 was elected Vice-President of the United States. He was defeated as Vice-President (with W. J. Bryan) in 1900. Died June 13, 1914.

**Stevens Point**, a city, county seat of Portage Co., Wisconsin, on the Wisconsin River, 150 miles north of Milwaukee. It has large lumbering interests and manufacture of sashes and doors, furniture, boxes, automobile cradles, etc. Pop. 10,500.

**Stewart** (stō'art), BALFOUR, physicist, born at Edinburgh in 1828; died in 1887. He was educated at St. Andrews and Edinburgh; engaged in mercantile affairs, and went to Australia for several years; and on his return he was appointed successively assistant to Professor Forbes in Edinburgh, director of Kew Observatory, and professor of physics in Owen's College, Manchester. Among his numerous writings are: *An Elementary Treatise on Heat* (1866); *Lessons on Elementary Physics* (1870); *Conservation of Energy* (1873); *The Unseen Universe* (1875); and *The Paradoxical Philosophy* (1878), in conjunction with Professor Tait; and *Practical Physics* (1885), in conjunction with Professor Gee.

**Stewart**, CHARLES, naval officer, born at Philadelphia in 1778; died in 1869. He took part in the naval operations against Tripoli in 1804, commanded the *Constitution* in 1813, was in command of a squadron in the Mediterranean 1816-20, and in the Pacific 1821-23. He afterwards commanded the home squadron and had charge of the naval station at Philadelphia.

**Stewart**, SIR DONALD, was born in 1824, educated at Aberdeen University, entered the Bengal Staff Corps in 1840, took part in the suppression of the Indian mutiny in 1857, and in the Abyssinian expedition of 1867-68. He commanded the Candahar column in the Afghan campaign in 1878-80, and marched with the field force from Candahar to Cabul, defeating the Afghans at Ahmed Kheyl. He was commander-in-chief in India in 1881-85, and afterwards became a member of the Indian Council. He died in 1900.

**Stewart**, DUGALD, a Scottish philosopher, born at Edinburgh in 1753; died in 1828. He was educated in Edinburgh, and attended the lectures of Dr. Reid in Glasgow. In 1772 he began to assist his father, who was professor of mathematics in Edin-



burgh University, being appointed joint-professor three years afterwards. In 1778 he agreed to lecture also as substitute for Adam Ferguson in the chair of moral philosophy, and in 1785, when the latter resigned, Dugald Stewart received the appointment. Besides holding this position for a quarter of a century, from which he spread a fine intellectual and moral influence, Stewart was the author of *Elements of the Philosophy of the Human Mind* (1792-1827), *Outlines of Moral Philosophy* (1793), and accounts of the *Life and Writings of Adam Smith*, of *Dr. Robertson* and of *Dr. Reid*.

**Stewart**, FAMILY OF. See *Stuart*.

**Stewing** (stō'ing), a mode of cooking by which the meat is first covered with cold water, gently heated, and then kept slowly simmering below the boiling point until it is thoroughly cooked. If the stewing is not accomplished slowly the meat will be dry and tough.

**Steyr** (stī'er), a town of Upper Austria, at the confluence of the Steyr with the Enns, 10 miles S. E. of Linz, and about 90 miles S. W. of Vienna. It contains an old castle (10th century) and a Gothic church (1443.) Its chief industry is in iron and steel, and the making of cutlery; there is also an important small-arm factory. Pop. 17,592.

**Stibnite** (stih'nīt), trisulphide of antimony, an ore consisting of 72.88 antimony and 27.12 sulphur. The color is lead-gray or blackish, and it is very brittle. This ore is the source of most of the antimony of commerce. Called also *Antimony-glance*.

**Stickleback** (stik'l-hak), the popular name for certain small teleostean fishes which constitute the genus *Gasterosteus*. The species are found in the ponds and streams of the United States, as well as in salt-water; they are very active and voracious, and live upon aquatic insects and worms. The sticklebacks are among the very few fishes which build nests for their young. The nest is composed of straw, sticks, etc. In the top a small hole is formed, and in this the eggs, yellow in color and about the size of poppy seeds, are deposited. The most common species is the three-spined stickleback, banstickle, or tittebat (*G. aculeatus*, or *trachurus*), which is distinguished by the body being protected at the sides with shield-like plates, and by the possession of three spines on the back. It varies from 2 to 3 inches in length.

**Stigma** (stig'ma), in botany, the upper extremity of the style, and the part which in impregnation receives the pollen. It is composed of cellular tissue, has its surface destitute of true epidermis, and is usually moist. In many plants there is only one stigma, while in others there are two, three, five, or many, the number of stigmas being determined by that of the styles.



Section of Flower.  
s, Stigma.

**Stigmata** (stig'ma-ta), marks said to have been supernaturally impressed upon the bodies of certain persons in imitation of the wounds on the crucified body of Christ. St. Francis of Assisi is said to have been supernaturally marked in this way, and a similar distinction was claimed for St. Catherine of Siena.

**Stilbite** (stil'bit), a mineral of shining pearly luster, of a white color, or white shaded with gray, yellow, or red. It has been associated with zeolite and called *foliated zeolite* and *radiated zeolite*.

**Stilet'to**, a small dagger with a round, triangular or square pointed blade from 6 to 12 inches long, introduced in the middle ages, and made of ivory, bone or metal.

**Stilicho** (stil'l-kō), a general under the later Roman empire, was probably the son of a Vandal captain of the barbarian auxiliaries of the Emperor Valens. His prowess and military skill made him invaluable to the Emperor Theodosius. That emperor having bequeathed the Empire of the East to his son Arcadius, and that of the West to his second son Honorius, the former was left under the care of Rufinus, and the latter under the guardianship of Stilicho. At the death of the emperor (in 394 A.D.) Rufinus stirred up an invasion of the Goths in order to procure the sole dominion, but Stilicho put this down and effected the destruction of his rival. After suppressing a revolt in Africa he marched against Alaric (403 A.D.), whom he signally defeated at Pollentia, but whose claim for a subsidy from the Roman treasury he afterwards warmly supported. This conduct excited suspicion of his treachery on the part of Honorius, who massacred all the friends of Stilicho during his absence. He received intelligence of this fact at the camp of Bologna, whence he fled to

Ravenna. There, however, he was seized and put to death, 408 A.D.

**Still.** See *Distillation*.

**Still,** ANDREW TAYLOR (1828-1917), founder of osteopathy, born in Lee county, Virginia, educated at the log schoolhouse at Jonesboro, Va., and Holston College, Tenn. He served as a surgeon and major of the Twenty-first Kansas Volunteers in the Civil war. In 1874 he grasped the pivotal truth of osteopathy, and that year he called the birth of the science. He established his first school in 1892 at Kirksville, Mo., in a two-room frame cottage which has grown to the great American School of Osteopathy. He died December 12, 1917.

**Stilling.** See *Jung*.

**Stillingfleet** (stil'ing-flēt), EDWARD, a learned English divine, born in 1635; died in 1699. He studied at St. John's College, Cambridge, and was successively appointed rector of Sutton in Bedfordshire (1657), St. Andrews, Holbron (1665), canon of St. Paul's (1670), archdeacon of London (1677), the following year dean of St. Paul's, and bishop of Worcester (1689). His writings, most of which are controversial, and combat the views of Roman Catholics, Nonconformists, etc., include *Irenicum*, a *Weapon-salve for the Church's Wounds* (1659), *Origines Sacrae, or a Rational Account of the Christian Faith* (1662), etc.

**Stillwater** (stil'wā-ter), a city, capital of Washington Co., Minnesota, on the St. Croix river, 18 miles N. E. of St. Paul. It was formerly the center of a great lumber trade, but its chief industries now are foundries, machine shops, flour, boot and shoe, and wood-working factories, etc. Pop. 10,198.

**Stillingia** (stil'in-ji-a), a genus of plants, nat. order Euphorbiaceae, one of the species being the famous tallow-tree of China (*S. sebifera*). See *Tallow-tree*.

**Still Life**, in painting, the representation of inanimate objects, such as dead animals (game, fishes, etc.), furniture, vases, sometimes with fruits and flowers in addition.

**Stillman,** (stil'man), JAMES (1850-1918), an American banker, born at Brownsville, Texas, educated at Ossining, N. Y. He was president of the National City Bank of New York from 1891 to 1909, during which time he raised the bank's surplus from \$2,452,000 to \$29,038,000. He was the banker for the great Standard Oil Company and was the force behind the construction of many

railroads and industries, being at one time director of no fewer than 54 large corporations. He believed in foreign expansion and set himself to make America a commercial leader among nations, with New York the financial center of the world. He was an ardent yachtsman and was vice-commodore of the New York Yacht Club. He died March 15, 1918.

**Stillman,** THOMAS BLISS (1852-1915), an American chemist, born at Plainfield, N. J., graduated from Rutgers College in 1873. He was author of *Engineering Chemistry* and *Examination of Lubricating Oils*.

**Stillman** WILLIAM JAMES, author and artist, was born at Schenectady, New York, in 1828; died July 5, 1901. He wrote *The Cretan Insurrection*, *On the Track of Ulysses*, *Apollo and Venus*, etc. He was editor of the *Crayon* 1856-57.

**Stilt-bird,** STILT-PLOVER, a wading bird, having remarkably long slender legs, a feature from which it derives its common name. The stilt-bird of Great Britain is the *Himantopus melanopterus*. The black-necked stilt, *H. nigricollis*, is found in the United States. Few birds exceed it in the powers of flight, it traveling with astonishing rapidity.

**Stilted Arch**, a term applied to a which does not spring immediately from the imposts, but from a vertical piece of masonry resting on them so as to give to the arch an appearance of being on stilts. Arches of this kind occur frequently in all the mediæval styles.

**Stilton Cheese**, a well-known and solid, rich, white cheese, originally made at *Stilton*, Huntingdonshire, England, but now chiefly made in Leicestershire.

**Stimson** (stim'sun), HENRY LEWIS, born at New York in 1867; was graduated at Harvard in 1888. He entered the law office of Senator Root, was appointed district attorney for the southern district of New York State, and distinguished himself by his successful prosecution of the Sugar Trust frauds. He also tried and convicted Charles W. Morse for misapplying bank funds. He was nominated for Governor of New York in 1910, but lost the election. In 1911 he succeeded Jacob M. Dickinson as Secretary of War in Taft's cabinet.

**Stimulants** (stim'u-lants), in medicine, agents which produce a quickly diffused and transient increase of vital energy in the organism or some part of it. Stimulants are of two classes: the one comprises certain medi-

nai substances; the other warmth, cold, electricity, galvanism, and mental agents such as music, joy, hope, etc. in the first class ammonia, alcohol and sulphuric ether are commonly employed as stimulants. Stimulants have also been divided into *general* and *topical*, according as they affect the whole system or a particular part.

**Sting**, a sharp-pointed weapon or instrument with which certain insects, bees and wasps in particular, are armed by nature for their defense. In most instances this instrument is a tube, through which a poisonous matter is discharged, which inflames the flesh, and in occasional instances proves fatal to life.

**Sting-ray**, a fish belonging to the genus *Trygon*, nat. order Elasmobranchii, family Trygonidae, which is allied to that of the rays proper. It is remarkable for its long, flexible, whip-like tail, which is armed with a projecting bony spine, very sharp at the point, and furnished along both edges with sharp cutting teeth. A species (*Trygon centrura*) is common on the eastern coasts of N. America. These fishes sometimes inflict serious wounds with their tail.

**Stink-ball**, a preparation of pitch, rosin, niter, gunpowder, colophony, asafetida, and other offensive and suffocating ingredients, placed in earthen jars, formerly used for throwing on to an enemy's decks at close quarters, and still in use with Eastern pirates.

**Stint** (*Tringa*), a grallatorial bird, a species of sandpiper. Temminck's stint (*Tringa Temminckii*) is the smallest species of the British sandpipers, length  $5\frac{1}{2}$  inches. It inhabits the edges of lakes and inland rivers, and is said to breed in North Europe.

**Stipe** (*stip*), in botany, the foot-stalk of the fronds of ferns, as also the stem which carries the pileus of such fungi as agarics.

**Stipple** (*stip'i*), in engraving, a mode of producing the desired effect by means of dots; also called the *dotted style*, in contradistinction to *engraving in lines*. See *Engraving*.

**Stipule** (*stip'ui*), in botany, any, a small leaf-like appendage to a leaf, commonly situated at the base of the petiole in pairs, one on each side, and either adhering to it or standing separate. They are usually of a more

delicate texture than the leaf, but vary in this respect as well as in form and color. They are not found in all plants, but where they occur they frequently characterize a whole family, as in Leguminosae, Rosaceae, Malvaceae, etc.

**Stirling** (*stur'ling*), a royal and parliamentary burgh of Scotland, capital of the county of the same name, situated on a height overlooking the winding course of the river Forth, and 36 miles N. W. from Edinburgh. The town consists of an ancient portion formed of steep winding streets, and a modern portion built on the lower ground. The most important edifice is the castle, on a rocky eminence, which rises 220 feet above the plain, and terminates precipitously on the north-west side of the town. The principal parts of it as they now stand are the royal palace (rebuilt after a fire in 1855); the Parliament House, once a noble fabric, but now converted into mess-rooms and other accommodations; the chapel-royal, now used as store-rooms; and another palace begun by James IV, and finished by his granddaughter Mary. Other objects deserving of notice are the old church, with a massive and lofty tower; the North Parish Church; two old buildings called Mar's Work and Argyle's Lodgings; a fine arcade with town-hall; the Smith Institute, with library, reading-room, museum and picture-gallery; a new public hall, etc. The principal manufactures are woollens, carpets, leather, ropes, carriages; and there is a small shipping trade. Pop. 18,697.

The COUNTY of Stirling, area 451 square miles, lies between the firths of Clyde and Forth. In the N. W. corner is Ben Lomond, a mountain over 3000 feet high. The chief river is the Forth. The coal-fields of the southeastern part of the county are extensive, iron largely mined, and limestone is wrought in the Campsie district. There are important manufactures of woollens, cottons, and iron, besides a number of breweries and distilleries. Pop. 142,290.

**Stirling**, JAMES HUTCHISON, born in Glasgow in 1820; educated in arts and medicine in Glasgow University, France, and Germany; practiced as a surgeon in Wales for some years, but ultimately devoted himself to literary and philosophical studies. He is the author of *The Secret of Hegel* (1835); *Sir Wm. Hamilton, being the Philosophy of Perception* (1865); *Jerrold, Tennison, Macaulay, and other Essays* (1868); *As regards Protoplasm* (1869); *The Philosophy of Law* (1873); *Bur*



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in *Drama, together with Sacred Leaves* (1878); *Test-Book to Kant* (1881); *The Community of Property* (1885), etc.; and translator of Schwegler's *Hand-book of the History of Philosophy*. He was Gifford lecturer at the University of Edinburgh, 1888-90. Died in 1900.

**Stirrurp** (stir'up), a strap or something similar hanging from a saddle, and having at its lower end a suitable appliance for receiving the foot of the rider, used to assist persons in mounting a horse, and to enable them to sit steadily in riding. Ancient writers make no mention of stirrups, and they are first known to have been used in Europe in the sixth century A.D. They were in use among the Anglo-Saxons, and by the twelfth century they were common.

**Stiver** (sti'v'er), an old Dutch coin and money of account worth about two cents in money of the United States.

**St. Mary's**, a borough in Elk Co., Pennsylvania, 10 miles E. of Ridgway. It has breweries, saw and grist mills, and other industries. Pop. 6346.

**Stoat.** See *Ermine*.

**Stock** (stok), a name originally applied to a cruciferous garden plant, *Matthiola, incana* (called more fully *stock-gillyflower*), but now extended to the various species of *Matthiola*, and to certain allied plants of the same order. They are herbaceous or shrubby, biennial or sometimes perennial, and have single or double fragrant flowers, varying in color from white to red. The pods are nearly cylindrical, stigmas, large and spreading, and seeds winged. *M. incana* is probably the parent of the greater number of the hoary-leaved varieties cultivated, and known as Brompton stock, queen stock, etc. The Mahon stock (*Malcolmia maritima*) has been introduced from the Mediterranean, and like the species already mentioned is a favorite annual in the flower-garden on account of its beauty and fragrance.

**Stock**, in law, the term used to denote either the nominal capital invested in an incorporated company, usually called the capital stock, or the interests of the subscribers in the corporation. The capital stock is divided into shares which are distributed among the stockholders; and the par value of each share is determined by dividing the capital stock by the total number of shares issued. The stockholder is entitled to a share of the profits, and a voice in the management of the corporation. Dividends are paid on *common stock* whenever in the

judgment of the directors there is a sufficient surplus to warrant it; but the rate of percentage of dividends which shall be paid on *preferred stock* is usually fixed in the certificate of incorporation or the by-laws, and cannot exceed that rate, though it may be less if the earnings are not sufficient to pay it in full.

*Treasury stock* is that retained by the corporation and not issued to subscribers; *watered stock* is that for which the corporation has not received full value, and is usually issued for property estimated at a fictitious value. Laws governing the issue, ownership and control of stock vary in the several states.

**Stockade** (sto-kād'), in fortification, a fence or barrier constructed by planting upright in the ground trunks of trees or rough piles of timber so as to include an area which is to be defended.

**Stock Exchange**, an organization of professional brokers which conducts speculation and investment in securities, the paper representatives of transportation, industrial, mining, commercial and other properties. The leading stock exchanges of the United States are located in the cities of New York, Boston, Pittsburgh, Philadelphia, Chicago, Baltimore, Cleveland, Cincinnati, New Orleans, Salt Lake City, Denver, San Francisco, St. Louis. The principal exchanges in other countries are those of London, Paris, Berlin, Amsterdam, Antwerp, Brussels, Vienna and St. Petersburg.

On the American stock exchanges the brokers are all of one class—that is, they are not divided into jobbers and brokers proper; but one broker may specialize in the shares of Union Pacific, another in those of the Steel Corporation, and so on. Some brokers deal particularly in 'odd lots'—blocks of less than 100 shares—and some members called 'room traders' speculate entirely for their own account and do no commission business for customers. The commission charged for buying or selling is 12½ cents a share, so that on the usual order of 100 shares, the broker receives \$12.50. The government of the exchange in New York is vested in a body called the Governing Committee, consisting of the president, treasurer and forty other members, of whom one-quarter are renewed each year. The government of the other American exchanges is similar in form.

The business of buying and selling shares is done in a large room known as the 'floor.' Scattered over the floor are a large number of high posts. Each post bears the name of the stock or stocks which may be traded in at that post.



This provision is to bring buyers and sellers in any security together as quickly as possible. A broker desiring to buy shares of a certain stock will go to the post allotted to that stock and call out its name with the number of shares wished and the price he will pay. This is his bid. Other brokers may offer the stock to him at a slightly higher price, or his bid may be accepted at once. As soon as a price is agreed on, each broker—the buyer and the seller—makes a memorandum of the transaction which is reported to the offices at once by telephone. Meanwhile the broker also hands another memorandum of the transaction to an errand boy who takes the memorandum at once to the telegraph operator, who in turn sends it out on to the little instrument called the 'ticker.'

Transactions on the New York Stock Exchange may be made in three different ways: cash, regular or on a limited option to buyer and seller as to the time of delivery or acceptance. Cash means that stock bought in this manner is taken up and paid for the same day. Regular transactions mean that the stock bought in this way must be taken up and paid for by a quarter past two o'clock of the following day.

Connected with the stock exchanges of America are found clearing houses for shares. All the stocks in which there is a wide and active market are cleared. The object of this is to make as many offsets as possible, without actual deliveries, between sales and purchases. After the close of the exchange at three o'clock, comparison slips are at once exchanged between the two parties to each and every transaction, so that any misunderstanding may be at once noted. All these comparisons must be made by a quarter past four, and all firms should have their statements ready for the clearing house before seven o'clock. These statements are in the form of a balance sheet giving a record of the sales and purchases made by the firm.

One of the important differences between the New York Stock Exchange and the European bourses lies in the great variations in prices which occur in the former within short periods of time without any change in the value of the property represented by the stock. It was formerly the custom to attribute this difference to the system of marginal speculation which obtains in America, but now there seems to be no doubt but that the relations between speculation and bank loans are the real cause. Owing to the daily clearings of stock, it is customary to make bank loans on shares on call. In other words, whereas European call, or day-to-day, loans are made chiefly on com-

mercial discounts and acceptances, American call loans are made almost invariably on bonds and stock as collateral. This brings into the closest relations the American money market and the stock exchange. Moreover these call loans are usually based on the exchange price of the stock on the day when the loan is made, regardless of the correspondence or non-correspondence of this price with the book value of the shares as shown by an appraisalment of the property, condition of the company's finances, etc. It is the general custom to make call loans up to 80 per cent. of the selling price of the stock on the exchange if the stock be a dividend payer. In this way it results that, aside from higher interest charges, not very much more margin is required from a group of speculators when buying at a low figure than when buying at a high, and in either case the burden of the purchase is borne by the banks which lend on the shares, either directly to the speculators, or indirectly to them through their brokers. This feature makes immense speculative commitments on the exchange possible, with their accompaniment of inflated prices.

The same condition accounts at times for very great falls in prices. When calling of loans becomes imperative with the banks, speculators unable to pay off their loans have to see their shares thrown on the market. Such sales depress prices, weaken other loans (whose validity is judged by their correspondence with exchange prices) and induce further calls and more selling. Under this recurrent process prices may fall very low, particularly if other disturbing features, as in 1903 and 1907, are also present. Upon the outbreak of the European war, panic ensued among holders of securities, and the stock exchanges of the world were closed to prevent the selling of stocks and bonds at prices which would have brought ruin to banks and other financial houses. Practically none of them were opened until December, 1914, and then only under severe restrictions.

**Stockholm** (stok'hölm), the capital of Sweden, is beautifully and picturesquely situated between Lake Mälär and the Baltic, not far south of the junction of the Baltic Sea with the Gulf of Bothnia. It stands partly on the north and south sides of the strait that communicates between the lake and the sea, and partly on several islands, which are connected with the mainland and with each other by a number of bridges. The harbor approaches are rendered dangerous by reefs, but the harbor itself is commodious, with good wharfage facilities. The oldest and densest part of the city is called

the Staden, or the 'city.' Norrmalm on the north (with its eastern and western extensions of Ladugardsgardet and Kungsholmen), Södermalm on the south, and the island of Djurgården on the east, are important suburban extensions of the city proper. The chief public building is the Royal Palace, a fine edifice in the Italian style, situated in the Staden; other noteworthy edifices are the old Church of St. Nicholas (1264), the Franciscan Church, in which all the later sovereigns of Sweden have been buried, the Riddarhus (house of the nobility), the Royal Library, National Museum, Academy of Sciences, Parliament House, etc. The educational institutions are varied and of high excellence. The environment of the city with its numerous water-ways and bridges is suggestive of Venice, and its picturesque islands have been made beautiful by many promenades and parks, the most beautiful of which is the Djurgården. It is besides a place of considerable trade, and has varied manufactures, important iron, steel and ship-building industries. Pop. (1911) 341,886.

**Stocking**, a close-fitting covering for the foot and leg, anciently made of cloth or milled stuff sewed together, but now knitted by the hand or woven in a frame, the material being wool, cotton, or silk.

**Stock-jobbing**, the practice of dealing in stocks or shares, especially by persons who buy and sell on the Stock Exchange on their own account and not for clients, as do the stockbrokers properly so-called. The transactions carried out are often entirely of a gambling nature, and the jobber may have stock of his own neither to buy nor to sell. This business is now carried on to an amazing extent, and is of this character:—A agrees to sell B \$50,000 of bank stock at 120 per cent., to be transferred in twenty days, for \$60,000. Now, if the price of bank stock on the day appointed for transfer should be only 118 per cent., he may then purchase as much as will enable him to fulfill his bargain for \$59,000 and thereby gain \$1000 by the transaction. Should the price of bank stock, however, advance to 125 per cent., he will have to pay \$62,500 for the necessary amount of stock and will thus lose \$2500 by completing his agreement. In New York, Philadelphia and other American Stock Exchanges the delivery of the stock is required; in London, where 'time contracts' prevail, the stock is not usually transferred. See *Bulls and Bears*.

**Stock-list**, a list published daily or periodically in connection

with a stock-exchange, enumerating the leading stocks dealt in, the prices current, the actual transactions, etc.

**Stockmar** (shtok'mar), CHRISTIAN FRIEDRICH, BARON VON, German diplomat and physician, was born in Coburg, 1787; died, 1863. He was appointed (1816) physician to Prince Leopold of Coburg, subsequently holding the positions of his secretary, keeper of the privy purse, and controller of the household. He also took part in the negotiations which led to Leopold's marriage with the Princess Charlotte, and to the elevation of Leopold to the throne of Belgium (1831), and was one of those who arranged the marriage of Queen Victoria to Prince Albert (1840).

**Stockport** (stok'port), a parliamentary and municipal borough of England, partly in Cheshire and partly in Lancashire, 5 miles southeast of Manchester, on the Mersey. Its chief structures are St. Mary's Church, Christ Church, the free grammar school, the Sunday school, the free library, the museum situated in Vernon Park, and the immense railway viaduct which here crosses the Mersey. The cotton trade, connected with which are spinning, weaving, dyeing, etc., is the staple, and there are also foundries, machine shops, breweries, etc. Pop. 108,693.

**Stock Raising**, the rearing of cattle, goats and swine for market, forms one of the great industries of the United States, but while this country leads the world in the value of its live stock (\$4,925,000,000 in 1910), several other countries are important rivals. The Argentine Republic, with the same favorable conditions of climate and pasture, and with a less densely populated area, is rapidly increasing its exports of cattle and sheep products. Australia leads the world in the wool-raising industry. Statistics in the United States show that the dairy industry is increasing in importance while the business of raising cattle is declining. The number of dairy cows reported in 1910 was 20,625,000.

**Stocks** (stoks), an apparatus formerly used for the punishment of petty offenders, as vagrants, trespassers, and the like. It usually consisted of a frame of timber with holes in which the ankles, and sometimes both the ankles and wrists, of the offenders were confined.

**Stockton** (stok'tun), a city, capital of San Joaquin county, California, 48 miles S. E. of Sacramento, on the Central Pacific Railway. It is visited by steamers by way of the San Joaquin river, and is the center of a

considerable trade, especially in wheat, peaches, grapes, potatoes and beans. It has extensive manufactures of agricultural implements, glass, leather, lumber, flour, soap, etc. Pop. 35,000.

**Stockton** (STOCKTON-UPON-TEES), a parliamentary and municipal borough and seaport, England, county of Durham, on the left bank of the Tees. It is well built, and has a town house, borough hall, custom house, many fine churches and chapels, etc. Its proximity to the Cleveland district has led to the erection of extensive iron-works, foundries, and works for the manufacture of marine engines, iron bridges, etc., and it has iron shipbuilding yards, potteries, bottle-works, etc. Pop. 60,085.

**Stockten**, FRANCIS RICHARD, an American author, born at Philadelphia in 1834; was an engraver and draughtsman, but abandoned this occupation for journalism. He attained much popularity by his short stories, which are very numerous, among the best known being the *Rudder Grange* stories, *The Lady or the Tiger?* *The Ting-a-ling* stories, etc. He also wrote several novels, including *The Squirrel Inn*, *Pomona's Travel*, and various others of a humorous and often grotesque character. He died April 22, 1902.

**Stockwell** (stok'wel), CHESTER TWITCHELL, was born at Royalston, Massachusetts, in 1841, studied medicine and dentistry, and wrote *The Evolution of Immortality*, *The Ethical Basis of Equality*, *The New Materialism*, *The New Pantheism*, etc.

**Stoddard** (stod'ard), CHARLES WARREN, born at Rochester, New York, in 1848, removed to California, and in 1864 to Hawaii, where much of his later life was spent. He was professor of English literature at Notre Dame University, 1885-87, and at the Catholic University of America after 1889. His principal books are *Poems* (1867), *South Sea Idyls* (1873), and *Mashallah: a Flight into Egypt* (1881). He died April 24, 1909.

**Stoddard**, FRANCIS HOVEY, author, born at Middlebury, Vermont, in 1847. He was graduated from Amherst and became professor of English literature at the University of the City of New York. He wrote *The Modern Novel*, *Conditions of Labor in England*, *Miracle Plays and Mysteries*, *The Uses of Rhetoric*, etc.

**Stoddard**, RICHARD HENRY, poet, was born at Hingham, Massachusetts, in 1825; learned the trade of an iron-molder; began in 1848 to write

in prose and verse for periodicals, and ultimately devoted himself to literature. Among his numerous writings are *Foot-prints* (1840); *Poems* (1852); *Songs of Summer* (1857); *The King's Bell* (1863); *The Book of the East*, and other *Poems* (1871); and *Memoir of E. A. Poe* (1875). He died May 12, 1903; his wife, ELIZABETH DREW STODDARD (1873-1902), wrote several popular novels. *The Morgesons*, *Two Men*, and *Temple House*.

**Stoics** (stô'iks), a sect of philosophers which flourished first in Greece and subsequently in Rome, so-called from the porch or *Stoa*, at Athens, where Zeno, its founder, taught. It was about B.C. 308, fourteen years after the death of Aristotle and thirty-nine years after the death of Plato, that Zeno laid the foundation of the new school. He lived to a great age, and was held in much esteem by the Athenians, but none of his works have been preserved. His two most eminent disciples were Cleanthes and Chrysippus, who developed and systematized the Stoic doctrines. These were carried to Rome by Panætius of Rhodes, whose disciple, Posidonius, was the instructor of Cicero. Cato of Utica and Brutus also embraced Stoicism, and its chief teachers among the Romans were Cicero, Seneca, Epictetus, and Marcus Aurelius. The Stoics are proverbially known for the austerity of their ethical doctrines, which, indeed, quite overshadowed all the rest of their philosophy. With Zeno and his disciples the system appears to have been an attempt to reconcile a theological pantheism and a materialist psychology with a logic which seeks the foundations of knowledge in the representations or perceptions of the senses, and a morality which claims as its first principle the absolute freedom of the human will. Transferred to the Roman world, this philosophy became a practical rule of life. To Epictetus and the Stoics of the later empire the supreme end of life, or the highest good, is virtue, that is, a life conformed to nature, the agreement of human conduct with the all-controlling law of nature, or of the human with the divine will; not contemplation, but action, is the supreme problem for man; virtue is sufficient for happiness, but happiness or pleasure should never be made the end of human endeavor. The great struggle of Stoical morality is to subdue all emotion, which in itself is contrary to nature, entirely without utility, and productive only of evil. The wise man alone attains to the complete performance of his duty; he is without pas-

sion, although not without feeling; he is not indulgent, but just toward himself and others; he alone is free, having entirely subdued his passions, which are the great barrier to liberty; he is king and lord, and is inferior in inner worth to no other rational being, not even to Zeus himself.

**Stokes**, SIR GEORGE GABRIEL, scientist, born in Sligo, Ireland, in 1819; was educated at Bristol and at Cambridge, taking his degree in 1841 as senior wrangler and first Smith's prizeman. In 1849 he was appointed Lucasian professor of mathematics at Cambridge. He became a member of the Royal Society in 1851, was awarded the Rumford medal for his investigations on light, and was president of the Royal Society from 1885 till 1888. His writings were mostly contributed to the transactions of the learned societies. In 1889 he was created a baronet. He died in 1903.

**Stoke-upon-Trent**, a market town and parliamentary borough of England, in Staffordshire, on the Trent and Mersey Canal, 14 miles northwest of Stafford. It has recently been greatly improved, and has now a town hall, free library and museum, new market hall, etc. Its extensive manufactures of china and earthenware make it the center of the 'Potteries' district. Pop. 234,553.

**Stola** (stō'la), a garment worn by the Roman women over the tunic. It came as low as the ankles or feet, was fastened round the body by a girdle, leaving broad folds above the breast, and had a flounce sewed to the bottom. It was the characteristic dress of the Roman matrons, as the toga was of the men.



Roman matron attired in the Stola.

**Stolberg** (stōl'hurg), a town in Rhénish Prussia, on the Vicht, 7 miles east of Alx-la-Chapelle. Mining for coal, iron, lead, zinc, etc., is extensively carried on in the neighborhood, and there are smelting works, iron-foundries, rolling-mills, etc. Pop. 14,963.

**Stolberg**, CHRISTIAN, COUNT VON, a German author, born at Hamburg in 1748; died in 1821. He

traveled through Switzerland and North Italy in company with Goethe and Lavater; settled in Schleswig, and wrote poems, dramas, etc., besides a translation of Sophocles and other works from the Greek. He was much influenced by Klopstock.—His brother, FRIEDRICH LEOPOLD, COUNT VON STOLBERG, born in 1750; died in 1819, wrote plays, poems, travels, etc.; translated the *Iliad*, four tragedies of Aeschylus, some of the works of Plato, and Ossian's works. In 1800 he joined the Roman Catholic Church, after which he wrote an elaborate *History of the Religion of Jesus Christ*.

**Stole** (stōl), a long narrow band or scarf with fringed ends, worn by ecclesiastics of the Roman and English churches, by deacons over the left shoulder, being fastened under the right arm; by bishops round the neck, with both ends pendent in front to the knees; and by priests similarly, but with the ends crossed over the breast at mass.—*Groom of the stole*, the first lord of the bed-chamber in the household of the English kings.

**Stolp** (stōp), a town in Pomerania, Prussia, on the Stolpe, about 10 miles from the Baltic Sea. It has a large church built in the fourteenth century, an ancient castle, and manufactures of linen, articles in amber, spirits, tobacco, etc. Pop. 31,154.

**Stolypin** (stō'lī-pin), PETER ABEKZ-DIEVITCH, premier of Russia, was born in 1863; was graduated from University of St. Petersburg in 1884. A brilliant student, he soon won a position in the cabinet, in the ministries of the Interior and of Agriculture. In 1902 he became president of the Arbitration Board and governor of Grodno, and in 1903 governor of Saratoff. Thence he returned to the ministry of the Interior, and in 1906, on the formation of the first duma, was made Prime Minister. In August of that year a bomb was exploded in his house by enemies of his administration, but did not seriously injure him, though 30 persons were killed. He continued in power during the succeeding dumas, acting in the interest of the Imperial Government, and making new enemies by his severity. On September 11, 1911, he was shot while at the theater, and died a few days later.

**Stomach** (stum'ak), THE, the principal organ of digestion in animals, may be regarded simply as an expanded portion of the alimentary canal. The human stomach is of an irregularly conical or pear-shaped form; it is situated in the epigastric region, lying al-



most transversely across the upper and left portion of the abdominal cavity, below the liver and diaphragm and close to the front wall of the abdomen. Its largest extremity is directed to the left, its smaller to the right. Its upper opening, where the oesophagus terminates, is called the *cardiac* orifice, because of its closeness to the heart; and the lower opening, where the intestine begins, the *pylorus*, the portion of the intestine which joins it here being the duodenum. At the entrance to the latter is a valve which prevents the contents of the intestine from regurgitating backwards. The stomach is composed of four coats or layers, the outermost, or serous layer, forming part of the peritoneum or general lining membrane of the abdomen. Next is a muscular coat, then an intermediate or cellular, and lastly, an inner or mucous coat in which are the orifices of the glands for the secretion of the gastric juice. By its blood-vessels the stomach is intimately connected with the liver and spleen. Its nerves are very numerous, and come from the eighth pair and the sympathetic nerve. By these it is brought into close relationship with the heart, lungs, etc. The stomach owes its digestive powers chiefly to the gastric juice, an acid liquid containing a fermentive principle called pepsin that converts albuminous foods into peptones capable of absorption. Digestion is also aided by certain stomachic movements by which the gastric juice is mixed with the food. (See *Digestion*.) The stomach is subject to various diseases. *Acute gastric catarrh*, in which the mucous membrane becomes congested, may be constitutional; but more probably it arises from errors of diet, excess of alcohol, sudden changes of temperature, etc. In *chronic gastric catarrh* the congestion becomes permanent, and the symptoms are such as appear in an aggravated form of dyspepsia. *Ulceration of the stomach* is a disease of middle life, and seems to occur most commonly among women. The ulcer is at first limited to the inner coat of the stomach, but if not healed it will strike more deeply and probably penetrate the walls of the stomach. In a case where the stomach adheres, at the seat of the ulcer, to some other organ, actual perforation may be prevented; in which case peritonitis, which is speedily fatal, is not likely to arise. The symptoms of this disease are chiefly pain, vomiting, especially vomiting of blood, and general dyspeptic symptoms. *Cancer of the stomach* is not uncommon, though it seldom occurs before the age of forty. Its symptoms are not easily

to be decided even by a skillful physician. In mammals there are three kinds of stomachs, *simple*, *complex*, and *compound*. In the *simple* it consists of a single cavity, as in man and the Carnivora, etc. This is the most common form. The *complex* has two or more compartments communicating with each other, with no marked difference of structure, as in the kangaroo, squirrel, porcupine, etc. The Cetacea have from five to seven such compartments. The *compound* stomach is peculiar to the ruminants (which see). In animals of the lowest type there is no distinct stomach cavity at all; and even in those more highly organized it is often extremely simple.

**Stomach-pump**, a small pump or syringe used in medical practice, for the purpose of emptying the stomach and introducing cleansing or other liquids. It resembles the common syringe, except that it has two apertures near the end, instead of one, in which the valves open different ways, so as to constitute a *sucking* and a *forcing* passage. When the object is to extract from the stomach, the pump is worked while its sucking orifice is in connection with a flexible tube passed into the stomach; and the extracted matter escapes by the forcing orifice. When it is desired, on the contrary, to throw cleansing water, or other liquid into the stomach, the tube is connected with the forcing orifice, by which the action of the pump is reversed.

**Stomach-staggers**, a disease in horses, depending on a paralytic affection of the stomach. In this disease the animal dozes in the stable and rests his head in the manger; he then wakes up and falls to eating, which he continues to do till the stomach swells to an enormous extent, and the animal at last dies of apoplexy or his stomach bursts.

**Stomapoda** (sto-map'o-da), an order of crustaceans, having six or eight pairs of legs, mostly near the mouth (hence the name). They are found chiefly in intertropical climates, and are almost without exception marine. The order includes the locust shrimps (*Squilla*), the glass shrimps (*Erichthys*), and the opossum shrimps (*Myotis*).

**Stomata** (sto'ma-ta), in botany, minute orifices or pores in the epidermis of leaves, etc., which open directly into the air cavities pervading the parenchyma, and through which exhalation takes place. In zoölogy the name is given to the breathing-holes of insects

or similar animals. They are situated along the sides of the body in insects.

**Stone** (stōn), a town of England, county of Stafford, on the Trent, 7 miles south of Stoke-upon-Trent. It manufactures earthenware, shoes, etc. Pop. 5800.

**Stone**, a hard concretion of some species of earth, as lime, siliceous clay, and the like; also, the mineral obtained by quarrying rocks. The principal component parts of stones are siliceous, alumina, zirconia, glucina, lime, and magnesia; sometimes the oxides of iron, manganese, nickel, chromium, and copper are also found to enter into their composition. Stones are of various degrees of hardness and weight; they are brittle and fusible, but not malleable, ductile, or soluble in water. Stones are of extensive use for a great variety of purposes—for building, paving, grinding, ornamental purposes, etc. The stones of public buildings are liable to decay from chemical decomposition and mechanical disintegration. To prevent this decay oils and cements have been frequently used, but they have been found to discolor the stone and require frequent renewal. A siliceous coating applied to the stone seems to be the most effectual remedy. Frederick Ransome has patented a process in which a solution of silicate of soda is first put upon the stone and afterwards a solution of chloride of calcium. This process has been received with considerable favor.

**Stone**, a common measure of weight. The English imperial standard stone is 14 lbs. avoirdupois, but other values are in regular use, varying with the article weighed; thus, the stone of butcher's meat or fish is 8 lbs., of cheese 16 lbs., of hemp 32 lbs., of glass 5 lbs.

**Stone**, or CALCULUS. See *Calculus*.

**Stone Age**, an ancient period in the history of mankind in which only stone, bone and wood implements were known and used. It is divided into two sub-periods, the Paleolithic, or age of chipped stone, and the Neolithic, or age of polished stone implements. It far antedated historical times, though it still persists among some savage tribes.

**Stone**, ARTIFICIAL, a concreted material applied to numerous purposes, as making building blocks, flagstones, tiles, statuary, vases, grindstones, sewer-pipes, etc. There are many varieties, most of which have a base of hydraulic mortar, with which sand and pulverized stone of different kinds are mixed.

**Stone**, FRANK, an English genre painter, born at Manchester in 1800; died at London in 1850. He painted at first in water-colors, and was for long a member of the old Water-color Society. His first important work in oil, *The Legend of Montrose*, was exhibited at the Academy in 1840. Among his subsequent works are: *The First Appeal*, *The Last Appeal*, *Mated*, *The Course of True Love*, and *The Gardener's Daughter*. Most of his works have been engraved. He was elected A.R.A. in 1851.

**Stone**, LUCY (BLACKWELL), an American reformer, born in West Brookfield, Massachusetts, in 1818; was graduated from Oberlin College in 1847. In 1855 she married Dr. Henry B. Blackwell, retaining her own name. She expressed her views of woman suffrage in *Taxation without Representation*. In 1869 she helped organize the American Woman's Suffrage Association; became connected with the *Woman's Journal* in 1872, and was its editor after 1888. Her lectures on woman suffrage made her widely known. She died in Boston, October 18, 1903.

**Stone**, MARCUS, a painter of historical genre, the son of Frank Stone, was born in London in 1840; learned his art in his father's studio; exhibited his first picture in 1858 in the Academy, of which he became an associate in 1877, being elected an academician in 1887.

**Stone**, WILLIAM JOSE (1848-1918), an American lawyer and statesman, born in Madison county, Kentucky. He was educated at the University of Missouri and practiced law at Jefferson City, Mo. From 1885 to 1891 he was Democratic Congressman, and was governor of Missouri from 1893 to 1899. He was elected United States Senator in 1902 and re-elected in 1908 and 1914. Although chairman of the Senate Foreign Relations Committee he differed from President Wilson in the latter's pre-war policy and held to the belief that Americans should be warned not to take passage on armed belligerent vessels. He was one of those who voted against the war resolution in the Senate, but afterwards took his place with the supporters of war measures.

**Stone-fly** (*Perla bicaudata*), a well-known species of neuropterous insects, much used by anglers as a bait in trout-fishing. The hinder wings are large, the abdomen is furnished with two long appendages, and the larger jaws or mandibles are rudimentary.

**Stoneham** (stōn'am), a town of Middlesex Co., Massachusetts,

## Stonehenge

8 miles N. of Boston. It is largely a residential place; has large shoe factories; also produces druggists' supplies, chemicals, etc. Pop. 7090.

**Stonehenge** (stōn'henj), an extensive group of standing stones in Salisbury Plain, Wiltshire, England, about 7 miles N. of Salisbury. They form two circles and two ovals. The outer circle, which is about 300 feet in circumference, consisted, when entire, of sixty stones, each being about 15 feet high and 7 feet broad. Of these thirty were uprights, and thirty imposts, the uprights being placed at intervals of 3½ feet, and the imposts fitting by means of tenon and mortice. Of the outer circle twenty-four uprights remain (seventeen standing and seven down) and eight imposts, and at the grand entrance there are eleven uprights remaining, with five imposts. The inner circle, which is 8 feet from the outer, consisted of about thirty stones, 6 feet in height, without imposts; nineteen remain, eleven standing. The first oval consists of five trilithons, as they are called, that is, groups of three stones, two uprights, with an impost. Before each trilithon stood three smaller upright stones, but there are only six now standing. Inside the inner oval is a large slab supposed to have been an altar. The whole is surrounded by a double mound and ditch, and there is also an avenue leading from the northeast, bounded by a mound and ditch. In the neighborhood is a flat tract of land called the Cursus, and in the surrounding plain are numerous tumuli. These circles were probably formed in connection with the Druidical or some other old religion, but nothing is known of their origin or date of construction. See *Standing Stones*.

**Stoneman** (stōn'man), GEORGE, soldier and statesman, was born in Chautauqua Co., New York, in 1822. He was graduated from West Point in 1846, was made captain in 1858 and brigadier-general of volunteers in 1861. He commanded the cavalry of the Army of the Potomac at the battle of Chancellorsville and in 1864 was captured, with much of his command, in a raid against Macon. He was promoted Major-general in 1865, was governor of California in 1886-87, and died Sept. 5, 1894.

**Stone-ochre**, an earthy oxide of iron pigment, which forms a yellow

**Stone-pine**, a tree of the genus *Pinus*, the *P. Pinea*, common in the south of Italy. See *Pine*.

**Stone-plover**, a large species of plover, the *Edicnemus*

*crepitans*. It appears in England at the latter end of April, frequenting open hilly situations; makes no nest, but lays two eggs on the bare ground, and emigrates in small flocks about the end of September. Called also *stone-curlew* and *thick-knee*.

**Stone River**, BATTLE OF, one of the most sanguinary battles of the Civil war, fought Dec. 31, 1862, and Jan. 3, 1863, between the Army of the Cumberland, under Gen. Rosecrans (q. v.) and the Confederate forces under Gen. Bragg (q. v.), two miles east of Murfreesboro, Tenn. It ended in a victory for the Federals, though the losses on both sides were very heavy, being 13,249 for the Union, and over 11,000 for the Confederates. Gen. Bragg retired his forces to the line of the Duck river, and the Army of the Cumberland occupied Murfreesboro. Called also the *Battle of Murfreesboro*.

**Stones**, PRECIOUS. See *Gems*.

**Stonesfield Slate** (stōns'fēid), in geology, a slaty calcareous limestone, forming a constituent portion of the lower oolite formation, and abounding in organic remains. In it was first detected mammalian remains of the secondary epoch. See *Geology*.

**Stoneware**. See *Pottery*.

**Stonington** (stōn'ing-tun), a town and port of New London county, Connecticut, 50 miles S. S. W. of Providence, on the Atlantic coast, with a capacious harbor. It has a considerable trade and manufactures of silks, velvets, and iron goods. This place was bombarded by a British squadron in 1814, but was successfully defended. Pop. 9154.

**Stool of Repentance**, a seat in the churches of Scotland which those sentenced to expiate sins had to occupy.

**Stoppage in Transitu**, is the exercise of a right allowed by law to a seller to stop the delivery of goods purchased by a buyer who has become bankrupt while the goods are in the hands of a carrier or middleman for transmission. Stoppage in transitu, as the term implies, can only take place while the goods are actually on the way, since if they have arrived at their journey's end the seller's right over them has ceased.

**Storage Battery**, the name given an apparatus in which electricity is generated by chemical change of materials. Cells composed of

large sheets, or grids, of lead, superficially coated with protoxide of lead, are immersed in dilute sulphuric acid and polarized by passage of the current. As a result pentoxide of lead is formed on the positive plate and spongy metallic lead on the negative. When this has been accomplished by the electric current, the reverse charge sets up and the cells gradually return to their former chemical condition. In so doing they develop an electric current which may be used as a source of power. When the original condition has been restored they become inactive, but can be again charged as before. Such cells are grouped in series in storage batteries, and form a somewhat costly but convenient source of electricity. At first used for lighting and minor purposes, they have been improved and made more effective and are now of much service in moving automobiles, passenger railway cars, etc. Efforts have been made to improve on the lead battery, and Edison has recently invented a nickel-iron storage battery, in which equal power is produced in a battery of half the weight of the lead battery. In this plates of nickel-plated steel are held in a form of nickel-plated iron, and perforated boxes of phosphate hold a mixture of oxidized nickel and pulverized carbon, the electrolyte being a solution of caustic potash. This battery has not yet come into much use, but large numbers of automobiles are equipped with lead storage batteries. These seem likely to prove better than gasoline engines for heavy auto-trucks.

**Storax** (stō'rax), a resinous and odoriferous balsam. It is obtained by incisions made in the branches of the *Styrax officinalis*, a small tree which grows in the Levant, and is also known by the name of storax. The best is imported in red tears, but the common sort in large cakes. Storax has an agreeable, slightly pungent, and aromatic taste; it is stimulant, and in some degree expectorant.—*Liquid storax* is obtained from *Liquidambar styraciflua*, a tree which grows in Virginia, and from other species. It is greenish, of an agreeable taste and aromatic smell.

**Stork**, a name given to the birds of the genus *Ciconia* and of the subfamily Ciconiinae. They are tall and stately birds, the beak being moderately cleft and destitute of a nasal furrow. The common stork (*Ciconia alba*) is found throughout the greater part of Europe, but passes the winter in Africa and Asia. The adult is pure white, with the exception of the black quill feathers of the wings, the scapularies, and greater

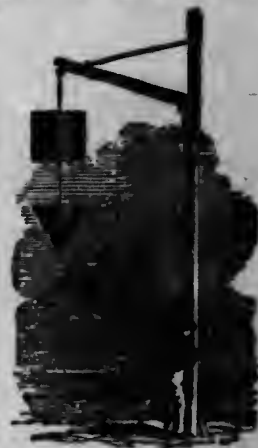
wing-coverts, and the red beak, legs, and toes. It is about 3 feet 6 inches in length, and when erect its head is about 4 feet from the ground. It is remarkable for its affection toward its young. It is a common practice in parts of Europe, especially in Holland, to place boxes for storks to build in, and it is considered a good omen when the box on the roof is occupied. Children are told that the stork brings babies to the house. The black stork (*C. nigra*) occurs in Poland and Prussia and in the sequestered parts of the Alps. The American stork is the *C. Maquari*; and the gigantic stork, or adjutant of Bengal, is the *C. argala*.

**Storm.** See *Meteorology*, *Cyclone*, *Wind*.

**Storm-glass**, a weather-glass containing a chemical solution sensible to atmospheric changes. In fine weather the substances in solution are said to settle at the bottom of the tube, leaving the liquid comparatively clear; previous to a storm the substances rise, and the liquid assumes a turbid and flocculent appearance.

**Storm-signal**,

a cone and drum used at seaports and coast-guard stations to indicate the appearance of a storm. The cone exhibited alone with its apex down portends a south gale; with its apex up a north gale. The cone with the apex down and the drum over it portends dangerous winds from the south; with the apex up and the drum under dangerous winds from the north.



Storm-signal, indicating dangerous winds from the south.

**Stornoway** (stō'nō-wā), a police burgh and seaport on the island of Lewis, Ross-shire, Scotland, about 180 miles from Oban. It is the center of fishing industry in the Outer Hebrides, its export of fish being chiefly to the Baltic ports. Pop. 3852.

**Storthing** (stōr'ting), the parliamentary assembly of Norway (which see).

**Story** (stō'ri), JOSEPH, an American lawyer, born in 1779; died in 1845. In 1808 he entered Congress, in 1811 became speaker of the Massachu-



setts State legislature, and soon after was appointed a judge of the United States Supreme Court. In 1829 he became professor of law at Harvard, a position which he held for the rest of his life. His law works include a number of special treatises, commentaries and judgments, and a collection of his miscellaneous writings was published in 1852.—His son, WILLIAM WETMORE STORY, born in 1819 at Salem, Mass., studied law, and published several law books, but gave up the legal profession; was long a resident of Rome, and was well known as a sculptor and poet. Died in 1895.

**Stothard** (stoth'ard), THOMAS, an English painter, born at London, in 1755; died in 1834. He early showed an aptitude for drawing, attempted book illustration and drew designs for magazines. Studying at the Royal Academy, he became a prolific designer. Among his more important works were designs for *Boydell's Shakespeares*, *Robinson Crusoe*, *The Pilgrim's Progress*, etc. Other works were *The Canterbury Pilgrims*, *The Flitch of Bacon* and *Greek Vintages*.—His son CHARLES ALFRED STOTHARD, born in 1786; died in 1821, was an antiquarian and painter.

**Stoughton** (stō'tum), a town of Norfolk Co., Massachusetts, 18 miles s. of Boston. Here are manufactures of boots and shoes, woolen yarns, cardigan jackets and rubbers. Pop. 6316.

**Stourbridge** (stur'orij), a market town of England, in Worcestershire, 10 miles w. of Birmingham. It has extensive manufactures of glass, iron and fire-bricks. Pop. 17,316.

**Stourbridge Clay**, a celebrated fire-clay found in a bed four feet thick, in the coal-measures of Stourbridge in Worcestershire.

**Stovaine** (stō'vān) is a highly complex chemical used as a local or regional anæsthetic. It crystallizes in small, brilliant scales, which melt at 175° C. (347° F.). It is a hydrocarbon derivative and soluble in water, methyl alcohol and acetic ether, slightly in absolute alcohol, and sparingly in acetone. It is quite stable and its solutions may be sterilized by heat at 115° C. (239° F.) without undergoing decomposition. It is precipitated from solution by the alkaloidal reagents and decomposed by alkalies. It is used especially by injection into the fluid within the vertebral canal in which the spinal cord is suspended, where, by temporarily paralyzing the spinal nerve tracts, insensibility to pain is produced, lasting from thirty to ninety minutes, during which

surgical operations may be performed without pain and yet the patient remain conscious. Its use obviates the necessity and dangers of the inhalation of ether, chloroform, ethyl oxide and other inhalant anæsthetics. It cannot be used for operations on the head, neck, shoulders, arms or the upper part of the trunk above the diaphragm, since it would embarrass or stop the heart by paralyzing its nerve supply.

**Stove** (stōv), an apparatus of metal, brick or earthenware, which is heated within by a fire, generally almost excluded from sight. The heating medium may be burning wood, coal, petroleum or gas. The simplest of all forms is the familiar Dutch stove, a hollow cylinder of iron, standing on the floor, close at top, whence a small flue or chimney proceeds, with bottom bars on which the coals, etc., rest. But as this form was found objectionable from the metal becoming overheated and the air in the apartment becoming unwholesomely dry, many kinds of improved stoves have now taken its place.

**Stow** (stō), JOHN, an English historian and antiquary, born at London about 1525; died in 1605. His studies and books brought him under suspicion of the ecclesiastical authorities and efforts were made to incriminate him as a papist. His chief works were: *A Summary of Englishe Chronicles*, *Annales* and *A Survey of London*. He printed editions of several antique works.

**Stowe** (stō), HARRIET ELIZABETH BEECHER, daughter of the Rev. Lyman Beecher and sister to Rev. Henry Ward Beecher, was born at Litchfield, Connecticut, in 1812; became associated with her sister Catherine in teaching a school at Hartford; removed to Cincinnati, and there married the Rev. Calvin E. Stowe in 1832; wrote several tales and sketches, and contributed to the *National Era*, a newspaper published at Washington, the serial story of *Uncle Tom's Cabin*. She issued this tale in book form in 1852, when it achieved an enormous success both in the United States and Europe. By its effect on the public mind it had a share among the influences that brought on the Civil war. Among her other numerous writings are: *Sunny Memories of Foreign Lands* (1854); *Dred, a Tale of the Dismal Swamp* (1859); *The Minister's Wooing* (1859); *Oldtown Folks*, one of her best novels, etc. She died July 1, 1896.

**Strabane** (strā-bān'), a market town in Ireland, County of Tyrone, on the Mourne near its confluence with the Finn. 15 miles s. w. of London.

with the Finn, 15 miles s. w. of Londonderry. Shirt-making is the chief industry. Pop. 5033.

**Strabismus** (stra-bis'mus). See *Squinting*.

**Strabo** (strā'bō), a Greek geographer, a native of Amasia, in Pontus, was born about 54 B.C., and died about 21 A.D. His earliest writings were his *Historical Memoirs* and a *Continuation of Polybius*, both of which are now lost. His great work, however, on geography, in seventeen books, has been preserved entire, with the exception of the seventh book, of which there is only an epitome. The first two books are introductory, the next ten treat of Europe, the four following of Asia, and the last of Africa.

**Stradella** (strā-del'iā), ALESSANDRO, born at Naples about 1645, was chapel-master at Genoa, and composed oratorios, cantatas, madrigals, and operas. At Venice he became enamored of one of his pupils named Ortensia, the mistress of a Venetian noble, who eloped with him to Rome. They were followed, and several attempts were made by hired assassins to murder them. This was ultimately accomplished (1678) in Genoa. This tragical story forms the subject of an opera by Flotow.

**Stradivari** (strā-dē-vā'rē), ANTONIO (STRADIVARIUS), a celebrated violin-maker, who was born in Cremona, Italy, about 1649; died in 1737. He was a pupil of Nicolo Amati, in whose employment he remained until 1700, when he began making on his own account. It was he who settled the typical pattern of the Cremona violin, and his instruments, for tone and finish, have never yet been excelled.

**Strafford** (straf'urd), THOMAS WENTWORTH, EARL OF, an English statesman, the eldest son of Sir William Wentworth, was born in London in 1593, educated at St. John's College, Cambridge, and after leaving the university received the honor of knighthood. He sat in parliament for Yorkshire for a number of years, and when Charles I asserted that the Commons enjoyed no rights but by royal permission, he was strongly opposed by Sir Thomas Wentworth. In this struggle his abilities were recognized, and high terms offered him by the court, which he accepted, and in 1628 was successively created Baron Wentworth, privy-councillor, and President of the North. In the exercise of this authority he commended himself to Archbishop Laud, who selected him to proceed to Ireland as lord-deputy in 1632. Here he greatly improved the state of the country, both as regarded law,

revenue, and trade; but to accomplish his ends he did not scruple to use the strongest and most arbitrary measures. For these services he was created Earl of Strafford. When the Long Parliament met the very first movement of the party opposed to arbitrary power was to impeach Strafford of high treason, with which charge Pym appeared at the bar of the House of Lords in 1640. His defense, however, was so strong that the original impeachment was deserted for a bill of attainder. The bill passed the Commons by a great majority, and was feebly supported by the House of Lords. The king endeavored to secure his safety, but yielded to the advice of his counselors, backed by a letter from Strafford himself, who urged him, for his own safety, to ratify the bill. Strafford was accordingly beheaded on Tower Hill in May, 1641.

**Strain** (strān), in mechanics, the force which acts on any material, and which tends to disarrange its component parts or destroy their cohesion, or the change resulting from application of such force. See *Stress, Elasticity, Strength of Materials*.

**Straits Settlements**, a British crown colony, deriving its name from the straits which separate the Malay Peninsula from Sumatra. It consists of the island of Singapore (the seat of government); the town and province of Malacca; the island of Penang and province of Wellesley; the islands and territory of the Dindings; the Cocos or Keeling Islands as a dependency; and it has an administrative control of the native states of Perak, Selangor, Sungei Ujong, Negri Sembilan, Johore and Pahang; area, about 35,000 sq. miles. The colony is administered by a governor and an executive and legislative councils. The chief exports are tin, pepper, sugar, sago, tea, coffee, and tobacco. Pop. about 573,000; Feudatory States, 357,000. See *Singapore, Penang, Malacca*, etc.

**Stralsund** (strāl'zunt), a seaport town of Prussia, in Pomerania, on the strait which separates the island of Rügen from the mainland, 115 miles north by west of Berlin. Its chief buildings are three massive Gothic churches and an ancient town-house. The manufactures consist of woollens, iron castings, machinery, sugar, etc., and there is a trade in grain and timber. This town was an important member of the Hanseatic League and during the Thirty Years' war successfully withstood a nearly three years' siege by Wallenstein. Pop. 31,813.

**Stramonium** (stra-mō'ni-um). See *Datura*.

**Strange** (stranj), **SIR ROBERT**, an eminent engraver, was born in Pomona, one of the Orkney Isles, in 1721; died in 1792. He studied law and attempted a seafaring life, but ultimately resolved to devote himself to painting. While thus engaged the rebellion of 1745 broke out, and he joined the Highland forces in Edinburgh, where he engraved a half-length portrait of the Pretender. After the battle of Culloden he went to France, gained a prize for design at Rouen, resided for some time at Paris, and in 1751 settled in London and became the founder of the English school of historical engraving. He received knighthood in 1787. His engraved plates, which number about eighty, evince an unusual combination of purity, breadth, and vigor.

**Strangles** (stran'glz), in farriery, a disorder which attacks horses; generally between the ages of three and five years. It consists of an abscess which occurs between the branches of the lower jaw. The disease is considered contagious. There is a similar infectious disease of swine called also *strangles*.

**Strangulation** (stran-gū-lā'shun), a sudden and violent compression of the windpipe, constriction being applied directly to the neck, either around it (as in hanging) or in the forepart, so as to prevent the passage of air, and thereby suspend respiration and life. If animation is only suspended by strangulation, the methods of restoring it are much the same as in drowning (which see).

**Strangury** (strang-gū-ri), a disease in which there is pain in passing the urine, which is excreted with difficulty.

**Stranraer** (stran-rār'), a seaport of Scotland, county of Wig-town, at the head of Loch Ryan, 20 miles west of Wigtown. The principal buildings are the ruins of Kennedy Castle, and the town-hall and court-house. The chief trade is in agricultural produce. Pop. 6036.

**Strappado** (stra-pā'dō), a military punishment, which consisted of having the hands of the offender tied behind his back, drawing him up by them to a certain elevation by a rope, and then suddenly letting him drop to within a certain distance of the ground.

**Strap-work**, a style of architectural ornamentation or enrichment general in the fifteenth and sixteenth centuries, but of which specimens

exist executed as far back as the eleventh century, consisting of a narrow fillet or band folded and crossed, and occasionally interlaced with another.

**Strasbourg** (strās'börg), or **STRASSBURG**, a town and fortress of Germany, in Alsace, capital of the territory of Alsace-Lorraine, on the Ill, about 2 miles west of the Rhine, to which



Strasbourg Cathedral, West Front.

its glacia extends, 250 miles east by south of Paris, and about 370 miles southwest of Berlin. By means of canals which unite the Ill with the Rhine, Rhone, and Marne, it is brought into communication with the Atlantic and the Mediterranean. It has always been regarded as a place of strategical importance, and strong fortifications and a pentagonal citadel were erected by Vauban in 1682-84. Since the siege of 1870 by the Germans these have been considerably altered and strengthened, the new system of defense adopted including fourteen detached forts situated from three to five miles from the center of the town. The streets in the older parts are irregular and quaint of aspect, hut since the removal of part of the old fortifications the modern portions have greatly expanded. The chief building is the cathedral, a structure which presents the architectural styles of the centuries from the eleventh to the fifteenth, in which it was built, but whose main element is Gothic. It is surmounted by a tower 466 feet high, has a splendid western facade, with statues and great rose-window, fine painted glass windows, and a famous astronomical clock. The other notable buildings are the church of St. Thomas, the Temple-Neuf or Neukirche, the old episcopal palace, the town-house, the new university building, opened in 1884, and the new imperial palace. The old episcopal palace contains the university and town library, numbering over 800,000 volumes. There are statues to Gutenberg and General Kléber, in squares correspondingly named, besides others. Its industries are very varied, and include tanning, brewing, machine-making, woolen and cotton goods, cutlery, musical instruments, artificial flowers, gloves, chemicals, and the preparation of its celebrated *pâtés de foie gras*. Strashurg, under the name of Argenteratum, is supposed to have been founded by the Romans, who erected it as a barrier against the incursions of the Germans, who ultimately possessed it. In the sixth century the name was changed to Strashurg, and in the beginning of the tenth century it became subject to the emperors of Germany. United to France in 1681, it was ceded with the territories of Alsace and Lorraine to Germany in 1871. Pop. (1910) 178,290.

**Strass**, a variety of flint-glass, but containing more lead, and, in some cases, a smaller proportion of borax, used in the manufacture of artificial gems of the better class.

**Strategy** (strat'e-ji), may be defined as the art of moving troops so as to be enabled either to dispen-

with a battle, or to deliver one with the greatest advantage and with the most decisive results. *Tactics* is the art of handling troops when in actual contact with the enemy. See *Battle*.

**Stratford** (strat'furd), a town of England, county of Essex, on the navigable river Lee, in the suburbs of London. It has extensive engineering works in connection with the Great Eastern Railway, chemical works, distilleries, etc. Pop. (1911) 50,738.

**Stratford**, a city and port of Ontario, Canada, on the Grand Trunk Railway and the Avon river, 88 miles w. of Toronto. It has railway shops and various manufactures. Pop. (1913) 16,425.

**Stratford-upon-Avon**, a municipal market-town of England, borough and market-town in Warwickshire, 8 miles southwest of Warwick, and about 100 miles by rail from London, famous as the birthplace of Shakespeare. The chief objects of interest are the house in which Shakespeare was born, and the parish church in which he was buried. The church interior was restored in 1840, and the tower rebuilt with the old material in 1867. Shakespeare's remains were interred in the chancel, and against the north wall are his monument and bust. There are several other churches, a town-hall, guild-hall, Shakespeare memorial theater, library, and picture-gallery. Pop. (1911) 8532.

**Strath**, in Scotland, a valley of considerable size, often having a river running through it and giving it its distinctive appellation; as *Strathspey*, *Strathdon*, *Strathearn*, *Strathmore*, etc.

**Strathclyde** (strath'klyd'), a kingdom formed by the Northern Romanized Britons which extended from the Clyde to the Solway, and had its capital in Dumharton.

**Strathcona** (strath'kō-na), a town of Alberta, Canada, on the Canadian Pacific R. R. It has brewing and malting interests. Pop. (1911) 5579.

**Strathcona**, AND MOUNT ROYAL, DONALD ALEXANDER SMITH, BARON, a Canadian legislator and railroad-builder, was born at Archieston, Morayshire, Scotland, in 1820, and entered in early life the service of the Hudson Bay Company. For thirteen years he was occupied on the Labrador coast and afterwards in the Northwest wilderness, serving the company with such ability that he was eventually appointed its chief factor, and in the end was made resident governor. He served as a special commissioner in the first Riel rebellion, 1869-71, doing his duty so well as to re-



ceive the special thanks of the governor in council. In 1871 became a member of the first Manitoba parliament, and in the same year was elected to the Dominion House of Commons. In 1872 he was made a member of the first executive council of the Northwest Territory. He became largely interested in the railway development of Canada and gave years to the work of completing the Canadian Pacific Railway, which owed its success to him more than to any other man. His services in the interest of Canada were so valuable and excellent that in 1886 Queen Victoria conferred on him the honor of knighthood, and in 1897 raised him to the peerage as Baron Strathcona and Mount Royal. He was appointed to represent the Dominion of Canada in London as high commissioner in 1896. Other positions held by Lord Strathcona have been those of president of the Bank of Montreal, Lord Rector and Chancellor of Aberdeen University, and Chancellor of McGill University, while he has received a number of honorary university degrees. He died January 21, 1914.

**Strathcona**, a town of Alberta, Canada, on the south bank of the Saskatchewan River, opposite Edmonton, with which it is connected by a steel bridge. It is the northern terminus of the Calgary and Edmonton branch of the Canadian Pacific Railway. There are some manufactures and coal is mined in the vicinity. Strathcona is now amalgamated with Edmonton. Here is the University of Alberta, which was opened in 1908.

**Strathmore** (strath-môr'), the general name given to the extensive valley of Scotland which stretches northeast from Dumbartonshire to Kincardineshire, having on one side the Grampians and on the other the Ochil and Sidlaw Hills; but it is popularly limited to the district which stretches from Methven in Perthshire to Brechin in Forfarshire.

**Strathnairn** (strath-nârn'), HUGH ROSE, BARON, a British soldier, born in 1803; died in 1885. He entered the army in 1820, organized the Turkish defense in 1840, was consul-general for Syria, and in 1848 became secretary to Lord Stratford de Redcliffe. He served in the Crimean War and the suppression of the Indian mutiny, succeeded Lord Clyde as commander-in-chief in India, and from 1865 to 1870 was commander-in-chief in Ireland. He was raised to the peerage in 1866 and made field-marshal in 1877.

**Strathspey** (strath-spa') in Scotland, a species of dance in duple time, supposed to have been

first practiced in the district from which it received its name. It resembles the reel, but has a slower movement.

**Stratum** (strâ'tum), in geology, a layer of any deposited substance, as sand, clay, limestone, etc., which has been originally spread out over a certain surface by the action of water, or in some cases by wind, especially such a layer when forming one of a number superposed and forming a mass of rock. When strata do not lie horizontally but are inclined, they are said to *dip* towards some point of the compass, and the angle they make with the horizon is called the *angle of dip* or *inclination*. When strata protrude above the surface, or appear uncovered, they are said to *crop out*. They are said to be *conformable* when their planes are parallel, whatever their dip may be; and *unconformable* when there is a want of parallelism between the strata. See *Geology*.

**Stratus** (strâ'tus). See *Cloud*.

**Straubing** (strou'bing), a town in Lower Bavaria, on a height above the right bank of the Danube, 25 miles southeast of Ratisbon. The Stadthurm (city tower) is an interesting thirteenth century relic. Pop. (1905) 20,856.

**Straus**, (strous), OSCAR SOLOMON, an American diplomatist, was born at Ottenberg, Rhenish Bavaria, in 1850; came to the United States in 1854. In 1887 he was appointed United States minister to Turkey and again in 1898, holding the office until 1900. In 1902 President Roosevelt appointed him a permanent member of the Committee of Arbitration at The Hague. On December 24, 1906, he became Secretary of Commerce and Labor and in 1909 was appointed Ambassador to Turkey. He is the author of a number of works on religious liberty and United States political history.

**Strauss** (strous), DAVID FRIEDRICH, writer, was born at Ludwigsburg, Württemberg, in 1808. He studied in Tübingen University; became assistant to a country clergyman in 1830; was appointed temporary professor in the seminary at Maulbronn; resigned this position and went to Berlin in 1831 to study under Schlegel and Hegel; returned to Tübingen and lectured on logic and philosophy; and published in 1835 his famous *Life of Jesus*, in which he attempted to prove that the gospel narratives had a mythical origin and growth. To his numerous critics he replied in *Streitschriften*, and *Zwei friedliche Blätter*. Appointed in 1839

to the chair of dogmatic theology in Zurich he was prevented from entering upon his duties by a storm of popular indignation, but received a small pension in recompense. His subsequent writings were many. In *Der alte und der neue Glaube* ('The Old and the New Faith,' (1872), his attitude toward Christianity was entire hostile. His more important works have been translated into English. He died February 8, 1874.

**Strauss, JOHANN**, an Austrian composer, pover, born in 1825; son of Johann Strauss, a Viennese dance-music writer and conductor (1805-49). He toured through Europe, and in 1863 became conductor of the court balls at St. Petersburg. He wrote over 400 waltzes, many of them world-famous, and several successful operettas; died in 1899.—His brothers JOSEPH and EDWARD also distinguished themselves as composers and conductors.

**Strauss, RICHARD**, German composer and conductor, born in Munich in 1864. Since 1898 he has been first conductor at Berlin. As a composer he represents the ultra-modern school, and, while he has not the gift of melody, his mastery of orchestration is extraordinary. His symphonic poems are very popular and his operas, including *Salome* and *Electra*, have been sensational successes wherever produced.

**Strawberry** (str'ber-i), a well-known fruit and plant of the genus *Fragaria*, nat. order Rosaceæ. It is remarkable for the manner in which the receptacle, commonly called the fruit, increases and becomes succulent; but the true fruit is the small seeds or achenes on the surface of the receptacle. The species are perennial plants, throwing out runners which take root and produce new plants; they are natives of temperate and cold climates in Europe, America, and Asia. The following species afford the varieties of cultivated strawberries: (1) Wood strawberry (*F. vesca*), found wild in woods and on hillsides throughout Europe, and now cultivated in gardens, as the red, the white, the American, and Danish Alpine strawberries. (2) The Alpine strawberry (*F. collina*), a native of Switzerland and Germany. The varieties of strawberries called green are the produce of this species. (3) Hautbois strawberry (*F. elatior*), a native of North America. (4) Virginian strawberry (*F. virginiana* or *caroliniana*), a native of Virginia. To this species belongs many varieties cultivated in gardens, and known by the name of scarlet and black strawberries. (5)

Large-flowered strawberry (*F. grandiflora*) is supposed to be a native of Surinam, and to have furnished gardens with the sorts called pine strawberries. (6) Chile strawberry (*F. chilensis*), a native of Chile and Peru, and the parent of a number of mostly inferior strawberries. Strawberries are much valued for dessert, and for purposes of jam-making. The strawberry thrives in any good garden soil, and is propagated by seeds, by division of the plant, and by runners.

**Strawberry-pear**, a plant of the cactus family, the *Cereus triangularis*, which grows in the West India Islands. Its fruit is



Strawberry-pear (*Cereus triangularis*).

sweetish, slightly acid, pleasant, and cooling.

**Strawberry-tomato**, the name of genus *Physalis* (*P. Alkekengi*), nat. order Solanaceæ, known also as *winter-cherry*, cultivated for its fruit, which is of a bright red color, of the size of a small cherry, and makes a delicate sweetmeat.

**Straw Plait**, straw plaited or braided into strips or tissues of some size for making hats, bags, ornaments, etc. In the manufacture of straw hats the straw must be of a certain length between the knots and must not be brittle; and these qualities are found most frequently in the wheat grown in Tuscany, where the well-known Leghorn hats are made. When the grain is still green the straw is pulled up by the roots, dried in the sun, bleached by means of sulphurous fumes, split by a machine, and then plaited into hats by women and young children as a domestic industry. Cer-

tain kinds of wheat cultivated around Luton, in Bedfordshire, were found suitable for plaiting, from which cause it became the center of the straw-plait industry in England. In the United States the making of hats, etc., from imported plait is now an extensive industry.

**Streator** (stré'tur), a city of La Salle Co., Illinois, on Vermillion River, 80 miles s. w. of Chicago. Coal is largely shipped from neighboring mines, and sewer-pipe, glass, hardware, etc., are made. Pop. 14,253.

**Street** (strét), GEORGE EDMUND, an English architect, born in 1824. Having studied architecture under Sir G. Gilbert Scott, in 1850 he began work on his own account. He favored the English Gothic style, and in that his principal works were built. He died in 1881.

**Street Railways**, railways specially designed for local passenger traffic. The first was laid in New York City in 1831, by John Stephenson, but was a financial failure. In 1845 it was resumed. In 1852 many other lines were projected and commenced. The first motive power was by means of horses, but in 1873 Hailidie built a road in San Francisco on which the cars were drawn by an endless cable which ran over a drum and pulleys in a conduit beneath the surface on which the rails were laid. This motive power came in considerable use but after 1885 was rapidly superseded by electricity applied by overhead wires, the connection with the car being made by means of a trolley and flexible pole. Other means of propulsion are the 'third rail' and the underground wire electric methods, compressed air, storage batteries, etc., in all of which the United States is far in advance of other nations. Electric lines of railway have nearly superseded all others and now run out from American cities far into the adjacent country and greatly add to the convenience of travel, they having been extended until continuous rides can be had for several hundred miles. The principle is being rapidly applied to the railroad traffic. See *Electric Railway*.

## Strength of Materials.

The strength of any material is the resistance which it opposes to alteration of form or to fracture by any application of force. Materials are subject to many forms of strains, and some are better qualified to resist strains of a certain kind than others. Stone, for example, is admirably constituted for supporting

immense weights, but it would not offer much resistance to a direct pull. Cast-iron is superior to wrought-iron in resisting a pull or tensile stress, but the latter excels the former in its resistance to a thrust or compressive stress. A material is exposed to five distinct strains: a tensile or stretching strain in the direction of its fibers, as in the case of ropes, tie-beams, etc.; a transverse strain acting perpendicularly or obliquely to its length, as in levers, joists, etc.; a crushing strain by pressure, as in the case of pillars, posts, etc.; a torsional or twisting strain acting in a perpendicular direction at the extremity of a lever or otherwise, as in axles, crank-shafts, etc.; and a shearing force applied laterally, as in the case of a shearing-machine for cutting through iron plates and bars. Wrought-iron and steel offer the greatest resistance to tensile strains; the strength of wood in this direction varies according to its seasoning and specific gravity. The heavier the wood is, in general, the stronger it is. The transverse strength of beams is determined largely by their elasticity. This property varies greatly in different materials. Wood has a greater elastic range of action than iron or steel bars, and consequently sinks or deflects to a greater degree under a given weight. Any strain beyond the elastic limit entails fracture. Increased stiffness or transverse resistance of beams is rapidly obtained with an increase of depth of the beam. With the exception of wood, materials offer a greater resistance to a crushing force than to a tensile strain. Cast-iron is superior to wrought-iron in this respect, and is consequently much employed in the construction of bridges and foundations. Torsional stress tries the solidity and tenacity of metals more than any other kind of stress. But the torsional strength of shafts increases very rapidly as the diameter is enlarged. The distribution of material in hollow forms conduces to the greatest strength and stiffness in combination with the minimum consumption of material. A familiar instance of the hollow construction is the stem of grasses, and especially the bamboo, while another example is that of the hollow bones of animals.

**Strepsiptera** (strep-sip'ter-a; 'twisted-winged'), a small and very peculiar and anomalous order of insects. The females are wingless, and live as parasites in the abdomens of bees, wasps, and other hymenopterous insects. The males have their

front pair of wings in the form of twisted filaments, the posterior pair are fan-shaped and membranous. The jaws are rudimentary. The heads of the parasitic females protrude from between the abdominal joints of their host. The strepsiptera are viviparous, and the



Strepsiptera.

a, *Stylops Dalli*, male insect. b, Do. magnified. c, Anterior wings. d, Double antennae.

larvæ are little caterpillars which attach themselves to the bodies of wasps and bees. The female larvæ never leave their hosts; the male larvæ undergo their metamorphosis within the bodies of their hosts, from which in due time they emerge as perfect winged males. *Stylops Dalli* and *S. Spencii* are among the more common species.

**Strepsirhi'na** ('twisted - nostrils'), one of the three chief divisions into which the order of Quadrumana or monkeys is sometimes arranged, represented by such forms as the aye-aye or cheiromys of Madagascar, by the lemurs, lorises, etc. See *Lemur*, etc.

**Stress**, in mechanics, a term sometimes used as equivalent to *strain*, at other times used as the force producing strain, the latter referring to the amount of change produced. See *Strain*.

**Strickland** (strikt'land), AGNES, an English authoress, born in 1796 at Reydon Hall, near Southwold, Suffolk. She wrote, in conjunction with her sister Elizabeth, *Lives of the Queens of England* (twelve vols., 1840-48); *Lives of the Queens of Scotland* (eight vols., 1850-59). She also published *Letters of Mary Queen of Scots*, with an *Historical Introduction and Notes*; *Lives of the Bachelor Kings of England*; *Lives of the Tudor Princesses*; poems, stories, etc. She died in 1874.

**Stricture** (strikt'ūr), a contraction of a tube, duct, or orifice; for instance, of any part of the alimentary canal or of the urinary passages. This disease usually affects the urethra, and is treated by dieting and dilatation of the passage by means of catheters.

**Striegau** (strig'ou), a town of Prussia, province of Silesia, 27 miles w. s. w. of Breslau. It has granite quarries and polishing works. On June 4, 1745, the Austrians and Saxons were defeated here by Frederick the Great. The industries are cigar-making, malt, and machinery. Pop. 13,427.

**Strigidæ** (strij'i-dē), a family of nocturnal birds of prey, comprehending the owls.

**Strigops** (stri'gops). See *Owl-parrot*.

**Strike** (strikt), the action taken by workmen in any branch of industry when they cease from work with the object of compelling their employer to concede certain demands made by them; distinguished from a *lock-out*, which is the retaliatory measure adopted by the employers to resist such demands by stopping their works. Great strikes, often involving hundreds of thousands of workmen, have been numerous during the past century, alike in the United States and Europe. They have occasionally led to great destruction of property as in the railroad strike in Pennsylvania in 1877, and loss of life as at Chicago in 1886, Homestead, Pa., in 1892, and the exceedingly violent strike in the coal-mining industry of Colorado in 1913 and 1914, which resulted in the loss of life of 19 persons, most of them women and children, victims of the militia which had been requisitioned. The tragedy took place at Ludlow in April, 1914, and became known as the 'Ludlow Massacre'. The Lawrence, Mass., strike of 1912, involving 35,000 workers, was notable as the first large Eastern strike conducted by the I. W. W. This organization was also responsible for the Paterson, New Jersey, strike of 1913, involving several thousand silk workers.

In 1916 the railroad trainmen of the United States, numbering 400,000, threatened to strike, unless their demand for an eight-hour day at the existing ten-hour wage was granted. The strike order was issued, to become effective September 4. This was in the midst of the European war. President Wilson appealed to Congress and a law was passed making the eight-hour day the legal basis for railroad employees. There were many strikes in 1917, all of them settled by arbitration.

Owing to the great demand for labor, the scarcity of supply, and the high wages offered, the strikes in 1918 had been reduced to a minimum. Among the agencies of the government for the settlement of trade disputes are the U. S. Board of Mediation and Conciliation, the Railroad Wage Commission, the Shipbuilding Wage



Adjustment Board and many others. See *Trades' Unions*.

**Strindberg** (strind'bär-y'), JOHAN AUGUST, a Swedish novelist and dramatist, born at Stockholm, January 22, 1840; died in 1912. After various experiments as schoolmaster, tutor and actor, he turned to literature as a profession. He began writing as an exponent of realism and marked characteristics of all his work are his hatred of woman and of existing institutions. He is best known in America through his plays, *Miss Julia*, *The Father*, *Creditors*, *Perish*, and *Easter*.

**Stromboli** (strom'bō-lē), one of the Lipari Islands in the Mediterranean, north of Sicily, with a volcanic cone almost constantly active. See *Lipari Islands*.

**Strombus** (strom'bus), or WING-SHELLS, the name given to a genus of marine tropical gasteropoda. The aperture is much dilated, the lip expanding and deeply notched. The giant strombus (*S. gigas*), of the West Indies, is largely used for cameos and is ground for use in the manufacture of porcelain.

**Strong, JAMES**, an American theologian and educator, born in New York City in 1822; died in 1894. He was professor of biblical literature and acting president of Troy University, 1858-61; professor of exegetical theology

miles broad. It is of moderate elevation; its coasts are deeply indented; and the soil good. Pop. 1274.

**Strontia**. See *Strontium*.

**Stronianite** (stron'shi-an-It), a mineral, native strontium carbonate, varying in color from white to yellow and pale green, and occurring massive, fibrous, stellated, and (rarely) in orthorhombic crystals, resembling those of aragonite in form. It was first discovered in the lead mines of Strontian, Argyleshire, Scotland.

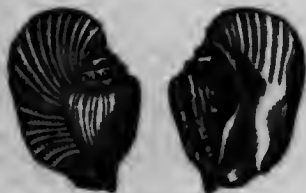
**Strontium** (stron'shi-um), one of the metals, of a yellowish color; specific gravity 2.54; atomic weight 175; chemical symbol Sr. It burns when heated in air with a crimson flame. It is less abundant than barium, and occurs in nature in similar forms of combination. The oxide is called *strontia*.

**Strophanthin** (strō-fan'thin), a crystalline glucoside with a strongly bitter taste, obtained from the seeds of *Strophanthus hispidus*, a plant belonging to the nat. order Apocynaceae, and a native of Africa. It is readily soluble in water and alcohol. Strophanthin is a muscle-poison, and increases the contractile power of the muscles. It has been used with great advantage as a tonic in heart disease. It strengthens the heart-beat and reduces its frequency.

**Strophe** (strō'fē; Greek, *strophē*, from *strephō*, I turn), the name of one of the divisions of a Greek choral ode, corresponding to the *antistrophē*. The singing of the strophes on the stage was accompanied with a motion or turn from right to left; the singing of the antistrophe, with a contrary motion, from the left to the right.

**Stroud** (stroud), or STROUDWATER, a town of Gloucestershire, England, adjacent to the Slade and Frome, 9 miles south of Gloucester. It is a center for cloth factories and dyeworks. Pop. 9153.

**Struensee** (strū'en-sā), JOHANN FRIEDRICH, COUNT, born in 1837 at Halle on the Saale; studied medicine, and in 1768 was appointed physician to the King of Denmark. He soon became a favorite with both the king and queen, and effected the dismissal of all those who were obstacles to his own ambitious plans. In 1770 he advised the king (who was little better than an imbecile) to abolish the council of state, a measure which roused the indignation of the Danish nobility, since it threw all authority into the



Winged Strombus (*S. tricornis*).

in Drew Theological Seminary, Madison, N. J., 1868; traveled as a member of the Palestine Exploration Committee, 1874; was one of the committee selected to revise the O. T. section of the authorized version, and with John McClintock edited the *Cyclopedia of Biblical, Theological and Ecclesiastical Literature*.

**Strongylus** (stron'ji-lus), a genus of intestinal roundworms. *S. gigas* is the largest nematode worm at present known to infest man or any other animal, the male measuring from 10 inches to 1 foot in length, while the female is said to attain a length of over 3 feet.

**Stronsay** (stron'sā), one of the Orkney Islands, 12 miles N. E. of Kirkwall; about 7 miles long and 4½

hands of the queen and the favorite. Struensee by various means gradually usurped the administration of all affairs in the name of the king, and caused himself to be created count. His arrogance now caused a conspiracy against him, and on January 16, 1772, the queen, Struensee, and their partisans were seized. The favorite was brought before a special commission, was found guilty of criminal relations with the queen (on insufficient evidence), convicted, and executed on April 28, 1772.

**Struthio** (strŭ'thl-ŏ). See *Ostrich*.

**Struthionidæ** (strŭ-thl-on'i-dē), a family of terrestrial birds incapable of flight, the wings being, in the majority of instances, merely rudimentary, but having long and strong legs, which enable them to run with great rapidity. This family includes the ostrich, cassowary, emu, etc., and is equivalent to the Brevipennes of Cuvier and the Ratitæ of Huxley.

**Strutt**, JOSEPH, an English antiquary, born in 1742 or 1749, was articled to W. W. Ryland, the engraver, and obtained the gold and silver medals of the Royal Academy. In 1773 he published his *Regal and Ecclesiastical Antiquities from Edward the Confessor to Henry VIII.*, and shortly afterwards his *Horde Angel-Cynnan, or Manners, Customs, etc., of the English* (1774-76, three vols., with 157 plates). He published other works of similar character, and left some manuscripts, from which were afterwards published his *Queenhoo-Hall*, a romance, concluded by Sir Walter Scott; *Ancient Times*, a drama; also *The Test of Guilt, or Traits of Ancient Superstition*, a dramatic tale. He died in 1802.

**Struve** (strŭ've), FRIEDRICH GEORG WILHELM VON, astronomer, born at Altona, Germany, in 1793, and was educated at Dorpat University. In 1813 he entered the Dorpat observatory, and was appointed director in 1817. On the completion of the Russian observatory at Pulkova, near St. Petersburg, in 1839, he was nominated its director, and here he continued his researches on nebulae and double stars. From 1816 to 1819 he was engaged on the triangulation of Livonia, and from 1830 to 1845 he was connected with the measurement of the arc of the meridian in the Baltic provinces, which was afterwards extended to the Arctic Ocean and the Danube. He died in 1864.

**Stry**, or **STRYI** (strē), a town of Austria, in Galicia, situated on a river of the same name. It was the

scene of a great conflagration in April, 1886, which destroyed over 600 houses and most of the public buildings. The chief manufactures are leather goods and matches. Pop. 23,206.

**Strychnine** (strĭk'nĭn; C<sub>22</sub>H<sub>33</sub>N<sub>3</sub>O<sub>6</sub>), an alkaloid existing in nux-vomica, St. Ignatius' beans, and in various other plants of the genus of *Strychnos* (which see). Strychnine may be prepared from nux-vomica by treating with rectified spirit, acetate of lead, etc., precipitating with ammonia, dissolving the precipitate with alcohol, and crystallizing. Strychnine forms colorless four-sided prisms, which are inodorous and intensely poisonous. One-eighth of a grain of strychnine is sufficient to kill a large dog; three-eighths of a grain produces violent tetanic spasms in man, while half a grain has been known to prove fatal. When taken in small doses for a long period of time the drug produces increased excitability of the nerves. Strychnine resists putrefaction, and may therefore be detected in bodies which have been buried for a long time. This alkaloid combines with acids, forming a series of well-defined salts; a series of strychnine derivatives is also known, in which the hydrogen is partly replaced by such groups as ethyl (C<sub>2</sub>H<sub>5</sub>), amyl (C<sub>5</sub>H<sub>11</sub>), etc.

**Strychnos** (strĭk'nŏs), a genus of plants, nat. order Loganiaceæ. It is composed of trees or shrubs which do not yield a milky juice, and have opposite, usually nerved leaves and corymbose flowers; some of the species are possessed of tendrils, and are climbing plants. They are found principally in the tropical parts of Asia and America. Among the species are *S. nux-vomica*, nux-vomica, poison-nut, or ratsbane; *S. potatorum*, or clearing-nut; *S. Ignatii*, or St. Ignatius' bean; *S. colubrina*, or snakewood; *S. toaifera*, woorail or poison-plant of Guiana. See the separate articles.

**Strype** (strĭp), Rev. JOHN, ecclesiastical historian, born at London in 1643, and was educated at St. Paul's School, and Cambridge University, where he graduated B.A. in 1665. In 1669 he became vicar of Low Leyton, and remained there till within a few years of his death. He published nothing till after he was fifty, and his works consist for the most part of transcriptions of curious and valuable papers, which he brought to light for the first time. The chief of them are *Memorials of Cranmer* (1694), followed by the *Lives of Sir Thomas Smith, Bishop Aymer, Archbishop Parker, and Arch-*

bishop Whitgift. His *magnumopus* was *Neoclesiastical Memorials* (three vols., 1721). He died at Hackney in 1737.

**Stuart** (*stü'ört*). **THE FAMILY OF.** This house derives its name from the important office of steward of the royal household of Scotland. The name is often written *Stewart*, and occasionally *Stewart*. The form of *Stuart* was first assumed when Queen Mary went to France, and was adopted by all her descendants. The founder of the house seems to have been a Norman baron named ALAN, whose second son, WALTER, entered the service of David I of Scotland, and became *dapifer*, or steward of the royal household. Walter obtained large grants of land from David, and died in 1246. ALEXANDER, the fourth steward, had two sons—JAMES, who succeeded him in 1283, and JOHN, known in history as the Sir John Stewart of Bonkyl, who was killed at Falkirk (July 22, 1298). James was chosen as one of the regents on the death of Alexander III, and died in the service of Bruce in 1309. His son, WALTER, the sixth steward, married Marjory, daughter of King Robert I; a union which secured to his family the crown of Scotland in the event of the extinction of the royal line. He died in 1326, and was succeeded by his son, ROBERT, the seventh steward, who, on the death of David II without issue, succeeded to the crown as Robert II in 1371. For the subsequent history of the royal line see the articles *Scotland*; *Robert II*; *Robert III*; *James I, II, III, IV, V*; *Mary Stuart*; *James I (of England)*; *Charles I and II*; *James II*; *William and Mary*; and *Anne*. Mary of Modena, second wife of James II of England, gave birth to James Edward Francis, prince of Wales, commonly called the Old Pretender, or the Chevalier St. George. In 1715 an unsuccessful attempt was made by the Jacobites, or Stuart party, to set this prince on the throne of his ancestors by force of arms. He married a granddaughter of John Sobieski, king of Poland, by whom he had two sons, Charles Edward, the Young Pretender (see *Charles Edward Stuart*), and Henry Benedict Maria Clement, who became a cardinal in 1747. The last male representative of the branch of the Stuart line descended from Henrietta Maria, daughter of Charles I, was Francis V, ex-duke of Modena, who died childless, November 20, 1875. Many of the noble families of Scotland are descended from other branches of the Stuart line.

**Stuart, ARABELLA**, born at Chatsworth in 1575, was the only child of Charles Stuart, earl of Lennox, brother of Lord Darnley, and was granddaughter of Margaret Tudor, daughter of Henry VII, thus being in the line of succession to the English throne. On the death of Queen Elizabeth, an abortive conspiracy was formed for setting up Arabella Stuart in opposition to her cousin James. Her private marriage to William Seymour, grandson of the Earl of Hertford, alarmed the court, and she and her husband were placed in confinement. They both escaped, but the Lady Arabella was recaptured and placed in the Tower, where she remained a close prisoner until her death on September 27, 1615.

**Stuart, CHARLES EDWARD.** See *Charles Edward Stuart*.

**Stuart, GILBERT CHARLES**, painter, born at Narragansett, Rhode Island, in 1755. He studied in London under Benjamin West, and painted there a number of portraits with such ability as to win a high reputation. After his return to the United States he painted a portrait of Washington, which is esteemed the best ever made; also portraits of Adams, Jefferson, Madison, Mrs. Washington, and other distinguished Americans. He died July 27, 1828.

**Stuart, JAMES ELWELL BROWN**, soldier, born in Patrick Co., Virginia, in 1832; was graduated from the West Point Military Academy in 1854; and became captain in 1860. In 1861 he resigned his commission in the United States army and entered the Confederate service. He was in charge of the Confederate cavalry at the first battle of Bull Run and in October, 1862, made a daring and successful raid to Chambersburg, Pa. He was promoted Major-General and commanded troops at Chancellorsville, Gettysburg, and the Wilderness, and on May 12, 1864, was mortally wounded in a fight with Sheridan's cavalry.

**Stuart, JOHN M'DOUALL**, a celebrated Australian explorer, born in Scotland in 1818. In 1844-46 he accompanied Stuart's expedition as draughtsman, and in 1858, making six expeditions into the interior, he successfully explored the country west of Lake Torrens, in South Australia. In 1862 he achieved the difficult task of crossing the Australian continent near the center from south to north. He died at London in 1866. He wrote *Explorations in Australia*, edited and published in 1864 by W. Hardman, London.

**Stuart, Moses**, an American theologian, born at Wilton, Connecticut, in 1780, and was educated at Yale College. He was called to the bar in 1802, but abandoned law for theology. In 1810 he was appointed professor of sacred literature at the theological seminary in Andover, a post he held for thirty-eight years, during which time he published several Greek and Hebrew grammars, commentaries on some of *St. Paul's Epistles* and on the *Apocalypse*, *Hints on the Prophecies*, *A Critical History and Defense of the Old Testament Canon*, and many other works. He died at Andover, Massachusetts, in 1852.

**Stuart, Ruth M'Enery**, author, born in Louisiana and educated in New Orleans till 1805. She is the author of many humorous negro dialect tales. Of these may be named *Carlotta's Intended*, *The Woman's Exchange*, *The River's Children*, and *Aunt Amity's Silver Wedding*.

**Stubbs** (stubs), **William**, an English historian and divine, was born in 1825, and was educated at Ripon Grammar-school, whence he proceeded to Oxford University and latterly became a fellow of Trinity College. In 1848 he was ordained, and became vicar of Navestock, Essex, in 1850. He subsequently held several important positions and in 1888 became bishop of Oxford. He edited many valuable historical works in the *Rolls Series*, including *Chronicles and Memorials of the Reign of Richard I (1864-65)*; *Gesta Regis Henrici II (1867)*; *Chronicle of Roger Hoveden (1872-73)*; *Memorials of St. Dunstan (1874)*; and *Opera Radulphi de Diceto (1876)*. His chief work is the *Constitutional History of England* (three volumes, 1874-78). He published many other works besides the above, and was a member of various English and foreign learned societies, gaining a high standing both as author and critic. He died in 1901.

**Stucco** (stuk'kō), a fine plaster, used as a coating for walls, and to give them a finished surface. Stucco for internal decorative purposes is a composition of very fine sand, pulverized marble, and gypsum, mixed with water till it is of a proper consistency. The stucco employed for external purposes is of a coarser kind, and variously prepared, the different sorts being generally distinguished by the name of cements. Some of these take a surface and polish almost equal to that of the finest marble. The third coat of three-coat plaster is termed *stucco*, consisting of fine lime and sand. There is a species called

*bestard stucco*, in which a small portion of hair is used.

**Stud-book**, a book containing the pedigrees of famous animals, especially horses. There are stud-books also for special breeds of dogs, etc.

**Studding-sails** (stud'ing-sails), formerly called *souding-sails*, fine-weather sails set outside the square sails. The top-mast and top-gallant studding-sails are those which are set outside the top-sails and top-gallant-sails; they have yards at the head, and are spread at the foot by booms which slide out on the extremities of the lower and top-sail yards, and their heads or yards are hoisted up to the top-sail and top-gallant-sail yard-arms.

**Stuffing-box**, a contrivance for securing a steam, air, or water-tight joint when it is required to pass a movable rod out of a vessel or into it. It consists of a close box cast round the hole through which the rod passes, and in which is laid, around the rod and in contact with it, a quantity of hemp or other material called *packing*, this packing being lubricated with oily matter. The stuffing-box is used in steam-engines, pumps, on the shaft of a screw-steamer where it passes through the stern, etc. See *Piston*.

**Stuhlweissenburg** (stöl'vis-én-burk), a town of Hungary, 30 miles southwest of Budapest. It was for five centuries the crowning-place of the Hungarian kings, but has now lost its former importance. It contains some fine buildings, among which are a cathedral, built in 1752, a bishop's palace, and a theater. Pop. 32,167.

**Stupa**. See *Dagoba*.

**Sturdy** (stur'di), a disease to which sheep are liable, also called *staggers* (which see).

**Sturgeon** (stur'juu), a ganoid fish of the genus *Acipenser*, family Sturioidae, the members of which family are all popularly included under the name sturgeon. The general form



Sturgeon.

of the sturgeon is elongated and rather slender, the snout long and pointed; the body is covered with numerous bony plates in longitudinal rows; the exterior



portion of the head is also well mailed; the mouth placed under the snout is small and funnel-shaped, without teeth, and provided with tentacle-like filaments or barbules. The eyes and nostrils are on the side of the head. On the back is a single dorsal-fin, and the tail is forked, but is heterocercal or unequally lobed, and is provided with a row of spines along its upper margin. The sturgeons are sea-fish, but ascend the larger rivers of Europe in great abundance, and are the objects of important fisheries. The flesh of most of the species is wholesome and agreeable food; their roe is converted into caviare (see *Caviare*), and their air-bladder affords the finest isinglass. The common sturgeon (*Acipenser sturio*) inhabits the North American and European seas, migrating during early summer into the larger rivers and lakes. Its flesh is firm and well-flavored; somewhat resembling veal. The general body color is yellow; its length is usually 5 or 6 to 8 feet, but it may reach 12 feet. The food consists of molluscs, small crustaceans and small fishes. When caught in the Thames, within the jurisdiction of the Lord-mayor of London, it may be claimed by that dignity; formerly it used to be regarded as a royal fish reserved for the sovereign. The sterlet (*A. ruthenus*) is found in the Volga and the Danube. Its flesh is the most delicate, and its roe yields the best caviare. The great or white sturgeon, or beluga (*A. huso*), is found in the Danube, the Volga, and other rivers running into the Black and Caspian Seas. It frequently exceeds 12 and 15 feet in length, and weighs above 1200 pounds. The flesh is not much esteemed, but the finest isinglass is made from its air-bladder. There are several species peculiar to North America. One of these, the fresh-water sturgeon, (*A. rubicundus*), inhabits the great lakes and connected streams.

**Sturgis** (stur'gis), JULIAN, author, born at Boston, Massachusetts, in 1848, was taken to England as an infant and became a British subject. He wrote *My Friends and I*, *John a-Dreams*. After *Twenty Years*, *Little Comedies*, etc. He died in 1904.

**Sturgis**, RUSSELL, architect and author, born in Baltimore Co., Maryland, in 1836; died February 11, 1909. He was graduated from the College of New York in 1856, studied architecture, practiced it until 1880; afterwards became active in the management of Art Societies in New York and in lectures on art subjects. He wrote much on art, his works including *European Archi-*

*itecture*, *The Appreciation of Sculpture*, *History of Architecture*, etc.

**Sturluson**, SNORRI. See *Snorri Sturluson*.

**Sturnus**. See *Starling*.

**Sturt**, SIR CHARLES, an Australian explorer, born in India in 1796. He entered the army, and in 1825 was stationed at Sidney, New South Wales, with the rank of captain. In 1828 he led an expedition to explore the interior of Australia, and discovered the Macquarie, Castlereagh, and Darling rivers. He also explored the Murrumbidgee, and in 1830 discovered the Murray. In 1844 he penetrated to the great barren region nearly in the center of the continent. Subsequently he was made colonial secretary of South Australia, and the exposure to which he was subjected having undermined his health, he received a pension from the colony. He returned to England totally blind, and died in 1869. He wrote *Two Expeditions into the Interior of South Australia in 1828-31* (Lond. 1833), and *Narrative of an Expedition into Central Australia in 1844-46* (Lond. 1849).

**Stuttering**. See *Stammering*.

**Stuttgart** (stur'gärt), capital of the kingdom of Württemberg, S. Germany, beautifully situated near the left bank of the Neckar, and closely surrounded by vineyard slopes, 816 feet above the sea. With the exception of part of the lower and older town, it consists of spacious streets and squares lined with fine buildings, among the latter being the new palace, finished in 1807; the old palace (1570); the Stiftskirche, a Gothic structure of the fifteenth century; the Gothic hospital church, containing a statue of our Saviour by Dannecker; and several other churches; the royal library (500,000 vols.); the museum and picture-gallery; the polytechnic school; a great building containing the exchange and concert-rooms, etc.; the theater, the town-house, and many other buildings. There are several high-class educational establishments, the polytechnic being the chief. Stuttgart is the chief center in South Germany for the book-trade, connected with which are paper-mills, type-foundries, printing-presses, and lithographic establishments. The other leading manufactures include dyes, chemicals, woolen and cotton goods, various fancy articles, jewelry, musical instruments, mathematical and scientific instruments, liqueurs, confectionery, and beer. Stuttgart dates from 1228, and in 1320 became the residence

of the counts of Württemberg. From 1436 to 1482 it was much improved and enlarged, and has since, with only a short interval, been the capital. Eastward from Stuttgart, and almost connected with it by the royal palace grounds, is the town of Cannstatt. Pop. (1910) 285,559.

**Stuyvesant** (sti've-sant), PETER, born in Holland in 1602; in 1647 was made director-general of the Dutch colony of the New Netherlands, a position he held until 1664, when the colony fell into the hands of the English and became known as New York. His administration was vigorous and rather arbitrary, the result being that the people refused to support him in his resistance to the English. Stuyvesant went to Holland the next year, but soon returned, and passed the rest of his life at his farm called the Bonwerij, from which the present Bowery in the city of New York has its name. He died in 1682.

**Stye** (sti; known also as *hordeolum*), a little boil on the margin of the eyelid, which commences in the follicle of one eyelash. Styes are most common in young people especially in anæmic girls, and are mostly associated with some obvious derangement of the general health, which should be made the subject of treatment. The tumor generally bursts in a few days, and it is very seldom necessary to puncture it. Warm-water dressings with lint and oiled silk should be applied.

**Style** (stil), in botany, the prolongation of the summit of the ovary which supports the stigma. Sometimes it is entirely wanting, and then the stigma is *sessile*, as in the poppy and tulip. When the ovary is composed of a single carpel, the style is also single, and the number of styles varies according to the number of carpels, though when the carpels are numerous the styles may be nnited.

**Style, Old and New.** See *Calendar*.

**Stylites** (sti'lits), or PILLAR SAINTS (from the Greek *stylos*, column; in Latin, *sancti columnares*), a class of Christian saints, who, by way of penance, passed the greater part of their lives on the top of high columns. This method of self-torture was introduced by Simeon the Stylite (St. Simeon Stylites), a Syrian monk who lived in the open air near Antioch, on

the top of a column 40 cubits high and only 3 feet in diameter at the top. Here he remained for many years, till his death in 459 or 460. It appears, however, that he must have descended at times, since he cured the sick by his touch, and performed sundry other miracles, wrote epistles, and took part in political quarrels. His example was imitated by many persons in Syria and Palestine, and the mania continued until the twelfth century.

**Stylobate** (sti'lu-bât), in architecture, generally, any sort of basement upon which columns are placed to raise them above the level of the ground or floor; but, technically, a continuous nnbroken pedestal upon which an entire range of columns stands, contradistinguished from *pedestals*, which are merely detached fragments of a stylobate placed beneath each column.

**Stylops** (sti'lops). See *Strepsiptera*.

**Styptic** (stip'tik), a remedy that has the virtue of clotting blood, or of closing the aperture of a wounded vessel. Oak bark decoction, gall-nuts in powder or infusion, matico, and turpentine, are styptics derived from the vegetable kingdom; and from the mineral are derived salts of iron, the sulphates of copper and zinc, the acetate of lead and the nitrate of silver.

**Styracæ** (sti-râ'se-ê) STYRACA'CEÆ, a small nat. order of plants belonging to the polycarpous group of monopetalous exogens. The species are trees or shrubs with alternate leaves without stipules. The flowers are usually axillary, and are either solitary or clustered, with membranaceous bracts; the fruit is a drupe, the seeds few or solitary. The species are chiefly found in the temperate and tropical parts of North and South America, and also in Asia and Africa. The order is chiefly remarkable for furnishing the storax and benzoin of commerce. Some of the species are used for dyeing yellow. The order includes the snowdrop-tree of North America (*Halesia tetraptera*).

**Styrax** (sti'raks), a genus of plants, nat. order Styracæ, of which it is the type. The species are elegant trees and shrubs, with entire leaves and white or cream-colored racemose flowers. They are principally natives of America and Asia; one is found in Europe, and one in Africa. *S. officinalis*, also called storax, is a native of Syria, Italy, and most parts of the Levant. It yields the storax of commerce (which see). *S. Bensoin* (gum-benjamin-tree) is a native of Sumatra and Java. It yields the

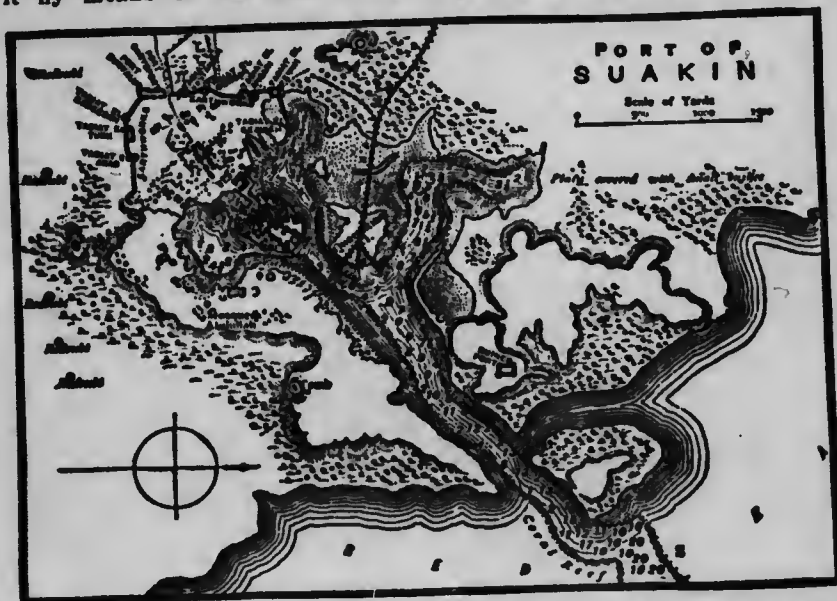


a. Style; b. stigma.

gum benzoin of commerce. (See *Benzoin*.) The hardy species of *Styrax* are well adapted for shrubberies, on account of their foliage and handsome flowers.

**Styria** (stir'ī-ā; German, *Steiermark*), a duchy of Austria, bounded by Upper and Lower Austria, Hungary, Croatia, Carnioia, Carinthia, and Salzburg; area, 8670 square miles. The whole duchy, with the exception of the southern part, is mountainous. The Noric Alps traverse the district between the Enns and the Mur; the Styrian Alps between the Mur and the Drave; and the Carnic Alps between the Drave and the Save. These mountains rise to a height of between 7000 and 8000 feet, and are rich in minerals. Styria belongs to the basin of the Danube, which drains it by means of the four rivers

German duchy which, after bearing the name of Alemannia, from its original inhabitants, the Alemanni, changed it to Suevia or Schwabenland, in consequence of the incursion of the Suevi. On the division of the kingdom of the Franks in 843, Suabia, along with Bavaria, became as it were the nucleus of Germany, and its rulers continued for many centuries to hold a prominent place in its history. In 1376 was formed, chiefly by the union of its towns, the celebrated Suabian League. From 1512 to 1806 Suabia formed one of the ten circles into which the German Empire was divided. It is now divided between Würtemberg, Baden, Bavaria, Hohenzollern, and Lichtenstein. The name of Suabia is given to a division of Bavaria; area, 3730 square miles; pop. 713,681. Augshurg is its capital.



mentioned above. On the southern plains and in the valleys the land is fertile, and wheat, maize, hemp, flax, and the poppy are raised. The vine thrives well in many districts. The chief sources of wealth are the forests and minerals, dairy-farming, mining, and manufactures. Gratz is the capital. Pop. 1,356,058, the majority of whom are of German descent.

**Styx** (stiks), in Greek and Roman mythology, the name of a river of the infernal regions. Styx was also a rivulet in Arcadia, whose water was considered poisonous.

**Suabia**, or **SWABIA** (swā'bi-ā; German, *Schwaben*), an ancient

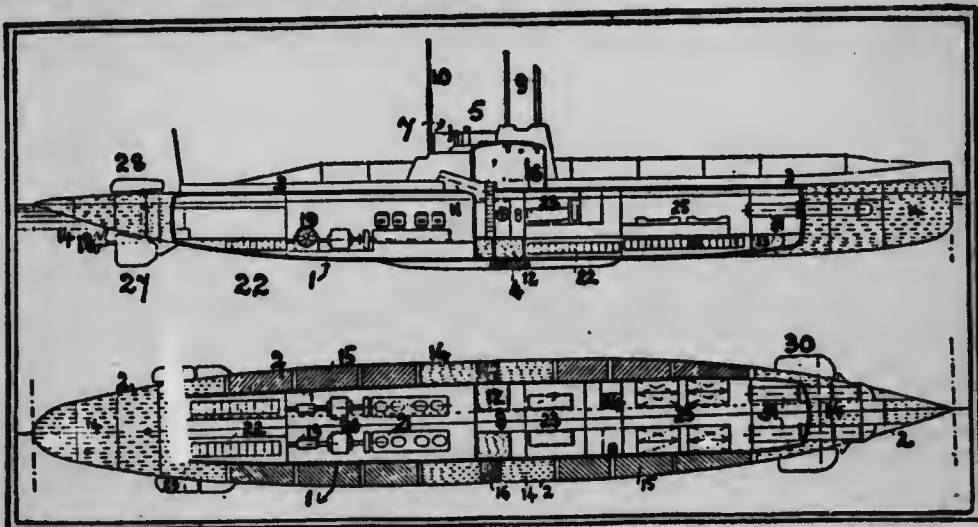
**Suaheli** (swā-hē'li), a name given to the inhabitants of the Zanzibar coast of East Africa and the adjacent islands, a people of mixed Arabic and native African origin. They form the most important part of the subjects of the Sultan of Zanzibar, and their language is the common medium of communication in East Africa.

**Suakin** (swā'kēn), or **SAUAKIN**, a seaport of Nubia, on the west coast of the Red Sea. The principal part of the town lies on a small rocky island, but there is also a portion (El Kaff) surrounded by fortifications on the mainland. The Mahdist rising in the Soudan almost completely de-

stroyed the trade of Suakin, but this has since revived, gums, ivory and tobacco being exported. It is a station for pilgrims bound for Mecca, and had a population, in 1905, of 10,500.

**Suarez** (swá'reth), FRANCIS, one of the most eminent scholastic and polemic writers of the Roman Catholic Church, was born at Granada in 1548; died at Lisbon in 1617. He entered the society of Jesuits in 1564, and soon became professor in succession at Valladolid, Rome, Alcalá, and Salamanca. In 1597 Philip II appointed him principal professor of divinity at the University of

**Submarine Boats** (sub-ma-rén'), vessels built to descend into and move under water. While prior to the year 1773 many submarine boats were constructed, in that year the first designed for or used in actual warfare was built by David Bushnell. The hull of this boat was only large enough for one man, who drove and steered it and caused it to descend or rise. A fore-and-aft shaft fitted with a screw propeller furnished the motive power. This could be operated by the hand or foot, and gave a speed of two to three knots ahead or astern. To sub-



SUBMARINE BOAT

1, inner hull; 2, outer hull; 3, deck; 4, bottom hatch for mine planting; 5, deck control station; 6, inner conning tower; 7, deck wheel and binnacle; 8, central hatchway; 9, periscopes; 10, mast; 11, engine room; 12, compressed air tanks; 13, fresh water tank; 14, water ballast in outer hull; 15, fuel oil storage; 16, lubricating oil storage; 18, propellers; 19, reversing gear; 20, motor-generators; 21, Diesel engines; 22, electric storage batteries; 23, officers' quarters; 24, galley; 25, crew's quarters; 27, 28, rudders; 29, 30, hydroplanes or diving rudders; 31, twin torpedo tubes.

Coimbra, a position he held until his death. The most recent edition of his works, in twenty-eight vols., 4to, was completed in Paris in 1860.

**Subiaco** (sö-bé'á-kö; ancient, *Sablaqueum*), a town of Italy, in the province of Rome, on a height near the right bank of the Teverone, 34 miles east of Rome. It has a fine old castle, formerly often occupied by the popes; remains of Nero's villa; and in the neighborhood interesting monasteries. Pop. 8003.

**Sublimation** (sub-li-má'shun), a process by which solid substances are, by the aid of heat, converted into vapor, which is again condensed into the solid state by the application of cold.

merge the vessel water was admitted by a valve, and was pumped out by a hand-worked force pump. The boat's magazine was two pieces of oak bolted together and designed to hold 150 pounds of gunpowder. It was detachable and fitted with a screw for attaching it to a ship's bottom. At one time the operator of this boat was able to get beneath the bottom of an English man-of-war off New London, but was prevented from blowing her up by his inability to drive the attaching screw through her copper sheathing. Late in the eighteenth and early in the nineteenth century Robert Fulton built several submarines, the latest of which was 80½ ft. long. This boat was driven by steam engines. Between that time and 1902, when the United States acquired a



## Submarine Boat

Holland submarine, many experiments were carried out in submarine naval construction. During the Civil war the Confederates had a craft which had no free-board and which succeeded in blowing up the U. S. S. *Housatonic* with a sper torpedo, but foundered with all on board. The first Holland boats used by the United States navy include the following points of interest: Length, 63.3 ft.; beam, 11.75 ft.; displacement, 120 tons submerged. They were fitted with storage batteries and electric motors for submerged running, and gasoline engines for surface running, which also operated in charging the batteries. The surface and submerged speeds were 9 and 6.5 knots, respectively, and the surface radius 400 miles. The boats in present use (1916) are of several different types. They are divided into a class called fleet submarines of about 1500 tons, with a surface speed of not less than 20 knots, and coast submarines of 600 tons and slower speed. In these craft the torpedo tubes have an automatic loading device. Their armament consists of a 3-inch gun, a machine gun and an anti-aeroplane gun; they are equipped with gyroscope compasses; are fitted for submerged and surface signaling, and have wireless outfits. While the submarine service of the navy has been, on the whole, remarkably free from fatal accidents, that such accidents are always possible was demonstrated by the sinking of the Holland boat F-4, which went down in 300 feet of water outside of Honolulu harbor, March 25, 1915, with a crew of 21 men. In the later type of submarine construction the Diesel engine (*q. v.*) has been installed, and gasoline, which has been the cause of many accidents aboard these vessels, has been displaced by heavy oil as fuel. The horsepower of these engines, depending on the type of craft, is from 1200 to 6500; the electric motors for submerged running are of a maximum of 2400 horsepower, capable of producing speeds of 24 and 18 knots, and with a radius of 2800 and 2900 miles. These craft carry an armament of eight 21-inch torpedo tubes and two 4-inch guns on disappearing mounts. The crew is made up of 3 executive officers, 2 engineer officers, a surgeon and 46 men.

The part played by the submarine in the European war has been one of considerable prominence. It has been carried on mostly by the English and German navies, the German fleet having shown itself particularly destructive. In February, 1915, Germany declared the existence of a war zone around the British Isles and began a systematic war of destruction by submarines on merchant

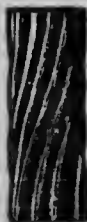
shipping. Thousands of ships were torpedoed, with great loss of life. The most atrocious example of this sort of warfare was the sinking by a German submarine, on May 7, 1915, of the *Lusitania*, over 1100 persons being drowned.

Important appliances of the submarine are the periscope, the instrument by which those in the underwater vessel can see what is going on above the water; the Fessenden oscillator, a sounding apparatus by which signals can be sent through the water for 100 miles; the microphone, which registers sounds and enables the listeners in the submarine to hear the approach of a ship five miles away; and the multiple pump, by means of which the submarine can remain practically motionless under water at any desired depth. Camouflage (*q. v.*) was applied to the hulls of ships, the bizarre colors blending with the ocean and making the vessels less liable to detection. To counteract this device, later submarine periscopes were fitted with ray filters, which were said to destroy the effect of the camouflage.

An attempt was made by Germany during the war to carry on her trans-oceanic trade by means of submarine, and the cargo undersea boat, *Deutschland*, made two trips to America in 1916. After the United States entered the war, in April, 1917, great but scarcely successful efforts were made by the enemy to stop the flow of troops to Europe. The *Tuscania*, carrying 2179 United States troops, was torpedoed February 5, 1918, off Ireland, with a loss of 113 American soldiers. In June, 1918, Germany carried her submarine offensive directly to the United States by sinking a number of small unarmed ships off the North Atlantic coast.

**Submarine Cable,** a rope of wires and insulating materials laid along the bed of a sea

or ocean through which telegraphic messages are transmitted. The conducting portion of such cables consists of a number of pure copper wires twisted into a strand which is covered with alternate coatings of a pitchy mixture and gutta-percha. This core is then covered with Manila yarn and twisted iron wires. The first attempt to lay a submarine cable was made in 1850, between Dover and Calais, but the cable only lasted a few hours owing to friction against the rocks. However, electric communication across the channel was reestablished not long after. The first Atlantic cable, from Ire-



Submarine Cable.

land to Newfoundland, was successfully laid by the *Great Eastern* in 1866, after unsuccessful attempts in 1857, 1868 and 1865. Long submarine cables now connect nearly all parts of the world. Signals through the cables are generally recorded by Thompson's mirror galvanometer and also by his siphon recorder, which enables the transmission of messages to be carried on with great rapidity. There were, in 1912, over 400 cables in use, with a total length of more than 200,000 miles. See *Telegraph, Electric*.

**Submarine Forests**, a term applied to beds of impure peat, consisting of roots, stems, and branches of trees, etc., occupying the sites on which they grew, but which by change of level are now submerged by the sea. Such submarine forests do not contain any trees that are not found growing at the present time.

**Submarine Mines**, explosives placed under water in a harbor, or along the coast, to destroy the vessels of an enemy. They have been long used, and were employed effectively by the Germans in the war of 1870. The Spanish-American war demonstrated the inefficiency of torpedoes and torpedo boats against rapid-fire guns, but the submarine mines were a source of constant dread to the battleships. In 1904, the destruction of the Russian battleship, *Petropavlovsk*, also of the Japanese ships *Hatsuse* and *Yoshino*, by submarine mines, and the indiscriminate scattering of mines in the Gulf of Pe-chi-li, were features of the war. Mines were also widely used in the European war.

**Subornation of Perjury**, the crime of inducing a person to commit perjury, punishable similarly to perjury. See *Perjury*.

**Subpoena** (sub-pō'na), in law, is a writ commanding a witness to appear in court, or render himself liable to an action of damages. When he is required to bring books or papers in his possession a clause is inserted to that effect, and the writ is then called a *subpoena duces tecum* ('bring with you under penalty'). A witness is allowed his traveling expenses.

**Subsidy** (suh'si-di), a term once used to denote the pecuniary assistance afforded, according to treaty, by one government to another, sometimes to secure its neutrality, but more frequently in consideration of its furnishing a certain number of troops. *Subsidy*, in England, was formerly an aid or tax granted to the crown. It now signifies

a sum paid by a government to aid corporate or individual enterprises.

**Shipping Subsidies** are government grants in aid of shipping and may be applied to any of the following objects: bounties for the construction of ships and their navigation; payments on contracts for carrying the mails; payments to shippers who contract to observe specified constructive details in shipbuilding and hold their ships in readiness to act as auxiliary naval vessels in time of war. In the United States the first postal subvention was authorized by an act of Congress, March 3, 1845. This law, with various changes, has been re-enacted from time to time. In 1891 a law was passed empowering the Postmaster-General to make contracts with American ship owners for carrying the mails. The maximum rate is \$4, \$2, \$1, and 60 cents per mile for the four classes of ships specified in the contract. Where mileage rates are not paid the compensation to American steamers is \$1.00 per pound of letters and post cards; for the same service foreign ships receive 44 cents. Bills for granting general subsidies are almost continuously before Congress. But concerted action looking toward the relief of American shipping cannot be said to have been brought.

**Substance** (sub'stans), in a philosophical sense, is distinguished from accident, and signifies that which exists independently and unchangeably; while accident denotes the changeable phenomena in substance, whether these phenomena are necessary or casual, in which latter case they are called accidents in a narrower sense. Substance is, with respect to the mind, a merely logical distinction from its attributes. We can never imagine it, but are compelled to assume it.

**Subularia** (sub-ū-lā'ri-a), a genus of plants, nat. order Cruciferae, found in the gravelly bottoms of lakes, usually in shallow water, in North and Central Europe, North Asia, and the Northern United States. *S. aquatica*, or awlwort, the only species, consists merely of a tuft of white fibrous roots, narrow awl-shaped leaves, and a leafless stalk, bearing a few small white flowers. It is indigenous to Scotland and the north of England and Ireland.

**Subway** (suh'wā), a tunnel cut or built for various purposes beneath the public streets of a large town. In order to relieve the overcrowded condition of the London streets the construction of an underground railway was suggested, and in 1825 a company was formed for this purpose. After overcoming many engineering difficulties the work was successfully com-

pleted, and in January, 1863, the first underground railway was opened to the public. London is now abundantly supplied with subways and in the United States there are a number of notable examples, the most important of these being those constructed in New York City. The total length of these is over 25 miles, and others of much importance are projected. Boston, Philadelphia, Chicago and St. Louis are also well supplied. Subways are frequently built in connection with trunk-line railroads, as well as for the relieving of the congested traffic of the streets. A striking example is the one recently opened by the Pennsylvania R. R. which runs under the city of New York and its two river boundaries. Subways are constructed either of concrete arches, as in Paris, or steel-and-concrete construction, known as box or cellular sections, which is shown in the opposite illustration. The cost of subway construction is great on account of the many difficulties encountered in the course of the underground work in large cities. The most important is the problem presented by the sewer system, extensive reconstruction of the sewers being necessitated, and new main drainage lines and outfall demanded. Electricity is the motive power in the subways, thus avoiding smoke, dust and other accompanying discomforts of steam. The system used in American subways employs the direct current at about 600 volts potential, supplied by a third rail supported on insulators just above ground alongside the track, the return going through the track rails.

**Succession** (suk-sesh'un), **PRESIDENTIAL**, in the United States. A succession bill was passed in Congress, January 15, 1886; signed by President Cleveland January 19 of that year. Under its provisions, in case of the death of the Vice-President, the Secretary of State stands next as successor to the presidency, followed by the Secretary of the Treasury, the Secretary of War, the Attorney-General, the Postmaster-General, the Secretary of the Navy, and the Secretary of the Interior in turn.

**Succession Wars**, wars which have arisen from claims for the possession of the crown on the occasion of a sovereign dying without undisputed legal heirs. In modern European history the most important of these struggles were those of the *Spanish succession* (1700-13), and of the *Austrian succession* (1740-48). Shortly before the death of Charles II of Spain, without issue or collateral male heirs, several competitors laid claim to the throne, the two principal being the dauphin of France, son of

Charles' eldest sister, and the Emperor Leopold of Austria, who claimed, in right of his mother, Mary Ann, daughter of Philip III of Spain. The other powers were greatly interested in this question, since the union of either France or Austria with Spain would have endangered the balance of power in Europe. After much negotiation Philip of Anjou was put forward by Louis XIV to represent the French claim, and Leopold nominated his second son, Charles, as his substitute, both parties declaring that Spain should never be incorporated with their respective dominions. The king of Spain eventually recognized Philip as his heir, and on the king's death, in November, 1700, Philip was proclaimed at Madrid. He was recognized by most of the European powers except Austria, which in 1701 began a war against France; and the arrogant and aggressive behavior of Louis, and his recognition of the son of James II as king of England, caused England, Holland, and Austria to combine against him and Philip in 1702. Prince Eugene of Austria had already opened the contest in 1701, and had defeated the French at Carpi (July) and at Chiari (September). In 1702-03 Marlborough, at the head of an allied Anglo-Dutch-German army, reduced the French strongholds along the Meuse and in the Low Countries. In 1704 Marlborough and Eugene joined their forces and defeated the Franco-Bavarian army at Blenheim (August 13). Barcelona was captured by an English force in 1705, and the Earl of Peterborough gained some brilliant successes in this quarter. On May 23, 1706, the French were defeated by Marlborough at Ramillies, and again at Turin by the Austrians in September. In April, 1707, a Franco-Spanish force under the Duke of Berwick routed an Anglo-Portuguese army at Almanza, Spain. In the following year Marlborough and Eugene reunited their forces and severely defeated the French at Oudenarde (July 11). The resources of France were now almost crippled, and Louis made overtures of peace which were rejected. The struggle was renewed with great vigor; Villars, with a French army of nearly 100,000 men, proceeded against Marlborough and Eugene, but he was defeated by the allies at Malplaquet on Sept. 11, 1709. In Spain the French had entirely gained the upper hand by next year. The war dragged on until the accession in 1711 of the Archduke Charles to the Austrian throne changed the whole aspect of affairs, and the

war, so far as Britain, France, and Holland were concerned, was brought to an end by the Peace of Utrecht in 1713. Peace between Britain and Spain soon followed, Britain gaining Gibraltar (taken in 1704 by Admiral Rooke) and Minorca. In the end the Emperor Charles, forsaken by his allies, was reluctantly compelled to sign a treaty at Baden on September 7, 1714, recognizing Philip V as the king of Spain. See *Utrecht, Peace of*.

The war of the Austrian succession arose on the extinction of the male line of the house of Hapsburg, by the death of the emperor Charles VI, October 20, 1740. By diplomatic negotiations before his death, and by means of the settlement called the Pragmatic Sanction (which see), Charles had endeavored to secure the Austrian succession for his daughter, Maria Theresa. But there were several other claimants for the Austrian possessions, which included Bohemia, Hungary, Northern Italy, part of the Netherlands, and Austria proper. Besides Maria Theresa, the other claimants of importance were Charles Albert, elector of Bavaria, and Philip V of Spain; while the chief European powers which took an interest in the succession were France, Prussia, and England. The first movement in the general scramble was made by Frederick II of Prussia, who, in Dec., 1740, marched his army into Silesia, and secured the four duchies in that province as his share of the spoil. In the following year an agreement was entered into between France, Spain, Bavaria, Prussia, Saxony, Sardinia, and Naples, in terms of which a French-Bavarian army entered Upper Austria, another French army invaded the Austrian possessions in the Netherlands, and the forces of Spain and Naples occupied the Austrian territory in Northern Italy. This having been done, the coalition arranged that Charles Albert should be crowned (January, 1742) as Emperor of Germany under the title of Charles VII, and this was accomplished at Frankfort. Meanwhile Maria Theresa appealed for help to the Hungarian diet at Presburg with such effect that the Magyar horsemen promptly invaded Bavaria and captured the city of Munich. She also formed an alliance with England, in accordance with which the English government furnished her with money, sent a fleet to Naples to demand the withdrawal of Neapolitan troops from Austrian territory, and supplied a portion of the army which, under George II, defeated the French forces at Dettingen (1743).

After this event negotiations for peace were begun, but with so little success that another league was formed including England, Holland, Austria, Saxony, and Sardinia, and a general European war broke out. Among the more important events of this general conflict were the second Silesian war, begun by Frederick II; an attempted invasion of England by France in favor of the Pretender; and the brilliant campaign in the Netherlands conducted by Marshal Saxe, and terminating (May, 1745) in the victory of Fontenoy, where the English and allies under the Duke of Cumberland were defeated. In 1745, however, the Emperor Charles VII died, and his son, Maximilian Joseph, gave up all claim to the Austrian throne, and concluded peace with that country; and in the same year the husband of Maria Theresa was elected emperor under the name of Francis I. (See *Maria Theresa*.) War was still continued against Austria by Frederick II of Prussia and the French forces under Marshal Saxe, but ultimately a definite treaty of peace between all the powers was signed in 1748 at Aix-la-Chapelle. See also *Frederick II, Prussia, Austria*, etc.

**Succinic Acid** (suk-sin'ik;  $C_4H_4O_4$ ), an acid obtained by the dry distillation of amber. Succinic acid also occurs in certain lignites, and is found in the turpentine of several species of pine, and in certain plants. It is also occasionally found in the animal organism.

**Suchet** (su-shā), LOUIS GABRIEL, Duke of Albufera, Marshal of France, born at Lyons in 1770, entered the military service at an early age (1790), and served with distinction under Napoleon, Masséna, Joubert, and Moreau in the Italian and Swiss campaigns. He attained the rank of lieutenant-general before he was thirty, and in 1808 he received the command of a division in Spain, and was almost constantly victorious till after the battle of Vittoria. His brilliant services in that country obtained him the marshal's staff, and the title of duke. After the restoration Suchet was created peer of France. He lost his peerage after the battle of Waterloo, but recovered it in 1819. He died in 1826.

**Suchow.** See *Soo-chow-foo*.

**Sucker** (suk'er), or SUCKING-FISH, a name applied popularly to the Remora (which see); to the lump-sucker (which see); and also to the fishes belonging to the teleostean genus



**Liparis**, which is nearly allied to the lump-suckers. The best-known forms are Montague's sucker (*Liparis Montaguei*) and the common sucker or sea-anail (*L. vulgaris*), which adhere to stones and other fixed objects by means of their united ventral fins. They are small fishes, 3 or 4 inches long.

**Suckling** (suk'ling), SIR JOHN, a wit, courtier, and dramatist, born in 1609, at Whitton, in Middlesex, and was educated at Trinity College, Cambridge. In 1631-32 he served as a volunteer under Gustavus Adolphus. In 1639 he equipped a troop of horse for the service of Charles I against the Scotch. Being implicated in a plot to rescue the Earl of Strafford from the Tower he was obliged to flee to France, where he is said to have committed suicide about 1641. His writings consist of letters written with ease and spirit; some miscellaneous poems, including ballads and songs, which for grace and elegance of style are inimitable; a prose treatise entitled *An Account of Religion by Reason*; and several plays—*Aglaura*, *The Goblins*, *Brennoralt*—which were probably the first plays produced with stage scenery on an elaborate scale.

**Sucre.** See *Chuquisaca*.

**Sucre** (sü'krä), ANTONIO JOSE DE, Spanish American patriot, was born in 1793 at Cumana in Venezuela. He engaged in the rising against Spain in 1811, attained the rank of brigadier-general in 1819, and in 1822 won the decisive victory of Pichincha, which forced the Spaniards to evacuate Quito. In 1824 he routed the Spanish forces at Ayacucho, thus liberating Upper Peru, which was turned into a republic called Bolivia, of which Sucre was elected president in 1826. An insurrection broke out in 1828, and Sucre was driven from the country, but returned at the head of a Colombian army and reinstated himself. He was assassinated in June, 1830.

**Suctoria** (suk-tö'ri-a: 'sucking animals'), also called *Discophora* and *Hirudinea*, an order of Annelida or worms, represented by the leeches (which see) and their allies.

**Sudan** (sü-dän'). See *Soudan*.

**Sudbury** (sud'bu-ri), a municipal borough of England, in the county of Suffolk, 22 miles west of Ipswich, on the left bank of the Stour. It is neat, clean, and well built, and has three old churches, a hospital, a grammar-school, and several other pub-

lic buildings. Manufactures include silk, velvet, and cocoanut matting, lime, and bricks. There is a considerable river trade in coal and agricultural produce. Pop. (1911) 7141.

**Sudermann** (sü'der-män), HERMAN, a German playwright and novelist, born at Matschen in East Prussia, December 9, 1857. He studied at Königsberg and Berlin, and devoted himself to a literary career in the capital. He first gained recognition by his social drama, *Die Ehre* (Honor), 1889. His best-known plays are *Heimat*, translated as *Magda* (1893); *Johannes* (1897), dealing with John the Baptist; *Johannesfeuer* (1901), presented in America as *The Fires of St. John*; and *Es lebe das Leben* (1902), translated as *The Joy of Living*.

**Sudetengebirge** (sü'dä-t-n-g-e-bir'-gē), a mountain-chain of Europe, which separates Prussian Silesia from Moravia, and connects the Riesengebirge with the Carpathians. The mountains are generally low, the highest peak being Spiegglitzer-Schneeberg, about 5000 feet high, and are chiefly of granite. They are rich in coal and metals, and are well wooded.

**Südras.** See *Soodras*.

**Sue** (sü), MARIE-JOSEPH-EUGÈNE, a French novelist, born at Paris in 1804. He adopted his father's profession of medicine, became a surgeon in the army, and served in Spain in 1823. In 1825 he joined the naval service, and in the capacity of surgeon, was present at the battle of Navarino in 1827. On his father's death in 1829 he inherited an immense fortune, and, having abandoned his profession, he devoted himself to literary composition. His most famous works are *Les Mystères de Paris* and *Le Juif Errant*, well known in English as *The Mysteries of Paris* and *The Wandering Jew*. In 1850 he was elected to the Constituent Assembly, and sat as an advanced radical. After the *coup d'état* by Napoleon III, in 1851, he left France and retired to Annecy, where he died in 1857.

**Sueaborg.** See *Sveaborg*.

**Sueca** (sü-ä'kä), a prosperous and well-built town of Spain, on the left bank of the Jucar, 23 miles south of Valencia, a few miles from the Mediterranean, by the Sierra de Cullera. Pop. 14,435.

**Suet** (sü'et), the fatty tissue situated about the loins and kidneys of certain domestic animals, especially the ox and sheep, and which is harder and less fusible than the fat from other parts of the same animals. *Beef-suet*

is much used for culinary purposes, and purified mutton-suet forms an ingredient in ointments, cerates, and plasters.

**Suetonius** (awē-tō'ni-us), **CAIUS SUTONIUS TRANQUILLUS**, a Roman writer, the son of a military tribune, flourished about 100 A.D. Little is known of the circumstances of his life. He distinguished himself as an advocate, and enjoyed the patronage of the younger Pliny. He became secretary (*magister epistolarum*) to the Emperor Hadrian, but was dismissed on account of his intimacy with the Empress Sabina. His chief work, *Vitæ Duodecim Cæsarum* ('Lives of the Twelve Cæsars'), gives an interesting account of the private life and personal character of the twelve first Roman emperors from Julius Cæsar to Domitian, and is of great value to us from the light which it throws on domestic manners and customs.

**Sueur**, **LE**. See *Lesueur*.

**Suevi** (swē'vi), the general name of a number of united tribes who, before the Christian era, inhabited parts of Germany. The confederation included the Marcomanni and the Semnones, the former inhabiting what is now Bohemia, and the latter the present Lusatia and Brandenburg. The Suevi of Cæsar lived between the Rhine and the Weser. In the great migration of the northern nations, the Suevi joined the Alans, entered Gaul, and in 409 Spain. After the Vandals had gone to Africa the Suevi spread as far as Portugal. They were overcome and absorbed by the Visigoths in 556. Those of them who remained in Germany were the ancestors of the present Suabians.

**Su'ez**, a town of Egypt, situated at the Red Sea terminus of the Suez Canal, 76 miles E. of Cairo, with which it is connected by rail. Previous to the construction of the Suez Canal, and the fresh-water canal from the Nile (see next article), it was an ill-huilt and miserable place, but is now in a fairly flourishing condition. Among the principal buildings are the Greek church, viceroy's villa, two hospitals, custom-house, etc. Pop. 18,347.

**Suez Canal** (sū-ēz', sū'ez'), the great ship-canal without locks now connecting the Mediterranean with the Red Sea; running from Port Said on the former to Suez on the latter, a distance of nearly 100 miles. According to Herodotus, a large canal from the Red Sea to the Nile was constructed about 600 B.C. This canal, which seems never to have been of much use, was

annually blocked up about 767 A.D. Napoleon I had conceived the idea of making a ship-canal across the isthmus of Suez. In 1854 the French engineer M. Ferdinand de Lesseps obtained a concession for that purpose, and in 1858 was able to form a company for carrying on the work. Operations were begun on April 25, 1859, and on November 17, 1869, the canal was opened; the total cost of construction was nearly \$80,000,000. There were 75 miles of actual excavation, the remaining 25 miles being through shallow lakes (Lake Menzaleh, Lake Timsah, Bitter Lakes), which usually had to be deepened. For about four-fifths of its length it was



originally 327 feet wide at the surface of the water, 72 at the bottom, and 26 deep; for the remainder only 196 feet wide at the top, the other dimensions being the same; but the increase of traffic led to its being widened and deepened. A canal was also constructed for bringing fresh water from the Nile at a point near Cairo. This canal reaches the salt-water canal at Ismailia, and then runs almost parallel to the ship-canal to Suez. It is almost 40 feet wide and 9 deep, and is used for navigation as well as for domestic purposes and irrigation. The land on both sides of the ship-canal is to be retained by the com-

pany for ninety-nine years. In November, 1875, the British government bought from the Viceroy of Egypt his interest in the canal, consisting of 170,002 shares, for the sum of £4,000,000. The shipping passing through the canal has steadily increased since its opening. About four-fifths of the tonnage passing through belongs to Britain. Navigation at night by aid of the electric light began on March 1, 1887, and has shortened the time of passage by about one-half, viz., to from sixteen to twenty hours. The distance between London and Bombay by the old route round the Cape is about 11,220 miles; by the canal route, 6332. Steamships are allowed to sail at a speed of five to six knots an hour.

**Suffolk** a city, county seat of Nansemond Co., Virginia, on the Nansemond River, 23 miles s. w. of Norfolk; the junction of six railroads. It has car shops, knitting-mills, packing plant, factories, etc., and has a large trade in peanuts. Pop. 10,000.

**Suffolk** (suf'ok; literally south-folk), a maritime county of England, bounded by the German Ocean, Essex, Norfolk, and Cambridgeshire. It has a coast-line of about 50 miles, and an area of 1500 square miles. The county is intersected by several rivers, chief among them being the Lark, a tributary of the Great Ouse; the Stour, and the Gipping. Most of the surface is level and agriculture is the main industry. Chief town, Ipswich. Pop. 384,293.

**Suffragan.** See *Bishop*.

**Suffrage** (suf'rij), the right to vote for any purpose, but more especially the right of a person to vote in the election of his political representative. Many writers advocate the universal extension of this right, but in Britain and most European countries it is limited by a household or other qualification. In the United States it is with few exceptions exercised by all male citizens of twenty-one years and upwards. Among late laws on the subject these may be mentioned: Idaho prevents polygamists from voting; in Maine and Massachusetts the voter must be able to read the State constitution in the English language, write his name, and must not be 'a pauper or under guardianship.' Mississippi in its State constitution has an educational test for suffrage. In Wyoming it is a crime to discharge an employé because he has been nominated for an office. California has made it penal to enclose wages in pay envelopes on which any political arguments or the

names of party candidates are printed. Efforts for many years have been made by women to gain the privilege of suffrage, with the result that complete woman suffrage has been granted in eleven States: Wyoming, Colorado, Utah, Idaho, Washington, California, Arizona, Kansas, Nevada, Oregon and Montana; also Illinois in large measure.

**Suffragette**, the title given the militant women's suffrage advocates in England, these invading Parliament and suffering imprisonment as martyrs to their cause. No amount of severity has yet been able to check their earnestness. See *Women's Rights*.

**Sufism** (sū'fizm), the pantheistic mysticism of the Mohammedan East, which strives for the highest illumination of the mind, the most perfect calmness of the soul, and the union of it with God by an ascetic life and the subjugation of the appetites. This pantheism, clothed in a mystico-religious garb, has been professed since the ninth and tenth centuries by a sect which at present is gaining adherents continually among the more cultivated Mohammedans, particularly in Persia and India. The name is from *sufi*, a religious ascetic, an Eastern term applied to all members of religious monastic bodies leading an ascetic life. The Sufis were originally devout persons who, perplexed by the discord prevailing among the various systems of Mohammedan philosophy in the second century of the Hejira, found consolation in pious mysticism. Their teachings though at first consonant with orthodox Mohammedanism, gradually led to a mode of thought totally irreconcilable with the Koran. About the beginning of the tenth century the Sufis divided into two branches, one of which followed Rostanle, who openly embraced pantheism, and the other Junaid, who sought to reconcile Sufism with Mohammedanism. Among eminent Persian poets belonging to the Sufis we may mention Hafiz, a distinguished Sufi; Ferided-din, Rumi, and Jami. The celebrated philosopher and jurist Alghazzali was also a Sufi.

**Sugar** (shug'ar), a name applied to various compounds of carbon, hydrogen, and oxygen, all of which have a more or less sweet taste, a neutral reaction to vegetable colors, and are soluble in water. The sugars are generally of vegetable origin; they are mostly crystallizable, and when in solution they rotate the plane of a ray of polarized light. Among all these compounds the sugar of the sugar-cane and beet is

distinguished *par excellence* by the name sugar. It is supposed that sugar was first cultivated in India, but a knowledge of the sugar-cane and its method of cultivation was brought from Persia by the Arabs, and given by them to Europe. The Spaniards were the first to plant it in Madeira (1400), from whence it spread to their possessions in the West Indies and South America; while during the middle ages Venice was the emporium of the trade in sugar. There is a record that so early as 1310 it was shipped from the latter port to London. It was, however, chiefly used as medicine until the beginning of the last century, when it became a food staple in connection with tea and coffee.

Sugar is principally prepared from the sugar-cane and from beet. (See *Sugar-cane and Beet*.) The first operation in the manufacture of sugar from sugar-cane consists in pressing the juice from the canes. For this purpose the canes are passed under large rollers, which extract about 70 to 90 per cent. of the juice. The cane juice is now boiled in copper vessels; milk of lime, sulphurous acid, or phosphoric acid is added to neutralize the vegetable acids (malic, etc.), and at length the sugar crystallizes. The liquid portion remaining is drained off and sold as molasses. The raw sugar is then usually shipped to importing countries, where it is refined. In obtaining the juice from beet-root two methods have been adopted. In one of these the roots are placed in a cylinder, where they are mashed to a pulp by rows of saw-toothed blades driven with great rapidity, after which the juice is pressed out by means of a hydraulic press; in the other process the roots are placed in a series of cylinders through which water is forced until the saccharine matter in the roots has all been obtained. By this process as much as 90 per cent. of the juice is extracted. When this is accomplished the expressed juice is heated to about 70° C., milk of lime is added, and the temperature increased; the lime separates the impurities in the form of phosphates and albuminates of calcium, etc., which cover the surface with a white crust. When the boiling juice breaks through the crust the liquid is run off and cleared of the lime by carbonic acid. The syrup is then twice filtered, and allowed to crystallize.

The sugar-cane contains about 18 per cent., and the beet 11.2 per cent. of sugar. The first process of refinement is to dissolve the raw sugar in water to which a little lime is added; this solution is heated by steam and passed through filters, generally consisting of

deep vats, the bottoms of which are perforated and covered with a thick layer of animal charcoal. The syrup is then collected underneath and boiled down to induce crystallization. The latter operation is conducted in vacuum-pans connected with an air-pipe, a condenser, and a pipe to admit steam. The juice being in the pan, a partial vacuum is produced by means of the air-pump, and steam circulates through a coiled pipe in the pan until the liquid boils, while the vapor thereby produced is removed and condensed. The sugar-syrup is then run out and allowed to crystallize in conical-shaped vessels of clay or sheet-iron; *papier-mâché* is also used. In these vessels the crystalline mass assumes its marketable form, from which it derives the name of *loaf-sugar*. After draining the sugar in the molds the juice is completely removed by a centrifugal machine; the sugar-loaf is then dried. From the syrup which drains off an inferior sugar is obtained, and the remaining uncrystallized syrup is sold as molasses. *Sugar-candy* is prepared by boiling sugar-syrup with a little animal charcoal, clearing with white of egg, boiling down over an open fire, and crystallizing. Sugar-candy is known in commerce as *refined-white*, which forms large colorless crystals, and is prepared from refined cane-sugar; *yellow-candy*, forming straw-colored crystals, prepared from boiled sugar; and *brown-candy*, similar in color to ordinary moist sugar, and prepared from inferior cane-sugar. Sugar-candy is largely used for making liqueurs, sweetening champagne, etc. Sugar is also produced extensively in the United States from the rock or sugar maple, in Asia from various species of palms, and in some countries from species of Guinea-corn or sorghum.

The common sugars have the general name of *cane-sugar*, and the chemical formula  $C_{12}H_{22}O_{11}$ , which is also the formula for several other sugars, all called *saccharoses*. Another form of sugar, called *grape-sugar* or *dextrose* ( $C_6H_{12}O_6$ ), is the type of sugars called *glucoses*, and is manufactured chiefly for the use of brewers and wine-makers; it is also known as *honey-sugar*, *fruit-sugar*, *starch-sugar*, etc. It occurs in many natural fruits, such as the peach, plum, currant, apple, and grape, in quantities varying from 1.5 per cent. in the peach to 15 per cent. in the grape. It also forms the solid crystalline portion of honey. Grape-sugar may be obtained from grape-juice by heating it with marble, filtering, clearing with ox-blood, evaporating, and crystallizing. It is, however, generally prepared by boiling



starch with dilute sulphuric acid; the clear liquid is then run off from the precipitate, evaporated by steam, filtered through animal charcoal, and run into the crystallizing vessels. Dextrose or grape-sugar as well as cane-sugar belongs to the class of fermentable sugars. A certain number of other sugars, as mannite or manna-sugar, quercite or oak-sugar, etc., are non-fermentable. Cane-sugar crystallizes in large monoclinic prisms, which when broken exhibit phosphorescence. At 100° it melts to a clear liquid, which when cool and solidified is commonly known as *barley-sugar*.

The quantity of cane-sugar in a solution which contains no other substance may be estimated by simply estimating the specific gravity of the solution, but when other bodies are present it must be ascertained by other chemical processes or by means of the saccharometer, which is an instrument for determining the rotary power exercised by a solution of sugar upon a ray of polarized light. See *Saccharometer*.

Considerable quantities of sugar from the cane are produced in Louisiana, Hawaii and Porto Rico; but much the greater portion of the supply is obtained from Java and Cuba. A large quantity of beet-sugar has long been received from Germany, Austria, France, and Russia, in which countries a bounty is paid to the manufacturer when his sugar is exported, and he is protected from importation. Much is also produced in the United States, where the product is increasing with some rapidity. Of late years the West Indies have suffered greatly by the competition of bounty-encouraged beet-sugar produced on the continent of Europe.

**Sugar-cane** (*Saccharum officinarum*), a plant of the nat. order Gramineæ or grasses, from which great part of the sugar of commerce is obtained. It is nowhere found in a wild state, but is probably a native of tropical Asia. It grows to the height of 7 or 8 feet or more, and has broad ribbed leaves, and smooth shining stems. It is now cultivated in all the warm parts of the globe, such as the West Indies, Brazil, Java, Louisiana, etc., but varies in growth ac-

cording to the situation, the season, or the weather. The sugar-cane flowers only after the lapse of an entire year, and a plantation lasts from six to ten years. The juice of the cane is so palatable and nutritive that during the sugar harvest every creature which partakes freely of it appears to derive health and vigor from its use. For the process of making sugar, as well as for other information regarding this product, see the preceding article.

**Sugar-mite** (*Aodrus sacchari*), a species of mite frequently to be observed in raw sugar, very similar in appearance to the itch-mite.

**Sugar of Lead**, the common name for acetate of lead.

See *Lead*.

**Suhl** (sûl), a town of Prussia, prov. of Saxony, 30 miles s. w. of Erfurt. It is a mining center, and has manufactures of fire-arms; ironworks, machine-works, potteries and tanneries. Pop. 13,814.

**Suicide** (sû'i-sid), self-murder; the act of designedly destroying one's own life. To constitute suicide, in a legal sense, the person must be of years of discretion and of sound mind. See *Felo de se*.

**Suidæ** (sû'i-dæ), the family of mammals of which the hog is the type. This family is characterized by having on each foot two large principal toes, shod with stout hoofs, and two short lateral toes which hardly touch the earth.



Sugar-cane (*Saccharum officinarum*).



Characters of Suidæ.

a, Skull of Wild Boar. b, Teeth of the upper jaw. c, Teeth of lower jaw. d, Foot. e, Bones of foot.

The canine teeth project from the month and curve upwards. The muzzle is terminated by a truncated snout, fitted for turning up the ground. The family includes the wild boar, the wart-hog, and the peccary.

**Suidas** (sū'i-das), a Greek grammarian, who must have lived about the eleventh or twelfth century after Christ. He wrote a *Lexicon* which forms a kind of cyclopaedia and dictionary.

**Suir**, or **SURN** (shur), a river rising in the Slieve-Bloom Mountains, Tipperary, Ireland. It forms the boundary between Tipperary and the counties of Waterford and Kilkenny, and after a course of about 80 miles it flows into Waterford harbor. It passes the towns of Cahir, Clonmel, and Carrick, and is navigable by vessels of 500 tons to Waterford.

**Sukkur** (suk-kur'), a town of Bombay Presidency, India, situated on the right bank of the Indus opposite Rohri. It contains the usual public offices with a civil hospital, dispensary, and an Anglo-vernacular school. It has a considerable local and inland trade, but no special manufacturing industries. Pop. 31,816.

**Suleiman Pasha** (sū-la-mān'), a Turkish general, born in Constantinople of poor parents in 1840. He entered the army at an early age and rapidly rose to the highest rank. In 1876 he was made general of a division, and on the outbreak of the Russo-Turkish war, he had chief command in Herzegovina. In October, 1877, he was appointed leader of the army of the Danube, but was recalled in February, 1878, and accused of high treason. He was tried and condemned to fifteen years' imprisonment in December of the same year, but was soon afterwards pardoned. He died in Constantinople April 15, 1883.

**Suliman Mountains** (sū-ls-mān'), a range on the borders of Afghanistan and British India. The highest summit, Takht-i-Suliman, or 'Suliman's Seat,' attains an elevation of more than 6000 feet (according to some estimates 11,000 or 12,000 feet). These mountains are covered with dense forests, and are generally considered the peculiar seat of the aboriginal Afghans.

**Sulina** (sū-ls'na), the middlemost of the three chief mouths of the Danube; it quits the Khedrile or most southerly branch, and opens into the Black Sea after an easterly course of over 50 miles. (See *Danube*.) It is used for transporting immense quantities of corn, chiefly for the British market. The passage over the bar at the mouth has been deepened by means of two piers at a cost of \$500,000. A town and port (now free) at the mouth bears

the same name. Pilots, fishermen, lightermen, etc., chiefly form the pop. of 5611.

**Sullots** (sū'll-ōts), a mixed people of Albanian and Greek origin descended from Arnaut and Grecian shepherds, who, to escape the tyranny of the Turks in the seventeenth century, settled in the mountains of Parga, south of Albania, where they formed an independent republic. They lived partly by rearing cattle and partly by plunder. Their chief village, Suli, was occupied by the Turks in 1822, and the Sullots then dispersed themselves throughout the

**Sulla** (sū'la). LUCIUS CORNELIUS, a Roman dictator, was born in 788 B.C. He received a good education, but was notorious from his youth upwards for his excessive dissipation and debauchery. He served with distinction under Marius in the Jugurthine (107-104) and Cimbrian (104-102) wars, and in 93 was chosen praetor. For his services in the Social war (90-88) he was appointed consul, (B.C. 88), and the province of Asia, with the conduct of the war against Mithridates, fell to his lot. Marius was also ambitious of this command, and resorted to acts of violence to carry his point, by which Sulla was compelled to escape from Rome. But Sulla reëntered the city at the head of his army, drove Marius to Africa, and then sailed for Greece at the beginning of 87 B.C. He expelled the armies of Mithridates from Europe (86), crossed into Asia (84), and was everywhere victorious, gaining plenty of wealth for himself and his soldiers, and forcing Mithridates to conclude a peace. Marius had died in 86 B.C., after proscribing Sulla and confiscating his property, but the party of Marius was still strong. Sulla now hastened to Italy, and landed at Brundisium with 40,000 men B.C. 83. He was joined by many of his friends who had been banished from Rome. He gained four battles over the Roman forces in person, and defeated the Samnite army under Telesinus. He entered the city victorious in 82, and immediately put to death between 6000 and 7000 prisoners of war in the circus. Rome and all the provinces of Italy were filled with the most revolting scenes of cruelty. After satisfying his vengeance by the murder or proscription of thousands he caused himself to be named dictator for an indefinite period (B.C. 81). He now ruled without restraint, repealed and made laws, abolished the tribuneship, and settled his veterans in various parts of Italy. In 79 B.C. he laid down his dictatorship,

and retiring to Puteoli, abandoned himself to all sorts of debauchery. He died in 78 B.C. See *Rome*.

**Sullivan** (sul'i-van), SIR ARTHUR SEYMOUR, born in London in 1842, son of a band-master. He became a choir-boy at the Chapel Royal, and in 1856 gained the Mendelssohn scholarship of the Royal Academy of Music, where he completed his musical education. In 1858 he went to Leipzig, and on his return in 1862 at once attracted attention by his music to Shakespeare's *Tempest*. He wrote oratorios (*Prodigal Son*, *Light of the World*), anthems, songs, etc.; but his most popular compositions were the burlesque operettas which he produced in conjunction with W. S. Gilbert. Among the most popular of these are *H.M.S. Pinafore* (1878), *Pirates of Penzance* (1880), *Patience* (1881), *Iolanthe* (1882), *Mikado* (1885), *The Yeomen of the Guard* (1888), and the *Gondoliers* (1889). In 1886 he set to music an arrangement of Longfellow's *Golden Legend*, which is one of his finest compositions. He was knighted in 1883, and died November 23, 1900.

**Sullivan**, JOHN LAWRENCE, famous American pugilist, born in Boston, Mass., in 1858. His greatest fight was in 1889, when he defeated Kilrain in a 75-round battle in Mississippi. He held the championship of the world for ten years, losing the title to Corbett in 1892 at New Orleans, being defeated in the 21st round. In later years he became a temperance lecturer. Died Feb. 2, 1918.

**Sully** (sul'i, Fr. sül-le), MAXIMILIEN DE BETHUNE, DUC DE, Marshal of France and first minister of Henry IV, was born in 1560, and educated in the Protestant (Calvinistic) faith. He distinguished himself at the battle of Ivry in 1590, where he was severely wounded, and was afterwards of great assistance to the king in resisting the intrigues of the League. In 1597 he was appointed controller of finance, and by his excellent administration largely reduced taxation, and eventually paid off a state debt of 300,000,000 livres. He also received many other offices and dignities, and became adviser of the king in all his councils. His industry was unwearied, and he did all he could to encourage agriculture, which he regarded as the mainstay of the state. In 1606 the territory of Sully-sur-Loire was erected into a duchy in his favor. After the murder of Henry IV (1611) he retired from court and resigned most of his charges. He now occupied himself chiefly with agriculture, and rarely took part in political affairs.

He was created a marshal by Richelieu in 1634 and died in 1641. His later years were employed in writing memoirs of his life and times. These are of much interest and importance.

**Sulphates** (sul'fats), salts of sulphuric acid. Sulphuric acid is dibasic, forming two classes of sulphates, viz., *neutral sulphates*, in which the two hydrogen atoms of the acid are replaced by metal, and *acid sulphates*, in which one hydrogen atom only is so replaced. The general formula of the former class is  $M_2SO_4$ , and of the latter  $MHSO_4$ . (M represents a monovalent metal.) Of the sulphates, some are found native; some are very soluble, some sparingly soluble, and some insoluble. The most important sulphates are—sulphate of aluminum and potassium, or alum; sulphate of ammonium, employed for making carbonate of ammonia; sulphate of copper, or blue vitriol, much used as an escharotic in surgery, and also used in dyeing and for preparing certain green pigments; sulphate of iron, or green vitriol, used in making ink, and very extensively in dyeing and calico-printing; it is also much used in medicine; sulphate of calcium, or gypsum; sulphate of magnesium, or Epsom salts; sulphate of manganese, used in calico-printing; sulphate of mercury, used in the preparation of corrosive sublimate and of calomel; bisulphate of potash, much used as a flux in mineral analysis; sulphate of sodium, or Glauber's salts; sulphate of quinine, much used in medicine; sulphate of zinc, or white vitriol, used in surgery, also in the preparation of drying oils for varnishes, and in the reserve or resist pastes of the calico-printer. Many double sulphates are known.

**Sulphides** (sul'fids), binary compounds of sulphur with other elements.

**Sulphites** (sul'fitts), salts of sulphurous acid. The sulphites are recognized by giving off the suffocating smell of sulphurous acid when acted on by a stronger acid. A very close analogy exists between them and the carbonates. See *Sulphur*.

**Sulphur** (sul'fur), an elementary, non-metallic, combustible substance which has been known from the earliest ages; chemical symbol, S. It frequently occurs in a pure state in beds of gypsum or clay, but is generally associated with sulphate of strontium. It also occurs in chemical combination with oxygen and various metals, forming sulphates and sulphides. It is found in greatest abundance and purity in the

## Sulphur

neighborhood of volcanoes, modern or extinct, as in Sicily; and as an article of commerce is chiefly exported from the Mediterranean. It is also found in Iceland, California, and Mexico. It is also obtained by the roasting of iron pyrites; the condensed mass of sulphur thus obtained is broken into lumps and distilled. Native sulphur is usually separated from the earthy matter by a process of distillation, the sulphur vapors being liquefied by a condenser. The product obtained from native sulphur, or from iron pyrites, is afterwards refined by a further process of distillation. Pure sulphur is commonly met with in two forms, that of a compact, brittle solid, and a fine powder. It is nearly tasteless, of a greenish-yellow color, and when rubbed or melted emits a peculiar odor. Its atomic weight is 32, and its specific gravity 1.99. It is insoluble in water, and not very readily soluble in alcohol, but is taken up by spirits of turpentine, by many oils, and by carbon disulphide. It is a non-conductor of electricity. It is readily melted and volatilized. It fuses at  $232^{\circ}$  Fahr., and between  $232^{\circ}$  and  $280^{\circ}$  it possesses the greatest degree of fluidity, and, when cast into cylindrical molds, forms the common roll-sulphur of commerce. It possesses the peculiar property of solidifying at a higher degree, or when raised to  $320^{\circ}$ . From  $480^{\circ}$  to its boiling point ( $792^{\circ}$ ) it again becomes fluid, and at  $792^{\circ}$  it rises in vapor, which condenses in close vessels in the form of a fine yellow powder, called *flowers of sulphur*. Sulphur exists in two distinct crystalline forms, and also as an amorphous variety; these modifications are characterized by differences in specific gravity, in solubility in various liquids, and in many other points. Sulphur combines with oxygen, hydrogen, chlorine, etc., forming various important compounds; it also unites with the metals, forming sulphides. It is employed in the manufacture of gunpowder, matches, vulcanite, and sulphurous and sulphuric acids. It is also employed in medicine, and for various other purposes. *Sulphur chloride* ( $\text{S}_2\text{Cl}_2$ ) is produced by passing chlorine gas into a retort containing melted sulphur. It is used for vulcanizing caoutchouc. Sulphur forms two combinations with oxygen, the *dioxide* ( $\text{SO}_2$ ) and the *trioxide* ( $\text{SO}_3$ ). The former is the sole product of the combustion of sulphur; it is a colorless gas, which may be liquefied and solidified by cold and pressure. This gas is used in the arts for bleaching silk, wool, straw, parchment, and generally such substances as are destroyed by the action of

## Sulphuric Acid

chlorine. Sulphur trioxide ( $\text{SO}_3$ ) is a white crystalline solid, produced by the oxidation of the dioxide. *Sodium thio-sulphate* ( $\text{Na}_2\text{S}_2\text{O}_3$ ) is produced by boiling sulphur with soda lye, and passing sulphur dioxide into the solution until it is completely decolorized. It is largely used in the arts as an antichlor, and for fixing photographs. Carbon disulphide ( $\text{CS}_2$ ) is a volatile liquid, with a poisonous vapor, produced by the action of sulphur upon carbon at high temperatures. It is used for dissolving caoutchouc and gutta-percha, for extracting essential oils, spices, etc., from plants and seeds, and bitumen from minerals, etc.

## Sulphuretted Hydrogen (sul'fū-ret-ed;

$\text{H}_2\text{S}$ ), a compound formed when hydrogen and sulphur come in contact in the nascent state. It is a transparent colorless gas, recognized by its peculiar fetid odor, resembling that of putrid eggs. It is very deleterious to animal life, and is often formed where animal matters or excrements putrefy. It is the active constituent of sulphurous mineral waters. It is also known by the name of *hydrosulphuric acid*, *sulphydic acid*, and *hydrothionic acid*. It is usually prepared by decomposing a metallic sulphide, especially sulphide of iron or of antimony, by means of hydrochloric or sulphuric acid. Sulphuretted hydrogen is of great use in the laboratory, in qualitative analysis, as by its means the metals can be divided into groups.

## Sulphuric Acid (sul'fū'rik), or OIL OF VITRIOL, a most

important acid discovered by Basil Valentine towards the close of the fifteenth century. It was formerly procured by the distillation of dried sulphate of iron, called *green vitriol*, whence the corrosive liquid which came over in the distillation, having an oily consistence, was called *oil of vitriol*. The principle upon which it is now manufactured was laid down by Roebuck in 1746, and consists in burning sulphur, or more frequently iron pyrites, in closed furnaces, and leading the fumes, mixed with oxides of nitrogen, into large leaden chambers, into which jets of steam are continuously sent. The oxides of nitrogen are produced by the action of sulphuric acid upon niter contained in pots, which are placed between the sulphur ovens and the chambers. The sulphur dioxide takes away part of the oxygen from the oxides of nitrogen, which are again oxidized by the air in the chambers. The sulphur trioxide produced unites with the steam to form sulphuric acid. The acid produced in the chamber is condensed in leaden vessels until it



reaches a certain gravity (about 1.72), when it is run into glass, or sometimes platinum vessels, where the condensation is continued until the specific gravity has increased to 1.84. The acid of gravity 1.72 constitutes the brown acid of commerce; it is largely used in the manufacture of superphosphate of lime and for other purposes. Pure sulphuric acid is a dense, oily, colorless fluid, exceedingly acid and corrosive, decomposing all animal and vegetable substances by the aid of heat. It unites with alkaline substances, and separates most of the other acids from their combinations with the alkalies. It has a very great affinity for water, and unites with it in every proportion, producing great heat; it attracts moisture strongly from the atmosphere, becoming rapidly weaker if exposed. The sulphuric acid of commerce is never pure, but it may be purified by distillation. With bases sulphuric acid forms salts called sulphates, some of which are neutral and others acid. (See *Sulphates*.) By concentrating sulphuric acid as far as is possible without decomposition, and cooling the liquid so obtained, crystals of the true acid,  $H_2SO_4$ , are formed. The ordinary acid is a hydrate of  $H_2SO_4$  of varying composition. A very strong form of sulphuric acid, known as *Nordhausen acid*, is prepared by heating green vitriol in closed vessels; it is a solution of sulphur trioxide in sulphuric acid ( $H_2SO_4 \cdot SO_3$ ), or it may be regarded as *pyro-sulphuric acid*. It has a specific gravity varying from 1.86 to 1.92, and is chiefly used in the arts for dissolving indigo. Of all the acids the sulphuric is the most extensively used in the arts, and is in fact the primary agent for obtaining almost all the others by disengaging them from their saline combinations. Its uses to the scientific chemist are innumerable. In medicine it is used in a diluted state as a refrigerant.

**Sulphuric Ether** (ether); ethylic, vinic, or ordinary ether ( $C_2H_5 \cdot O$ ) is a colorless transparent liquid, of a pleasant smell and a pungent taste, extremely exhilarating, and producing a degree of intoxication when its vapor is inhaled by the nostrils. It is produced by distilling a mixture of equal weights of sulphuric acid and alcohol, and by various other means. Its specific gravity is 0.720. It is extremely volatile and highly inflammable; and its vapor, mixed with oxygen or atmospheric air, forms a very dangerous explosive mixture. It dissolves in 10 parts of water, and is miscible with alcohol and the fatty and volatile oils in

all proportions. It is employed in medicine as a stimulant and antispasmodic. Ether, by its spontaneous evaporation, produces a great degree of cold, and is used in the form of spray in minor surgical operations for freezing the part, and thus rendering it insensible to pain. True sulphuric ether, known also as *sulphate of ethyl* ( $(C_2H_5)_2SO_4$ ), is an oily liquid of burning taste and ethereal odor, resembling that of peppermint. It is almost incapable of being distilled without decomposition, as at a temperature of about  $280^\circ$  it resolves itself into alcohol, sulphurous acid, and olefiant gas. See *Ethers*.

**Sulphurous Acid.** See *Sulphurous Oxide*.

**Sulphurous Oxide** (sul'fu-rus oks'id), a gas formed by the combustion of sulphur in air or dry oxygen. It is transparent and colorless, of a disagreeable taste, a pungent and suffocating odor, is fatal to life, and very injurious to vegetation. At  $45^\circ$ , under the pressure of two atmospheres, it becomes liquid, and also at  $0^\circ$  under the pressure of one atmosphere. It extinguishes flame, but is not itself inflammable. It has considerable bleaching properties, so that the fumes of burning sulphur are often used to whiten straw, and silk and cotton goods. This gas is also called *sulphur dioxide*; when led into water it forms *sulphurous acid* ( $H_2SO_3$ ). This acid readily takes up oxygen, passing into sulphuric acid; it is dibasic, forming salts called sulphites.

**Sulphur Springs**, a city, capital of Hopkins Co., Texas, 93 miles w. n. w. of Jefferson. It has cotton gins, compresses, oil mills, etc. Pop. 5151.

**Sulpicians** (sui-pish'yans), a Roman Catholic congregation of missionary priests founded in 1642 at Paris by the Abbé Oller. They have a number of houses in Europe and America, and are chiefly engaged in training young men for the priesthood. They are called Sulpicians from the parish of St. Sulpice, where the congregation was first organized.

**Sultan** (sni'tan), in Arabic, signifies 'mighty one, lord.' It is the ordinary title of Mohammedan rulers. The ruler of Turkey assumes the title of *Sultan-es-selatin*, 'Sultan of sultans.' The title sultan is also applied to the sultan's daughters, and his mother, if living, is styled *Sultan Valide*.

**Sultanpur** (sul'tan-pör), a district of India, in Oudh; area, 1713 square miles. Chief river, the Gumti. Pop. 1,083,904.—The town SUL-

TANJUB, administrative headquarters of the district, has a pop. of 9550.

**Sulu** (sū-lū'), or SOOLOO ISLANDS, a group in the Indian Archipelago, consisting of about 190 islands, which stretch from the N. E. point of Borneo to the Philippine Islands; total estimated area, over 1000 square miles. Sulu, the chief island, is lofty, and lies near the center of the group. The inhabitants are of Malay descent, and nearly all are Mohammedans. There is a trade between Sulu and Singapore in beche-de-mer, pearl shells, etc. The United States assumed the sovereignty of the islands in 1898. Pop. (1912) 75,000.

**Sulzer**, WILLIAM, one-time governor of New York, born March 18, 1863; admitted to the bar in 1884. He was a member of the 54th to the 62nd congresses and was elected governor on the Democratic ticket in 1912. He refused to abide by the will of Tammany, and undoubtedly for that reason was charged and convicted of other misdeeds, and impeached in 1913.

**Sumach** (sū'mak; *Rhus*), a genus of shrubs of the nat. order Anacardiaceae, with pinnate leaves and small flowers. They all have a lactescent acrid juice, and most of them possess valuable tanning properties. More than seventy species are known. *R. coriaria* is found in the countries about the Mediterranean. Its roots contain a brown, and its bark a yellow dye. The leaves and seeds are used in medicine as astringent and styptic, and the leaves are exported for use in tanning, dyeing, and calico-printing. *R. typhina* is an American species with hairy branches, hence its common name of stag's-horn sumach. It produces small red berries, and is cultivated in European gardens for ornament. *R. glabra*, another American species, is also grown for ornament, and its berries and branches are used for dyeing purposes. *R. venenata*, commonly called dog-wood or poison sumach, is a shrub of the American swamps. It grows from 12 to 20 feet high, and produces greenish-white flowers. It is extremely poisonous, in some cases giving rise to inflammation of the skin followed by a vesicular eruption. *R. radicans*, often called poison ivy, is a climbing variety. It affects certain individuals in the same manner as the poison sumach, but it is less virulent. The leaves of several of these species are now extensively collected in the United States for tanning or other purposes. The celebrated Japan varnish is obtained from a species of *Rhus* with downy and velvety leaves. For currier's sumach see *Corisaria*.

**Sumatra** (sū-mā'trā), a great island in the Indian Seas immediately under the equator, separated from the peninsula of Malacca by the Straits of Malacca and from Java by the Straits of Sunda. Greatest length, 1115 miles; greatest breadth, 275 miles; area, 161,612 square miles. Banca and other islands adjoin the coast. The west side of the island is mountainous, with peaks ranging in height from 2000 feet in the south to 5000 feet farther north; and culminating in Indrapura, a volcano 12,400 feet high. The east side spreads out into interminable level plains. There are several volcanoes in the island. Copper, tin, and iron are found in abundance, and deposits of coal exist. The chief rivers are the Rokan, Musi, Jamhi, and Indragiri, which all form extensive deltas at their mouths. Sumatra enjoys great equability of climate, but in many low-lying parts is unhealthy; rain falls almost incessantly in the south. Mangroves grow near the coast, and at higher elevations myrtles, palms, figs, and oaks of various species are met with. The camphor-tree prevails in the north, and among vegetable curiosities are the nipa-tree and the gigantic Rafflesia. Pepper, rice, sugar, tobacco, indigo, cotton, coffee, are cultivated for export, and camphor, benzoin, catechu, gutta-percha and caoutchouc, teak, ebony, and sandal-wood are also exported. The fauna includes the elephant, the tapir, the two-horned rhinoceros, the tiger, the orang-outang and other apes, some species of deer and antelope, and numerous birds and reptiles. Of the domestic animals the chief is the pig, next to which rank the cow and the horse. The island is for the most part under the authority of the Dutch, and their possessions are divided into six governments. The most important native state is Acheen (which see), in the extreme north of the island. Sumatra has a very mixed population, consisting of Malays, Chinese, Arabs, and many native tribes. The Bataks are a peculiar and interesting race, approaching the Caucasian type. Writing has been known among them from a very early period, and their ancient books are written in a brilliant ink on paper made of bark. The native tribes of Sumatra have no temples and no priests, but a form of Mohammedanism prevails among the Malays on the coast. The chief towns are Palembang, Padang, Bonkulun and Achin. Total pop. estimated at between 3,000,000 and 4,000,000. The Dutch acquired their territories in Sumatra in the sixteenth and seventeenth centuries. The British formed a settle-

ment at Bencoolen in 1685, and in 1811 seized the Dutch possessions on the island. These were restored in 1815, and by treaties in 1834 and 1871 the Dutch were allowed the right to enlarge their territories by treaty, or by conquest and annexation. The tidal wave accompanying the volcanic eruption of Krakatoa in 1883 caused great destruction on the south coast of Sumatra.

**Sumba** (sŭm'hā), same as *Sandalwood Island* (which see).

**Sumbal** (sŭm'bal), or **SUMBUL**, an Eastern name for the root of an umbelliferous plant, *Euryangium sumbul*. It contains a strongly odorous principle, like that of musk, and is regarded as an antispasmodic and stimulating tonic. Also an Eastern (Arabic) name of spikenard (which see).

**Sumbawa** (sŭm'bā-wā), an island of the Indian Archipelago, lying south by west of Celebes, between Lombok and Flores, about 160 miles long from east to west, with a breadth varying from 13 to 31 miles. It is divided into several native states, governed by rajahs, all tributary to the Dutch. The soil is mostly volcanic, and very fertile, cotton, rice, tobacco, etc., being grown, besides the usual tropical fruits. Sumbawa is mountainous, and in the north is the volcano Temboro, 7600 feet high, of which an eruption in 1815 caused the loss of 12,000 lives. The inhabitants are of Malay race and Mohammedans. Pop. about 150,000.

**Sumbul.** See *Sumbal*.

**Sumerians** (sŭ-mer'yanz), a name equivalent to Accadians. See *Accadians* and *Assyria*.

**Summary Proceeding**, in law, said of a form of trial in which the ancient established course of legal proceedings is disregarded, especially in the matter of trial by jury. In no case can a party be tried summarily unless when such proceedings are authorized by legislative authority, as in a committal for contempt of court, the conviction of a person by justices of the peace, etc.

**Summer** (sum'er), the season of the year which in the northern hemisphere generally may be said to comprise the months of June, July and

August. The astronomical summer lasts in the northern hemisphere from the June solstice to the September equinox, during which time the sun, being north of the equator, shines more directly upon this part of the earth, and rises much sooner and sets later, which renders this the hottest period of the year. The period of greatest heat generally takes place in August, since the influence of the sun's rays has then been felt for a long time on the earth, and the wind blowing from the north becomes milder owing to a moderation of the temperature in the polar circle caused by the thawing of the ice. In the southern hemisphere the summer lasts from the December solstice to the March equinox. See *Seasons*.

**Summer-duck** (*Ais Sponsa*), a species of duck, allied to the mandarin duck or Chinese teal (*Ais galericulata*), and distinguished as a genus by a short bill, with a large horny tip and straight edges, and by the hinder toe being unconnected to the other digits. These birds inhabit North America, and usually build their nests in the hollows and trunks of trees.

**Summit** (sum'it), a city and summer resort of Union Co., New Jersey, on the Lackawanna River, 12 miles w. of Newark. It is picturesquely situated on a ridge called Second Mountain and many New York business men reside here. It has a large silk factory and extensive nurseries. Pop. 7500.

**Summons** (sum'unz), in law, a writ addressed to the defendant in a personal action admonishing him to appear in court. It must contain the names of all the defendants, the name and address of the person taking it out, and the date of issue; but it need not state the form or cause of action. A summons should be served on the defendant in person; but if reasonable efforts are made to do this, and the defendant is aware of its issue, the judge may authorize the plaintiff to proceed in the action without personal service. In the United States a summons is a writ commanding the sheriff, or other authorized officer, to notify a party to appear in court, to answer a complaint made against him, and in the same writ specify some day therein mentioned.

**Sumner** (sum'ner), CHARLES, jurist and statesman, was born at Boston, Massachusetts, January 6, 1811, and educated at Harvard University. In 1834 he was called to the bar, and shortly afterwards became reporter of the United States Circuit Court. In 1836 he published three volumes of Judge Story's decisions, subsequently known as *Sum-*



Sumbul  
(*Euryangium sumbul*).

*ner's Reports*, and edited a periodical called the *American Jurist*. He visited Europe in 1837, and returned to Boston in 1840, where he resumed his legal practice. Between 1844 and 1846 he edited and published *Vesey's Reports*, in twenty volumes. In 1851 he was elected to the senate of the United States, and distinguished himself by his strong antipathy to slavery. In May, 1856, after delivering a speech vigorously attacking the slaveholders, he was violently assaulted by P. S. Brooks, a member representing a slaveholding State (South Carolina). His injuries compelled him to absent himself from public duties for nearly four years. He was a supporter of Lincoln and Hamlin, and in 1861 he became chairman of the senate committee on foreign relations. He was an enemy to the policy of President Johnson, and opposed the home and foreign policy of President Grant. After the latter's reelection in 1872 Sumner seldom appeared in debate. He died at Washington, March 11, 1874.

**Sumner**, EDWIN VOSE, soldier, born at Boston, Massachusetts, in 1797. He entered the army, served as captain on the western frontier for many years, and as major in the Mexican war, where he won distinction. He was governor of New Mexico 1851-53; as colonel escorted Abraham Lincoln from Springfield to Washington in 1861, and served as brigadier and major-general in the Civil war. He commanded a corps at Fair Oaks and Malvern Hill and one of the three divisions of the army at Fredericksburg. He was put in command of the Department of the Missouri in 1863, and died March 21 of that year.

**Sumner**, JOHN BIRD, Archbishop of Canterbury, son of a clergyman, was born at Kenilworth, Warwickshire, in 1780, and educated at Eton and Cambridge, where he took high honors. He entered the church, and became rector of Mapledurham. In 1820 he was made canon of Durham, in 1828 bishop of Chester, and in 1848 archbishop of Canterbury. He died in London in 1862. His works include *The Evidences of Christianity* (1824), and *Lectures on the Gospels and Epistles* (1831-40).

**Sumter** (sum'ter), a city, capital of Sumter Co., South Carolina, 44 miles E. by S. of Columbia; served by four railway systems. It has cotton and oil mills, iron, brass and steel foundries, manufactures of wood, brick, building materials, etc. Pop. 11,000.

**Sumter**, Fort. See *Fort Sumter*.

**Sumptuary Laws** (sump'tu-a-ri), laws intended to repress extravagance, especially in eating and drinking, and in dress. They were common in ancient times, and also appear in the old statute books of most modern nations. They were more frequently enacted in ancient Rome than in Greece. After the Twelve Tables, the first Roman sumptuary law was the Lex Oppia (215 B.C.), directed exclusively against female extravagance in dress, jewelry, etc. The other Roman laws of this kind were nearly all designed to suppress extravagance in entertainments. The Lex Julia, the last sumptuary law, was passed in the reign of Augustus. Sumptuary laws were revived by Charlemagne, and in France various laws and decrees of a similar nature were passed down to the reign of Louis XV. In England these laws were passed from the reign of Edward III down to the time of the Reformation. Most of them were repealed by 1 James I chap. xxv, but they were not all expunged from the statute books till 1856. Sumptuary laws were also passed by the ancient Scottish legislature, but they were all repealed, evaded, or neglected. Such laws furnish modern historians with valuable evidences of the manners and customs of different nations in past ages. They are, however, altogether foreign to the spirit of modern legislation, and contrary to the most elementary principles of political economy and no such laws have been enacted in the United States.

**Sunny**. See *Soumy*.

**Sun**, the central orb of the solar system, that around which revolve the earth and the other planets. The sun appears to be a perfect sphere, with a diameter of 866,900 miles; its mean density is about  $\frac{1}{4}$ , taking that of the earth as 1; its mean distance from the earth is taken as nearly 93,000,000 miles. It rotates on its own axis; this axis of rotation being inclined to the ecliptic at an angle of  $82^{\circ} 40'$ ; and its rotation period is estimated at 25 days, 7 hours, 48 minutes. The mass of the sun is about 750 times that of all the other members of the solar system combined, and the center of gravity of the solar system lies somewhere in the sun, whatever may be the relative positions of the planets in their orbits. The dark spots on the sun discovered by Galileo have been shown to be hollows, and their depth has been estimated at from 3000 to 10,000 miles. The spots are very changeable in their



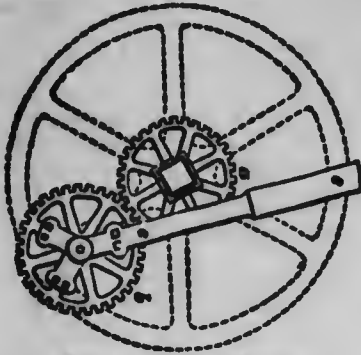
figure and dimensions, and vary in size from mere points to spaces of more than 50,000 miles in diameter. It is from observations of these spots that the sun's rotation on its axis has been calculated. The frequency of sun spots attains a maximum every ten and a half years, the number of spots falling off during the interval to a minimum, from which it recovers gradually to the next maximum. This periodicity has been thought to be intimately connected with the meteorological phenomena observed on the earth, especially with the rainfall. Spots are called *maculae*, brighter portions of the sun are called *faculae*, and the lesser markings are called *mottlings*. The sun is now generally believed to be of gaseous constitution, covered with a sort of luminous shell of cloud formed by the precipitation of the vapors which are cooled by external radiation. This dazzling shell is termed the *photosphere*. The spots are supposed to be cavities in this cloud-layer, caused by the unequal velocities of neighboring portions of the solar atmosphere. Zöllner, who considers the body of the sun to be liquid, sees in them slags or scoriae floating on a molten surface, and surrounded by clouds. It is estimated that the sun's radiation will melt a shell of ice covering its surface to a depth of between 25 and 40 feet in one minute, but the temperature of the surface has not yet been ascertained. It is probable, however, that the temperature and radiation have remained constant for a long period. The photosphere is overlaid by an atmosphere which appears by the evidence of the spectroscope to contain nearly all the materials which enter into the composition of the sun, since in the lines of the spectrum of sunlight is found proof of the existence in the solar atmosphere of the following substances:—Iron, titanium, calcium, manganese, nickel, cobalt, chromium, barium, sodium, magnesium, copper, hydrogen, zinc, sulphur, cerium, strontium, and potassium. In 1706 Captain Stannyan observed a blood-red streak just before the limb of the sun appeared after a total eclipse, and such appearances were subsequently observed, being first scientifically described in 1842 under the names of flames, protuberances, or prominences. In 1868 the spectroscope showed that these appearances were due to enormous masses of glowing hydrogen gas floating above the sun, similarly to clouds in our atmosphere. The region outside the photosphere in which these colored prominences are observed has been called the *chromosphere*, which has

an average depth of from 2000 to 6000 miles. The incandescent hydrogen clouds stretch out beyond this to altitudes of 20,000 to 100,000 miles, and jets of chromospheric hydrogen have been observed to reach a height of 200,000 miles in twenty minutes, and disappear altogether within half an hour. Outside the chromosphere, extending very far out from the sun, is the *corona*, an aurora of light observed during total eclipses, and which is now the chief object to be observed by eclipse expeditions. This phenomena has been shown to be connected with the existence of what is called the 'coronal atmosphere,' but the nature of this atmosphere is as yet undetermined. The amount of light sent forth by the sun is not exactly measurable, but the amount of heat has been pretty accurately computed, and it is equivalent in mechanical effect to the action of 7000 horse-power on every square foot of the solar surface, or to the combustion on every square foot of upwards of 13½ cwts. of coal per hour. Of this heat only a minute fraction is received by the earth and the other planets, the remainder radiating out into interstellar space.

**SUN WORSHIP OF THE.** Sun worship, probably prevailed in the earliest times among all nations, and the chief deities of the polytheisms of ancient India, Egypt, Greece, Rome, Germany (Indra, Amoun Ra, Zeus, Jupiter, Odin, etc.), are, according to a popular theory, all identified as sun gods. But by some people the sun itself was worshipped as a physical object associated with fire, as among the followers of Zoroaster, the ancient Celts, etc. Many of the American Indians worshipped the sun, including those of the southern United States, Mexico and Peru, the latter of which had the most developed system.

**Sun and Planet Wheels,** an ingenious contrivance adopted by Watt in the early history of the steam engine, for converting the reciprocating motion of the beam into a rotary motion. In the annexed figure the sun wheel *a*, is a toothed wheel fixed fast to the axis of the fly-wheel, and the planet wheel *b* is a similar wheel bolted to the lower end of the connecting-rod *c*; it is retained in its orbit by a link at the back of both wheels. By the reciprocating motion of the connecting-rod the wheel *b* is compelled to circulate round the wheel *a*, and in so doing carries the latter along with it, communicat-

ing to the fly-wheel a velocity double its own.



Sun and Planet Wheels.

**Sun-bear**, a bear of the genus *Helarctos*; the Malay bear, *H. malayanus*, called by the natives bruang, is a small animal with a slender form. It has a close black coat and a white mark on the throat. See *Bear*.

**Sun-bird**, the name given to a family (*Nectariniidae*) of tenuous-tral insectivorous birds, which are confined to the tropical regions of Africa and Asia, and in brilliant plumage and habits resemble the humming-birds. They live on insects and the juices of flowers; their nature is lively. They build in trees; some species make dome-like nests, which they suspend at the extremities of twigs or branches.

**Sunbury** (sun'bur-i), a town, county seat of Northumberland Co., Pennsylvania, on the Susquehanna river, 54 miles N. of Harrisburg. It is a shipping point for coal and lumber and has important manufactures, including lumber, caskets, silks and woollens, flour, iron wares, etc. Pop. 13,770.

**Sunda** (sun'da), STRAIT OF, between the islands of Sumatra and Java, and connecting the China Sea and the Indian Ocean. It is about 15 miles wide at the narrowest part. See *Arakatoa*.

**Sunda Islands**, a group of islands in the Indian Archipelago; composed of the Great Sunda Islands, namely, Sumatra, Borneo, Celebes, Java, Madura, Banca, and Billiton; and of the Lesser Sunda Islands, namely, Bali, Lombok, Sumbawa, Flores, Sandalwood Island or Sumba, Ombai, the Timor group, etc.

**Sun Dance**, a dance in the form of a religious ceremony, practiced by some of the North American Indian tribes. Among the Sioux and Blackfeet it was a striking performance, often

marked by wild and dramatic incidents. It still survives among the Dakota, Assiniboine, Ponca, Cheyenne, Arapaho, Crow, the Plains, Cree and Sarcee. It is usually held about the beginning of July and lasts from five to fourteen days.

**Sunday**, lit. 'the day of the sun,' the first day of the week, called by Christians the Sabbath (q. v.), or Lord's Day.

**Sunday**, WILLIAM ASHLEY ('Billy'), an American evangelist, born at Ames, Iowa, November 19, 1862; was educated at the high school at Nevada, Iowa; later studied at Northwestern University, and in 1912 received an honorary degree (D.D.) from the Pennsylvania College for Women. He was a professional baseball player, 1883-90, on the Chicago, Pittsburgh and Philadelphia teams of the National League; was assistant secretary of the Y. M. C. A., Chicago, 1891-95; and has been an evangelist since 1896. In 1903 he was ordained to the Presbyterian ministry by the Chicago presbytery.

**Sunday-schools**, schools held on Sunday for the purpose of imparting religious instruction to the young by means of reading and repetition in the Bible, catechism, hymns, etc. In 1527 Martin Luther established several Sunday-schools in Germany for the instruction of children and youths in reading the Holy Scriptures, and in the latter half of the same century Cardinal Borromeo organized similar schools throughout Milan. Robert Raikes, an editor of Gloucester, England, who started a Sunday-school in that town in 1781, is frequently credited with the institution of the modern Sunday-school. But there seems little warrant for this, not even in Britain, since John Knox had organized such a school in Scotland as early as 1560, while in America such schools had been established a century before the Raikes school. Among the earliest in the colonies were those of Danbury, Mass., in 1674; Norwich, Conn., in 1676, and Newtown, Long Island, in 1683. The earliest record, made at the Pilgrim Church, Plymouth, Mass., in 1680, is to the effect that "The Deacons be requested to assist the minister in teaching the children during intermission on Sabbath." A school was established in Ephrata, Pa., in 1740, and one in Hanover Co., Va., in 1786. In Philadelphia a First-day or Sunday-school Society was organized in 1791 to give religious instruction to poor children. In New York and Boston the movement gained great strength early in the 19th century. Now the work is thoroughly organized and its excellent results are apparent in all portions of the land. In

1873 a plan for uniform Bible lessons was formally adopted in this country and accepted by England and Canada. It was in this way that the International Sunday-school Lessons had their origin. The number of Sunday-schools in the United States reported to the International Sunday-school Convention, 1914, was 1,5,685; teachers and officers, 1,690,739; scholars, 16,750,207. The total number in the world reported at the Zürich convention of 1913 was, schools 297,806; teachers, 2,624,896, and scholars 26,076,593.

**Sunderbunds** (sūn'dur-bunz), or **SUNDARBANS**, a vast tract of forest and swamp forming the southernmost portion of the Gangetic Delta, at the head of the Bay of Bengal; estimated area, 6526 square miles. The country is one vast alluvial plain, where the continual process of landmaking has not yet ceased. It abounds in morasses and swamps, and is mainly an impenetrable jungle infested by tigers and other wild animals. It has never been surveyed and no census has been taken of the territory. The tract gets its name from the sundri (*Heritiera littoralis*), a timber tree which is very abundant.

**Sunderland** (sun-dur-land), a seaport of England, at the mouth of the Wear, county of Durham, 13 miles N.E. of Durham, and 12 miles S.E. of Newcastle. It has parks, a museum, a free library, a school of art, etc. The principal buildings include St. Peter's, an ancient parish church on the site of the monastery in which the Venerable Bede was educated, many other churches and chapels, theaters, etc. The river is crossed by a castiron bridge, built in 1796, and since reconstructed and strengthened. The harbor with its docks covers 150 acres, and its entrance is formed by two stone piers. The staple trade interests of the place are shipping, the coal trade, and shipbuilding, and there are also large factories for the making of marine engines, iron work, bottles, glass, earthenware, rope, etc. Coal is the chief export; the imports are chiefly timber and grain, with various raw materials and provisions. Pop. 151,162.

**Sun-dew** (*Drosera*; nat. order *Droseraceæ*), plants growing in bogs and marshes, having leaves clothed with reddish hairs bearing glands which exude drops of clear glutinous fluid, glittering like dew-drops, whence the name. A characteristic of these plants is their habit of capturing insects by their viscid secretion. When the insect alights on the disk or even slightly touches one or two of the exterior tentacles, it is at once entangled by the viscid secretion. The

tentacles to which it is adhering begin to bend and pass on their prey to the tentacles next succeeding them inwards and the insect is thus carried by a curious rolling movement to the center of the leaf. On all sides the tentacles become inflected in a like manner, and the blade of the leaf almost closes up, while the insect is drowned in the increased secretion which its presence has stimulated. After the absorption of the digestive matter, which consumes a varying period, the tentacles unbend and the leaf resumes its normal appearance. The digestive tract has also been traced in the Venus fly-trap (*Dionaea*), the butterwort (*Pinguicula*), the pitcher-plant (*Nepenthes*), etc.

**Sun-dial.** See *Dial*.

**Sundsvall** (sūns'val), a seaport of Sweden, on the Gulf of Bothnia, near the mouth of the Indals, with important exports of timber and iron. Pop. (1911) 16,855.

**Sun-fish** (*Orthogoriscus*), a name given to a number of fishes, but properly applied to a marine form, *Orthogoriscus*, order *Plectognathi*. Two species are classified, the rough or short sun-fish (*O. mola*), of which one of the largest specimens preserved is 7 ft. 6 in. long; and the rarer smooth or oblong sun-fish (*O. truncatus*), which seldom exceeds 2 ft. in length. The name also has been applied to the basking-shark. In the United States the name is given to a group of brilliantly marked fresh-water fishes belonging to the family *Centrarchidae*. The species are quite numerous. They are very bold, and take the hook with avidity. The name is variously regarded as derived from the form of the fish and from its habit of floating at the surface, as if to enjoy the sun.

**Sun-flower** (*Helianthus*), nat. order *Compositæ*, a genus of plants, so called from the ideal resemblance of the yellow flowers to the sun with its golden rays. The root is mostly perennial; the stem herbaceous, upright, and often tall; the leaves opposite or alternate, undivided, often rigid and scabrous; the flowers large and terminal, usually disposed in a corymb. The species are numerous, and mostly inhabit North America. The gigantic sunflower (*H. annuus*), common in gardens, is a native of Peru. The stem is from 6 to 15 feet in height; the flowers, sometimes 1 foot in diameter, are usually turned towards the south. The seeds form an excellent nourishment for poultry and for cage birds; and an edible oil has also been expressed from them. For the *Helianthus tuber-*

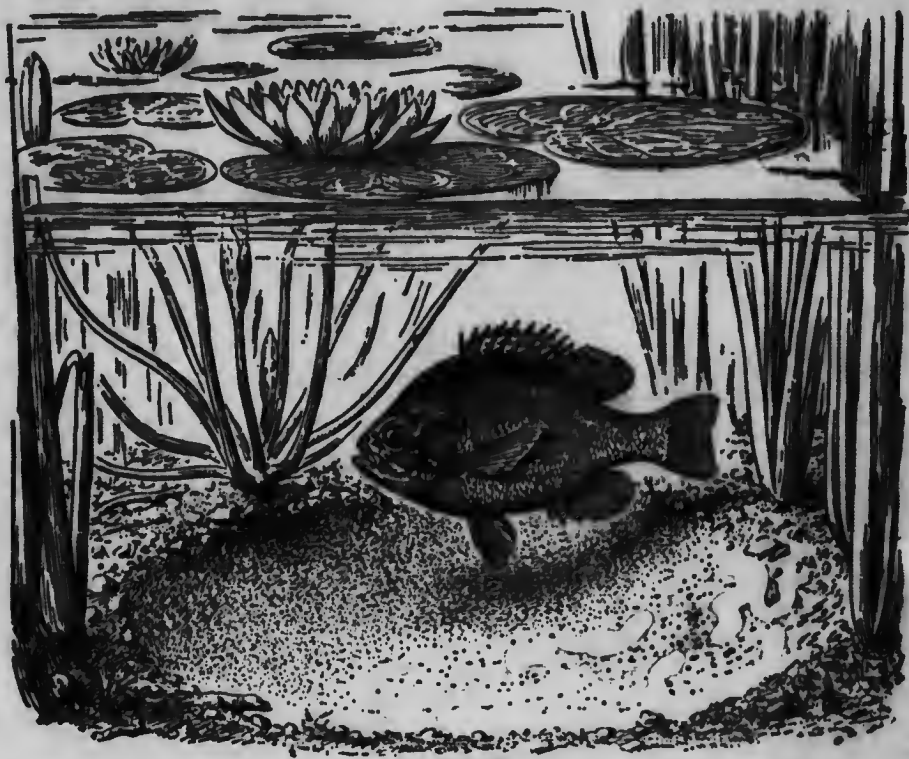
osus, or Jerusalem artichoke, see *Artichoke*.

**Sunn**, **SUNN-HEMP**, a material similar to hemp, imported from the East Indies, and extensively used in the manufacture of cordage, canvas, etc. It is obtained from the stem of the *Crotalaria juncea*, a shrubby leguminous plant 8 to 12 feet high. It is called also *Bombay Hemp*, *Madras Hemp*.

**Sunnites** (sun'itz), the so-called orthodox Mohammedans, in contradistinction to the Shiites or

—Pains in the head, accompanied by fever; lethargy, or suffering which prevents sleep; congestion of the brain or other nerve-centers, or an inflammation of the brain sometimes ensues, and often terminates fatally. Sometimes the effects of the stroke can be discerned only in impaired bodily health or mental vigor dating from some occasion on which the patient was exposed to a violent sun.

**Sun Yat Sen**, Chinese reformer, to whose effort the over-



Sunfish on Nest.

heterodox Mohammedans. They form by far the larger of the two divisions, embracing the Mohammedan inhabitants of Egypt and the rest of Africa, Syria, Turkey in Europe and Asia, Arabia, etc. They chiefly differ from the Shiites in receiving the Sunna (a collection of traditions relating to Mohammedanism) as of equal importance with the Koran, while the Shiites reject it absolutely.

**Sun-stroke**, any sudden and severe injury to the health resulting from the exposure of the head to a hot sun. The most usual symptoms of sun-stroke are the following:

throw of the Manchu dynasty in 1911 was largely due. He was born in 1862, studied medicine, and became a prominent advocate of western ideas. He formed the 'Young China party' and organized a peaceful revolution. See, *China*. Elected provisional president of the Chinese republic, he resigned in favor of Yuan Shi-kai.

**Supercargo** (sū-per-kar'gō), a person charged with the accounts and disposal of the cargo and with other commercial affairs in the merchant ship in which he sails as agent for the owner of the cargo.



## Supererogation

**Supererogation** (sū-per-er-u-gā'-shun). Works or, in the Roman Catholic Church, the name for a class of good works which are considered to be not absolutely required of each individual as conditions to salvation. Such good deeds, it is believed, God may accept in atonement for the defective service of another.

**Superfoetation** (sū-per-fō-tā'shun), a second conception after a prior one, and before the birth of the first child, by which two fetuses are growing at once in the same womb. Several certified cases have occurred in which women have given birth to two children, the second child being born at periods varying from 90 to 140 days later than the first. These certainly appear to be cases of superfoetation. The possibility of superfoetation in the human female has been vigorously opposed by some eminent physicians, and as vigorously defended by others. Some believe that up to the third month of gestation a second conception may follow the first, and that this will satisfactorily account for all the cases of superfoetation on record. It has also been argued that the human uterus may be double in some cases, and that in each of its cavities a fetus may be contained.

**Superior** (sū-pē'ri-ur), a city and port of entry, capital of Douglas Co., Wisconsin, situated at the head of Lake Superior, and separated by St. Louis Bay from Duluth, Minnesota. It has some notable public buildings, a state normal school and St. Mary's Hospital, and is an important shipping point for iron products, grain, flour, lard, cement and lumber. There are extensive docks and elevators, one with a capacity of 10,000,000 bushels. Its manufactures include large lumber mills, ship yards, iron works, etc. Pop. 40,384.

**Superior, LAKE**, the largest expanse of fresh water in the world, and the most westerly and most elevated of the North American chain of lakes. It washes the shores of the State of Minnesota on the west, those of Wisconsin and the northern peninsula of Michigan on the south, and those of Canada in other directions. Its greatest length is 420 miles, greatest breadth 160 miles; circuit about 1750 miles; area about 32,000 square miles (or the same as that of Ireland). It is 630 feet above sea-level, and varies in depth from 80 to 200 fathoms. In shape it forms an irregular crescent, dotted with numerous islands towards its northern and

southern sides. The northern shore consists of cliffs varying in height from 300 to 1500 feet, but the southern shore is low and sandy, although occasionally interrupted by cliffs, among which are the fantastic Pictured Rocks, 300 feet high, one of the greatest natural curiosities of the United States. The waters of the lake are remarkable for their transparency, and are well stocked with fish, principally trout, white-fish, and sturgeon. The lake receives more than 200 streams, and about thirty are of considerable size. The outlet is at the southeast by St. Mary's River (which see). Fish, iron, and copper are the chief exports, the latter existing in valuable veins on both the shores and islands of the lake, and the iron in vast quantities in the Minnesota and Wisconsin border lands.

**Superior Planets.** See *Planets*.

**Supernaturalism** (sū-per-nat'ū-rā-lizm), a term used chiefly in theology, in contradistinction to *rationalism*. In its widest extent supernaturalism is the doctrine that religion and the knowledge of God require a revelation from God. It considers the Christian religion an extraordinary phenomenon, out of the circle of natural events, and as communicating truths above the comprehension of human reason. Rationalism maintains that the Christian religion must be judged of, like other phenomena, by the only means which we have to judge with, namely reason. See *Rationalism*.

**Supple-jack** (sup'l), a popular name given to various strong twining and climbing shrubs. The supple-jack imported into Europe for walking sticks is the barked branches of one or more West Indian species of *Paulinia*, nat. order Sapindaceæ. The name is also given to a rhamnaceous twiner (*Berchemia volubilis*), found in the southern United States.

**Supporters**, in heraldry. See *Heraldry*.

**Suppuration.** See *Inflammation*.

**Supralapsarians** (sū-pra-lap-sā'ri-anz), in theology, those who maintain that God, antecedent to the fall of man, decreed the apostasy and all its consequences, determining to save some and condemn others, and that in all He does He considers His own glory only; opposed to *Sublapsarians* (which see).

**Supra-renal Capsules** (sū-pra-re'nal) two small yellowish glandular bodies

which exist, one at the front portion of the upper end of each kidney. (See *Kidney*.) They have no excretory duct, and are connected with the kidneys by areolar tissue only. They consist of an outer or *cortical*, and an inner or *medullary* portion, the former being of a deep yellowish color, and the latter of a dark brown or black hue, and of a soft and pulpy formation. The capsules are furnished with numerous nerves, and derive their blood from the *aortic*, *renal* and *phrenic* arteries, returning it by the *supra-renal* vein. They are present in all mammals. Their exact functions are as yet uncertain. In the embryo they are larger than the kidneys themselves, but afterwards greatly diminish, and in the adult possess only about  $\frac{1}{4}$  of their original bulk. See *Addison's Disease*.

**Supremacy** (sū-prem'a-si), ROYAL, as a term in English law, is practically restricted to denote the authority of the crown in matters ecclesiastical. After the abolition of the papal supremacy at the English Reformation, the royal supremacy was affirmed by various acts under Henry VIII and Elizabeth, all enforcing an oath of supremacy. The oath was taken by holders of public offices along with the oath of allegiance, and afterwards with that of abjuration, until the three were consolidated in one in the reign of Victoria. The new oath of allegiance which is imposed upon members of parliament does not in express terms affirm the royal supremacy in ecclesiastical matters.

**Supreme Court**, a court provided for in the Constitution of the United States and created in 1789, its purpose being to deal with controversies to which the United States is a party; to controversies between two or more States; between a State and citizens of another State; between citizens of different States; all cases in law and equity arising under the constitution; all cases affecting ambassadors, other public ministers or consuls; all cases of admiralty and maritime jurisdiction. In the exercise of these functions the question of the constitutionality of a law passed by Congress or State legislatures often arises, and any law pronounced unconstitutional, or out of agreement with the requirements of the constitution, by a majority of the Supreme Court judges becomes null and void. This court, as now constituted, consists of nine justices (including the chief-justice), appointed by the President and

senate for life, with retiring pension under full salary (\$10,000) at the age of seventy. Similar courts have been instituted in the several states, as courts of final appeal in questions of law affecting the citizens of a state. In 1875 a SUPREME COURT OF JUDICATURE was formed in England, consisting of a *High Court of Justice* and a *Court of Appeal*, the latter being the final court of appeal in the kingdom. No appeal can be taken from a decision of the High Court in criminal matters, except for error of law apparent on the record passed regarding which no question has been reserved.

**Surabaya.** See *Sourabaya*.

**Suradanni** (sū-ra-dan'l), a valuable kind of wood growing in Demerara.

**Surajah Dowlah** (sū-rā'ja dou'la; *Sirāj-ud-Daulah*), the last independent nawab of Bengal, under whom was perpetrated the massacre of the Black Hole (which see). He succeeded his grandfather, All Verdy Khan, in 1756, and within two months of his accession found a pretext for marching on Calcutta. On the arrival of Clive and Admiral Watson he retreated to Moorshedabad, but was routed at the battle of Plassey (June 23, 1757). He then fled up the Ganges, but was betrayed by a *fakir*, and was put to death by order of the son of Meer Jassier, the new nawab. Surajah Dowlah's reign lasted fifteen months, his age at the time of his death being barely twenty.

**Surakarta.** See *Sourakarta*.

**Surat** (sū-rāt'), a town of India, Bombay Presidency, capital of a district of same name, on the left bank of the Tapti, about 20 miles above its mouth in the Gulf of Cambay. The town possesses few attractions, and consists of narrow winding streets lined with lofty houses. It contains several public buildings, including two hospitals, and an old castle or fortress now containing public offices. The organization of trade guilds is here highly developed. The chief exports are agricultural produce and cotton; but the trade and importance of the town are insignificant compared with former times, Surat in the eighteenth century being perhaps the foremost city in India. Pop. 119,306.

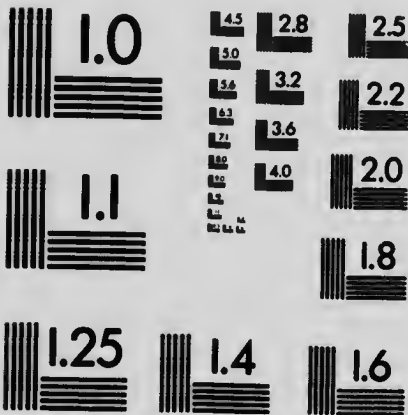
**Surd.** See *Irrational Quantities*.

**Surety.** See *Guarantee*.



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**Surf-bird**, a plover-like bird (*Aphriza virgata*) found on the Pacific coasts of North and South America. It is akin to sandpipers and turnstones, and is sometimes called Boreal Sandpiper.

**Surf-duck**, or SURF-SCOTER, a species of duck (*Oidemia perspicillata*), about the size of a mallard, frequenting the coasts of Labrador, Hudson Bay, and other parts of North America. See also *Scoter*.

**Surface-tension**, that property in liquids by which a liquid surface acts as if it were a stretched elastic membrane. This idea was first developed in 1751, and in 1805 was applied by Young to explain capillarity and other phenomena. It was developed in its complete mathematical forms by Laplace and Gauss. It is the cohesive power which keeps soap-bubbles intact until very thin. Much attention has been given to the subject in recent years, including the phenomenon shown in the rippling of liquid surfaces.

**Surgeon-fish.** See *Sea-surgeon*.

**Surgery** (sur'jér-i), the operative branch of medicine or that part of the medical art which is concerned with the removal of injured parts or organs, or with the healing of lesions by means of operations on the parts affected, either by the hand or with instruments. Surgery early became separated, for practical ends, from medicine, and by a natural expansion came to embrace two parts, the science pertaining to surgical operations, and the art required for conducting them. From this arose a mischievous distinction between medical and surgical cases. We have thus surgical and medical anatomy, surgical and medical pathology, and surgical and medical clinics. But the progress of science has both extended the domain of surgery, and made the relation between it and medicine more intimate. The origin of surgery may almost be held to be coeval with the human race. Herodotus says that the medical art in Egypt was divided into numerous branches representing each member of the body. The Greeks made considerable progress in surgery, and the Hippocratic collection contains six surgical treatises in which important operations are described as conducted in a mode little behind the modern practice. Medicine was first cultivated at Rome by Greek slaves. It afterwards became a special science, and among its professors who advanced the art of surgery were Archagathus (200 B.C.), surnamed the

executioner, from his frequent use of the knife; Asclepiades, to whom is attributed the origin of laryngotomy; and Themison, the first to use leeches. A greater name than these is that of Celsus, called the Latin Hippocrates, who flourished about the beginning of the Christian era. He mentions autoplactic operations and the treatment of hernias, and his method of amputation is still occasionally employed. Galen (died 200 A.D.) did much for medicine but little for surgery. Paul of Ægina, a practitioner of the seventh century, may be looked upon as the last representative of the Græco-Roman school. The Arabs were initiated into medicine and surgery by the translation of the works of the Greeks. Among the Asiatic Arabs the only devoted student of surgery who has left any record of his art is Abulcasis, who flourished at the beginning of the twelfth century.

On the decline of the Roman Empire, the medical art in Europe fell entirely into the hands of the monks and when, in 1163, the Council of Tours prohibited the clergy from performing any operation, surgery became incorporated with the trade of barber, and was reduced to the simplest operations, chiefly that of letting blood. The earliest revival of science arose from the contact of Europeans with the Eastern nations, particularly the Arabs, and before the close of the eleventh century Salerno in Italy, acquired celebrity for a school of medicine in which all the teachers were laymen. This school acquired the right to confer the degrees of master and doctor. Among surgeons of reputation of the Salernitan school, may be mentioned Roger of Parma, and his disciple Roland, who made great use of cataplasms and other emollients. Guy de Chauliac, the first great surgeon of France, belongs to the latter half of the fourteenth century. Berengario de Carpi held a chair at Bologna from 1502 to 1507. He boasted of having dissected more than 100 dead bodies, and made important discoveries. Vesalius, a Belgian physician, born 1514; died 1564, is regarded as the father of modern anatomy. He prepared the way for Ambrose Paré, who did for surgery what Vesalius had done for anatomy. Paré was surgeon in ordinary to Henry II, Charles IX, and Henry III. His works were translated into English, and include a general treatise on surgery and a special treatise on wounds. Among the great surgeons of the sixteenth century were Paracelsus, who advocated a thorough reform in surgery

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Guillemeau, whose special study was ophthalmia; Pineau, a skilful surgeon and lithotomist; Jacques Démarque, one of the first authors who wrote on bandages; and Fabricius of Hilden in Germany, the author of a complete course of clinical surgery, and the inventor of surgical instruments for the extraction of foreign bodies from the ear, urethra, etc., which are still in use. In England, Harvey, the discoverer of the circulation of the blood, lectured on surgery; but a genuine school of surgery was first founded by Richard Wiseman, who has been called the Paré of England. His works were published in two vols. in 1676. In England the Company of Barber Surgeons, incorporated by Edward IV in 1461, gave place to a separate corporation of surgeons in 1745 (see preceding article). In 1731 the Royal Academy of Surgery was founded in Paris, and soon produced a school of surgeons so eminent as to take the lead of their profession in Europe. Among the eminent French physicians of the present period we may mention J. L. Petit, Mareschal, Quesney, Morand, and Lous. In the English school we have Cowper, Cheselden, Percival Pott, and John and William Hunter. Preëminent among these are Pott and John Hunter, the latter being the most eminent surgeon and physiologist of his day. The rapid advance of scientific knowledge in the nineteenth century was not without its influence on the art of surgery. This century will ever be conspicuous in the annals of surgery as that in which the inestimable boon of anesthetics was conferred upon mankind, by which not only was pain in surgery abolished, but the extent of its operative department was immensely enlarged. Of no less importance has been the discovery of the relation of micro-organisms to putrefaction and to infectious diseases, and the consequent introduction of the antiseptic method of treating wounds. A scarcely less noticeable feature of this epoch has been the application of the rules of hygiene to the construction and management of hospitals, by which the general health of the patients has been much benefited, and the mortality reduced. The operative skill of the surgeons has kept pace with the increased precision in physiological knowledge, and surgical operations are now performed on many parts of the body which not long ago would have been deemed certain death to the patient. Diseased conditions in the cranium, the thoracic cavity, the abdomen, the joints, are all successfully

treated. Cancerous affections are boldly treated by excision, while diseases of the uterus are now treated with a boldness and success which a few years ago seemed impossible. Among the eminent surgeons of the nineteenth century we may mention Astley Cooper, Abernethy, Brodie, Simpson, Lister in England; Dupuytren, Dubois, Bichat, in France; Gräfe, Langenbeck, in Germany; Physick, Mott, Gross, Sims, Pancoast, Mitchell, Barton, Agnew, Bigelow, Hodge, in the United States.

Since the introduction of anaesthesia and the enunciation of antiseptic doctrines, further progress has been mainly in elaboration and practical application of the principles involved. New anesthetics have been introduced, many of which have for special operations advantages over chloroform. Of greater importance still is asepsis, the corollary of Lister's proposition; and surgeons now, if possible, seek excision rather than destruction of organisms. In many situations, however, aseptic surgery is an impossibility. The chief developments of the twentieth century so far have been the discoveries of Alexis Carrel in the field of *Vascular Surgery* (which see) and the work of George W. Crile in the prevention of *Surgical Shock* (which see).

The United States has played a leading part in the development of modern surgery. They created the art of orthopædic surgery—surgery to correct deformities—and are the most distinguished practitioners of the art. An Americanized Frenchman, Dr. Alexis Carrel, has opened the way to a revolutionary advance in medicine through the surgical treatment of diseases and worn-out tissue. See *Carrel*.

But, great as is the work that America has done in modern surgery, it is only a conspicuous part of an amazing whole. Here are some of the items: A finger that has been completely severed from the hand can be restored so that the full use of it is recovered; tissues that under old methods would be dead and useless can be revived by the application of intense heat; a wound of the heart can be sewed up as simpler wounds are sewed; a blood clot in the great artery of the lung can be removed; the bronchial tubes can be electrically lighted and cleared of dangerous obstructions; the brain can be freely treated by surgical means; and joints and even vital organs may be transplanted from one body to another and continue to perform their normal functions.

Surgical treatment may be necessary for (1) congenital defects, such as hare lip or club foot; (2) acquired defects, such as broken limbs or lacerated tissues; (3) the removal of foreign substances,

such as bullets or calculi, from within the body; (4) the removal of diseased or injured structures, which may constitute a danger or cause discomfort to the patient, such as gangrenous tissues, malignant tumors, necrosed bones, or carious teeth; (5) the relief of conditions which threaten a patient with inevitable death, such as arterial hemorrhage, laryngeal, intestinal, or urethral obstruction, strangulated hernia, or the pressure of intrathoracic effusions; (6) the substitution of new for lost tissues, as in skin-grafting, or in the injection of paraffin in place of lost or depressed nasal bones. Thus many surgical operations do not involve the use of the knife. A surgeon's primary aim is to heal, not to wound, and his operations are frequently conducted by means of splints, bandages, or other fixation apparatus, and by rest, massage, or electricity.

**Surgical Shock.** After anesthesia and asepsis had all but perfected the science of surgery, George W. Crile, of Cleveland, Ohio, began his remarkable work in the prevention of surgical shock, due to fear and to exhaustion from the wounding of tissue. No one anæsthetic can prevent shock, but by combining three or four different drugs Dr. Crile has apparently attained complete success. He calls his method anoci-association or 'harmless association.'

Here, for example, is the procedure adopted in abdominal operation. If possible, he keeps the patient ignorant of the fact that he is to undergo an operation—at least of the time when the operation is to take place. As though for another purpose the surgeon gives him an injection of morphine. The drug simply produces a negative state of mind; the most awful sights and suggestions do not disturb the sick man in the least. The morphine thus protects him from the effects of psychical shock. He has no fear when the anesthetist approaches with the inhalation apparatus. Dr. Crile uses nitrous oxide in preference to ether, because experiments have proved that under this drug there is only one-third as much shock as under ether. He relies upon another anæsthetic method, however, to secure complete protection. Under the conventional anæsthetic the wounded tissues carry their messages to the brain by means of the nerves. These nerves are just as active under ether as they are under normal conditions. A local anæsthetic, however, produces insensibility to pain in the region affected, not by making the patient unconscious—under an application of cocaine he is completely awake—but because it interrupts

the flow of sensation from the seat of operation. Under these conditions the tissues cannot telegraph to the brain for aid, and the patient suffers no pain, not even unconscious pain. The operation proceeds for any length of time and is usually successful. In short, Dr. Crile's experiments seem to have ushered in a new era of surgery—the era of the 'shockless operation.' At the Lakeside Hospital in Cleveland Dr. Crile has performed thousands of operations, with a death rate in the last 1000 cases of less than 1 per cent.

**Suricate** (sŭ'ri-kät; *Suricata tetradactyla*), an animal of the Cape Colony allied to the ichneumon, sometimes domesticated as being an exterminator of rats, mice, and other vermin.

**Surinam** (sŭ'ri-näm). See *Guiana Dutch*.

**Surinam Bark**, the bark of *Andira inermis*. See *Andira*.

**Su'rinam Toad**. See *Pipa*.

**Surmullet** (sur'mul-et), a name of fishes forming the family Mullidæ, allied to the perches, and often called red mullets. They have two dorsal fins with a wide interval between them, the first being spinous, and two long barbels hanging from the lower jaw. The common red mullet (*Mullus barbatus*) of the Mediterranean is about 12 inches long, esteemed very delicious food, and was much prized by the Romans.

**Surnames**. See *Names, Personal*.

**Surplice** (sur'plis), a white garment worn by priests, deacons, and choristers in the Church of England and the Roman Catholic Church over their other dress during the performance of religious services. It is a loose, flowing vestment of linen, having sleeves broad and full, and differs from the *alb* only in being fuller and having no girdle or embroidery at the foot.

**Surrey** (sur'ri), a county of England, bounded by the Thames, separating it from Buckinghamshire and Middlesex; by Kent, Sussex, Hamp-



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shire, and Berkshire; area, 707 sq. miles. A range of hills, called the North Downs, stretches across the county from east to west, sloping gently down towards the Thames on the north, and on the south descending precipitously to the Weald, a flat plain which extends into Kent and Sussex. The highest point in the county is Leith Hill, 993 feet, about 3 miles south of Dorking. Almost the whole of the county is drained by the Thames, with its tributaries the Wey, Mole, and Wand. A large portion of the soil is under tillage, though extensive areas are covered with heath. In the N. a great part of the land is devoted to vegetable gardens for the London supply, and other farms to the raising of medical and aromatic plants. The vicinity of the metropolis, and the beautiful sites which it affords, have caused many parts of Surrey to be studded over with mansions and villas. The county contains the metropolitan parliamentary boroughs of Battersea and Clapham, Camberwell, Lambeth, Newington, Southwark and Wandsworth. The county town is Guildford. Pop. 845,544, many of whom are included within the limits of London.

**Surrey.** See *Howard, Family of.*

**Surrey,** HENRY HOWARD, EARL OF, English poet, born about 1516, was the grandson of the Earl of Surrey who was the victor at Flodden, and who, as a reward for his services, was created Duke of Norfolk. He succeeded to the courtesy title of Earl of Surrey when his father became second Duke of Norfolk in 1524. The Howards held an eminent position at the court of Henry VIII, and Surrey's cousin, Catherine Howard, became the king's fifth wife. Shortly before Henry's death Surrey and his father were suspected of aiming at the throne, and were arrested and lodged in the Tower, and Surrey was tried, condemned, and executed on Tower Hill, Jan. 19, 1547. Surrey was one of the leaders of the early poetic movement under Henry VIII. Most of his poems were translations or adaptations of Italian originals. His translations of the second and fourth books of the *Aeneid* are the first attempt at blank verse in the English language.

**Surrogate** (sur'u-güt), in Britain the deputy of a bishop or ecclesiastical judge. His chief duty is the granting of marriage licenses. In certain of the United States an officer exercising supervision over the probate of wills.

**Surturbrand** (sur'tur-brand), fossil wood, impregnated

more or less with bitumen, found in great abundance in Iceland. It is used by the Icelanders chiefly in their smithies. It is sometimes so little mineralized as to be employed for timber.

**Surveying** (sur-vā'ing), the art of measuring the angular and linear distances of objects on the surface of the earth, so as to be able to delineate their several positions on paper, to ascertain the superficial area, or space between them, and to draw an accurate plan of any piece of ground in more or less detail. It is a branch of applied mathematics, and is of two kinds, land surveying and marine surveying, the former having generally in view the measurement and delineation on paper of certain tracts of land, and the latter the laying down of the position of beacons, shoals, coasts, etc. Those extensive operations of surveying which have for their object the determination of the latitude and longitude of places, and the length of terrestrial arcs in different latitudes, are frequently called *trigonometrical surveys*, or *geodetic operations*, and the science itself *geodesy*. In land-surveying various instruments are used, the most indispensable of which are Gunter's chain, for taking the linear dimensions when the area of the land is required; the theodolite, for measuring angles; and the surveyor's cross, or cross-staff, for raising perpendiculars. See *Geodesy* and *Trigonometrical Survey*.

**Survival of the Fittest.** See *Natural Selection*.

**Susa** (sū'sā), an ancient city of Persia, the capital of the province of Susiana, or Elam, was situated in the plain between the Kerkha (Choaspes) and the Dizful. It was a very extensive city, with a strongly fortified citadel, containing the palace and treasury of the Persian kings, whose chief residence it was from the time of Darius I. It is the Shushan of the book of Daniel, where it is mentioned as situated on the banks of the river Ulai or Enlêus. The plain of Susa is covered with extensive mounds, in which fragments of brick and pottery with cuneiform inscriptions are found, and important discoveries have been made by Mr. Loftus, and more recently by M. Dieulafoy.

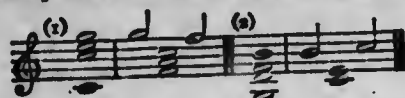
**Susa** (ancient *Hadrumentum*), a seaport of Tunis, on the Gulf of Hamâma, 45 miles from Kairwan. It has a rapidly increasing trade; exports oil, grain, esparto. Pop. 10,000.

**Susannah** (sū-zan'a), Book or, is one of the apocryphal ad-



ditions to the book of Daniel which are found in the Greek versions of Theodotian and the Seventy. They have not been found in any Hebrew original, and are generally rejected by the Jews.

**Suspension** (sus-pen'shun), in music, the prolongation of a note in a chord, having the effect of suspending for a moment certain notes in the



Suspension (1) from above; (2) from below.

following chord; or the delay of a dissonance in reaching the chord into which it is to be resolved.

**Suspension-bridge.** See *Bridge*.

**Susquehanna** (sus-kwe-han'ná), a river of the United States, formed by two branches, an eastern or northern branch, 250 miles long from Lake Otsego in New York, and a western branch, 200 miles from the western slope of the Alleghenies. These unite at Northumberland in Pennsylvania. The united stream flows south and southeast, and after a course of 150 miles reaches the head of Chesapeake Bay at Port Deposit, Maryland. It is a wide but shallow stream, nowhere navigable to any extent, save in the spring. Many dams exist along its course, the most important being the great McCall dam on the lower Susquehanna for the development of electric power. This is transmitted to Baltimore and may soon be extended to other cities.

**Sussex**, a southern maritime county of England, bounded north by Surrey, north and northeast by Kent, southeast and south by the English Channel, and west and northwest by Hants; area, about 1459 sq. miles. The great physical feature of the county is the range of chalk hills known as the South Downs, which traverse the county from the Hants border, near Petersfield, to the bold promontory of Beachy Head. They are chiefly used for sheep pasture, and the breed for which the county is famed is known as the 'Southdowns.' Much of the remainder of the county is devoted to agriculture, grain and hay being the leading crops. Among the mineral products is 'Sussex' marble, a kind of limestone containing fresh-water shells, which admits of being cut and polished. The mildness and equableness of the climate along the southern coast has led to the growth of numerous health resorts and watering or bathing places,

the most famous of these being Brighton. The county is rich in archaeological remains, among which are the castles of Pevensey, Bodiam, Hastings, Arundel, Bramber, and Hurstmonceux. Pop. (1911) 663,416.

**Sustentation Fund.** See *Free Church of*

*Scotland.*

**Susuk**, Soosock, Soosoo (*Platanista Gangetica*), the Gangetic dolphin, a cetacean of the delta of the Ganges, closely allied to the fresh-water dolphins, which inhabit the Amazon and other rivers of South America. It has long-beaked jaws, 120 teeth, and very small eyes.

**Sutherland** (sut'hér-land), a maritime county in the north of Scotland, bounded north and west by the Atlantic, south by Ross and Cromarty, east by the North Sea and Caithness; area, 2028 sq. miles. On the northern and western sides the coast is remarkable for the loftiness and holdness of its precipices, and its deep indentations by numerous lochs or arms of the sea; but the east coast is generally flat and continuous, with sandy shores. The interior consists of a succession of lofty and rugged mountains, rising in Ben More to 3273 feet. There are valuable salmon fisheries in several of the rivers, game of all kinds is abundant, and there are extensive deer forests. The herring-fishery is important. It is the most sparsely populated county in Scotland. Pop 21,440.

**Sutlej** (sut'lej), a river of Northern Hindustan, one of the 'five rivers' of the Punjab, has its source in Tibet, in a lake at an elevation of 15,200 feet, and pierces the Himalayas through a gorge with heights of 20,000 feet on either side. Thence it flows southwest, forming the eastern boundary of the Punjab, and enters the Indus at Mithankot after a total course of about 900 miles. In the latter part of its course, after its junction with the united stream of the Jhelum, Chenab, and Ravi, it bears the name of the Panjnad.

**Sutler** (sut'ler), a person who follows an army and sells to the troops provisions, liquors, or the like. The sutlers attached to regiments in the French army are called *vivandiers*.

**Sutras** (sū'tras; Sanskrit 'threads'), in Sanskrit literature, the name given to the numerous series of religious aphorisms and rules, including all the ritual, grammatical, metrical, and philosophical works, and consisting of brief sentences to be committed to memory. These were usually written on

## Sutro

dried palm-leaves tied together by a string.

**Sutro** (sū'tro), ADOLPH, mining engineer, born at Aix-la-Chapelle, April 29, 1830; removed to the United States in 1850, and in 1860 devised a tunnel to drain and ventilate the Comstock mines in Nevada. After 9 years of preliminary effort, this work was begun in 1869 and completed at a cost of about \$4,000,000. He subsequently acquired a large fortune by real estate operations in San Francisco, and gave large sums of money to public institutions, among them the Sutro library, founded by him. He was elected mayor of San Francisco in 1894. He died August 8, 1898, leaving nearly his entire fortune by will to the city, but the will was contested and broken.

**Suttee** (su-ts'; Sanskrit, *satt*, an excellent wife), a term applied by the English to the self-immolation of Indian widows on the funeral pyres of their husbands. The origin of this practice is of considerable antiquity, but it is not enjoined by the laws of Manu, nor is it based on the Vedas. It was abolished by Lord Bentinck in 1829, but cases are still occasionally heard of.

**Suttner** (süt'nér), BARONESS VON [BERTHA VON KINSKY], an Austrian novelist, wife of Baron von Suttner, born at Prague, Austria, June 9, 1843; died June 21, 1914. In 1891 she founded the Austrian Society of Peace-Lovers, and as its president took part in the peace congresses at Rome, Bern, Antwerp and Hamburg. She wrote a number of novels including *Die Waffen Nieder* (*Lay Down Your Arms*) for which she was awarded the Nobel peace prize in 1905.

**Sutton Coldfield**, an ancient market-town and now a municipal borough of England, in Warwickshire, 7 miles northeast of Birmingham. Pop. 20,132.

**Sutton in Ashfield**, an ancient market-town of England, in Nottinghamshire, 3 miles southwest of Mansfield. There are manufactures and in the vicinity are collieries and lime-works. Pop. 21,707.

**Suvorof-Rimnikski** (sū-vá'rov), PETER ALEXANDER VASILIEVICH (his name is also spelled *Suvarof*, *Suvarrow*, etc.), COUNT OF, Prince Italiski, field-marshal and generalissimo of the Russian armies, was born about 1729 or 1730, and in his seventeenth year entered the service as a common soldier. He served in the war against Sweden, in the Seven Years' war, in Poland, and against the Turks,

giving many proofs of courage and conduct, and obtaining the rank of lieutenant in 1754, of lieutenant-colonel in 1763, of brigadier-general in 1768, and of general of division in 1773. In 1783 he reduced the Kuban Tartars under the Russian yoke. In 1787, as chief in command, he conducted the defense of Kinburn to a successful issue; and in 1789 he gained the dignity of count by his great victory on the banks of the Rymnik, where the Austrian troops, under the Prince of Saxe-Coburg, were surrounded by 100,000 Turks. By his timely arrival with 10,000 Russians he not only rescued the Austrians, but occasioned the utter overthrow of the enemy. The next, and perhaps the most sanguinary of his actions, was the storming of Ismail in 1790, which was followed by the indiscriminate massacre of 40,000 of the inhabitants of every age and both sexes. He was next employed against the Kingdom of Poland, and conducted a campaign of which the partition of the country was the result, receiving a field-marshal's baton, and an estate in the dominions which he had helped to annex to the Russian crown. The last and most celebrated of his services was his campaign in Italy in 1799, when his courage and genius for a while repaired the disasters of the allied forces. He gained several brilliant victories at Piacenza, Novi, etc., drove the French from all the towns and fortresses of Upper Italy, and was rewarded with the title of Prince Italiski. But in consequence of a change in the plan of operations he passed the Alps; and the defeat of Korsakof at Zürich, together with the failure of the expected assistance from the Austrians, obliged him to retreat from Switzerland. On his recall to Russia, preparations were made for his triumphal entry into St. Petersburg; but having incurred the displeasure of the Emperor Paul the preparations for his triumph were suspended. Chagrin at this disgrace hastened his death, which took place May 18, 1800.

**Suwalki** (sū-vál'kē). See *Souvalky*.

**Suwar'row**. See *Suvorof-Rymnikski*.

**Suvarrow Islands**, a group of three low wooded islands in the Pacific, about 450 miles N. N. W. of Cook or Hervey Islands, and about the same distance E. of Samoa. The group was annexed to Great Britain in 1889.

**Suzerain** (sū'ze-rān), in feudalism, a lord paramount; either the king, as original holder of the realm,

or his immediate vassals, as grantors in turn to sub-vassals.

**Svastika** (svas'ti-ka), a religious symbol used by early races of Aryan stock from Scandinavia to Persia and India. It consists of a Greek cross, either enclosed in a circle the circumference of which passes through its extremities or with its arm bent back, and was intended to represent the sun, being found invariably associated with the worship of Aryan sun gods (Apollo, Odin). Similar devices occur in the monumental remains of the ancient Mexicans and Peruvians, and on objects exhumed from the prehistoric burial mounds of the United States.

**Svendsen** (svend'sen), JOHAN SEVERIN, a Norwegian composer, born at Christiania in 1840; became conductor of the musical association in Christiania and in 1883 court conductor at Copenhagen. He has composed a symphony and other orchestral works, chamber music, concertos for violin and violoncello, and songs.

**Sverdrup** (sver'dröp), OTTO, a Norwegian explorer, born in 1855. He accompanied Nansen on his Greenland expedition in 1888 and was captain of the *Fram* when the latter proved the existence of the polar drift. On the second expedition with the *Fram* he discovered several islands between Greenland and the Parry Isles and Melville Island, described in his work *New Land*.

**Swabia.** See *Suabia*.

**Swahili.** See *Suaheli*.

**Swallow** (swol'ö), the general name for all the insectivorous birds of the family *Hirundinidae*, distinguished by their narrow, elongated wings, their short, broad beak, their wide gape, their comparatively small and weak legs and feet, and their habit of hawking on the wing for insects, which constitute their food. They are found all over the world except in the coldest regions, and there are a number of species. Swallows bear much resemblance to swifts (which see), and among the swifts are several forms which are popularly named 'swallows.' Thus the bird known in the United States as the chimney swallow is not a true swallow, but a swift (*Chaetura pelagica*). Of true swallows, however, several are American, and among them the barn swallow (*Hirundo erythrogaster*), very similar to the European chimney swallow, the purple martin (*Progne subis*), and the cliff swallow (*Petrochelidon lunifrons*). Three are British, the common or chimney swallow (*Hirundo*

*rustica*), the house-martin (*H. urtica*), and the sand-martin (*H. or Cotile riparia*). The name of 'sea swallow' is given to the tern (which see). See also *Martin*, *Sand-martin*.

**Swallow-tailed Butterfly and**

**Moth**, names given to the *Papilio Maenon*, a beautiful species of butterflies, and to the *Durapteryx sambucaria*, a common moth, so called because the hinder wings are prolonged into small tails.

**Swallow-wort.** See *Colandine*.

**Swammerdam** (swam'er-dam), JOHN, one of the most eminent Dutch naturalists of the seventeenth century, was born at Amsterdam in 1637, and was destined for the church, but embraced the profession of medicine. He was devoted especially to the study of insects; and his *General History of Insects* and other works laid the foundations of the modern science of entomology. He died in 1680.

**Swampscott** (swamp'scot), a fashionable watering place in Swampscott township (town), Essex Co., Massachusetts, 13 miles N. E. of Boston. Pop. of town 6204.

**Swan** (swon; *Cygnus*), a genus of swimming birds, family *Cygnidae*, distinguished as a group by the bill being of equal length with the head, and broad throughout its length; by the cere being soft; by the front toes being strongly webbed, while the hinder toe is not webbed, and has no lobe or underskin. The species which inhabit or visit Europe are the mute or tame swan (*C. olor* or *mansuetus*), the whooper, whistling, or wild swan (*C. musicus* or *ferus*), and Bewick's swan (*C. Bewickii*). They have their representatives in North America in the trumpeter swan (*C. buccinator*), and the *C. columbianus* or *americanus*. South America produces one very distinct species, the beautiful black-necked swan (*C. nigricollis*). The black swan (*C. atratus*) of Australia, like the white swan, is frequently kept as an ornament in parks or pleasure grounds. Its large size, and the gracefulness of its form and motions, render the swan one of the most ornamental of all the water-birds. In England, from a very early date, it has been specially protected by both legal and regal interference. In Henry VII's reign the theft of a swan's egg was deemed an offense punishable by a year's imprisonment. Swans themselves, at a prior date, were declared to be exclusively 'royal' or 'king's' property; and no subject was

## Swanevelt

entitled to hold possession of these birds, save under special favor from the sovereign. To such subjects as possessed the permission to keep swans a special or 'swan' mark was attached, and this mark was cut on the bill of the bird as a distinctive badge of ownership. The process of marking is known as 'swan-upping' or 'hopping,' and the ceremony is yet annually carried out on the Thames on behalf of the crown, the universities of Oxford and Cambridge, and several of the London guilds or companies.

**Swanevelt** (swa'ne-velt), HERMANN, landscape-painter of the Dutch school, born about 1618. He set out for Italy when very young, and, captivated by the pictures of Claude Lorraine, became a scholar of this famous master. He died at Paris in 1655.

**Swan River**, a river in Western Australia, which colony was originally known as the 'Swan River Settlement.' Perth, the capital of the colony, is on the Swan River, and Fremantle is at its mouth.

**Swansdown** (swons'down), a name for a fine, soft, thick woolen cloth; or more commonly for a thick cotton cloth with a soft nap on one side.

**Swansea** (swon'sæ; Welsh, *Abertawe*), a seaport town of Wales, Gower Peninsula, county of Glamorgan, at the mouth of the river Tawe, at its entrance into Swansea Bay, Bristol Channel. The ancient town consisted of a few narrow streets at the mouth of the river with a Norman castle, which is still an object of interest. The modern town faces the bay. Copper-works were first established in 1719, and Swansea is now one of the most important copper-smelting centers of the world, and is the chief seat of the British tin-plate industry. Copper ore is imported from all parts of the world, and in the neighborhood is abundant coal for smelting. There are also iron-works, steel-works, zinc-works, alkali-works, etc. Pop. 114,073.

**Swarthmore College**, a co-educational college at Swarthmore, Pa., 12 miles W. S. W. of Philadelphia, founded in 1869 as a school for the children of Friends. In 1911 there were 46 instructors, 395 students, and a library of 40,000 volumes.

**Swatow** (swil-tou'), a port of China, in the province of Kwangtung, at the mouth of the Han River. It is entirely of modern origin, being built on ground recently recovered from the sea. It was opened to foreign commerce in 1860. The chief trade is with Hong-Kong. The principal exports are

tea, oranges, and the grass-cloth and pine-apple cloth made in the town and district. Swatow has also manufactures of bean-cake and sugar refining. Pop. 38,000.

**Swaziland** (swi'as-land), a small country in South Africa, lying between the Transvaal, Zululand, and Amatzongaland; area, 6580 square miles. It is a mountainous country, with fertile valleys, and great mineral wealth, especially of gold and coal. The Swazis are a section of the Zulu race, but have always been firm allies of the British. In 1894 Swaziland became a dependency of the South African Republic, and after the Transvaal war fell under British control, though the native dynasty is allowed to remain in nominal possession of the government. Pop. 85,484, of whom less than 1000 are Europeans.

**Sweaborg**, or **SVEABORG** (svä-ä-borg'), a fortress of Russia, in Finland, on seven small islands off the harbor of Helsinki. It is the seat of a great naval harbor and arsenal. In 1855 it was bombarded by the British and French fleets.

**Sweat** (swet). See *Perspiration*.

**Sweating Sickness**, in medicine, a demic disease of extraordinary malignity which prevailed in England towards the end of the fifteenth century and the beginning of the sixteenth, and spread very extensively over the Continent. It appears to have spared no age or condition, but is said to have attacked more particularly persons in high health, of middle age, and of the better class. Its attack was very sudden, and the patient was frequently carried off in one, two, or three hours. It seems to have first appeared in the army of the Earl of Richmond upon his landing at Milford Haven in 1485, and soon spread to London. It broke out in England four times after this, in 1506, 1517, 1528, and 1551. The process eventually adopted for its cure was to promote perspiration and carefully avoid exposure to cold.

**Sweating System**, the system by which subcontractors undertake to do work in their own houses or small workshops, and employ others to do it, making a profit for themselves by the difference between the contract prices and the wages they pay their assistants. The object of the subcontractor or sweater being to secure as large a margin of profit as possible, the tendency of the system is to grind the workers down to the lowest possible limit. It exists in the large cities of



Britain and the United States, and is an evil, in its mode of operation, that calls for close supervision. Various investigations of this system have been made, but much needs to be done to bring it under proper control.

**Sweden** (swē'den; Swedish, *Sverige*), a kingdom of the north of Europe, until 1905 united with Norway under one monarchy. It is bounded north and west by Norway; southwest by the Skager-Rack, Kattegat, and Sound; south by the Baltic; east by the Baltic and the Gulf of Bothnia; and northeast by the Torneå and its affluent Muonio, separating it from Finland. It consists of the three great divisions of Swealand or Sweden Proper in the middle, Götland or Gottland in the south, and Norrland in the north. For administrative purposes it is divided into twenty-five län or governments. The total area is 172,876 sq. miles; the estimated population is 5,136,441. The population of Sweden is mainly rural. There are only four towns with a population exceeding 30,000, namely Stockholm (the capital), Göteborg or Gottenburg, Malmö, and Norrköping. Nearly 2,500,000 of the population are agricultural; about a quarter of a million are cultivators of their own land.

**Physical Features.**—The coast-line of Sweden, more than 1400 miles in length, is serrated rather than deeply indented. The west coast is very rocky, but seldom rises so high as 30 feet. Along the south and southeast coast low shores alternate with precipitous cliffs, which, however, are of no great elevation. A great number of islets are scattered near the shores. There are also two islands of some size: Oeland near the southeast coast, and Gothland further out in the Baltic. The whole of the upper part of the shore of the Gulf of Bothnia consists of sandy alluvial deposits. The interior has far less of a highland than of a lowland character. From the mountains or elevated masses which run along the frontiers of Norway, with summits that rise more than 6000 feet above sea-level (Sarjek is 6972 feet), the country slopes east towards the Gulf of Bothnia, and south to the shores of the magnificent lakes which stretch almost continuously across the country east to west near lat. 59° N. South of the lakes the country is generally flat, and covered by barren sand or stunted heath, though interspersed with forests, green meadows, and corn-fields. The Plain of Scanla, occupying the whole of the south peninsula between the Sound on the west and the Baltic on the south and east, is generally a fine tract

of land. The rivers and lakes are very numerous. The rivers all belong to the basins of the Baltic Sea and the German Ocean. To the former belong the Torneå, the Luleå, Umeå, the Angermann, the Ljusne, and the united Eastern and Western Dal. The principal rivers belonging to the basin of the German Ocean are the Klar and the Göta. In general the rivers are too rocky for navigation, and the chief natural means of internal communication are supplied by the lakes, the chief of which are Lake Wener (area, 2014 square miles), Lake Wetter (715 square miles), and Lake Mälär, which has the capital on its shores, and is also remarkable for the number of islands which crowd its surface. Numerous canals connect the lakes and rivers and greatly facilitate inland navigation. Almost the whole of the country is composed of gneiss, partially penetrated by granite. The chief mineral is iron, which is produced in large quantities, of excellent quality, admirably adapted for steel. Zinc, copper, and silver, are also raised. Coal is worked in the south, but is poor in quality. Mining, and especially iron-mining, is one of the most important of Swedish industries. Roughly speaking, the mining region occupies the central part of the country, with the forest region to the north, and the agricultural region to the south.

**Climate, Fauna, etc.**—There is hardly any spring or autumn intervening between the heat of summer and the cold of winter, which in the north lasts for nine, and in the south for seven months. The extremes of heat and cold are much greater than in Britain; but on the whole the climate is eminently favorable to health, and no country furnishes more numerous instances of longevity. Among the larger wild animals are the wolf, the bear, the elk, the red and roe deer, the lynx, glutton, fox, and even the beaver. Of the smaller animals the most destructive is the lemming. Among birds the most remarkable are eagles, the eagle-owl, and the capercaillie. The rivers and lakes are well stocked with salmon and trout.

**Agriculture, Manufactures, and Trade.**—Of the total land area, nearly 8 per cent. is under cultivation, nearly 5 per cent. under natural meadows, and 44 per cent. under forests, especially pine and fir. Timber is the chief export. Of the cereal crops the principal is oats, considerable quantities of which are exported. Other cereal crops are barley and rye, wheat being cultivated to a comparatively small extent. Large quantities of wheat and flour are imported.

The potato is grown everywhere. The principal domestic animals are cattle, sheep, horses, swine, and reindeer. The last, necessarily confined to the north, are kept in large herds by the Lapianders, and supply them at once with food and clothing. The manufacturing industries include those connected with iron, steel, wooden goods, woollens, cottons, silks, refined sugar, leather, paper, spirits, etc. The greater part of the trade is with Great Britain and Germany. The chief denomination of money is the krona = 20.8 cents.

**People.**—The inhabitants of Sweden, with the exception of the Lapianders and Finns, found only in the north, belong to the Scandinavian branch of the Teutonic family, and are characterized by a tall robust stature, light hair, blue eyes, and light complexions. The Lutheran faith is recognized as the state religion, but recently there have been extensive secessions from the Established Church. Other religions are tolerated; but appointments in the public service can be held by Lutherans only. Elementary education is gratuitous and compulsory, and almost every person can read and write. There are two universities, at Upsala and Lund.

**Government, etc.**—The crown is hereditary in the male line. The king must be a member of the Lutheran Church, and has to swear fidelity to the laws of the land. His prerogatives consist of the right to preside in the high court of justice, to grant pardons, to conclude treaties with foreign powers, to declare war and peace, to nominate to all appointments civil and military, and to veto absolutely any decree of the Diet. He also possesses legislative power in matters of political administration, but in all other matters that power is exercised, in concert with the sovereign, by the Diet, in which is invested the right of imposing taxes. The Diet or Parliament consists of two chambers. The first chamber contains 150 members, elected by the twenty-five provincial landstings or constituencies, and the municipal corporations of Stockholm, Göteborg, Malmö, and Norrköping. They are elected for nine years, and serve gratuitously. The second chamber contains 230 members, elected for three years, and paid for their services. The executive power is in the hands of the king, under the advice of a council of state consisting of ten members, seven of whom are departmental heads. Affairs common to Sweden and Norway are administered by a council of state, on which both the kingdoms are repre-

sented. About a third of the revenue is derived from direct taxes and from national property, including railways; the remainder from customs, excise, and other indirect taxes. The total estimated revenue for 1910 was \$57,000,000, and the expenditure practically the same amount. The public debt amounted to \$131,600,000. The army comprises a nominal total of 328,000 men, the majority raised by conscription, by annual levy from among men between the ages of 21 and 32. The navy consists of 5 modern and 7 older battleships, 1 cruiser, 11 monitors, 51 torpedo boats, 6 destroyers, and 10 submarines.

**History.**—The early history of Sweden is obscure. Christianity was introduced about the beginning of the eleventh century. Sweden was more or less an appanage of the Danish crown until the time of Gustavus Vasa, who raised the peasants of Dalecarlia, defeated the Danes, was elected to the throne in 1523, and received authority to reorganize the church on the basis of Lutheranism in 1527. (See *Gustavus I.*)—His son, Erik XIV, reigned only eight years, when, having lost his reason, he was deposed. He was succeeded by his brother, John III, who endeavored to restore the Catholic religion in Sweden, in which, however, he failed. He died in 1592, and was succeeded by his son, Sigismund, who in 1587 had been elected king of Poland. Sigismund had been brought up in the Catholic faith, but before his coronation had promised to support Protestantism in Sweden. Failing to comply, he and his posterity were excluded from the crown, which was conferred in 1604 upon his uncle, Charles IX, who died in 1611, and was succeeded by his son, the celebrated Gustavus Adolphus. (See *Gustavus II.*) Sweden, which, notwithstanding internal troubles, had been advancing in political importance since the time of Gustavus Vasa, now became the leading power of the North; and under Gustavus Adolphus, who espoused the cause of Protestantism in the Thirty Years' war, took for the first time a leading part in the affairs of Europe. Gustavus Adolphus met his death at the battle of Lützen in 1632, and was succeeded by his daughter Christina, who renounced the crown in 1654 in favor of her cousin Charles Gustavus, son of the count palatine. (See *Christina.*) The short reign of Charles X was distinguished by some brilliant military enterprises, which extended to Poland, Prussia, Russia, and Denmark. He died suddenly in 1660,

leaving a son, Charles XI, only four years of age. The country was then for long under a council of regency, and carried on a protracted war with Denmark. Charles assumed the government in 1680. He organized the army, adopting a regular system of conscription, and restored the finances. He died in 1697, and was succeeded by his son, the celebrated Charles XII. Of the warlike monarchs of Sweden he is the one who has attained the highest reputation for military genius. (See *Charles XII.*) His career of conquest ended in the disastrous battle of Poltava, July 8, 1709, which compelled Sweden to yield the presidency among the northern states to Russia, and he was killed at the siege of Frederickshall, November 30, 1718, while pushing the conquest of Norway. He was succeeded by his second sister, Ulrica Eleonora, who in 1720 associated with her in the government her husband Frederick I. Sweden was now under the hands of an oligarchy, the chief power in the state being held by a secret council of 100 members: 50 of the order of nobles, 25 of the clergy, and 25 of the burghers. This council was divided into two factions, called (after 1738) the Hats and Caps, the former of which preferred to sell themselves to France, the latter to Russia. On the death of Frederick in 1751 Adolphus Frederick of Holstein-Gottorp, by the influence of Russia, was elected king. During his reign the country was distracted by the rivalries of the Hats and Caps, and the royal power sank to a shadow. Adolphus died in 1771, and was succeeded by his son, Gustavus III, whose reign was distinguished by a monarchical revolution. (See *Gustavus III.*) He was assassinated in 1792. His son, Gustavus IV, was deposed, and his family declared for ever incapable of succeeding to the crown, in 1809. (See *Gustavus IV.*) His uncle, the Duke of Sudermania, was declared king with the title of Charles XIII. (See *Charles XIII.*) In 1810 the Diet elected Jean Baptiste Bernadotte, one of Napoleon's marshals, crown-prince. (See *Bernadotte.*) In the final struggle with Napoleon previous to 1814 Sweden joined the allies, while Denmark took the part of France. The Danes were driven out of Holstein by Bernadotte, and the Treaty of Kiel was concluded between Sweden, Denmark, and Great Britain, January 14, 1814. Sweden by this treaty ceded to Denmark her last German possessions in Pomerania, and the Isle of Rügen, while

Denmark was compelled to cede Norway to Sweden as a compensation for the loss of Finland, gained by Russia. Sweden now held the whole Scandinavian Peninsula, and had lost all her other European possessions. Bernadotte succeeded to the crown in 1818, under the title of Charles XIV. He died in 1844, and was succeeded by his son, Oscar I, whose reign was singularly peaceful and uneventful. (See *Oscar I.*) He died July 8, 1859, and was succeeded by his son, Charles Louis Eugene, under the title of Charles XV, whose reign was marked by constitutional reforms. In 1866 the States, which from time immemorial had met in four chambers, representing the nobility, clergy, citizens, and peasantry, were reduced to the modern composition of two chambers, an upper and a lower, and the suffrage was extended in 1869. Charles XV died September 18, 1872, and was succeeded by his brother, Oscar II, who had previously served in the navy, and who at once set to work to develop the mercantile marine of his country. In 1905 Norway seceded from the union with Sweden. While under the rule of the Swedish king, it had maintained a separate administration, and now chose a separate king. Oscar died December 8, 1907, and was succeeded by his son, Gustavus (Gustaf) V. See *Norway.*

*Language and Literature.*—The Swedish language is a descendant of the ancient Norse, the original of the Scandinavian branch of the Germanic tongues, of which the purest representative at the present day is the Icelandic. It is more closely akin to Danish than to Norwegian and Icelandic. Commercial intercourse with the Hanse towns early brought a German influence to bear upon the language, while the services of the church and the training of the clergy subjected it to the influence of Latin. The earliest writings extant are the ancient provincial laws and the earliest ballads, which belong to the thirteenth century. In the fourteenth century translations of the chivalric romances of Southern Europe were introduced, and were followed by Biblical and theological translations and chronicles. The University of Upsala was founded in 1478, and printing was introduced into Stockholm in 1483. During the sixteenth century the literature, influenced by the Reformation, was chiefly polemical. The earliest translation of the New Testament (1526) was by Olavs Petri, whose brother, Laurentius, the first Protestant archbishop of

the kingdom, translated the Old Testament, published in 1541. A Swedish chronicle, *Swensk Krönika*, was written by Olaus and revised by his brother. Olaus also attempted the drama. The Thirty Years' war exercised a very favorable influence on Swedish literature. Several libraries captured by Gustavus Adolphus were sent into Sweden, and his daughter Christina became a liberal patron of literature, and brought many learned men to the country. The seventeenth century was chiefly characterized by the dramas of Messenius, and by the didactic and other poems of Stjernhjelm, 'the father of Swedish poetry' (1598-1672). In the eighteenth century French and English literature had much influence on that of Sweden. Olof von Dalin (1708-63) now took the chief place in verse and prose, other poets being Mrs. Nordenflycht, Creutz, and Gyllenborg. Among the great names of this century in science are those of Swedenborg (1688-1772), Linnæus (1707-78), Torbern Olof Bergman (1735-84), Karl Wilhelm Scheele (1742-86), Celsius (1701-44), Karl Mickel Bellman (1740-95) was a song-writer of great merit. Mörk (1714-63) was the first Swedish novelist. Berzelius (1779-1844), one of the first chemists of his age, belongs essentially to the present century, as do Tegnér (1782-1846), bishop of Vexlô, the greatest name in Swedish literature, whose *Story of Frithiof* was translated into every European language; Frederika Bremer (1801-65), the Finnish poetess, whose stories were popular far beyond Sweden; and Runeberg (1804-77), the poet, who is preferred by many Swedes even to Tegnér. Among recent writers are Zakris Topelius and Count Karl Snoilsky, poets; Abraham Rydberg, novelist and historian; Johan Strindberg, dramatist; and Selma Lagerlöf, and Anna Edgren, both novelists.

### Swedenborg

(swê'den-borg), EMANUEL, the founder of the New Jerusalem Church, or sect of Swedenborgians, was the son of Jasper Swedenborg, bishop of West Gothland, and was born at Stockholm January 29, 1688. His studies embraced mechanic mathematics, mining, chemistry, physiology, and most of the natural sciences. The period 1710 to 1714 he spent in extended scientific travels through England, Holland, France, and Germany. In 1716 he was appointed assessor extraordinary in the Royal College of Mines by Charles XII, for whom he invented a rolling-machine to transport cannon over the mountains to the siege of Frederick-

shall. This service, and his treatises on algebra, the value of money, the orbit and position of the earth and planets, and on tides, gained for him the favor of the government, and in 1719 Queen Ulrica raised the Swedenborg family to the rank of nobility, upon which occasion the name was changed to Swedenborg. In the discharge of the duties of his office he visited the mines of Sweden, of Saxony, and of Austria and Hungary. A work on the origin of things, followed by a treatise on mining and smelting (*Opera Philosophica et Mineralia*), was published in 1734 (3 vols), and attracted much attention among the scholars of Europe. He increased his stock of knowledge by new travels in 1736-40 in Germany, Holland, France, Italy, and England, and after his return published the *Economia Regni Animalis* ('Economy of the Soul-kingdom'), which contains the application of the system of nature, unfolded in his philosophical works, to man. He was first introduced to an intercourse with the spiritual world in detail, according to his own statement, in 1743, at London. The eyes of his inward man, he says, were opened to see heaven, hell, and the world of spirits, in which he conversed, not only with his deceased acquaintances, but with the most distinguished men of antiquity. That he might devote himself more fully to his spiritual intercourse he resigned, in 1747, his office in the College of Mines; but the king still paid him half his salary as a pension. Subsequently he resided much in England and Holland. His theological works, written in Latin between the years 1747 and 1771, found but a limited number of readers; and while he was an object of the deepest veneration and wonder to his few followers, his statements were the more mysterious to the rest of the world because he could not be suspected of dishonesty, and exhibited profound learning, keenness of intellect, and unfeigned piety. His works are very numerous, among the more important of them being the *Arcana Cælestia*, the *New Jerusalem*, *Angelic Wisdom*, the *Apocalypse Explained*, *Heaven and Hell*, etc. With uninterrupted health he attained the age of eighty-four, and died of apoplexy in London, March 29, 1772.

### Swedenborgians

(swê-den-bor'gi-anz), the followers of Swedenborg, and particularly the members of what is called the *New Jerusalem Church*, or *New Church*. This body adopts the doctrinal tenets



## Swedish Turnip

## Sweet-potato

and methods of Biblical interpretation laid down in the writings of Emanuel Swedenborg. The first attempt at organization took place in London in 1783, when John Flaxman, the sculptor, was among its members. The first church for public worship was opened in Eastcheap, London, in 1788. Many of Wesley's preachers about this time adopted the new faith and helped to spread it widely. Its great apostle, however, was the Rev. John Clowes, rector of St. John's Church, Manchester, who translated most of Swedenborg's writings, and who, while not agreeing that separation from the Establishment was advisable, fostered the many separatist places of worship which sprang up in Lancashire within the sphere of his influence. In 1789 a general conference was held of the various scattered congregations and receivers, which has since 1815 met annually. It possesses one general and six provincial missionary institutions, two foreign missionary committees, a well-endowed college for the training of students for the ministry, and an orphanage. The sect has spread from England to the United States, and possesses numerous and zealous adherents in various other countries. The belief of the Swedenborgians is: that Jesus Christ is God, in whom is a trinity not of persons but essentials, answering to the soul, body, and the operation of these in a man; that the Scriptures contain an internal or spiritual meaning, which is the Word existing in heaven; that the key to this is the correspondence between natural and spiritual things, as between effects and their causes; that man is saved by shunning evils as sins and leading a life according to the ten commandments; that man is a spirit clothed with a natural body for life on earth, and then when he puts it off at death he continues to live as before but in the spiritual world, first in an intermediate state between heaven and hell, but afterwards, when his character whether good or evil becomes harmonious throughout, among his like either in heaven or hell; that the Lord's second coming and the last judgment are spiritual events which have already taken place.

**Swedish Turnip.** See *Turnip*.

**Sweepstakes** (swēp'stāks), a gambling transaction, in which a number of persons join in contributing a certain stake, which becomes the property of one or of several of the contributors under certain conditions. Thus, in horse-racing each of the con-

tributors has a horse assigned to him (usually by lot), and the person to whom the winning horse is assigned gains the whole stakes, or the stakes may be divided between two or three who get the two or three horses first in the race.

**Sweet-bay.** See *Laurel*.

**Sweet-bread.** See *Pancreas*.

**Sweet-briar**, or **SWEET-BRIER** (*Rosa rubiginosa*), a plant naturalized in the United States. It grows wild, but is often planted in hedges and gardens on account of the sweet balsamic smell of its small leaves and flowers. It is also called *eglantine*.

**Sweet-flag** (*Acorus Calamus*), a plant, also called *Sweet-rush*, found in marshy places throughout the northern hemisphere. The leaves are all radical, long, and sword-shaped; the stem bears a lateral, dense, greenish spike of flowers; the root is long, cylindrical, and knotted. The root has a strong aromatic odor, and a warm, pungent, hitterish taste, and has been employed in medicine since the time of Hippocrates. It is used in the preparation of aromatic vinegar, hair-powder, etc.

**Sweet-gum**, the *Liquidambar styraciflua*, a large North American tree with palmately lobed leaves and globular fruit. The fragrant gum was used by Indians to perfume their smoking mixtures.

**Sweet-pea** (*Lathyrus odoratus*), a garden plant belonging to the nat. order Leguminosæ, and the sub-order Papilionaceæ. It is cultivated on account of the beauty of its flowers, which are sweet-scented, and in color purple, rose, white, or variegated.

**Sweet-potato** (*Batatas edulis*; nat. order Convolvulaceæ), a plant now cultivated in all the warmer



Sweet-potato (*Batatas edulis*).

## Sweet-william

## Swift

parts of the globe. It is a twining or climbing plant, its stems 5 or 6 feet long, trailing on the ground or climbing over shrubs, with heart-shaped leaves 5 or 6 inches long. The roots at times grow to a great size, but the ordinary average is from 3 to 12 pounds. The native country of the plant is a matter of conjecture, but it was first mentioned in the sixteenth century as used by the Indians of Brazil as an article of food. It was introduced into Spain about 1519. The roots were imported into England from the West Indies by way of Spain, and sold as a delicacy. It is the potato of Shakespeare and contemporary writers, the common potato being then scarcely known in Europe. The consumption of the sweet-potato is very large in many parts, including the United States and the warmer parts of America, the East Indies, etc. In favorable conditions the yield in the United States is from 200 to 300 bushels per acre. The taste of the roots is sweetish and agreeable and they are considered superior to the common potato in flesh-forming properties. *P. paniculata*, another species with a wide geographical distribution, is commonly cultivated for food in west-central Africa. Though given the name of sweet potato, this plant has no botanical relation to the common potato.

**Sweet-william** (*Dianthus barbatus*; nat. order Caryophyllaceæ), a species of pink, an old inhabitant of the flower garden, which has produced numerous varieties. It grows wild in dry and sterile places in middle and southern Europe.

**Swell**, in music, a gradual increase and decrease of sound; the crescendo and diminuendo combined, marked by the sign  $\llcorner \llcorner$ . Also an arrangement in an organ (and in some harmoniums) whereby the player can increase or diminish the intensity of the sound at will. In the organ it consists of a series of pipes with a separate keyboard, and forming a separate department (called the swell-organ). The loudness or softness of the tone is regulated by opening or shutting, by means of a pedal, a set of stops like a Venetian blind, which forms part of the frame in which the pipes are inclosed.

**Sweyn** (swān), a king of Denmark, father of Canute the Great. He died in 1014, after having established himself in England, though without being crowned there. See *Denmark* and *Ethelred II.*

**Swift**, the *Hirundo apus* of Linnaeus and *Cypselus apus* or *murarius* of modern ornithologists. Though swifts

are like swallows in many respects, their structure is almost entirely different, and some naturalists rather class them with the humming-birds or the goat-suckers. The swift has all four toes directed forwards; it is larger than the swallow; its flight is more rapid and steady; and its scream is very different from the twittering of the swallow. It has unusual powers of flight, its weight being most disproportionately small to its extent of wing, the former being scarcely an ounce, the latter 18 inches, the length of the body being about 8 inches. Its color is a somber or sooty black, a whitish patch appear-



Common Swift (*Cypselus apus*).

ing beneath the chin. It builds in holes in the roofs of houses, in towers, or in hollow trees. The *C. melba* or *alpinus*, a larger species, with the lower parts dusky white, has its home in the mountainous parts of Central and Southern Europe. A common North American swift is the so-called chimney swallow (*Chaturus pelagica*), which builds its nest in chimneys. (See *Swallow*.) The swifts or swiftlets of the genus *Collocalia*, which inhabit chiefly the islands of the Indian Ocean from the north of Madagascar eastwards, construct the edible birds'-nests which are used by Chinese epicures in the making of soup. See *Birds'-nests*.

**Swift**, JONATHAN, the greatest of English satirists, the posthumous son of Jonathan Swift, an Englishman, steward of the Irish inns of court, was born in Dublin, November 30, 1667, and was educated at Kilkenney and at Trinity College, Dublin. In 1688 he crossed over to England to pay a visit to his mother, who was residing at Leicester, in her native county, in a state of dependence upon her relations. By her advice he communicated his situation to Sir William Temple, who had married one of her relatives, and who

at that time lived in retirement at Moor Park, Surrey. He was received by Sir William into his house as his amanuensis, and was introduced to King William, who often visited Temple privately, and who offered Swift a captaincy of horse, which he declined, having already decided for the church. In July, 1692, he was graduated as M.A. at Oxford, having entered at Hart Hall in the preceding May. In 1694, conceiving his patron to be neglectful of his interest, he parted from him, with some tokens of displeasure on both sides, and went to Ireland, where he took orders; but he soon returned to Sir William Temple, and remained with him during the few remaining years of that statesman's life. On his death Swift found himself benefited by a pecuniary legacy and the bequest of Temple's papers, which he published with a dedication to the king. In 1699, he accepted an invitation from the Earl of Berkeley, one of the lords-justices in Ireland, to accompany him as chaplain and secretary, and was presented by that nobleman with the living of Laracor, where he went to reside in 1700. In 1701 he took his doctor's degree, and in 1704 he published anonymously his famous *Tale of a Tub*, to which was appended the *Battle of the Books*. In 1708 appeared an attack upon astrology under the title of *Predictions for the Year 1708*, by Isaac Bickerstaff, Esq., and in 1709 a *Project for the Advancement of Religion*, dedicated to Lady Berkeley, the only work to which he ever put his name. In 1710 he was in London, being engaged by the Irish prelate to obtain a remission of the first-fruits and twentieths, payable by the Irish clergy to the crown, and was introduced to Harley, afterwards Earl of Oxford, and to Secretary St. John, subsequently Lord Bolingbroke. He overtly joined the Tory party, and several political tracts appeared from his pen. The two most famous of these were *The Conduct of the Allies* (1711) and *The Barrier Treaty* (1712), which did immense service to the Tories, preparing the mind of the country for the peace which the ministers were then anxious to bring about. A bishopric in England was the object of his ambition; but the only preferment he obtained from his ministerial friends was the Irish deanery of St. Patrick's, to which he was presented in 1713. The dissensions between Oxford and Bolingbroke, whom he in vain attempted to reconcile, and the death of the queen, which soon followed, put an end to his prospects, and condemned

him to unwilling residence for life in a country which he disliked. In 1716 he is said to have been privately married to Miss Esther Johnson, the lady whom he rendered celebrated under the name of Stella; but this is doubted. In 1712 he had become acquainted in London with Miss Hester Vanhomrigh (Vanessa), a lady of fortune, with a taste for literature, in which it was a pleasure to him to give her instruction. The pupil became enamored of her tutor, and even proposed marriage to him; but he avoided a decisive answer. Miss Vanhomrigh died in 1723, of shock, it is said, at discovering his secret union with Stella. His *Proposal for the Universal Use of Irish Manufactures* (1720) and his celebrated *Drapier's Letters* (1723) made him the idol of the Irish people. His famous *Gulliver's Travels* appeared in 1726. After the death of Stella, which took place in 1728, his life became much retired, and the austerity of his temper increased. He continued, however, earnest in his exertions to better the condition of the wretched poor of Ireland; in addition to which he dedicated a third of his income to charity. In later years the faculties of his mind decayed, and by 1742 had entirely given way. He died in 1745, bequeathing the greatest part of his fortune to an hospital for lunatics and idiots. Swift's character was marked by many noble qualities, but was stained by excessive pride, implacability, misanthropy, and general indifference to the feelings of others. As a writer he has, perhaps, never been exceeded in grave irony, which he veils with an air of serious simplicity, admirably calculated to set it off. He abounds in ludicrous ideas, which often deviate, both in his poetry and prose, into very unpardonable grossness. His style forms a fine example of easy familiarity.

**Swift**, LEWIS, astronomer, was born at Clarkson, New York, in 1820. In early life he began the study of magnetism and electricity and after 1855 devoted himself chiefly to astronomy, especially the study of comets. He became director of the Warner Observatory, Rochester, N. Y., in 1882, and subsequently of the Lane Observatory, California. He discovered numerous comets and over 1200 nebulae. Died in 1912.

**Swilly** (swil'li), LOUGH, an inlet of the Atlantic in the north of Ireland, which penetrates the county of Donegal for about 25 miles. It is a fine expanse of great depth, with an average width of 8 miles, but is not much frequented by ships.

**Swimming** (swim'ing), the act or sort of sustaining and propelling the body in water. A large proportion of the animal tribes are furnished with a greater or less capacity for swimming either in water or on its surface, but man is unqualified for swimming without learning to do so as an art. The art of swimming chiefly consists in keeping the head, or at least the mouth, above water, and using the hands and feet as oars and helm. It forms a most healthful, invigorating, and agreeable exercise, and the means which it affords of preserving our lives or those of others in situations of peculiar peril is also a great recommendation of this exercise, which may be easily learned wherever there is water of moderate depth. Want of confidence is the greatest obstacle in the way of most who begin to learn swimming. The beginner cannot persuade himself that the water will support him, and with the feeling that some muscular effort is necessary for the purpose stiffens his back in such a way that the water cannot buoy him up with the head above water. If, instead of doing this, he would give up the endeavor to support himself by muscular strain, and trust to the water to support him like a cushion, the art of swimming would come to him almost as naturally as the art of walking does to a child. When the ability to swim in the ordinary way, chest downwards, is acquired, everything is acquired. It is as unnecessary to give special instructions for swimming on the back, on the side, etc., as it is to direct people who are able to walk how to turn themselves or walk up or down hill. In saving a person from drowning, which can be done most effectually if he has already lost consciousness, pull him by the hair, or push him before you, if far from shore; otherwise take him by the arm. An excellent method of supporting another in the water is to allow the person supported to rest his hands on your hips. This method can scarcely be practiced in cases where persons unable to swim are drowning; but it may be of much avail in supporting a brother swimmer who is attacked with weakness or cramp, and who has presence of mind to take advantage of the support. Several feats of modern swimming have been placed on record, the most famous of all being that of Matthew Webb, of the British mercantile marine service, who swam from Dover to Calais on August 24-25, 1875, in 21 h. 44 m 55s., a distance of 39½ miles. Capt. Webb, who has never been

approached as a long-distance swimmer in ocean and tidal waters, lost his life in an attempt to swim the whirlpool rapids of Niagara on July 24, 1883.

**Swimming-bladder**, **AIR-BLADDER**, or **SOUND** (of fishes), the names applied to a sac or bladder-like structure found in most, but not in all fishes, the chief office of which appears to consist in altering the specific gravity of the fish, and thus enabling it to rise or sink at will in the surrounding water. It has a homology or structural correspondence with the lungs of higher forms than fishes; but it has no analogy or functional correspondence with the lungs or breathing organs, save in the peculiar *Lepidosirens* (which see) or mud-fishes, in which the air-bladder becomes cellular in structure, and otherwise assumes a lung-like structure and function. In its simplest condition it exists as a closed sac lying beneath the spine, and containing air or gases of different kinds. By the muscular compression of its walls the density of the contained gas is altered, and the specific gravity of the fish affected accordingly, so as to change its position in the water. There is reason to believe that the swimming-bladder is the relic of an air-breathing organ possessed by certain fishes in a remote geological period, which ceased to function as a lung at a later period, vanishing in some cases, becoming the air-bladder in others. That it is essential to the fish as an aid in swimming is rendered very doubtful by its presence in certain fishes and its absence in others of the same genus or family. In most sea-fishes the gas which the swimming-bladder contains is oxygen, that in the air-sac of fresh-water fishes being mostly nitrogen. Such fishes as the flat-fishes, represented by the flounders, soles, etc., have no swimming-bladder developed, and it is absent in other forms, such as sharks, rays, lampreys, etc.

**Swinburne** (swin'burn), **ALGERNON CHARLES**, poet and essayist, was born at London in 1837, and was educated at Balliol College, Oxford. His first productions, *Queen Mother and Rosamond*, published in 1861, attracted but little attention. They were followed by two tragedies, *Atalanta in Calydon* (1864), and *Chastelard* (1865), and by *Poems and Ballads*, (1866), which excited considerable criticism. After that time Swinburne remained prominently before the public. Among his numerous later works may be mentioned: *A Song of Italy* (1867); *William Blake*, a critical



## Swindon

essay (1867); *Songs of Sunrise* (1871); *Bethwell*, a tragedy (1874); *Notes on Charlotte Brontë* (1877); *A Century of Roundels* (1883); *A Study of Victor Hugo* (1886); a collection of essays and criticisms under the title of *Miscellanies* (1886); a poem on the *Armada* (1888); *Studies in Prose and Poetry* (1894). He died May 10, 1909.

**Swindon** (swin'dun), a market town of England, in the county of Wilts, 77 miles west of London. It consists of Old Swindon and New Swindon. Old Swindon is a picturesque old place, known in Domesday as Svin-dune. New Swindon originated in the establishment here, in 1841, of the locomotive works of the Great Western Railway. These works employ several thousand hands. Pop. 50,771.

**Swine** (swin). See *Hog*.

**Swine Fever**, or SWINE PLAGUE, is known as hog cholera in the United States, where it has caused enormous losses. It is a specific contagious fever, generally very rapid in its course, death ensuing in a very few days. To suppress the disease all affected pigs must be killed, and if necessary those which have been in contact with them, and the carcasses and litter burned or deeply buried.

**Swine-fish**, a name given to the sea-wolf (which see).

**Swinemünde** (svē'nē-mün-dō), a seaport of Prussia, province of Pomerania, on the island of Usedom, at the mouth of the Swine, 36 miles N. N. W. of the town of Stettin, of which it is the foreport. The harbor, which is strongly fortified, is one of the best on the Prussian Baltic coast. The lighthouse is the loftiest in Germany. Swinemünde is much frequented for sea-bathing. Pop. 13,000.

**Swing-bridge**, called also *swing-bridge*, a bridge that may be moved by swiveling, so as to afford a passage for ships on a river, canal, at the mouth of docks, etc. In one form the whole bridge is swung to one side; in another it rotates from its center on a pier in the middle of the waterway, so as to make a passage on each side of it; while in a third it consists of two sections, each of which, when opened, is landed on its own side.

**Swinton** (swin'tunn), a town of England, in the West Riding of Yorkshire, at the junction of the Dearne and Dove; 10 miles northeast of Sheffield. It is an industrial place, with

pottery-works, glass-works, iron-works, coal mines, etc. Pop. (1911) 13,658.

## Swinton and Pendlebury,

a town of Lancashire, England, 5 miles N. W. of Manchester. Its inhabitants are largely engaged in the industries of cotton-weaving, brick-making, and coal mining. Pop. (1911) 30,759.

**Swiss Guards**, bodies of mercenary Swiss troops which, after Switzerland gained her independence in the fifteenth century, were employed in many European countries as body-guards, and for duty about courts. The most famous were the French Swiss Guards organized in 1616, and annihilated in the defense of the Tuilleries, August 10, 1792, whose heroism is commemorated in Thorwaldsen's colossal *Lion*, carved in the face of a rock at Lucerne. The French Swiss Guards were reorganized by Louis XVIII in 1815, and defeated and dispersed in the revolution of 1830.

**Swissvale**, a borough of Allegheny Co., Pennsylvania, on the Monongahela River, 8 miles E. S. E. of Pittsburgh. It manufactures railroad switches and signals, lamps, etc. Pop. 7381.

**Switches**. See *Railroad*.

**Swithin**, St. (swith'un), bishop of Winchester from 852 to 862, and patron saint of Winchester Cathedral from the tenth to the sixteenth century. The popular knowledge of this saint's name is due to the belief that if rain falls on the 15th of July (which is popularly known as St. Swithin's Day) it will rain for six weeks after. Similar superstitions are connected in various continental countries with other saints' days which occur in summer.

**Switzerland** (swit'zur-land; German, *Schweiz*; French, *Suisse*), a federal republic of Central Europe, bounded north by Baden, from which it is separated for the most part by the Rhine; northeast by Würtemberg and Bavaria, from which it is separated by the Lake of Constance; east by the principality of Lichtenstein and the Tyrol, from which it is separated by the Rhine and the Grisons Alps; south by Italy, from which it is separated by the Alps and the Lake of Geneva; and west and northwest by France, from which it is separated in part by the Jura Mountains and the River Doubs. Greatest length, 210 miles; greatest breadth, 126 miles. The federal cantons of which it consists,

## Switzerland

## Switzerland

## Switzerland

with their areas and populations, are as follows:—

Cantons.	Area in sq. m.	Popula- tion.
Aargau (Fr. Argovie)...	542	206,498
Appenzell .....	162	68,780
Basel (Fr. Bâle).....	177	180,634
Bern (Fr. Berne).....	2 660	589,483
Freiburg (Fr. Fribourg)..	644	127,951
Gall. St. (Ger. Sankt Gallen) .....	780	250,285
Geneva (Fr. Genève; Ger. Genf) .....	109	132,609
Glarus (Fr. Glaris).....	267	82,849
Grisons (Ger. Graubün- den) .....	2 774	104,520
Lucerne (Ger. Luzern)...	580	146,514
Neuchâtel (Ger. Neuen- burg) .....	812	126,279
Schaffhausen (Fr. Schaff- house) .....	116	41,516
Schwyz (Fr. Schwytz)...	351	55,385
Solothurn (Fr. Soleure)..	308	100,762
Ticino (Ger. and Fr. Tessin) .....	1 095	188,688
Thurgau .....	882	118,221
Unterwalden .....	295	28,330
Uri .....	415	19,780
Valais (Ger. Wallis)....	2 026	114,438
Vaud (Ger. Waadt).....	1 245	281,879
Zug .....	92	25,098
Zürich .....	665	431,036
Total .....	15,992	8,315,448

The largest towns are Geneva, Zürich, Basel, and Bern, the last being the federal capital.

**Physical Features.**—The characteristic physical features of Switzerland are its lofty mountain ranges, enormous glaciers, magnificent lakes, and wild romantic valleys. The loftiest mountain-chains belong to the Alps, and are situated chiefly in the south. The central nucleus is Mount St. Gothard, which unites the principal watersheds of Europe, and sends its waters into four large basins—north by the Rhine to the German Ocean, southwest by the Rhone to the Mediterranean, southeast by the Po to the Adriatic, and east by the Danube to the Black Sea. In like manner it forms a kind of starting-point for the loftiest ranges of the Alps—the Helvetian or Lepontine Alps, to which it belongs itself; the Pennine Alps, which include Mont Blanc, the culminating point of Europe, beyond the Swiss frontiers in Savoy; and the Rhaetian Alps, which stretch east and northeast across the canton of Grisons into the Tyrol. Besides the Alps, properly so-called, the only range deserving of notice is that of the Jura, which is linked to the Alps by the small range of the Jorat. See *Alps*.

**Rivers and Lakes.**—Owing to the mountainous nature and inland position of the country none of the rivers acquire

such a size within its limits as to become of much navigable importance. The Rhine, formed by two head-streams in the canton of Grisons, flows north into the Lake of Constance, and thence west to Schaffhausen, where it forms the celebrated falls of that name. Below these falls its navigation properly begins. Its principal affluent in Switzerland is the Aar. The Rhone, rising in the Rhone glacier (Valais), flows northwest into the Lake of Geneva. Immediately after issuing from the lake at the town of Geneva it receives the Arve, and about 10 miles below quits the Swiss frontier. The waters which the Po receives from Switzerland are carried to it by the Ticino; those which the Danube receives are carried to it by the Inn. The largest lakes, that of Geneva in the southwest and of Constance in the northeast, as well as that of Maggiore on the south side of the Alps, belong partly to other countries; but within the limits of Switzerland, and not far from its center, are Lake Neuchâtel, with Morat and Bienné in its vicinity, Thun with its feeder Brienz, Lucerne or Vierwaldstätter-see, Sem-pach, Baldegg, Zug, Zürich, and Wallen-stätter-see. All these internal lakes belong to the basin of the Rhine.

**Geology and Minerals.**—All the loftiest alpine ranges have a nucleus of granite, on which gneiss and mica-slate recline generally at a high angle. Coal-bearing strata are found in the cantons of Valais, Vaud, Freiburg, Bern, and Thurgau, and brown coal is obtained in St. Gall and Zürich. Iron is worked to advantage in several quarters, particularly among the strata connected with the Jura limestone. Rock and common salt are produced to some extent in the cantons of Vaud, Basel, and Aargau. The only other minerals deserving of notice are alabaster and marble, widely diffused; and asphalt, in the Val-de-Travers in the canton of Valais. Mineral springs occur in many quarters.

**Climate, Agriculture, etc.**—Owing to differences of elevation the climate is extremely variable even in the same localities. As a result of the same cause, few countries in Europe even of larger extent can boast of a more varied vegetation than Switzerland. In regard to vegetation it has been divided into seven regions. The characteristic product of the first is the vine, which grows up to 1700 or 1800 feet above the sea-level. The next is the hilly or lower mountain region, rising to the height of 2800 feet, and characterized by the

luxuriance of its walnut-trees, with good crops of spelt and excellent meadows. The third or upper mountain region, which has its limit at 4000 feet, produces forest timber, more especially beech, and has good crops of barley and oats, and excellent pastures. Above this, and up to the height of 5500 feet, is the fourth or subalpine region, distinguished by its pine forests and maples; here no regular crops are grown. The fifth or lower alpine region, terminating at 6500 feet, is the proper region of alpine pastures. In the sixth or upper alpine region the vegetation becomes more and more stunted, and the variation of the seasons is lost. The seventh or last region is that of perpetual snow. Many parts even of the lower regions of Switzerland are of a stony, sterile nature, but on every side the effects of persevering industry are apparent, and no spot that can be turned to good account is left unoccupied. Of the total area, over 28 per cent. is unproductive; of the productive area nearly 36 per cent. is under grass and meadows. The chief crops are wheat, spelt, rye, oats, and potatoes. The wine produced is mostly of inferior quality. Considerable quantities of fruits are grown. Among domestic animals the first place belongs to the horned cattle, and the dairy products of Switzerland are of most commercial importance, great quantities of cheese and condensed milk being exported. On the higher grounds goats are very numerous. Among wild animals are bears, wolves, chamois, wild boars, stags, badgers, foxes, hares, otters, birds of prey of large dimensions, and many varieties of winged game. The lakes and rivers are well supplied with fish.

**Manufactures and Trade.**—Of the population about 40 per cent. are dependent on agriculture, and about 34 per cent. on manufacturing industry. Switzerland is thus mainly an agricultural and manufacturing country. The system of peasant proprietorship prevails largely, it being estimated that there are nearly 300,000 peasant proprietors. The principal manufactures are cotton, silk, embroidery, watches and jewelry, machinery and iron, tobacco and wool. Geneva is the chief seat of the watch industry, Basel of the silk industry, and St. Gallen of embroidery. Switzerland being an inland country, has direct commercial intercourse only with the surrounding states; but the trade with other countries, especially Great Britain and the United States, is very important. There is a very com-

plete system of telegraphs and over 3000 miles of railway. The French metric system of money, weights and measures has been generally adopted in Switzerland.

**Religion and Education.**—Both the Evangelical-reformed Church and the Roman Catholic are national churches in Switzerland, about 59 per cent. of the inhabitants belonging to the former, and 41 per cent. to the latter. There is complete liberty of conscience and creed, but the order of the Jesuits and the societies affiliated to it are not allowed within the confederation. In terms of the constitution of 1874 primary education is secular and compulsory throughout the confederation. For the higher education there are four universities, Basel, Zürich, Geneva, and Bern; the first founded in 1460, and the three others since 1832. There are also academies or incomplete universities at Lausanne and Neuchâtel; a polytechnic school at Zürich; and a military academy at Thun.

**Government and Finance.**—The cantons of Switzerland are united together as a federal republic for mutual defense, but retain their individual independence in regard to all matters of internal administration. The legislative power of the confederation belongs to a federal assembly, and the executive power to a federal council. The federal assembly is composed of two divisions—the national council, and the state council or senate. The national council is elected every three years by the cantons—one member to each 20,000. Every lay Swiss citizen is eligible. The senate consists of forty-four members—two for each canton. In addition to its legislative functions the federal assembly possesses the exclusive right of concluding treaties of alliance with other countries, declaring war and signing peace, sanctioning the cantonal constitutions, and taking measures regarding neutrality and intervention. A special feature of the legislative system consists in the *Initiative* and *Referendum*, the first enabling the people to draw up and submit laws of their own to the legislature, the second enabling them to accept or reject laws passed by the legislative body. This system has made its way into other countries. The federal council consists of seven members elected for three years by the federal assembly, every citizen who has a vote for the national council being eligible for becoming a member of the federal council. The seven members of the federal council act as chiefs of the seven administrative departments of the republic. The president and vice-president of the federal council

are the chief magistrates of the republic. They are elected by the federal assembly for one year, and are not eligible for reelection till after the expiry of another year. The federal tribunal, consisting of nine members elected for six years by the federal assembly, decides in the last instance in all matters of dispute between the cantons, or between the cantons and the confederation, and acts in general as high court of appeal. It is divided into a civil and criminal court. For 1910 the estimated revenue was \$31,535,000, and expenditure \$31,768,000. The public debt on January 1, 1910, amounted to \$44,506,000. Each canton has a budget of its own.

**Army.**—The army consists of a Bundesauszug, or federal army, comprising all men able to bear arms from the age of twenty to thirty-two; and the Landwehr, or militia, comprising all men from the age of thirty-two to forty-four. In 1910 the Auszug (first 13 years' service) had a strength of 136,661, and the Landwehr (12 years' service), 68,113, making a total of 204,774. There is also, by a law of 1887, a Landsturm (300,000 men), in which every citizen between the ages of seventeen and fifty, not otherwise serving, is liable to be called to serve. The Landsturm is to be called out only in time of war.

**People.**—The Swiss are a mixed people as to race and language. German, French, Italian, and a corrupt kind of Latin called Rhetian or Roumansch, are spoken in different parts. German is spoken by the majority of inhabitants in fifteen cantons, French in five, Italian in one (Ticino), and Roumansch in one (the Grisons). Of the total population 71.4 per cent. speak German, 21.7 per cent. French, 5.3 per cent. Italian, and 1.2 per cent. Roumansch. The Swiss, however, have lived so long in a state of confederation that, apart from their peculiarities of origin and language, they have acquired a decided national character, and may now be viewed as forming a single people.

**History.**—The oldest inhabitants mentioned in written history are the Helvetians, who, between 58 B.C. and 10 A.D., were subjugated by the Romans. (See *Helvetii*.) Before the fall of the Roman Empire in the West, Switzerland was occupied by the German confederation of the Alemanni; by the Burgundians and the Lombards; and by the year 534, under the successors of Clovis, it had become a portion of the Frankish Empire. Under the successors of Charlemagne it was divided between the Kingdom of France and the German Empire, but ultimately the whole country fell to Ger-

many. For the most part, however, the dependence of Switzerland on Germany was merely nominal. The counts (originally local governors) conducted themselves as princes, assumed the name of their castles, and compelled the free inhabitants of their *Gaus* (districts) to acknowledge them as their lords. At the beginning of the thirteenth century the three forest cantons of Uri, Schwyz, and Unterwalden were subject to the counts of Hapsburg, who, although they were properly only imperial bailiffs (*Vögte*), yet regarded themselves as sovereign rulers. This claim the three cantons constantly refused to admit, and eventually (1291) leagued themselves together to oppose the usurpations of the house of Hapsburg. Tradition says that on the night of November 7, 1307, thirty-three representatives, with Fürst of Uri and his son-in-law, Tell, Stauffacher of Schwyz, and Arnold of Melchtal in Unterwalden at their head, met at Rütli, a solitary spot on the Lake of Lucerne, swore to maintain their ancient independence, and projected a rising of these cantons for the 1st of January, 1308. On the day fixed the rising took place, and the Austrian governors were deposed and expelled. But the events related of Tell are purely legendary. (See *Tell*.) A few years later the three cantons were invaded by the Hapsburgs; but the signal victory at the pass of Morgarten on the 15th of November, 1315, secured the independence of the cantons. The three united cantons were joined by the cities of Lucerne (1332) and Zürich (1351); the cantons of Glarus and Zug (1352), and the city of Bern (1353). Austria, which claimed jurisdiction over three of the newly-added members, namely, the city of Lucerne and the cantons of Glarus and Zug, again invaded the territory of the confederation, but was completely defeated at Sempach (where Arnold of Winkelried is said to have sacrificed his life for the sake of his fellow-countrymen) in 1386, and in 1388 at Näfels. The canton of Appenzell joined the confederation in 1411, and Aargau was wrested from the Austrians in 1415. The third war with Austria terminated in 1460, in favor of the confederation, which obtained Thurgau, Austria being thus deprived of all its possessions in the regions over which Switzerland now extends. In 1474, at the instigation of Louis XI of France, the Swiss turned their arms against Charles of Burgundy, invading his country and defeating his army near Héricourt. Charles, in revenge, invaded Switzerland, but the Swiss were again completely victorious, and in-



dicted several defeats upon the Burgundians at Granson in Vaud and at Murten (Morat) in Frelburg in 1476, and at Nancy in 1477, where Charles was slain. They admitted Frelburg and Solothurn into the confederation in 1481, and about the same time they concluded defensive alliances with several of the neighboring states. Their prosperity rose to such a height that all the courts around, even Austria, sought their friendship and alliance. The last war with Austria broke out in 1498. The Swiss had to undergo a severe struggle, but, victors in six sanguinary battles, they were, by the Peace of Basel in 1499, practically separated from the empire, a separation to which formal and international sanction was given in 1648. After this war they had no longer any enemy to fear, and their future wars were waged on behalf of foreign powers. In 1501 Basel and Schaffhausen, and in 1513 Appenzeli (which had long been an ally), were admitted into full confederation. The number of the cantons was thus brought up to thirteen, at which it remained till 1798. The town and the abbot of St. Gall and the town of Bienne had seats and votes in the Diet without being in full federation; and there were besides six allies of the confederation not enjoying these privileges—the Grisons, Valais, Geneva, Neufchâtel, Mühlhausen, and the bishopric of Basel. In 1516 France gave up to Switzerland the whole of the present canton of Ticino.

In 1518 the Reformation began to make its way into Switzerland, chiefly through the efforts of Zuinglius at Zürich. Zuinglius fell at Kappel (1531), but his work was carried on by Calvin at Geneva. The effect of the Reformation was long to divide Switzerland into separate camps. Aristocracy and Democracy, Protestantism and Catholicism, struggled for the supremacy. Internal dissensions, religious and political, continued for nearly two hundred years. The last time the two great parties met victory declared itself for the Protestants. The period of tranquillity that followed was alike favorable to the progress of commerce, agriculture, and manufactures, and to the arts and sciences. In almost every department of human knowledge the Swiss of the eighteenth century, both at home and abroad, acquired distinguished reputation, as the names of Haller, Bonnet, Bernoulli, J. J. Rousseau, Lavater, Bodmer, Brellinger, Gessner, Sulzer, Hirzel, Fuseli, Hottinger, Johann von Müller, Pestalozzi, and many others witness. In the last years of the century the ferment of the French revo-

lution spread to Switzerland; and in 1798 the ancient confederation was replaced by the Helvetic Republic, which lasted four years. In 1803 Napoleon I organized a new confederation, composed of nineteen cantons, by the addition of Aargau, Grisons, St. Gall, Ticino, Thurgau and Pays de Vaud. In 1815, by the compact of Zürich, Neufchâtel, Geneva and Valais were admitted into the confederacy, and the number of the cantons was thus brought up to twenty-two. This confederacy was acknowledged by the Congress of Vienna, which proclaimed the perpetual neutrality of Switzerland, and the inviolability of its soil. Again, in 1830 and in 1848, Switzerland was affected by the revolutionary movement in France, and a new federal constitution was introduced in the latter year. During the commotions of 1848 Neufchâtel set aside its monarchical form of government and adopted a republican one, and in 1857 it was put upon the same footing with the other cantons. Since that time the annals of Switzerland have little to record beyond the fact of constant moral and material progress. A revision of the federal constitution was adopted after a protracted agitation on the 19th of April, 1874, giving to the federal authorities more power. In the European war Switzerland was surrounded by the warring powers, but remained neutral.

**Sword** (sôrd), a weapon used in hand-to-hand encounters, consisting of a steel blade and a hilt or handle for wielding it. The blade may be either straight or curved, one-edged or two-edged, sharp at the end for thrusting, or blunt. The ancient Greek swords were of bronze, and later of iron. The Romans in the time of Polybius (B.C. 150) had short, straight swords of finely-tempered steel. The straight, long sword was used by the Christians of the West in the middle ages, while the Poles and all the tribes of Slavonic origin employed, and still prefer, the crooked sword or scimitar, which was also used by the Saracens, and is still the common one in the East. The double-handed sword of the middle ages was an unwieldy weapon, and probably originated from the wearing of plate armor. The sword is of much less importance in warfare than formerly, but European cavalry are still armed with it. From the former importance of the sword it came to be connected with various matters of ceremonial. The sword of state is one of the regalia, and the 'offering of the sword' one of the ceremonies of coronation. It is the emblem of power or authority, or of triumph and protection. Damascus, Toledo,

and Milan were anciently famous for their sword-blades. See *Broadsword*, *Cutlass*, *Rapier* and *Scimitar*; also *Outlery* and *Fencing*.

**Sword-fish**, a fish allied to the mackerel and represented by the common sword-fish (*Xiphias gladius*), the single known species. It occurs in the Mediterranean Sea and Atlantic Ocean, but may also be occasionally found round the coasts of Britain. It attains a length of from 12 to 15, or even 20 feet, the elongated upper jaw, or sword, forming three-tenths of its length. Its body is covered with minute scales. Its color is a bluish-black above, and



Swordfish.

silvery white on the under parts. The ventral fins are wanting. It is fished for by the Neapolitan and Sicilian fishermen with the harpoon. Its flesh is very palatable and nutritious. It attacks other fishes, and often inflicts fatal wounds with its powerful weapon; and there are frequent instances in which the timbers of ships have been found to be perforated through and through by the sword-like jaw, which has been left sticking in the wood.

**Swoyersville**, a borough in Luzerne Co., Pennsylvania, organized from part of Kingston township. Pop. 5396.

**Sybaris** (sib'ā-ris), an ancient Greek city of Lower Italy, on the Gulf of Tarentum, supposed to have been built by a colony of Achæans and Troezenians about 720 B.C. It rapidly rose to an extraordinary degree of prosperity, and the inhabitants were in ancient times proverbial for their luxury and voluptuousness. It was totally destroyed by the Crotonians, who turned the waters of the river Crathis against it (510 B.C.). Its name persists in the modern word Syharite.

**Sybel** (sə'bl), HEINRICH VON, a German historian, was born at Düsseldorf in 1817, studied at Berlin under Ranke, and became professor at Bonn in 1844. In 1861 he was elected by the university to the Prussian Landtag, and in 1874 he was returned to the imperial parliament. In 1878 he was nominated director of the state archives. Of his works the best known is his *History of the French Revolution*. He also wrote a compendious history of the founding

of the German Empire by William I. He died in 1895.

**Sycamine**. Same as *Sycamore*.

**Sycamore** (sik'a-mör), a European species of maple (*Acer pseudoplatanus*), a large and well-known timber tree (called *plane* in Scotland); also, in the western parts of the United States, a name for the occidental plane or buttonwood. See *Maple* and *Plane-tree*. For the sycamore of Scripture see *Sycamore*.

**Sycee-silver** (si-sē'), the fine silver of China, cast into ingots weighing commonly rather more than 1 lb. troy. They are marked with the seal of some banker or assayer as a guarantee of purity.

**Sychar** (sī'kār). See *Shechem*.

**Sycamore** (sik'u-mör), a tree of the genus *Ficus*, the *F. Sycamorus*, or sycamore of Scripture, a kind of fig-tree. It is very common in Palestine, Arabia, and Egypt, growing thick and to a great height, and though the grain is coarse, much used in building, and very durable. Its wide-spreading branches afford a grateful shade in those hot climates, and its fruit, which is produced in clusters upon the trunk and the old limbs, is sweet and delicate.

**Sycosis** (si-kō'sis), a pustular eruption on the chin, upper lip, or sides of the head, among the hairs, in the follicles of which the pustules have their chief seat.

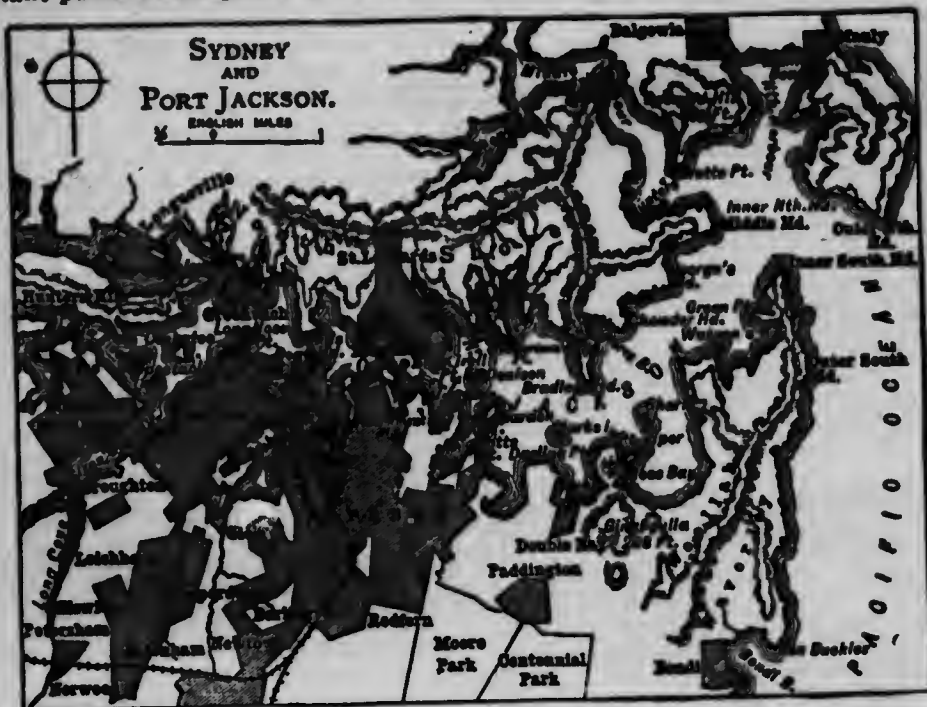
**Sydenham** (sid'n-ham), a district in the county of Kent, 6 miles S. S. E. of London Bridge, a southern suburban section of London. Originally a village with mineral springs of some note, it was selected as the site of the Crystal Palace, opened in 1854. Pop. 50,804. See *Crystal Palace*.

**Sydenham**, THOMAS, an English physician, was born in Dorsetshire in 1624, took the degree of bachelor of medicine at Oxford in 1648, and died in 1689. He commenced practice as a physician at Westminster, and applied himself to an attentive observation of the phenomena of diseases. Febrile disorders and the gout attracted his especial notice. The Sydenham Society, which owes its name to him, have published an English translation of his works, which were all written in Latin.

**Sydney** (sid'ni), the capital of New South Wales and the parent city of Australia, is picturesquely situated on the southern shore of Port Jackson, the shore line being deeply indented by capacious bays or inlets which form

harbors in themselves, and are lined with wharves, quays, and warehouses. Some of the older streets are narrow and crooked, bearing a striking resemblance to those of an English town; but the more modern streets, such as George Street, Pitt Street, Market Street, King Street, and Hunter Street, rank high in order of architectural merit. The steam tramway system is extended to all parts of the suburbs, and water communication between the city and its transmarine suburbs, Balmain, North Shore, Manly Beach, etc., is maintained by numerous steam-ferries. Among the most important public buildings are the new gov-

comparison with the edifices of older countries. The places of open-air recreation include the Domain, a beautiful park covering about 140 acres; Hyde Park, 40 acres, near the center of the city; the Botanical Gardens, the finest in the colonies, 88 acres; Moore Park, 600 acres; the Centennial Park, designed to commemorate the colony's centenary (1888), 708 acres; and the race-course, 202 acres. The entrance from the Pacific Ocean to Port Jackson, about 4 miles northeast of Sydney, is 1 mile in width, and is strongly fortified; the bay itself is about 10 miles in length and 8 in average breadth; it is well sheltered,



ernment offices, magnificent white free-stone structures in the Italian style; the town-hall, with a tower 200 feet high, and a very capacious great hall; the post-office, an Italian building with a tower 250 feet high; the government house; the university, a Gothic building with a frontage of nearly 400 feet, situated in a fine park; the free public library; school of art; public museum; St. Andrew's (Episcopal) Cathedral; St. Mary's (Roman Catholic) Cathedral; the Jewish synagogue; exchange; custom-house; mint; parliament houses; hospitals, asylums, and numerous other ecclesiastical, scholastic, and business buildings, which would not suffer by

and has a depth of water sufficient to float the largest vessels. Besides wharves and quays there are dry-docks and other accommodation for shipping, and the trade of the port is very large. The principal exports are wool, tallow, hides, preserved meat, tin, copper, etc.; the imports, grain, tea, coffee, sugar, wine and spirits, ironware and machinery, cotton and woollen goods, wearing apparel, furniture, etc. Sydney was founded in 1788, and was named in honor of Viscount Sydney, the colonial secretary. It was incorporated in 1842. The discovery of gold in the colony in 1851 gave an immense impetus to its progress. The population has grown rapidly, the last

## Sydney

estimate giving 800,000, of whom about a fourth belong to Sydney proper and the remainder to the numerous suburbs.

**Sydney**, a town of Canada, capital of Cape Breton county, Nova Scotia, on Cape Breton Island, on the southwest arm of Sydney harbor, is a prosperous town and coaling station with an excellent harbor. It is connected by rail with Bridgeport and other coal-mining centers, and has steel, packing and shipbuilding industries. Steamers ply regularly to Halifax (284 miles distant), North Sydney (18 miles distant, on the northwest arm of Sydney harbor), and other ports. Pop. (1911) 17,723.

**Sydney**, ALGERNON and SIR PHILIP. See *Sidney*.

**Sydney Mines**, Nova Scotia. Pop. 7464.

**Seyne** (sî-è-né). See *Assouan*.

**Syenite** (sî-en-It), a rock composed of hornblende and orthoclase feldspar with occasionally a little quartz. It abounds in Upper Egypt, near Assouan, the ancient Syene, whence it derives its name. It often bears the general aspect of a granite, but is distinguished from that rock by the presence of hornblende and the comparative absence of quartz and mica. Granite which contains hornblende is called *syenitic granite*, and fine-grained syenite, containing large crystals of feldspar, is called *syenitic porphyry*.

**Sylhet**. See *Silhet*.

**Sylla**. See *Sulla*.

**Syllabus** (sîl'a-bus), a document issued by Pope Plus IX, Dec. 8, 1864, which condemned eighty current doctrines of the age as heresies. It is merely a catalogue of quotations from modern writers. It provoked conflicts between the papal and the civil power in Prussia, Austria, and Brazil.

**Syllogism** (sîl'u-gizm), in logic, a form of reasoning or argument, consisting of three propositions, of which the two first are called the *premises*, and the last the *conclusion*. In this form of argument the conclusion necessarily follows from the premises; so that if the two first propositions are true the conclusion must be true, and the argument amounts to demonstration. Thus, plants have not the power of locomotion; an oak is a plant; therefore an oak has not the power of locomotion. These propositions are denominated the major premise, the minor premise, and the conclusion. The three propositions of a syllogism are made up of three ideas or

terms, and these terms are called the *major*, the *minor*, and the *middle*. The subject of the conclusion is called the minor term (oak); its predicate is the major term (the power of locomotion); and the middle term is that which shows the connection between the major and minor term in the conclusion, or it is that with which the major and minor terms are respectively compared (plants). Syllogisms are usually divided into categorical, hypothetical, disjunctive, etc. The *quantity* and *quality* of propositions in logic—that is, whether they are said of all generally or only of some, and whether they are affirmative or negative—are marked by arbitrary symbols, as A, E, I, O. Every assertion may be reduced to one of four forms—the universal affirmative, marked by A; the universal negative, marked by E; the particular affirmative, marked by I; and the particular negative, marked by O. Examples of each of these are: All men are liable to err; no man is the exact counterpart of another; some men are wise; some men are not wise. From these, by combination, all syllogisms are derived. The rules of the syllogism may be thus briefly expressed: (1) In every syllogism there must be three and only three terms. (2) The middle term must be universal (that is, inclusively or exclusively of a whole class) in one of the premises. (3) Neither the minor term nor the major must be used universally in the conclusion if not so used in the premises. (4) If both premises are affirmative the conclusion must be affirmative. (5) If either premise is negative the conclusion must be negative. (6) From two negative premises no conclusion can be drawn.

**Sylphs** (sîlfs), the elemental spirits of the air in the system of Paracelsus. The sylphs, like the other elemental spirits—the salamanders or spirits of fire, the gnomes or spirits of earth, and the undines or spirits of water—form the link between immaterial and material beings. They have many human characteristics, are male and female, and are mortal, but have no soul, and consequently suffer annihilation after death.

**Sylt** (sîlt), an island in the North Sea, off the coast of Schleswig-Holstein, to which province of Prussia it belongs; about 22 miles long, very narrow, but with a projecting peninsula on the east side; area, 40 square miles. It consists mainly of sand dunes, with some pasture for sheep. The inhabitants, about 4500 in number, are mostly Frisians by origin.

**Sylvester I** (sîl-ves'ter), Bishop of Rome, 314-335, was represented at the Council of Nice, and is



said to have held a council at Rome to condemn the errors of Arius and others. The story of his having baptized Constantine and received Rome and its temporalities as a donation, is pure fiction. He is honored as a saint.

**Sylvester II**, pope, was born of an obscure family in Auvergne, named Gerbert, and at an early age entered the monastery of St. Gerard, in Aurillac. He traveled into Spain to hear the Arabian doctors, and became so distinguished that he was appointed by Hugh Capet preceptor to his son Robert. Otto III, emperor, who had also been his pupil, conferred upon him the archbishopric of Ravenna in 998; and on the death of Gregory V, in 1000, procured his election to the papacy. He maintained the power of the church with a firm hand, was a great promoter of learning, and composed a number of works, particularly on arithmetic and geometry. He died in 1003. Among the vulgar he had the reputation of being a magician.

**Sylvester**, JAMES JOSEPH, mathematician, born at London in 1814, educated at Cambridge. He held professorships of mathematics at several institutions in England and the United States, being at Johns Hopkins University 1876-83, and after 1883 professor of geometry at Cambridge. He died March 15, 1897. He was a profound student of the higher algebra, made very important discoveries in mathematical science, and published many valuable scientific papers.

**Sylvia** (sil'vi-a), a genus of insectivorous birds of the dendrostrual tribe, type of the family Sylviadæ or warblers, of which *S. sylvicola* (wood-warbler or wood-wren), *S. trochilus* (the willow-warbler), *S. hortensis* (the garden warbler), and *S. rubecula* or *Erythraea rubecula* (the redbreast), are common examples.

**Syl'viadæ**. See above article.

**Symbiosis** (sim-bi-ô'sis; Greek, *syn*, together, *bios*, life), a sort of parasitism consisting in the living together or in close relationship of two species of animals, or two species of plants, or of some plant and some animal, each being of service to the other in some respect, as regards food, protection, etc. A well-known case is that of the pea-crabs, which live within the shell of various living molluscs.

**Symbol** (sim'bul), a sign by which one knows or infers a thing; an *emblem*. It is generally a definite visible figure intended to represent or stand for something else, as in the case

of the common astronomical symbols, which are signs conveniently representing astronomical objects, phases of the moon, etc., and astronomical terms. Some of these symbols are so ancient that we can find no satisfactory account of their origin. The symbols for the chief heavenly bodies are as follows:—Sun ☉, Mercury ☿, Venus ♀, Earth ♂ and ♁, Moon ☾, Mars ♂, Ceres ♀, Pallas ♀, Juno ♀, Vesta ♀, Jupiter ♃, Saturn ♄, Uranus ♅, Neptune ♆, Comet ☄, Star ✨. The asteroids, except the four given above, are represented by a circle with a number, thus ④.

**Lunar Phases**: ● Moon in conjunction, or new; ☾ Moon in eastern quadrature, or first quarter; ○ Moon in opposition, or full; ☾ Moon in western quadrature, or last quarter. See *Ecliptic*. **Chemical symbols** are merely the first letters of the names of the chemical elements; or, when the names of two or more elements begin with the same letter, two letters are used as the symbol, one of which is always the first letter of the name of the element. Generally speaking the letters comprising the symbol are taken from the English name of the element; but in some instances, specially in the cases of metals which have been long known, the symbols are derived from the Latin names, as Fe (Lat. *ferrum*) for iron. See *Chemistry*.—**Mathematical symbols** are letters and characters which represent quantities or magnitudes, and point out their relations; as,  $a'$ ,  $a_2$ ,  $a^2$ ,  $a_1$ ,  $a_m$ ,  $a$ ; the signs, +, —, ×, ÷, √, =, <, >, etc.

**Symbolics** (sim-hol'iks), a theological term for the study of creeds and confessions of faith, etc., from the ancient meaning of the word *symbolon* (*symbolum*), a brief compendium, a creed.

**Syme** (sim), JAMES, an eminent surgeon, born at Edinburgh in 1799; was educated at the High School and university of his native city, and studied anatomy under Barclay and Liston. In 1829 he opened Minto House Hospital as a surgical charity and school of clinical instruction; afterwards held professorships of clinical surgery in Edinburgh University and University College, London. Among his numerous writings are a *Treatise on the Excision of Diseased Joints* and *Principles of Surgery*. He died in 1870.

**Symmachus** (sim'a-kus), QUINTUS AURELIUS, a Roman writer, who flourished about 340-402 A.D., held important public offices under

Theodosius the Great, and was a zealous champion of the pagan religion. We possess ten books of letters by him, which are of importance for the history of the time.

**Symonds** (sɪ'mɒnds), JOHN ADDINGTON, an English writer of prose and verse, was born at Bristol in 1840, and educated at Harrow and at Balliol College, Oxford. His great work is the *Renaissance in Italy* (1875-80). Among his other works are: *Study of Dante*; *Studies of the Greek Poets*; *Sketches in Italy and Greece*; *Sketches and Studies in Italy*; translations of the Sonnets of Michael Angelo and Campanella; *Animi Tigra*, a collection of sonnets; *Vagabund's Libellus*; *In Nights and Days*; *Essays Speculative and Suggestive*. He died April 19, 1903.

**Sympathetic Inks** (sɪm-pa-thet-ik), inks which remain invisible until acted upon by heat or by some other reagent. See *Ink*.

**Sympathetic Nervous System**, the name applied to a set of nerves in vertebrate animals, forming a system distinct from, and yet connected with, the chief nerve-centers, or *central nervous system*. They are specially connected with the processes of organic life, the movements of the heart and of respiration, the work of the stomach, etc., in digestion, the process of secretion in glands, etc. See *Nerve*.

**Sympathetic Powder**, in alchemy, a preparation which was reputed to have the property of curing a wound if applied to the weapon that inflicted it, or to a cloth dipped in the blood that flowed from it. It was said to be composed of calcined sniphate of iron.

**Sympathetic Strike**, a labor strike by other crafts than the one primarily concerned, to the end that the first strike may be forced to a successful issue by a general cessation of business till the point in dispute in the initial strike may be decided. Of such a character was the great railroad strike in the United States in 1894, when the railroad employees struck in sympathy with the Pullman Car Company's employees. The principle has been developed in other strikes since, together with sympathetic boycotting of the goods of the contesting firms. The disposition to bring about a general strike of all industries has been shown recently on several occasions, especially that in France in 1909 and in Sweden in the same year, the latter being the most successful strike of this character ever

attempted. Efforts to develop a sympathetic strike were made in Philadelphia during the street-car strike of 1910, but it quickly proved ineffective.

**Sympathy** (sɪm-pa-thi), in physiology, is that quality of the animal organization by which, through the increased or diminished activity of one organ, that of others is also increased or diminished. The idea of an organized system—the union of many parts in one whole, in which all these parts correspond to each other—includes the idea of a mutual operation, of which sympathy is a part. The sympathetic medium has been sometimes supposed to be the nervous system, sometimes the vascular or cellular system; but sympathy takes place between such organs as have no discoverable connection by nerves or vessels. The phenomenon of sympathy appears even in the healthy body; but its effect is much more often observed in diseases. Sympathy is further used to express the influence of the pathological state of one individual upon another, as in the contagion of hysteria or of yawning.

**Symphony** (sɪm-fu-ni), an elaborate musical composition for a full orchestra, consisting usually, like the sonata, of three or four contrasted, yet inwardly related movements. Haydn, Mozart, Mendelssohn, and Beethoven are the most successful composers of this class of compositions.

**Symphytum**. See *Comfrey*.

**Sympiesometer** (sɪm-pi-e-zom'e-ter), a kind of barometer in which the weight of the air is indicated by the compression of gas in a tube, the lower part of the tube being filled with some oily fluid and the gas occupying the upper portion.

**Symptoms** (sɪm'tums), in medicine, the phenomena of diseases, from which we infer the existence and the nature of the disease. Symptoms have their seat in the functions which are affected by the disease, and may be perceptible by the patient alone (for example, pain and all change of sensations), or by the physician also (for example, all diseased movements). The nervous, the vascular, and the cutaneous systems are affected in most diseases, and thus afford symptoms. If the symptoms are perceptible only to the patient they are called *subjective*; if to the physician without necessary reference to the patient, they are *objective*.

**Synagogue** (sɪn'a-gog; from the Greek *synagōgē*, an assembly); the recognized place of public

worship among the Jews. Its origin, it is supposed, belongs most probably to the date of the Babylonish captivity in the abeyance of temple worship. The synagogues were so constructed that the worshippers, as they entered and as they prayed, looked towards Jerusalem. At the extreme east end was the holy ark, containing copies of the Pentateuch; in front of this was the raised platform for the reader or preacher. The men sat on one side of the synagogue and the women on the other, a partition 5 or 6 feet high dividing them. The chief seats, after which the scribes and Pharisees strove, were situated near the east end. The constitution of the synagogue was congregational, not priestly, and the office-bearers were not hereditary, but were chosen by the congregation. A college of elders, presided over by one who was the ruler of the synagogue, managed the affairs of the synagogue, and possessed the power of excommunication. The officiating minister was the chief reader of the prayers, the law, the prophets, etc. The servant of the synagogue, who had the general charge of the building, generally acted on week-days as schoolmaster to the young of the congregation. The right of instruction was not strictly confined to the regularly-appointed teachers, but the ruler of the synagogue might call upon anyone present to address the people, or even a stranger might volunteer to speak. The modern synagogue differs little from the ancient. Instead of elders there is a committee of management; and the women are now provided with seats in a low latticed gallery.—The *Great Synagogue* was an assembly or council of 120 members said to have been founded and presided over by Ezra after the return from the captivity. Their duties are supposed to have been the remodeling of the religious life of the people, and the collecting and redacting of the sacred books of former times.

**Synclinal** (sin-klī'nal). See *Anticlinal*.

**Syncopation** (sing-ku-pā'shun), in music, an alteration of the rhythm, by driving the accent to that part of a bar not usually accented. **Syncope** (sin'ko-pē), the name given to that form of death characterized by failure and cessation of the heart's action as its primary feature. The term is also applied to the state of faltering produced by a diminution or interruption of the action of the heart, and of respiration, accompanied with a suspension of the action of the brain and a temporary loss of sensation, volition, and

other faculties. Fatal syncope is usually the result of some nervous 'shock' resulting from a severe lesion of organs, from a want of blood, or an altered and abnormal state of blood pressure. Ordinary syncope is caused chiefly by weakness, mental emotion, etc.

**Syndicates** (sin'di-katz), originally, councils or bodies of syndics; afterwards, associations of persons formed with the view of promoting some particular enterprise, discharging some trust, or the like; now, combinations of capitalists for the purpose of controlling production and raising prices. Syndicates in the United States are known as trusts.

**Syndicalism** (sin'di-cal-izm), a system of labor agitation marked by its revolutionary methods and acts of violence as distinct from political or social procedure. The chief exponents of syndicalism in America are the Industrial Workers of the World. The ideal is the unification of labor in one great federation. It proposes that the control of the technical processes now exercised by the capitalist shall pass to various groups of organized workers. In Great Britain and the United States special emphasis is laid upon the organization of labor by industries rather than by crafts. Syndicalism advocates a policy of uncompromising hostility between labor and capital, and of 'direct action,' such as the general strike or sabotage. In 1913 France counted some 600,000 avowed syndicalists. Agricultural Italy contained many more; organized farm laborers controlled over 200,000 acres of tillable land, and the entire Italian railway system was under the influence of advanced syndicalism.

**Synge** (sing), JOHN MILLINGTON, an Irish dramatist and poet, born near Dublin in 1871, and died there March 24, 1909. He was associated with Yeats in the direction of the Abbey Theater, Dublin; and spent much time on the Continent as well as in the west of Ireland. His plays include *Riders to the Sea* (1905), *In the Shadow of the Glen* (1905), *The Well of the Saints* (1905), *The Playboy of the Western World* (1907), *Deirdre of the Sorrows* (1910).

**Syngnathus**. See *Pipe-fishes*.

**Synod** (sin'od), an ecclesiastical assembly convened to consult on church affairs. A synod may be diocesan, composed of a bishop and the clergy of his diocese; or provincial, of an archbishop and the bishops and clergy of his province; or national, of the whole clergy of a state under a papal legate. Synods of the Presbyterian Church are

# Synodical Period

courts of review standing between the presbyteries and the General Assembly, and embracing a certain number of associated presbyteries, the clergy and elders of which constitute the respective synods. See *Assembly (General)* and *Presbyterians*.

**Synodical Period** (si-nod'i-kal), in astronomy, the period between two successive conjunctions or oppositions of two heavenly bodies. A synodical month is a lunation, being the period from one full moon to the next full moon, or from new moon to next new moon. It is 29 days, 12 hours, 44 minutes, 2.37 seconds.

**Synonyms** (sin'u-nimz), or words having the same signification, strictly speaking, do not exist in any language; and in the popular use of the term synonyms are words sufficiently alike in general signification to be liable to be confounded, but yet so different in special definition as to require to be distinguished. The opposite of synonyms are *antonyms*.

**Synoptic Gospels** (si-nop'tik), a term applied to the gospels of St. Matthew, St. Mark, and St. Luke, which present a synopsis or general view of the same series of events. In St. John's gospel the events narrated are different. See *Gospels*.

**Synovial Membrane** (si-no'vi-al), the membrane lining the various joints or articulations of the higher animals, and which secretes a peculiar fluid—the *synovial fluid*—for the due lubrication of the joint. The structure of the synovial membrane resembles that of the serous membranes (which see). Its secretion is a thick viscid fluid somewhat resembling white of egg in general appearance. It is yellowish-white in color, has an alkaline reaction, and a saline taste.

**Syntax** (sin'taks), that part of grammar which treats of the manner of connecting words into regular sentences, constructing sentences by the due arrangement of words or members in their mutual relations according to established usage. In every language there is some fundamental principle which pervades and regulates its whole construction, although it may occasionally admit of particular variations. In some languages the principle of juxtaposition prevails, and little diversity of arrangement is possible, as is the case in English, in which inflections are so few. The relations of the subject, the action, and the object are indicated by their respective positions. In other languages—inflected languages like Latin or Greek—these

relations are indicated by the changes in the forms of the words, and the modes of arrangement are various.

**Synthes** (sin-thi-sis). See *Analysis*.

**Synthetic Rubber**, a variety of rubber produced by experiment in a chemical laboratory instead of in nature's workshop. Its production has been announced several times of recent years, but none of the processes has yet reached the commercial stage. According to recent experiments of Professor W. H. Perkins, of Manchester University, however, the production offers the probability of profit at a price of sixty cents per pound, with the possibility of its production at twenty-four cents a pound or less.

**Syphilis** (sif'i-lis), a contagious and hereditary venereal disease, usually communicated by sex intercourse, characterized in its primary or local stage by chancres or ulcers on the genitals, succeeded by inguinal buboes. The indications of a secondary or constitutional affection are ulcers in the throat, copper-colored eruptions on the skin, pains in the bones, nerves, etc. The name of this disease is traced to a poem written in Latin hexameters by the Italian Fracastoro, and published in 1530. Its history is one of the most difficult parts of the history of medicine. It is impossible to say when or where the disease originated, but it appears to have occurred in Europe and certain parts of Asia from the earliest times, and has gradually spread over the whole globe. During the latter part of the fifteenth century it assumed an epidemic form, and spread throughout the whole of Europe. Like other diseases, it gradually diminished in virulence, particularly after Paracelsus had found in mercury a useful remedy against it. It has recently been discovered that this disease is due to a protozoön, *spirochaeta pallida*, and what is claimed to be a remedy for it was discovered by Paul Ehrlich, a German chemist. See *Salvarsan*. The results of its use, so far, appear very promising, though they may not prove permanent, and some serious results, with a few deaths, have followed its application. These effects may be due to some fault in its preparation.

**Syphilization** (sif-il-i-zä'shun'), the treatment of syphilis by means of repeated syphilitic inoculations. It was originated by M. Anzias of Turin in 1844.

**Syphon**. See *Siphon*.

**Syra** (së'rä), the ancient Syros), a Greek island in the Aegean Sea, in the middle of the Cyclades, 10 miles



long and 5 broad. Anciently clothed with forests, and very fertile, it is now for the most part a brown and barren rock. Its inhabitants, only about 1000 at the beginning of the century, were largely recruited by refugees at the outbreak of the war of Greek independence, and latterly it has become the commercial center of the archipelago. Pop. 31,939. —SYRA, or HERMOPOLIS, the capital, is built round the harbor on the east side of the island. It is the seat of government for the Cyclades, and one of the most important seaports of Greece. Pop. 18,132.

**Syracuse** (sir'a-kūs; now *Siracusa*), anciently the chief city of Sicily, on the east coast of the island, one of the most magnificent cities in the world, with 500,000 inhabitants, is now greatly reduced, but still has an excellent harbor, capable of receiving vessels of the greatest burden. The ancient city was of a triangular form, 22 miles in circuit, and consisted of four parts surrounded by distinct walls; the modern city is confined to the small island of Ortygia, and is only about 2½ miles in circumference. It is defended by walls with bastions, and has many interesting remains and memorials of former times. The cathedral is the ancient temple of Minerva, and there are remains of amphitheaters and other Roman works. Syracuse was founded by a colony of Corinthians under Archias, B.C. 734, and, according to Thucydides, possessed a greater population than Athens or any other Grecian city. Among the most famous of its ancient Greek rulers were Gelon, Dionysius the elder and the younger, and Hiero I and II (see these articles). It was unsuccessfully besieged by the Athenians in B.C. 414; but fell into the hands of the Romans, after a three years' siege, in B.C. 212; and continued in their possession till the downfall of their empire. In 878 it was destroyed by the Saracens, and the mainland portion of the city has never since been rebuilt. Syracuse is the seat of an archbishop, and since 1865 has been the capital of a province of the same name. It has some manufactures of drugs, chemicals, and earthenware, and a considerable commerce, principally in wine. Pop. 35,000.

**Syracuse**, a city, situated in Onondaga County, New York, midway between Albany and Buffalo on the New York Central, the Lackawanna and other railroads. It is also on the Erie and Oswego Canals, and a harbor of the new large canal will be located so as to serve the important shipping in-

terests. It is a progressive city with broad, well shaded streets and beautiful parks. Syracuse University has seven colleges and 3800 students. There are many fine buildings, including the Court House, City Hall, Public Library, Y. M. C. A. building, high school buildings, and numerous churches. The Soldiers' Monument cost \$100,000. Syracuse is an important industrial and commercial center. The manufacture of salt was formerly the leading industry, but the industries are now very diversified, including metals and many manufactures of metals, fine tool steel, typewriting machines, automobiles and automobile accessories, electrical apparatus, agricultural implements, china, soda ash, knit goods, furniture, shoes and clothing. In 1789 salt works were established here, the settlement changing its name several times until 1825, when it was incorporated under its present name. A feature of interest is the Onondaga Indian Reservation, the capital of the Six Nations, 6 miles to the south of the city. Pop. 150,000.

**Syr-Daria.** See *Sir-Daria*.

**Syria** (sir'i-a), a country forming part of Asiatic Turkey, and bounded on the north by the Taurus range, on the northeast by the Euphrates, on the east by the Syrian desert, on the south and southeast by Arabia, on the southwest by Egypt, and on the west by the Mediterranean; area, estimated at about 70,000 square miles. The coast has some low sandy tracts, but is in general, though not deeply indented, lofty and precipitous, rising, particularly in Mount Carmel, to the height of 3000 feet. The only good harbors are those of Beyrout and Alexandretta (Scanderoon). In Lebanon the mountains reach a height of about 10,000 feet. Between the two parallel ranges of Lihanus and Anti-Lihanus is the valley of Cœle-Syria, whence the Orontes flows northwards, turning westwards at Antioch, and falling into the sea at the ancient Seleucia. The principal river of South Syria (Palestine, which see) is the Jordan. In the course of the Jordan are the lakes of Merom and Tiberias, and at its mouth is the far larger lake, the Dead Sea. Much of the soil, more especially in the valleys of Lebanon, is very fertile; but agriculture is not pursued with as much zeal as in ancient times. Nevertheless, the orchards of Damascus and the cornfields of Hanran are celebrated, and the olive-tree and the vine are found in all parts. The country is poor in minerals; the native manufactures in silk, cotton,

and wool have been paralyzed by the import trade from Europe; and the caravan trade has almost entirely ceased. The inhabitants, roughly estimated at about 2,500,000, consist chiefly of two elements, the Aramaic and the Arabic, the latter including Bedouins and town and peasant Arabs. Jews are found only in the large towns, and have immigrated back from Europe. The language generally spoken is Arabic, but with Aramaic elements. The Mohammedans comprise about four-fifths of the population, and the Christians one-fifth. Syria at an early period became part of the Assyrian Empire, and afterwards passed to the Persians, the Greeks, and the Romans. It formed part of the Byzantine Empire, but was taken by the Arabs in 636, by the Seljuk Turks in 1078, by the Crusaders, whose kingdom of Jerusalem lasted till 1293, by the Mamelukes, who united it with Egypt, and by the Ottoman Turks, who added it to their empire in 1517. The most important events in the modern history of Syria are its conquest by Mehemet Ali of Egypt in 1833, and its restoration to Turkey in 1840 by the intervention of the great European powers; and the war between the Druses and Maronites which broke out in 1860, peace being restored in 1861 only by the active efforts of a French force sent out under sanction of Turkey and the western powers. In 1887 Syria was divided into two vilayets, one having Damascus as its capital, the other Beyrout. Lebanon (250,000 inhabitants) has a special government, and is under a Christian Mutesarrif.

**Syriac** (sir'i-ak), a dialect or branch of the Aramaic, and thus one of the Semitic family of languages. (See *Aramaean*.) It was a vernacular dialect in Syria during the early centuries of our era, but ceased to be spoken as a living language about the tenth century, being crowded out by that of the Arabian conquerors. A very corrupted form of it, however, is still spoken by a few scattered tribes, and principally by the Nestorians of Kurdistan and Persia. Syriac literature had its rise in the first century of our era. At first it was chiefly connected with theological and ecclesiastical subjects, Biblical translations and commentaries, hymns, martyrologies, liturgies, etc., but in course of time it embraced history, philosophy, grammar, medicine, and the natural sciences. The oldest work in the language still extant is the incomplete translation of the Bible called the Peshito. (See *Peshito*.) In addition to the Peshito Version, which was recognized as the authorized version

by all the various sects of the Syrian Church, there is one made in the beginning of the seventh century by Paul of Tela, a Monophysite; this is based on the Hexaplar Greek Text, that is, the Septuagint with the corrections of Origen, and is of very great value for the criticism of the Septuagint, supplying as far as a version can the lost work of Origen. Another version, the Syro-Philoxenian, translated by Polycarp under the auspices of Philoxenus, bishop of Hierapolis (488-518), and revised by Thomas of Heraclea in 616, is very inferior to the Peshito. Among the MSS. brought by him from Syria in 1842 Dr. Cureton discovered an imperfect copy of the Gospels, differing widely from the common text, and which he supposed to belong to the fifth century. The most learned representative of the orthodox Syrian Church is undoubtedly Ephraem Syrus, who flourished in the fourth century. The Syriac literature, like the language, was superseded by that of the Arabians. The latest Syriac classic writer is Bar-Hebraeus, bishop of Maraga, who died in 1286. The greater part of this literature has been lost, but much valuable material still remains unedited.

**Syrian Christians**, or CHURCH OF THE SYRIAN RITE, that section of the Christian church which had its stronghold in Syria, and which was originally included in the Patriarchate of Antioch, and subsequently in that of Jerusalem. Up to the end of the fourth century the Syrian Church was in a very flourishing condition, having at that time a membership of several millions; but controversies arising on the incarnation, it split up into several sects, such as the Maronites in Lebanon, the Jacobites in Mesopotamia, the Christians of St. Thomas in India, and the Nestorians in Kurdistan. The term Syrian Christians is frequently specially applied to the latter community.

**Syringa** (sir-ing'ga). See *Lilac*.

**Syringe** (sir'lnj), an instrument consisting of a cylinder of metal or glass fitted with an air-tight piston, which is moved up and down by means of a handle. In its simplest form it is destitute of valves, one simple aperture at the extremity serving for the admission and ejection of fluid; those provided with valves, however, are available, on a small scale, for all the purposes of an air-pump.

**Syrrhaptēs**. See *Sand-grouse*.

**Syrtes** (sér'téz), two large gulfs of the Mediterranean on the coast

of Africa. The Lesser Syrtis, or Gulf of Cabes, lies on the east coast of Tunis; the Greater Syrtis, or Gulf of Sidra, lies between Tripoli and Barka. The navigation of the Syrtes was anciently considered very dangerous.

**Syrup** (sir'up), in medicine, a saturated, or almost saturated, solution of sugar in water, either simple, flavored, or medicated. In the sugar manufacture, a syrup is a strong saccharine solution which contains sugar in a condition capable of being crystallized out, the ultimate uncrystallizable fluid being called treacle or molasses.

**Syzran**, or **SYSRAN** (siz-ran'y'), a town of Central Russia, in the government of Simbirsk, and 90 miles south of the city of that name, a few miles from the Volga. It has tanneries, flour-mills, etc., and large exports of grain. Pop. 33,046.

**Syzygy** (si'zi-ji), in astronomy, the conjunction or opposition of any two of the heavenly bodies. See *Moon*.

**Szabadka** (sá-bád'ká). See *Theresopol*.

**Szarvas** (sár'vásh), a town of Hungary, county of Bekes, on the Körös. Pop. 25,773.

**Szatmar** (sát'mär), a royal free town of Hungary, in a marshy plain on the Szamos, 69 miles E. N. E. of Grosswardein. It has a considerable trade in wine and wood, is the seat of a Roman Catholic bishop, and contains a cathedral. Pop. 26,881.

**Sze-chuen** (sá'chü-an'), a large province in the west of China; area, 166,800 square miles. The surface is generally rugged and full of defiles, especially in the west, where many peaks rise far above the snow-line, but there is a plain of some extent surrounding Ching-too-fo, the capital. The principal river is the Yang-tse-kiang. The soil is only moderately fertile, but there are some metallic ones. Pop. est. about 70,000,000.

**Szegedin** (seg'e-din), a royal free city of Hungary, capital of the county of Csongrad, at the confluence of the Maros and Theiss, 80 miles west of Arad. It is second only to Budapest, and is a great center of commerce and agriculture. It has numerous industrial establishments, large salt and tobacco magazines, and a considerable shipping trade, especially in coal and timber. The town was almost completely destroyed by an inundation in March, 1879, but great embankments have since been built for its protection, and the whole town reconstructed, some fine public buildings having been erected. Pop. (1910) 118,328.

**Szegszard** (seg'särd), a market town of Hungary, 81 miles southwest of Budapest, on the Sarviz. Pop. 13,895.

**Szekler** (sek'lér), a Hungarian people inhabiting Transylvania, and preserving the Magyar characteristics in their purest form.

**Szentes** (sen'tesh), a town of Hungary, in the country of Csongrad, 29 miles N. N. E. of Szegedin. The inhabitants are chiefly engaged in agriculture and fishing. Pop. 31,308.

**Szigeth** (si'get), or **SZIGETVAR**, a town of Southwestern Hungary, formerly an important fortress, and in 1866 maintained a heroic resistance to a great Turkish army, which was continued until the fortress had become a heap of ruins and all the defenders were slain.

**Szigeth**, or **MARAMANO-SZIGETH**, a town of Northeastern Hungary, on the Theiss, at the foot of the Carpathians, a salt-mine depot and a center of the lumber trade. Pop. 17,445, one-third being Jews.

**Szolnok** (sol'nok), a market town of Hungary, on the Theiss and the Zagyva, is the junction of four railways, and has a considerable trade in tobacco, salt, and wood. Pop. 25,379.

# T

**T**, the twentieth letter in the English alphabet, a sharp mute consonant, representing the sound produced by a quick and strong emission of the breath after the end of the tongue has been placed against the roof of the mouth near the roots of the upper teeth. By Grimm's Law *t* in English corresponds to *d* in Latin, Greek and Sanskrit, and to *ss* or *s* in German.

**Taal** (täl), a town of Luzon, Philippine Islands, in the province of Batangas, on the Pansipit river and the Gulf of Balayan, 50 miles south of Manila. On the opposite bank of the river is Lemery, a town of 11,000 inhabitants. A bridge crosses the river here. Taal is built on the slope of a hill overlooking the gulf. It is an important military station and, like Lemery, is a port for coastwise trading vessels, having a flourishing trade in rice, corn, coffee, sugar, cotton goods, horses, cattle and fish. The former site of Taal was on the banks of Lake Taal, ten miles south of the Bay Lagoon. It was destroyed by the eruption of a volcano in 1873; following which the new town at the Gulf of Balayan was established. The people speak the Tagalog dialect and are fairly well advanced in education, the Tagalogs ranking second among the native tribes on the Philippine Islands. Population (1903), 17,525.

**Taasinge** (tö'sing-ē), an island of Denmark, south of Funen; area, 29 square miles. Pop. 4035.

**Tabanus** (tab'a-nus). See *Gad-fly*.

**Tabard** (tab'ard), a sort of tunic of the middle ages, worn over the armor, and generally embroidered with the arms of the wearer, or if worn by a herald, with those of his lord or sovereign. It still forms a part of the official dress of heralds.

**Tabasco** (tä-bäs'kö), a state of Mexico, between Yucat'an Peninsula and Vera Cruz; area, 10,072 square miles. The surface consists almost entirely of a great flat, sloping northwards to the Gulf of Mexico. A large portion of the state is still covered with primeval

forests. The inhabitants are chiefly Indians. The capital is San-Juan-Bautista. Pop. of the state, 159,834.

**Tab'asheer**, or **TABASHIR** (Persian), a siliceous concretion resembling hydrophane, sometimes found in the joints of bamboos and other large grasses. It is highly valued in the East Indies as a medicine, but its virtues are merely imaginary.

**Tabby** (tah'i), the name given to stuff watered or figured by being passed through a calender, the rollers of which, bearing unequally on the stuff, render the surface unequal, so as to reflect the rays of light differently, and produce the representation of waves. Silks treated in this way are called *moiré*.

**Tabernacle** (tab'er-na-kl), in Jewish antiquities, the tent or sanctuary in which the sacred utensils were kept during the wanderings of the Israelites in the desert. It was in the shape of a parallelogram, 45 feet by 15, and 15 feet in height, with its smaller ends placed east and west, and having its entrance in the east. Its framework consisted of forty-eight gilded boards of shittim-wood, bound together by golden rings and set into silver sockets; and this framework was covered with four carpets. The interior was divided by a curtain into two compartments, the outer the 'sanctuary' proper, and the innermost the holy of holies. In the sanctuary was placed on the north the table of showbread, on the south the golden candlestick, and in the middle, near the inner curtain, the altar of incense. In the center of the holy of holies stood the ark of the covenant. The tabernacle was situated in a court 150 feet by 75, surrounded by costly screens 7½ feet high, and supported by pillars of brass 7½ feet apart, to which the curtains were attached by hooks and fillets of silver. In the center or eastern half of the court stood the altar of burnt-offering, and between it and the tabernacle itself the laver, at which the priests washed their hands and feet before entering the sanc-



tuary. It was superseded by the temple at Jerusalem.

**Tabernacle**, in ecclesiology, an ornamented receptacle in which the host is kept on the altar; also a reliquary.

**Tabernacles**, **FEAST OF**, the last of the three great festivals of the Jews which required the presence of all the males in Jerusalem. Its object was to commemorate the dwelling of the Israelites in tents during their sojourn in the wilderness, and it was also a feast of thanksgiving for the harvest and vintage. The time of the festival fell in the autumn, when all the chief fruits were gathered in, and hence it is often called the feast of the ingathering. Its duration was strictly only seven days, but it was followed by a day of holy convocation of peculiar solemnity. During the seven days the people lived in booths erected in the courts of houses, on the roofs, and in the court of the temple. It was the most joyous festival of the year.

**Tabes** (tā'bēz), a term formerly applied to a disease characterized by a gradually progressive emaciation of the whole body, accompanied with languor, depressed spirits, and, for the most part, imperfect or obscure hectic fever, without the real cause of the affection being properly localized or defined.—*Tabes mesenterica*, abdominal phthisis, or consumption of the bowels, is a disease of the bowels caused by the formation of tubercles similar to those of the lungs in ordinary consumption. It causes extreme wasting, feebleness, and thinness of body, and recovery is rare.—*Tabes dorsalis* is the same as *locomotor ataxy* (which see).

**Tabinet** (tab'i-net), a rich fabric consisting of a warp of silk and a weft of wool, employed for window curtains and other furniture purposes.

**Table**, **ROUND**. See **Round Table**.

**Tableaux Vivants** (tāb-iō vā-vāp; French = 'living pictures'), representations of scenes from history or fiction by means of persons grouped in the proper manner, placed in appropriate postures, and remaining silent.

**Table-land**, or **PLATEAU** (plā-tō'), a flat or comparatively level tract of land considerably elevated above the general surface of a country. Being in effect broad mountain masses, many of these plateaus form the gathering-grounds and sources of some of the noblest rivers, while their elevation confers on them a climate and a vegetable and animal life distinct from that of the surrounding lowlands. In Europe the

chief table-lands are that of Central Spain, the less-defined upland in Switzerland, and the low plateaus of Bavaria and Bohemia. In Asia is the most extensive table-land in the world, the sandy rainless Desert of Gobi, nearly 400,000 square miles; also the loftiest inhabited table-land in the world, that of Tibet, with an elevation of from 11,000 to 15,000 feet. In Africa are the plateaus of Abyssinia, and the karoo or terrace plains of South Africa. In America the great table-lands are those of Mexico and the Andes. The table-lands of the Western United States are of large extent, comprising much of the states of Colorado, Utah, Oregon, Washington, and Idaho, with considerable portions of other states.

**Table Mountain**, a mountain of South Africa, south of Table Bay, its highest point being right over Cape Town. It is about 3500 feet high and level on the top. It joins the Devil's Mount on the east, and the Sugar Loaf or Lion's Head on the west.

**Table-turning**, one of the phenomena of spiritualism, in which a number of persons sit around a table, with hands or fingers touching it, the result in many cases being a tipping or other movements of the table, questions asked being frequently answered by responsive tips indicating 'yes' or 'no.' The phenomenon has been ascribed to involuntary muscular action of the sitters, but in view of the fact that the table is occasionally lifted bodily from the floor, while touched only on its surface, this explanation seems insufficient. The agency at work is claimed to be that of spiritual beings, but further investigation is needed before any decision in this problem can be reached.

**Taboo**, or **TABU** (ta-bō'), a peculiar institution formerly prevalent among the South Sea islanders, and used in both a good and bad sense—as something sacred or consecrated, and as something accursed or unholy—both senses forbidding the touching or use of the thing *taboo*. The idea of prohibition was always prominent. The whole religious, political, and social system of the primitive Polynesians was enforced by the taboo, the infringement of which in serious cases was death.

**Tabor** (tā'bur), a small drum, beaten with a stick, and used as an accompaniment to a pipe or fife.

**Tabor** (tā'bur), a remarkable hill of Northern Palestine, rising abruptly in the shape of an almost perfect cone from the plain of Esdraelon to

a height of nearly 1000 feet. It is clothed with woods to the very summit, where a view of immense extent is obtained. Its isolation led the earlier ecclesiastics to make it the scene of the transfiguration; but the historical data which we possess show that its summit was employed without intermission from 218 B.C. till 70 A.D. as a stronghold.

**Tabor**, (tá'bor), a town of Bohemia, on an eminence above the Luschnitz, 48 miles S. S. E. of Prague, with old walls and towers. Its castle was a stronghold of the sect of Hussites called Taborites, and makes a conspicuous figure in their history. Pop. 10,703.

**Taborites.** See *Hussites*.

**Tabreez**, or **TABRIZ** (tá-bréz'; the Persia, capital of the province of Azerbaijan, on the Aigi, 36 miles above its entrance into Lake Urumia. It lies at the inner extremity of an amphitheater, about 4000 feet above sea-level, with hills on three sides, and an extensive plain on the fourth. It is surrounded with a wall of sun-dried brick, with bastions, and entered by seven or eight gates. There are numerous mosques, bazaars, baths, and caravanserais. The citadel, originally a mosque, and 600 years old, was converted by Abbas Mirza into an arsenal. The blue mosque dates from the fifteenth century. Tabreez has manufactures of silks, cottons, carpets, leather and leather goods, etc. It is the great emporium for the trade of Persia on the west, and has an extensive commerce. It has frequently suffered from earthquakes. Pop. estimated about 200,000.

**Tabular-spar** (tab'ú-lar), or **TABLE-SPAR** (called also *Wollastonite*), in mineralogy, a silicate of lime, generally of a grayish-white color. It occurs either massive or crystallized, in rectangular four-sided tables, and usually in granite or granular limestone, occasionally in basalt or lava.

**Tacahout** (tak'a-hyt), the small gall tree (*Tamarix indica*). It is of great value for the gallic acid obtained from it which is used as a mordant in dyeing and in tanning.

**Tacamahac** (tak'a-ma-hak), the balsamic resin, the produce of several kinds of trees belonging to Mexico and the West Indies, the East Indies, South America, and North America. The balsam-poplar or tacamahac is one of these. See also *Calophyllum*.

**Tachygraphy** (ta-kig'ra-fí). See *Shorthand*.

**Tachypetes** (ta-kíp'e-téz). See *Frigate-bird*.

**Tacitus** (tas'i-tus), **CAIUS CORNELIUS**, an eminent Roman historian, born probably about 54 A.D. Of his education and early life we know little. He seems to have been first appointed to public office in the reign of Vespasian. Under Titus, by whom he was treated with distinguished favor, he became quaestor or ædile; was prætor under Domitian (A.D. 88), and consul under Nerva (A.D. 97). In 78 he married the daughter of Cneius Julius Agricola, the celebrated statesman and general, whose life he afterwards wrote. He was several years absent from Rome on provincial business, and probably then made the acquaintance of the German peoples. After his return to Rome he lived in the closest intimacy with the younger Pliny, and had a very extensive practice in the profession of law, acquiring a high reputation as an orator. The time of his death is uncertain; but it probably took place after A.D. 117. We have four historical works from his pen: his *Annals*, in sixteen books (of which books seventh to tenth inclusive are lost), which contain an account of the principal events in Roman history from the death of Augustus (A.D. 14) to that of Nero (A.D. 68); his *History* (of which only four books and a part of the fifth are extant), which begins with the year 69 A.D., when Galba wore the purple, and ends with the accession of Vespasian (70); his *Germany*, an account of the geography, manners, etc., of the country; and his *Life of Agricola*. The works of Tacitus have been pronounced, by the unanimous voice of his contemporaries and of posterity, to be masterpieces in their way. His style is exceedingly concise, so much so as to make it often difficult to gather his full meaning without great care. He had a wonderful insight into character, and could paint it with a master's hand. A high moral tone pervades all his writings, though he gives no clue to his religious belief.

**Tack** (tak), in navigation, the course of a ship in regard to the position of her sails and the angle at which the wind strikes them. Tacking is an operation by which a ship is enabled to beat up against a wind by a series of zigzags, the sails being turned obliquely to the wind first on one side and then on the other.

**Tackamahack.** See *Tacamahac*.

**Tacna** (tāk'ná), a town of N. Chile, in a plain on a river of same name, connected by rail with Arica. It

is of some commercial importance. Pop. 24,160.

**Tacoma** (tā-ko'mā), a city and port of Washington, on Commencement Bay, Puget Sound, 80 miles from the Pacific coast and 23 miles s. by w. of Seattle. Its situation is one of great beauty, commanding a magnificent view of Mount Rainier. It has an excellent harbor, with docks and wharves several miles in length, and has a large ocean traffic; also extensive shipyards. Lumber, shingles, and flour are very largely manufactured and there are many other industries. There are four steamship lines to the Orient and others to many parts of the world. Pop. 83,743.

**Taconic Mountains** (tā-kon'ik), a range of mountains in the United States, connecting the Green Mountains of Western Massachusetts with the highlands of the Hudson. The 'Taconic System,' in geology, was named from the characteristic strata of this range, a metamorphic rock, believed to be older than the Silurian system.

**Tactics** (tak'tiks), the branch of military science which relates to the conduct of troops in battle. Naval tactics has the same significance in relation to the handling of ships and fleets. *Strategy*, on the other hand, refers to the movements leading up to a battle. See *Battle*.

**Tacunga** (ta-kun'ga), a town of Ecuador, capital of the province of Leon, at the foot of Coto-paxi. Pop. 15,000.

**Tadema.** See *Alma-Tadema*.

**Tadmor.** See *Palmyra*.

**Tadpole** (tad'pōl), the name given to the larval or young state of frogs and other amphibians.

**Tael** (tāl), a money of account in China worth about \$1.50, the value of which varies considerably according to locality and the rate of exchange. The tael is also a definite weight, equal to 1.208 oz. troy.

**Tænia.** See *Tape-worm*.

**Taepings.** See *China*.

**Taffeta** (taf'e-ta), or *TAFFETI*, was originally the name applied to all kinds of plain silks, but has now become a kind of generic name for plain silk, gros de Naples, gros des Indes, shot silk, glacé, and others.

**Taffrail**, originally the upper flat part of a ship's stern, so

called because frequently ornamented with carvings or pictures; now a transverse rail which constitutes the uppermost member of a ship's stern.

**Taft**, ALPHONSO, jurist, born in Townsend, Vermont, in 1810; was judge of the Cincinnati Superior Court, 1866-1872; appointed Secretary of War, March 8, 1870; and made attorney-general, May 22. He was United States minister to Austria in 1882-1884, and to Russia, in 1884-1885. He died May 21, 1891.

**Taft**, LORADO, American sculptor, born at Elmwood, Ill., in 1860. He was for a number of years an instructor in the Art Institute, Chicago. Among his works are *The Solitude of the Soul*, *The Blind*, *Fountain of the Great Lakes*. He is the author of *History of American Sculpture* (1903).

**Taft**, WILLIAM HOWARD, twenty-seventh President of the United States, was born at Cincinnati, Ohio, September 15, 1857; son of Alphonso Taft. Admitted to the bar in 1880, he became judge of the Superior Court of Ohio in 1887; United States Solicitor-General in 1890; and a judge of the United States Circuit Court in 1892. He held this position until 1900, being also dean and professor in the law department of the University of Cincinnati, 1896-1900. In the latter year he was made chairman of the Philippine Commission, and in 1901 civil governor of the Philippine Islands. In 1903 he was appointed Secretary of War in President Roosevelt's cabinet, in 1906 was sent to investigate the troubles in Cuba, of which he was for a time provisional governor, and in 1907 and 1909 made tours of inspection to Panama. He was elected president by the Republican party in 1908. His administration was distinguished by two special sessions of Congress, the passage of a new tariff bill, the prosecution of several corporations and movements in the line of conservation and reform. He was renominated in 1912; but was defeated, partly owing to the split in the Republican party. See *Progressive Party*.

**Taganrog** (tā-gān-rok'), a seaport of Russia, in the government of Ekaterinodar, on the low cape on the northern shore of the Sea of Azof. It is built chiefly of wood, but the imperial palace where Alexander I died in 1825, and the Greek monastery are worthy of notice. Pop. (1910) 63,360.

**Taglioni** (tāl-yō'nē), MARIE, born in 1809, was known throughout Europe as the first ballet dancer of her time. She retired from the stage in 1847; but supported herself in London as

## Tagore

a teacher of deportment. She died at Marseilles in 1884.

**Tagore**, RABINDRANATH, a Hindu poet, born in 1861, known in the Occident chiefly through his own translations of his poems, though in India he is widely honored as a teacher and man of affairs. Tagore's works best known in English are *Gitanjali* (devotional), *The Garden* and *The Crescent Moon*.

**Tagus** (tā'gus; Spanish, *Tajo*; Portuguese, *Tejo*), the largest river of Spain and Portugal, issues from the mountains of Albaracin, on the frontier of New Castile and Aragon, flows northwest and southwest, and enters the Atlantic. It has a total length of 540 miles, and is navigable for 115 miles.

**Tahiti** (tā-bē'ti), the largest of the Society Islands, consisting of two peninsulas, connected by an isthmus 3 miles broad, and submerged at high-water; area, 412 square miles. It is hilly, volcanic, beautiful, and highly fertile; and produces sugar, cocoanut, arrow-root, dye-woods, etc. Pop. 10,639. See *Society Islands*.

**Tailor-bird** (*Orthotomus longicaudus*), a bird so named from its curious habits of weaving or sewing together leaves in order to form a nest. It belongs to the sub-family of the Sylvine or true warblers, and inhabits India and the Eastern Archipelago.

**Taimyr** (tā'mēr), a peninsula of Northern Siberia, extending into the Arctic Ocean, between the mouth of the Yenisei and Khatang Gulf, and containing Cape Ch.ruskin, the most northerly land in Asia.

**Taine** (tān), HIPPOLYTE ADOLPHE, a French writer, born at Vouziers (Ardennes) in 1828, and educated at the Collège Bourbon and the Ecole Normale. In 1854 his first work, an *Essay on Livy*, was crowned by the Academy; in 1864 he was appointed professor in the School of Fine Arts in Paris; and in 1878 he was elected to a seat in the Academy. His *History of English Literature*, one of the best and most philosophical works on the subject, appeared in 1864 (four vols.); his *Philosophy of Art* in 1865; his *Notes on England* in 1872; and his *Origin of Contemporary France* in 1875-84, the last a work of great research and value, in two sections, the first dealing with *L'ancien Régime*, the second with the *Revolution*. He died March 5, 1893.

**Tainter** (tān'tēr). CHARLES SUMNER, inventor, born at Watertown, Massachusetts, in 1854. He was the inventor of the graphophone, and aided in inventing the radiophone, an instrument

## Talavera de la Reina

for transmitting sounds to a distance through the agency of light. He took part in the 1874 expedition to the South Pacific to observe the transit of Venus. Was decorated by the French Academy in 1899.

**Taiping**, or TAEPIING (ti-ping'). See *China*.

**Tait** (tāt), ARCHIBALD CAMPBELL, archbishop of Canterbury, son of Crauford Tait, writer to the signet, was born at Edinburgh in 1811; died in 1882. He was educated at Oxford, and there opposed the Tractarian principles. He was appointed headmaster of Rugby on the death of Dr. Arnold in 1842; dean of Carlisle in 1850; bishop of London in 1856; and archbishop of Canterbury in 1868. His primacy was marked by the disestablishment of the Irish Church, and by the passing of the Public Worship Regulation Act of 1874.

**Tait**, PETER GUTHRIE, physicist and mathematician, born at Dalkeith, Scotland, in 1831; was educated at Edinburgh and Peterhouse, Cambridge. In 1854 he was appointed professor of mathematics at Queen's College, Belfast, and in 1860 professor of natural philosophy at Edinburgh. He was the joint-author, with Professor Sir William Thomson, of a textbook on *Natural Philosophy*, and with the late Professor Balfour Stewart of *The Unseen Universe*. His *Heat* appeared in 1884, *Light* in 1884, *Properties of Matter* in 1885, and *Dynamics* in 1895. For his various mathematical and physical researches the Royal Society, London, awarded him a royal medal in 1896. He died July 4, 1901.

**Taiwan** (tā'wān'), formerly FORMOSA (q. v.), an island off the coast of China, ceded to Japan by China in 1895 as a result of the Chino-Japanese war. Area, 14,000 square miles. Population, 3,612,200.

**Taj-Mahal** (tāsh-ma-hāl'). See *Agra*.

**Tajurah** (tā-j's'rá), a seaport town on the African coast of the Gulf of Aden, on a bay of the same name. It is the outlet of trade from Shoa, and was ceded to France in 1887. Pop. about 2000.

**Takow**. See *Taiwan*.

**Talavera de la Reina** (tā-lā-vā'rā dā lā rā'ē-nā), a town of Spain, in the province of Toledo, on the Tagus, 64 miles southeast of Madrid. It has a picturesque appearance, and various interesting buildings. A great battle was fought here July 27 and 28, 1809, between the French under Victor, Jourdan, and King Joseph,



and the British under Wellington, in which the former were defeated. Pop. 10,580.

**Talbot** (tal'but), a kind of hound formerly in vogue, pure white in color, probably the original of the blood-hound.

**Talbotype.** See *Photography*.

**Talc** (tal'k), a magnesian mineral, consisting of broad, flat, smooth laminae or plates, unctuous to the touch, of a shining luster, translucent, and often transparent when in very thin plates. There are three principal varieties of talc, common, earthy, and indurated. Talc is a silicate of magnesium, with small quantities of potash, alumina, oxide of iron, and water. It is used in many parts of India and China as a substitute for window-glass. A variety of talc called French chalk (or steatite) is used for tracing lines on wood, cloth, etc., instead of chalk. See *Potstone*, *Soapstone*, *Steatite*.

**Talca** (tal'ka), a town of Chile, capital of the province of Talca, on the Claro, is connected by rail with Santiago, and has manufactures of ponchos. Pop. 42,766. The province has an area of 3664 sq. miles, and pop. 146,685.

**Talcahuana** (tal'ka-wa'nō), a seaport of Chile, province Concepcion, with an arsenal, shipyards, etc. Pop. 13,499.

**Talent** (tal'ent), the name of a weight and denomination of money among the ancient Greeks, and also applied by Greek writers to various standard weights and denominations of money of different nations; the weight and value differing in the various nations and at various times. The Attic talent as a weight contained 60 Attic minæ or 6000 Attic drachmæ, equal to 56 lbs. 11 oz. troy weight. As a denomination of silver money it was equal to \$1218.75. The great talent of the Romans is computed to be equal to \$496.66 and the little talent to \$375. A Hebrew weight and denomination of money, equivalent to 3000 shekels, also receives this name. As a weight it was equal to about 93½ lbs. avoird.; as a denomination of silver it has been variously estimated at from \$1700 to \$1980.

**Talfourd** (tal'furd), SIR THOMAS NOON, an English dramatist and poet, was born in 1795, and was brought up at Reading, where his father was a brewer. He was called to the bar in 1821, and in 1833 was made serjeant-at-law. In 1835 he was returned to parliament for Reading, and in 1836 his tragedy of *Ion* (published the previous

year) was produced at Covent Garden, and achieved distinguished success. The tragedies subsequently produced by him were *The Athenian Captive*; *Glencoe*, or *the Fate of the Macdonalds*; and *The Castilian*, an historical tragedy. Besides his dramas he was the author of a *Life of Charles Lamb* and of *Vacation Rambles*. In 1849 he was raised to the bench in the Court of Common Pleas, and received at the same time the honor of knighthood. He died suddenly in 1854 at Stafford, while delivering his charge to a grand-jury.

**Taliacotian Operation** (tal-i-a-kosh'yun).

See *Rhinoplastio Operation*.

**Taliessin** (tal'i-sin), a Welsh bard said to have flourished during the twelfth or thirteenth century, and styled *Pen Beirdd*, 'chief of the bards.'

**Talipot Palm** (tal'i-pot; *Corjpha umbraculifera*), the great fan-palm, a native of Ceylon. The cylindrical trunk reaches a height of 60, 70, or 100 feet, and is covered with a tuft of fan-like leaves, usually about 18 feet in length and 14 in breadth. The leaves



Talipot Palm (*Corjpha umbraculifera*).

are used for covering houses, for making umbrellas and fans, and as a substitute for paper. When the tree has attained its full growth, the flower spike hursts from its envelope or spathe with a loud report. The flower spike is then as white as ivory, and occasionally 30 feet long. When its fruit is matured, the tree generally dies.

**Talisman** (tal'is-man), a figure cast or cut in metal or stone,

and made, with certain superstitious ceremonies, at some particular moment of time, as when a certain star is at its culminating point, or when certain planets are in conjunction. The talisman thus prepared is supposed to exercise extraordinary influences over the bearer, particularly in averting disease. In a more extensive sense the word is used, like amulet, to denote any object of nature or art, the presence of which checks the power of spirits or demons, and defends the wearer from their malice. Relics, consecrated candles, rosaries, images of saints, etc., were employed as talismans in the middle ages; and at that time the knowledge of the virtues of talismans and amulets formed an important part of medical science.

**Talitrus** (tāl'i-trus). See *Sandhop-per*.

**Tallage** (tāl'ij), a sort of tax formerly levied by the English kings on towns and counties, as part of the revenues of the crown, being originally exacted probably in lieu of military service. It was abolished by statute of 1340.

**Tallahassee** (tal-A-has'se), a city, capital of the State of Florida and of Leon Co., 165 miles w. of Jacksonville, and 26 miles N. of the Gulf of Mexico, being connected by rail with the seaport of St. Marks. It has cotton and cigar-making industries, and has the Florida State College, the Florida Normal and Industrial School (colored), and several libraries. Pop. 5018.

**Tallard** (tāl-lār), CAMILLE DE LA BAUME, DUC DE HOSTUN, COMTE DE, Marshal of France, descended of an ancient family of Dauphiny, was born in 1652; died in 1728. He entered the army while young, and after serving under the Great Condé in Holland, was engaged under Turenne in Alsace in the brilliant campaigns of 1674 and 1675. He distinguished himself subsequently on various occasions, and in 1693 was made lieutenant-general; marshal in 1703. In 1704 he was taken prisoner at the battle of Bienheim, and was carried to England, where he remained seven years.

**Talladega** (tal-lā-dē-gā), a city, capital of Talladega Co., Alabama, 109 miles N. N. E. of Selma. It contains a State institution for the deaf, dumb and blind, and has large manufactures of cotton, fertilizers, etc. Pop. 5854.

**Tallegalla** (tal-e-gai'la), or BRUSH TURKEY, a remarkable genus of rasorial birds, belonging to the family of Megapodidae, or mound-birds. (See *Megapodidae*.) The *Tallegalla Lohmani* is the best-known species, and that

usually designated by the distinctive name of 'brush turkey.' It inhabits Australia, where it is also known by the names 'wattled tallegalla' and 'New Holland vulture'—the latter name having reference to the naked vulturine head and neck. The male when full grown is colored of a blackish-brown above and below, with grayish tints on the back. The head and neck are covered with very small feathers of blackish hue, whilst a large wattle, colored bright or orange yellow, depends from the front of the neck. These birds are remarkable on account of the huge, conical 'egg-mound' which they form, several of them jointly, for the purpose of therein depositing their eggs, which are hatched by the heat of the decomposing mass of vegetable matter piled up. The eggs are greatly sought after on account of their delicious flavor.

**Talleyrand-Périgord** (tāl-a-rān-pā-rē-gōr),

CHARLES MAURICE DE, Prince of Benevento, a famous French diplomatist, was born at Paris in 1754; died there in 1838. Though the eldest of three brothers he was, in consequence of lameness caused by an accident, deprived of his rights of primogeniture, and devoted, against his will, to the priesthood. His high birth and great ability procured him rapid ad-



Talleyrand.

vancement, and in 1788 he was consecrated bishop of Autun. On the meeting of the states-general he was elected deputy for Autun. He sided with the popular leaders in the revolutionary movements; and his advocacy of the abolition of tithes and the transference of church lands to the state gained him great popularity. In 1790 he was elected president

of the national assembly. When the civil constitution of the clergy was adopted he gave his adhesion to it, and ordained the first clergy on the new footing. For this he was excommunicated by a papal brief, and thereupon embraced the opportunity to renounce his episcopal functions (1791). In 1792 he was sent to London charged with diplomatic functions, and during his stay there was proscribed for alleged royalist intrigues. Forced to leave England by the provisions of the Alien Act, in 1794 he sailed for the United States, but returned to France in 1799. The following year he was appointed minister of foreign affairs; but being suspected of keeping up an understanding with the agents of Louis XVIII, he was obliged to resign in July, 1799. He now devoted himself entirely to Bonaparte, whom he had early recognized as the master spirit of the time, and after Bonaparte's return from Egypt contributed greatly to the events of the 18th Brumaire (November 10, 1799), when the directory fell and the consulate began. He was then reappointed minister of foreign affairs, and for the next few years was the executant of all Bonaparte's diplomatic schemes. After the establishment of the empire in 1804 he was appointed to the office of grand-chamberlain, and in 1806 was created Prince of Benevento. After the Peace of Tilsit in 1807 a coolness took place between him and Napoleon, and became more and more marked. In 1808 he secretly joined a royalist committee. In 1814 he procured Napoleon's abdication, and afterwards exerted himself very effectually in reestablishing Louis XVIII on the throne of his ancestors. He took part in the Congress of Vienna, and in 1815, when the allies again entered Paris, he became president of the council with the portfolio of foreign affairs; but as he objected to sign the second Peace of Paris he gave in his resignation. After this he retired into private life, in which he remained for fifteen years. When the revolution of July, 1830, broke out, he advised Louis Philippe to place himself at its head and to accept the throne. Declining the office of minister of foreign affairs, he proceeded to London as ambassador, and crowned his career by the formation of the Quadruple Alliance. He resigned in November, 1834, and quitted public life forever. His *Memoirs* were published in 1861.

**Tallien** (tal-i-an), JEAN LAMBERT, a French revolutionist, was born at Paris in 1769, and first made himself known by publishing a revolutionary journal called *Ami du Citoyen*. He soon

became one of the most popular men of the revolutionary party, and took part in most of the sanguinary proceedings which occurred during the ascendancy of Robespierre. After the fall of Danton and his party, he perceived that he should become one of the next victims of Robespierre if he did not strike the first blow, and it was mainly by his influence that the latter with his friends was brought to the guillotine. He subsequently became a member of the Council of Five Hundred, but his influence gradually declined. In after years he was glad to accept the office of French consul at Alicante. He died at Paris, in poverty and obscurity, in 1820.

**Tallis** (tal'is), THOMAS, author of some of the finest music in the cathedral service of the English Church, was born about 1515, and served in the chapel royal during the reigns of Henry VIII, Edward VI, Mary, and Elizabeth. He died in 1585, and was buried in the parish church at Greenwich.

**Tallow** (tal'os), the harder and less fusible fat of animals, especially cattle and sheep, melted and separated from the fibrous matter mixed with them. Tallow is firm, brittle, and has a peculiar heavy odor. When pure it is white and nearly insipid; but the tallow of commerce has usually a yellowish tinge, which may be removed by exposure to light and air. Tallow is manufactured into candles and soap, and is extensively used in the dressing of leather, and in various processes of the arts. *Vegetable tallow* is contained in the seeds of various plants, one of the best known of which is the candle-berry (which see). See also *China War*, and next article.

**Tallow-tree** (*Stillingia sebifera*), a tree of the nat. order Euphorbiaceae, one of the largest, the most beautiful, and the most widely diffused of the plants found in China. From a remote period it has furnished the Chinese with the material out of which they make candles. The capsules and seeds are crushed together and boiled; the fatty matter is skimmed as it rises, and condenses on cooling. The tallow-tree has been introduced into the United States, and is almost naturalized in the maritime parts of Carolina. It has also been acclimatized by the French in Algeria. The tallow-tree of Malabar is *Vateria indica*.

**Tally** (tal'li), a piece of wood on which notches or scores are cut, as the marks of number. In purchasing and selling it was once customary for traders to have two sticks, or one stick cleft into two parts, and to mark with scores or

## Tally System

notches on each the number or quantity of goods delivered, or what was due between debtor and creditor, the seller or creditor keeping one stick, and the purchaser or debtor the other. Before the use of writing, or before writing became general, this or something like it was the usual method of keeping accounts. In the exchequer of England tallies were used till late in the eighteenth century. An exchequer tally was an account of a sum of money lent to the government, or of a sum for which the government would be responsible. The tally itself consisted of a squared rod of hazel or other wood, having on one side notches, indicating the sum for which the tally was an acknowledgment. On two other sides opposite to each other, the amount of the sum, the name of the payer, and the date of the transaction, were written by an official called the writer of the tallies. This being done the rod was then cleft longitudinally in such a manner that each piece retained one of the written sides, and one half of every notch cut in the tally. One of these parts, the *counterstock*, was kept in the exchequer, and the other, the *stock*, only issued. When the part issued was returned to the exchequer (usually in payment of taxes) the two parts were compared, as a check against fraudulent imitation. This ancient system was abolished by 25 Geo. III lxxii. The size of the notches made on the tallies varied with the amount. The notch for £100 was the breadth of a thumb, for £1 the breadth of a barley-corn. A penny was indicated by a slight slit.

**Tally System**, a mode of selling upon credit, in which the purchaser agrees to pay for the purchase by fixed installments at a certain rate, and both seller and purchaser keep books in which the circumstances of the transaction and the payment of the several installments are entered, and which serve as a tally and counter-tally. This mode of doing business has lately increased enormously in all branches of trade.

**Talma** (tál-má), FRANÇOIS JOSEPH, a celebrated French tragedian, was the son of a Parisian dentist, and was born at Paris in 1763. In 1787 he made his début at the Comédie Française in the character of *Séide* in Voltaire's *Mahomet*. His greatest successes were achieved at the Théâtre Français (afterwards Théâtre de la République), which he and others founded in 1791. He enjoyed the intimacy of Napoleon, and was the friend of Chénier, Danton, Camille Desmoulins, and other revolutionists. He

died in 1826. Talma was the greatest modern tragic actor of France, and one of the earliest advocates of realism in scenery and costume.

**Talmage** (tal'maj), THOMAS DE WITT, clergyman, born at Boundbrook, New Jersey, in 1832. After holding several Dutch Reformed pastorates, he became pastor of the Central Presbyterian Church in Brooklyn in 1860, and of the First Presbyterian Church in Washington in 1896. He won great popularity as a pulpit orator and lecturer, and his sermons were printed weekly for over thirty years in a large number of newspapers. For years he was editor of the *Christian Herald*, and published a number of works on religious subjects. He died April 12, 1902.

**Talmud** (tal'mud), a Chaldaic word signifying 'doctrine,' and sometimes used to designate the whole teaching of the Jewish law, comprising all the writings included in what we call the Old Testament, as well as the oral law or *Mishna*, with its supplement or commentary the *Gemara*, but more frequently applied only to the *Mishna* and *Gemara*. The main body of the Talmud — in the second of these two senses — consists of minute directions as to conduct. Its contents are hence very miscellaneous, and they are as varied in their character as in their subject. Much of it is taken up with regulations of the most puerile nature, and not a little with details only fitted to excite disgust. In other parts again there are passages containing the loftiest expression of religious feeling, passages which are said to be the source of almost all that is sublime in the liturgy of the Church of Rome, and those liturgies which have been mainly derived from it. Interspersed throughout the whole are numerous tales and fables, introduced for the sake of illustration. The Jews are carefully instructed in it, and its very language is sometimes quoted and acknowledged in the New Testament. The injunctions referred to in the sermon on the mount as having been 'said by them of old time' (properly, the elders) are all from the *Mishna*. The *Gemara* was originally an oral commentary of the *Mishna*, as the *Mishna* itself was originally an oral commentary of the *Mikra*, or written law. It consisted of the explanations and illustrations which the teachers of the *Mishna* were in the habit of giving in the course of their lessons. These oral comments were handed down from age to age, differing of course in different localities, and gradually increasing in quantity; and they were at last committed



## Talpa

to writing in two forms, the one called the Jerusalem and the other the Babylonian Gemara, or, with the addition of the Mishna, which is common to both, the Jerusalem and the Babylonian Talmud. The Jerusalem Talmud is the earlier and by much the smaller of the two. The language of both the Gemaras is a mixed Hebrew, but that of the Babylonian Gemara is much less pure than the other; in the narrative portions, designed as popular illustrations of the other parts, it comes near the Aramaic or vernacular dialect of the Eastern Jews. The style is in both cases extremely condensed and difficult. The Mishna, with its corresponding Gemara, is divided into six orders or principal divisions. The subjects of these orders are agriculture, festivals, women, damages, holy things, and purifications. These orders are subdivided into sixty-three tracts, to which the Babylonian Gemara adds five others, thus containing sixty-eight tracts in all. Other divisions of the Talmud are the Halaka, the doctrinal and logical portion; Hagada, the rhetorical or imaginative portion; and Cabala, the mystical portion, including theosophy and magic. Many translations of parts of the Talmud have appeared.

**Talpa** (tal'pā). See *Mole*.

**Talus** (tā'ius), in geology, a sloping heap of broken rocks and stones at the foot of any precipice, cliff, or rocky declivity.

**Tamandua** (ta-man'dū-a), a species of ant-eater.

**Tamaqua** (tā-mā'kwā), a town of Schuylkill Co., Pennsylvania, 17 miles N. E. of Pottsville, and in an extensive coal-mining district. There are many collieries, iron foundries, and machine shops, and manufactures of explosives and hosiery. Pop. 9462.

**Tamaricaceæ** (tam-ar-i-kā'se-ē), a small nat. order of polypetalous exogens. The species are either shrubs or herbs, inhabiting chiefly the basin of the Mediterranean. They have minute alternate simple leaves and usually small white or pink flowers in terminal spikes. They are all more or less astringent, and their ashes after burning are remarkable for possessing a large quantity of sulphate of soda. See *Tamarisk*.

**Tamarin** (tam'a-rin), the name of certain South American monkeys. The tamarins are active, restless, and irritable little creatures, two of the smallest being the silky tamarin (*Midax rosalia*) and the little lion monkey (*M. leonina*), the latter of which, though

only a few inches in length, presents a wonderful resemblance to the lion.

**Tamarind** (tam'a-rind; *Tamarindus indica*), a large and beautiful tree of the East and West Indies, nat. order Leguminosæ. It is cultivated chiefly for the sake of its pods (tamarinds). The West Indian tamarinds are put into casks, with layers of sugar between them, or with boiling syrup poured over them, and are called prepared tamarinds. The East Indian tamarinds, which are most esteemed, are preserved without sugar. They are dried in the sun, or artificially with salt added.



Tamarind (*Tamarindus indica*).

**Tamarisk** (tam'a-risk), the common name of shrubs of the genus *Tamarix*, the type of the natural order Tamaricaceæ. *T. gallica* is very abundant all round the Mediterranean, and is naturalized on some parts of the south coast of England. It attains a height of from 16 to 20 feet, has small flowers of a bright rose color, and altogether has a very attractive appearance, which makes it very much sought after as an ornament for shrubberies and parks.

**Tamatave** (tām-ā-tāv'), the chief port on the eastern side of Madagascar. It was for a time capital of the island. Pop. about 6000.

**Tamaulipas** (tā-mā-y-lē'pās), a state of Mexico, on the Gulf of Mexico, north of Vera Cruz; area, 32,270 square miles. The coast is low, but in the interior, towards the south, the surface becomes finely diversified by mountain, hill, and valley. The soil is generally fertile. Cattle in vast numbers are reared on the pastures. The foreign trade is carried on chiefly at the ports of Tampico and Matamoros. The capital is Ciudad Victoria. Pop. 218,948.

**Tambookieland**. See *Tembuland*.

**Tambourine** (tam-bu-rēn'), a musical instrument of the drum species, much used among the Spanish and Italian peasants, as well as else-



Tambourine.

where. It consists of a piece of parchment stretched over the top of a broad hoop, which is furnished with little bells. It is sounded by sliding the fingers along the parchment or by striking it with the back of the hand or with the fist or the elbow.

**Tambour-work** (tam-bör'; French *tambour*, a drum), a species of embroidery on muslin or other thin material, worked on circular frames which resemble drum-heads. The practice of tambouring is rapidly dying out, being replaced by pattern-weaving, by which tambour-work can be closely imitated.

**Tambov** (tâm-bof'), a government of Russia, south of Nijni-Novgorod and Vladimir, between the basins of the Oka and the Don; area, 25,676 sq. miles. It is one of the largest, most fertile, and most densely peopled provinces of Central Russia. More than two-thirds of the surface is arable. The principal crops are corn and hemp. Vast numbers of excellent horses, cattle, and sheep are reared. The chief industrial establishments are distilleries, tallow-melting works, sugar works, and woolen mills. Pop. 3,205,200.—**TAMBOV**, the capital, 263 miles southeast of Moscow, is built mostly of wood. It has a great trade in corn and cattle, and soap and tallow are largely made. Pop. 60,729.

**Tamerlane** (tam-er-lân). See *Timur*.

**Tamias** (tam'i-as). See *Squirrel*.

**Tamil** (tam'il), the name of a race which inhabits South India and Ceylon. The Tamils belong to the Dravidian stock of the inhabitants of India, and are therefore to be regarded as among the original inhabitants who occupied the country before the Aryan invasion from the north, but they adopted the higher civilization of the Aryans. The Tamil language is spoken not only in South India and Ceylon, but also by a majority of the Indian settlers in places farther east, as Pegu and Penang. There is an extensive literature, the greater part of it in verse. Among the chief works are the *Kural* of Tiruvalluvar, an ethical poem, and the Tamil adaptation of the Sanskrit *Ramayana*.

**Tamise** (tâ-méz), a manufacturing town of Belgium, province of E. Flanders, on the Scheldt. Pop. 12,463.

**Tam o'Shanter**, the hero of Burns's poem of the same name; also a cap with a close-fitting rim and large, flat top, usually with a knob or tassel in the center; in Scotland, a tight-fitting woolen cap or a braid bonnet.

**Tammany** (tam'a-ni), **SOCIETY OF**, or **Columbian Order**, formed in New York city in 1789, as a counterweight to the so-called 'aristocratic' Society of the Cincinnati; deriving its name from a noted friendly Delaware chief named Tammany, who had been canonized by the soldiers of the Revolution as the patron saint of America. The grand sachem and 13 sachems were intended to typify the President and the governors of the 13 original states. It was organized for social and benevolent purposes, but always had a political character. Always essentially Democratic, it represented the distrust of Hamilton's aristocratic policy. It is the leading political mainspring of New York politics.

**Tammy**, **TAMIS**, **TAMINE**, or **TAMINY**, a kind of woolen cloth highly glazed, used for making fine sieves employed in cooking, which are also called *tammies*. It is also used under the names of lasting and durant for ladies' boots.

**Tampa** (tam'pá), a port of Florida, Hillsboro Co., on the Gulf Coast; a rising business center, the terminus of three railways, and the point of departure of steamers for various ports. Among its places of interest are De Soto Park and the Convent of Holy Names. Here are large cigar factories and lumber mills and it is an important shipping point for naval stores, fruits, fish, and cattle. It has become a favorite winter resort. Pop. 37,782; including suburbs, 52,500.

**Tampico** (tâm-pé'kô), a seaport town of Mexico, in the state of Tamaulipas, near the mouth of the Panuco. Chief exports are oil and rubber. In 1914 a number of U. S. Marines who landed here were arrested. This was one of the incidents that led to intervention and the occupation of Vera Cruz by the United States (see *Mexico*). Pop. 35,000.

**Tamsui** (tâm-sŭ'ê), a town of China, island of Formosa, one of the treaty ports, with a trade in tea. Pop. about 100,000.

**Tam-tam**, or **TOM-TOM**, a cylindrical drum used in the East Indies. It is beaten upon with the fingers, or with the open hand. Public notices, when proclaimed in the bazaars of Eastern towns, are generally accompanied by the tam-tam.

**Tana** (tâ'nä), (1) a river in the extreme north of Norway, forming part of the boundary between it and Russia. (2) A river of E. Africa, within the British 'sphere of influence,' rising in Mount Kenia, navigable for about 100 miles in the rainy season.

**Tanagers** (tan'-a-jerz), passerine birds, genus *Tanagra*, family Fringillidae, or finches, distinguished by the bill being of triangular shape at its base and arched towards its tip, and remarkable for their bright colors. They are chiefly found in the tropical parts of America.

**Tanagra Figurines**, a class of antique terra-cotta statuettes and reliefs, first found in 1893 in the necropolis of Tanagra, Greece, but since found elsewhere in Greece. They date from about 400 B.C., though some of them are prehistoric.

**Tanais.** See *Don*.

**Tananarivo.** See *Antananarivo*.

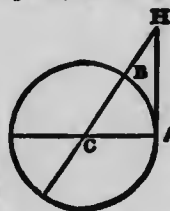
**Tancred** (tan'kred), son of the Marquis Odo the Good and Emma, the sister of Robert Guiscard, born in 1078, was one of the most famous heroes of the first Crusade. He distinguished himself at the siege of Nicæa (1097), at the battle of Dorylæum (July, 1097), at the capture of Jerusalem (July, 1099), and at Ascalon (August 12), and was appointed by Godfrey de Bouillon Prince of Galilee. He died in 1112, in his thirty-fifth year, of a wound received at Antioch. He is represented by Tasso in the *Jerusalem Delivered* as the flower and pattern of chivalry.

**Taney** (tā'ne), ROGER BROOKE, jurist, born in Calvert Co., Maryland, in 1777. He was graduated from Dickinson College, was admitted to the bar in 1799, and elected to the Maryland Senate in 1816. In 1831 he became Attorney-General of the United States, and in 1836 was appointed to succeed John Marshall as Chief Justice of the United States Supreme Court, a position which he held until his death in 1864. The most famous of his decisions is that in the Dred Scott case, denying freedom to a slave going into a free State, an incident used effectively in the antislavery movement.

**Tanganyika** (tān-gān-yē'kū), a lake of Central Africa, lying to the south of Lake Albert Nyanza. It extends from about 3° 25' to 8° 40' S. lat., and from 29° 20' to 32° 20' E. lon. It is 420 miles long, has an average breadth of about 30 miles, and is 2700 feet above the level of the sea. The basin in which it lies is inclosed by an almost continuous series of hills and mountains. It is fed by numerous rivers and streamlets, and discharges by the river Lukuga into the Congo. There are several London Missionary Society stations on Tanganyika, and on the eastern shore is the Arab

town of Ujiji. A carriage-road, 210 miles, runs to Nyassa. Tanganyika was discovered by Speke and Burton in 1858.

**Tangent** (tan'jent), in geometry, a straight line which touches or meets a circle or curve in one point, and which being produced does not cut it; a straight line drawn at right angles to the diameter of a circle, from the extremity of it, as HA in figure, which being continued at A, would merely touch and not cut the circle. In trigonometry the tangent of an arc is a straight line touching the circle of which the arc is a part, at one extremity of the arc, and



meeting the diameter passing through the other extremity. Thus AH is the tangent of the arc AB, and it is also said to be the tangent of the angle ACB, of which AB is the measure. The arc and its tangent have always a certain relation to each other; and

when the one is given in parts of the radius, the other can always be computed. For trigonometrical purposes tangents for every arc from 0 degrees to 90 degrees, as well as sines, cosines, etc., have been calculated with reference to a radius of a certain length, and these or their logarithms formed into tables. In the higher geometry the word tangent is not limited to straight lines, but is also applied to curves in contact with other curves, and also to surfaces.

**Tanghin** (tang'gin; *Tanghinia venenifera*), a tree of Madagascar, nat. order Apocynaceæ, bearing a fruit the kernel of which, about the size of an almond, is highly poisonous. Trial by tanghin was formerly used in Madagascar as a test of the guilt or innocence of a suspected criminal. The person undergoing the ordeal was required to swallow a small portion of the kernel. If his stomach rejected it he was deemed innocent, but if he died, as happened in most cases, he was deemed to have deserved his fate and suffered the punishment of his crime.

**Tangier** (tan'jēr), a seaport of Morocco, on the Strait of Gibraltar. It stands on two heights near a spacious bay, and presents a very striking appearance from the sea, rising in the form of an amphitheater, and defended by walls and a castle. Tangier is almost destitute of manufactures. The harbor is a mere roadstead, but there is a large trade. In 1662 Tangier was annexed to the English crown as part of the dowry of the Infanta of Portugal, the wife of King Charles II, but in 1684 it was

## Tangle

abandoned, because of expense necessary to keep it up. Pop. estimated at 40,000.

**Tangle** (tang'gl), the common name of two species of sea-weed found on the shores of Britain, *Laminaria digitata* and *Laminaria saccharina*.

**Tanistry** (tan'is-tri), a mode of tenure that prevailed among various Celtic tribes, according to which the tanist or holder of honors or lands held them only for life, and his successor was fixed by election. According to this custom the right of succession was not in the individual, but in the family to which he belonged; that is, succession was hereditary in the family, but elective in the individual.

**Tanjore** (tan-jör'), a city in Hindustan, in the presidency of Madras, capital of the district of the same name, in a fertile plain, about 45 miles from the sea and 170 miles south by west of Madras. The fortified town, about 4 miles in circuit, contains the palace of the rajah, and outside of it is the British residency. Manufactures of silk, muslin, and cotton are carried on to a considerable extent. The town was besieged and taken by the British in 1773. Pop. 57,870.—The district of Tanjore has an area of 3054 sq. miles, and a population of 2,245,029. It is very fertile, and is regarded as the granary of the Madras territories.

**Tank**, MILITARY, the name given to armored caterpillar tractors introduced by the British in September, 1916, during the European war. The larger, or 'male' tanks mounted a field piece in addition to machine guns; the smaller, or 'female' tank was equipped with machine guns only. The Germans employed a still smaller variety, called the 'baby' tank, which could be operated by one man. In General Byng's notable surprise attack of November, 1917, he used great numbers of the tanks, plowing through the wire entanglements and routing the Germans from their entrenchments.

**Tank-worm**, a nematode worm abounding in the mud in tanks in India, and believed to be the young of the *Filaria* or *Draconculus medinensis*, or guinea-worm, a troublesome parasite on man. See *Guinea-worm*.

**Tanna**. See *Thana*.

**Tannenberg, Battle of**, one of the notable battles of the European war in which the German troops under General Von Hindenburg defeated the Russians under General Rennenkampf in East Prussia in the closing days of August, 1914. Von Hindenburg was one of the most remark-

## Tannenberg, Battle of

able soldiers of Germany. At the beginning of the war he was on the retired list. He had fought as a young soldier in the war of 1870. When he rose to the rank of general he commanded for some years an army corps in East Prussia and made his home there after his retirement, traveling over every square mile of the lake region in a high-powered motor car, often accompanied by a fully horsed field gun borrowed from the garrison of Königsberg. With this gun he made elaborate experiments, finding out by actual trial where it could be driven through the shallow lakes, or where the muddy bottoms made it impossible for horse and wheels to pass. Thus he was superbly fitted to undertake the command of the East Prussian army. Rennenkampf, the Russian general, fought in the Russo-Japanese war. He was popular with the Russian soldiers, and had a reputation for enterprising dash. Of the forces at Rennenkampf's disposal it is impossible to make an exact estimate, but it is probable that the number was about four hundred thousand. The greater part of the German first line, or regular troops, had been hurried to France, and when Von Hindenburg was called to command the defense of East Prussia he had only two hundred thousand men, all of them East Prussians and Pomeranians. To hold their own against Rennenkampf's first attacks they had to be supplemented with hastily formed detachments of the land-sturm.

The first fighting on the frontier took place on August 3, and the Germans were forced back for several days, the Russians crossing the boundary and taking possession of the southeast corner of the German province of East Prussia, along the main railroad line that runs from Warsaw through the lake region to Königsberg. A battle lasting four days was fought at Gumbinnen, from August 17 to August 20, and the Germans were forced to retire from their entrenched line. Rennenkampf extended his success, attacking all along the line. Reinforcing his left, he enveloped and rolled up the German right, cutting off and capturing thousands of prisoners and many guns.

After the Battle of Gumbinnen the Germans in the north of East Prussia fell back on Königsberg. Allenstein, the headquarters of the 20th German army corps, was given up to the invaders without fighting. Meantime Von Hindenburg was preparing a very effective counter-stroke. Leaving only enough men to stiffen the garrison at Königsberg he transferred the troops by sea and by coast railway through Elbing to Dantzig and the Lower Vistula, where he had concen-



trated a very large army for the reconquest of East Prussia.

General Samsonoff, who had been in command of the southern army, pressed on through Allenstein, with intent to reach the Vistula. To succeed in this it was necessary to pass through a belt of difficult country, abounding in lakes, marshes, and woods around Osterode, Tannenberg, and Eylau.

It was here that Hindenburg with his intimate knowledge of the swampy land gave battle to the Russians. The Battle of Tannenberg lasted three days, and a quarter of a million men were in action on each side. On the 30th of August the Russian flank was turned, and the enveloping movement was carried on during the night. On the 31st the collapse of the line began. As the Russians gave way under the converging pressure of front and flank attacks they found that it was a difficult matter to extricate themselves from the wilderness of woods, lakes and marshes in which they had given battle. Three Russian generals fell in the final struggle: Samsonoff, Postitsch, and Martos. The Germans claimed that of the five army corps which formed the enemy's main battle line they destroyed three and a half. It was the most complete victory won by the Germans in the opening phase of the war and resulted in a precipitate evacuation of East Prussia by the invaders. *Rennenkampf* fought a heroic rearguard action, falling back by way of Gumbinnen, recrossing the frontier and retreating to the Niemen, where large reinforcements awaited.

**Tanner**, HENRY OSSAWA (1859- ), Benjamin Tucker Tanner, bishop of the African Methodist Episcopal Church. He was born at Pittsburgh, Pa., and began his studies at the Pennsylvania Academy of Fine Arts under Thomas Eakins; later a pupil of Jean Paul Laurens and Benjamin Constant of Paris. He specialized in religious subjects. He is represented in the Luxembourg ('Raising of Lazarus'), the Wiltach Collection, Philadelphia ('Annunciation'), Carnegie Institute ('Christ at the Home of Mary and Martha'), and the Chicago Art Institute ('The Two Disciples at the Tomb'). He is an Associate of the National Academy.

**Tanner's Sumach.** See *Coriaria*.

**Tannhäuser** (tân'hoi-zér), or TANNHÄUSER, in old German legend, a knight who gains admission into a hill called the Venusberg, in the interior of which Venus holds her court, and who for a long time remains buried in sensual pleasures, but at last listens to

the voice of the Virgin Mary, whom he hears calling upon him to return. The goddess allows him to depart, whereupon he hastens to Rome to seek from the pope (Pope Urban) absolution for his sins. The pope, however, when he knows the extent of the knight's guilt, declares to him that it is as impossible for him to obtain pardon as it is for the wand which he holds in his hand to bud and bring forth green leaves. Despairing, the knight retires from the presence of the pontiff, and enters the Venusberg once more. Meanwhile the pope's wand actually begins to sprout, and the pope, taking this as a sign from God that there was still an opportunity of salvation for the knight, hastily sends messengers into all lands to seek for him. But Tannhäuser is never again seen. The Tannhäuser legend has been treated poetically by Tietze, and Richard Wagner has adopted it (with modifications) as the subject of one of his operas.

**Tannic Acid** (tan'ik), or TANNIN, a peculiar acid which exists in every part of all species of oaks, especially in the bark, but is found in greatest quantity in gall-nuts. Tannic acid, when pure, is nearly white, and not at all crystalline. It is very soluble in water, and has a most astringent taste, without bitterness. It derives its name from its property of combining with the skins of animals and converting them into leather, or tanning them. It is the active principle in almost all astringent vegetables, and is used in medicine in preference to mineral astringents, because free from irritant and poisonous action. The name is generally applied to a mixture of several substances.

**Tanning** (tan'ing), the operation of converting the raw hides and skins of animals into leather by effecting a chemical combination between the gelatine of which they principally consist and the astringent vegetable principle called tannic acid or tannin. The object of the tanning process is to produce such a chemical change in skins as may render them unalterable by those agents which tend to decompose them in their natural state, and in connection with the subsequent operations of currying or dressing to bring them into a state of pliability and impermeability to water which may adapt them for the many useful purposes to which leather is applied. The larger and heavier skins subjected to the tanning process, as those of buffaloes, bulls, oxen, and cows, are technically called *hides*; while those of smaller animals, as calves, sheep, and goats, are called *skins*. In preparing the hides and skins for tanning

they are subjected to certain operations already described under *Leather*, after which the tanning proper begins. The various substances used for tanning are oak, fir, mimosa, and hemlock bark, sumach, myrobalans, divi-divi, vaionia-nuts, cutch, kino, gambir, and oak-galls—all of which contain tannin. The impregnation of the hides with this tannin may be effected either by placing them between layers of bark (oak bark being the best) in a vat filled with water, or steeping them in a liquor containing a small amount at first, but steadily increasing proportion of tannin throughout a series of pits. This liquor usually consists of water in which the ground or crushed tanning material has been steeped. The raw hide takes about a year to prepare it for the best quality of leather. There is also a process called *tawing*, which is employed chiefly in the preparation of the skins of sheep, lambs, goats, and kids. In this process the skins are steeped in a bath of alum, salt, and other substances, and they are also sometimes soaked in fish-oil. The more delicate leathers are treated in this manner, those especially which are used for wash-leathers, kid gloves, etc. After the leather is tanned it is finished for use by the process of *currying* (which see). Various improvements have been attempted to be made in the art of tanning, such as the preparation of the skins by means of metallic solutions instead of by vegetable tan-liquor; the forced absorption of the tan by applying pressure between cylinders; and the preparation of the skins by a chemical agent, so as to induce a quicker absorption of the tan. It has been found, however, that the slow process followed by the old tanners produces leather far superior to that produced by the new and more rapid methods, though a fair leather for certain purposes may be produced in five to ten weeks.

**Tanrec** (tan'rek), or **TENREC** (*Cen-tetes*), a genus of insectivorous mammals, resembling in outward appearance the European hedgehog, they being covered with bristles about an inch in length. These animals inhabit Madagascar. They hibernate like the European hedgehog, and live in burrows, which they excavate by means of their strong claws.

**Tansy** (tan'zi; *Tanacetum vulgare*), is a well-known plant, being abundant throughout Europe and naturalized in the United States. It is a tall plant, with divided leaves and button-like heads of yellow flowers. Every part of the plant is bitter, and it is considered as tonic and anthelmintic, tansy-tea being

an old popular medicine. It is now cultivated in gardens mainly for the young leaves, which are shredded down and employed to flavor puddings, cakes, etc.

**Tanta** (tän'tä), a town of Lower Egypt, situated on the railway about 50 miles N. of Cairo. It has many large public buildings, besides a palace of the Khedive, and is celebrated in connection with the great Moslem saint Seyyid-ei-Bedawi, to whom a mosque is here erected. Tanta has three great annual fairs, which are held in January, April, and August, and at the latter 500,000 persons are said to congregate from the surrounding countries. Pop. (1907) 54,437.

**Tantalum** (tan'ta-ium), a rare metallic element discovered in the Swedish minerals tantalite and yttrio-tantalite; chemical symbol Ta, atomic weight 182. It was long believed to be identical with niobium, but their separate identity has been established.

**Tantalus** (tan'ta-ius), in Greek mythology, a son of Zeus, and king of Phrygia, Lydia, Argos or Corinth, who was admitted to the table of the gods, but who had forfeited their favor either by betraying their secrets, stealing ambrosia from heaven, or presenting to them his murdered son Pelops as food. His punishment consisted in being placed in a lake whose waters receded from his lips when he attempted to drink, and of being tempted by delicious fruit overhead which withdrew when he attempted to eat. Moreover, a huge rock forever threatened to fall and crush him.

**Tantalus**, a genus of wading birds of the heron family. *T. loculator* is the wood-hen of America, which frequents extensive swamps, where it feeds on serpents, young alligators, frogs, and other reptiles. The African *tantalus* (*T. ibis*) was long regarded as the ancient Egyptian ibis, but it is rare in Egypt, belonging chiefly to Senegal, and is much larger than the true ibis.

**Tantras** (tan'tras), a name of certain Sanskrit sacred books, each of which has the form of a dialogue between Siva and his wife. The tantras are much more recent productions than the Vedas, the oldest being long posterior even to the Christian era, although their believers regard them as a fifth Veda, of equal antiquity and higher authority. The Tantrikas, or followers of the tantras, indulge in mystical and impure rites in honor of Siva.

**Taoism**, or **TAOISM** (tä'ö-izm, tou'-izm), a religious system formed in China by Lao-tse. He taught a comparatively pure morality, but in its later developments his doctrine is too

often associated with magical rites and superstitious observances. See *Lao-tse*. **Taormina** (*tā-or-mē'nā*), a town, province of Messina, Sicily, on Monte Tauro, overlooking the Strait of Messina. Its chief interest is in the ancient theater, sepulchers, reservoirs, etc., which are still in good preservation. It is a favorite place of resort for travelers. Pop. 4351.

**Taos** (*tā'ōs*), the name of a district and town of New Mexico, about 50 miles N. of Santa Fé, watered by the Rio de Taos, a tributary of the Rio Grande. Here is a fine example of the pueblo Indian architecture, of prehistoric date, yet still inhabited by a large number of Indians. This was the seat of the first Territorial government, was the residence of Kit Carson and Colonel Hart, and has now a town of about 500 inhabitants, a market-place for the Indian farmers surrounding.

**Tapajos** (*tā-pā-zhōs'*), a river of Brazil, which flows through the province of Para, and enters the Amazon after a northward course of nearly 1200 miles.

**Tapestry** (*tap'es-tri*), a kind of woven hangings of wool and silk, often enriched with gold and silver, with worked designs, representing figures of men, animals, landscapes, etc., and formerly much used for lining or covering the walls and furniture of apartments, churches, etc. Tapestry is made by a process intermediate between weaving and embroidery, being worked in a web with needles instead of a shuttle. Short lengths of thread of the special colors required for the design are worked in at the necessary places and fastened at the back of the texture. In Flanders, particularly at Arras (whence the term *arras*, signifying 'tapestry'), during the fifteenth and sixteenth centuries, the art was practiced with uncommon skill. The art of weaving tapestry was introduced into England near the end of Henry VIII's reign. During the reign of James I a manufactory was established at Mortlake, which continued till the beginning of the eighteenth century. Recently a royal school of tapestry has been established at Windsor, and some excellent work has been done by Mr. W. Morris at Merton (Surrey). The first manufacture of tapestry at Paris was set up under Henry IV, in 1606 or 1607, by several artists whom that monarch invited from Flanders. But the most celebrated of all the European tapestry manufactures was that of the Gobelins, instituted under Louis XIV. (See *Dayous Tapestry* and *Gobelins Manufac-*

*tory*.) The term *tapestry* is also applied to a variety of woven fabrics having a multiplicity of colors in their design, which, however, have no other characteristic of true tapestry. The name of *tapestry carpet* is given to a showy and cheap two-ply or ingrain carpet, the warp or weft being printed before weaving so as to produce the figure in the cloth.

**Tapeti** (*tap'e-ti*), the Brazilian hare, the *Lepus Brasiliensis*, the only hare inhabiting South America.

**Tape-worms**, certain internal parasites (Entozoa) constituting the order Cestodea or Tæniada of the sub-kingdom Annuloida, found in the mature state in the alimentary canal of warm-blooded vertebrates. Tape-worms are composed of a number of flattened joints or segments, the anterior of which, or head (which is the true animal), is furnished with a circle of hooks or suckers, which enable it to maintain its hold on the mucous membrane of the intestines of its host. The other segments, called *proglottides*, are simply generative organs budded off by the head, the oldest being furthest removed from it, and each containing when mature male and female organs. The tape-worm has neither mouth nor digestive organs, nutrition being effected by absorption through the skin. The length of the animal varies from a few inches to several yards. The ova do not undergo development in the animal in which the adult exists. They require to be swallowed by some other warm-blooded vertebrate, the ripe *proglottides* being expelled from the bowel of the host with all their contained ova fertilized. The segments or *proglottides* decompose and liberate the ova, which are covered with a capsule. After being swallowed the capsule bursts and an embryo, called a *proscœlex*, is liberated. This embryo, by means of spines, perforates the tissues of some contiguous organ, or of a blood-vessel, in the latter case being carried by the blood to some solid part of the body, as the liver or brain, where it surrounds itself with a cyst, and develops a vesicle containing a fluid. It is now called a *scolex* or *hydatid*, and formerly was known as the *cystic worm*. The *scolex* is incapable of further development till swallowed and received a second time into the alimentary canal of a warm-blooded vertebrate. Here it becomes the head of the true tape-worm, from which *proglottides* are developed posteriorly by gemination, and we have the adult animal with which the cycle begins. Eight true tape-worms oc-

cur in man, *Tenia solium*, the cystic form of which produces the measles of the pig, being the most common. Another, *T. mediocanellata*, is developed from the scolex, which causes measles in the ox. The tape-worm of the dog, *T. serrata*, is the adult form of the scolex which produces staggers in sheep. *Echinococcus* of the dog produces hydatids in man, through the development in man of its immature young. In all cases the only conclusive sign of tape-worm is the passage of one or part of one in the feces. One mode of treatment for this disorder is, for an adult, a teaspoonful of the extract of male-fern. A few hours thereafter a strong dose of castor-oil should be taken.

**Tapioca** (tap-l-ō'ka), a farinaceous substance prepared from cassava meal, which, while moist or damp, has been heated for the purpose of drying it on hot plates. By this treatment the starch-grains swell, many of them burst, and the whole agglomerates in small irregular masses or lumps. In boiling water it swells up and forms a viscous jelly-like mass. See *Cassava*.

**Tapir** (tā'per), the name of ungulate or hoofed animals forming the family Tapiridae. The nose resembles a short fleshy proboscis; there are four toes to the fore-feet, and three to the hind ones. The common South American tapir (*Tapirus americanus*) is the size of a small ass, with a brown skin, nearly naked. It inhabits forests, lives much in the water, conceals itself during the day, and feeds on vegetable substances. There are several other Ameri-



Malay Tapir (*Tapirus malayanus*)

can species. The *T. malayanus* or *indicus* is found in the forests of Malacca and Sumatra. It is larger than the American species, and is a most conspicuous animal from the white back, rump, and belly contrasting so strongly with the deep sooty black of the rest of the body as, at a little distance, to give it the aspect of being muffled up in a white sheet. Fossil tapirs are scattered

throughout Europe, and among them is a gigantic species, *T. giganteus*, Cuvier, which in size must have nearly equaled the elephant.

**Tapping** (tap'ing), or PARACENTE'SIS, a surgical operation commonly performed for dropsy, but also for empyema, and for the relief of other morbid effusions in natural or accidental cavities of the body. It consists in piercing the wall of the cavity with an instrument, commonly a trocar or a histoury. The fluid usually flows out, but it is sometimes necessary to use an instrument which acts as a syringe.

**Taprobane** (ta-prob'a-nē), the ancient name of Ceylon.

See *Ceylon*.

**Tapti**, or TAPTEE (tāp'tē), a river in Hindustan, rises in the Nerbudda division of the Central Provinces, and after a course of about 460 miles falls by several mouths into the Gulf of Cambay, 20 miles below Surat and 30 miles south of the mouth of the Nerbudda.

**Taqua-nut** (ta'kwa), the seed or nut of the South American tree *Phytelèphas macrocarpa*, known under the name of vegetable ivory. The fruit is as large as a man's head and contains numerous nuts of a somewhat triangular form, each as large as a hen's egg. When ripe they are exceedingly hard and white, resembling ivory very closely and being used for similar purposes.

**Tar** (tār), a thick, dark-colored, viscid product obtained by the destructive distillation of organic substances and bituminous minerals, as wood, coal, peat, shale, etc. Wood-tar, such as the Archangel, Stockholm, and American tars of commerce, is obtained by burning billets of wood slowly in a conical cavity at the bottom of which is a cast-iron pan into which the tar exudes. Wood-tar is also obtained as a by-product in the destructive distillation of wood for the manufacture of wood-vinegar (pyroligneous acid) and wood-spirit (methyl alcohol). It has an acid reaction, and contains various liquid matters, of which the principal are methyl-acetate, acetone, hydrocarbons of the benzene series, and a number of oxidized compounds, as carbohydric acid. Paraffin, anthracene, naphthalene, chrysene, etc., are found among its solid products. It possesses valuable antiseptic properties, owing to the creosote it contains, and is used extensively for coating and preserving timber, iron, and cordage. Coal-tar, which is largely obtained in gas manufacture, is also valuable inasmuch as it



is extensively employed in the production of dyes, etc. See *Coal-tar* and *Aniline*.

**Tara** (tá'ra), or **TARO**, the native name given to plants of the genus *Colocasia*, nat. order Araceae, especially *C. esculenta* and *C. macrorhiza*, cultivated in the Pacific Islands for their esculent root, which, though pungent and acrid raw, becomes palatable when cooked. A pleasant flour is also made of the roots or tubers, and the leaves are used as spinach. The name is also given to the allied *Caladium esculenta*, whose tuberous root and leaves are used in the same manner.

**Tara Fern**, a species of fern (*Pteris esculenta*) from the root or rhizome of which a flour was obtained which formerly made a staple article of food for the natives of New Zealand.

**Tarai** (ta-rí'; 'moist land'), a moist and jungly tract of Northern India, running along the foot of the first range of the Himalayas for several hundred miles, with a breadth of from 2 to 15, infested by wild beasts, and generally unhealthy. The name is given distinctively to a district in the Kumaun division of the Northwest Provinces, consisting of a strip of country of about 90 miles in length E. and W. along the foot of the Himalayas, and about 12 miles in breadth. Area, 938 square miles. Pop. 118,422.

**Taranaki** (tā-rā-nū-kē; formerly *New Plymouth*), a provincial district of New Zealand, on the west coast of North Island. Its coast-line extends to 130 miles, and it has an area of 3339 square miles. The coast is almost without indentations, and has no good natural harbors. Nearly three-fourths of this district is covered by valuable forests, and the rest is adapted for cattle rearing. There is a good coal-field on the banks of the Mokau, and the titaniferous iron-sand, which lies from 2 to 5 feet deep along the sea-beach, is believed to be the purest iron ore known. The soil is excellent, and a moist climate and temperate atmosphere render vegetation luxuriant. New Plymouth is the chief town, and has direct railway communication with Wellington and other parts of the colony. Mount Egmont, an extinct volcano, in the southwest, where the surface is most elevated, attains a height of 8270 feet, and is in many respects the most remarkable mountain in the colony. Pop. 38,000.

**Tarantass** (tar-an-tas'), a large covered traveling carriage without springs, but balanced on long poles which serve the purpose, and without seats, much used in Russia.

**Tarantella** (tar-an-tel'a), a swift, whirling Italian dance in six-eight measure.

**Tarantism** (tar'an-tizm), a leaping or dancing mania, of the mediæval period, somewhat similar to the disease called St. Vitus' dance. It was ascribed to the bite of the tarantula.

**Taranto** (tā'rān-tō; anciently *Tarentum*), a fortified seaport of S. Italy, in the province of Lecce, on a rocky peninsula at the northern extremity of the gulf of same name. It is well built, and contains a cathedral and several other churches, a diocesan seminary, and several hospitals. The manufactures include linen, cotton, velvet,



muslin and gloves. There is now a proposal for making Taranto a station of the Italian navy. The ancient Tarentum was founded by the Greeks in B.C. 708, and became a powerful city. It was captured by the Romans B.C. 272, and remained a notable Roman town until the downfall of the empire. Pop. 50,592.

**Tarantula** (ta-ran'tū-la), a kind of spider, the *Lycosa tarantula*, found in some of the warmer parts of Italy. When full grown it is about the size of a chestnut, and is of a brown color. Its bite was at one time supposed to be dangerous, and to cause a kind of dancing disease; it is now known not to be worse than the sting of a common wasp. In America the term is given to the large mygalid spiders.

**Tarapacá** (tā-rā-pá-kū'), a coast province of Northern Chile, containing deposits of niter and borax and silver mines; area, 18,131 square miles. Capital, Iquique. Pop. 101,105.

**Tarare** (tā-rār), a town of France, in the department of the Rhone, 20 miles northwest of Lyons. Silks, velvets, and muslins are made. Pop. 11,791.

**Tarascon** (tà-ràs-kon), a town of Southern France, department of Bouches-du-Rhône, on the Rhone, opposite Beaucaire, 50 miles N. W. of Marseilles. It has interesting mediæval structures. Pop. (1906) 5447.

**Taraxacin** (ta-rak'a-sin), a bitter crystallizable principle contained in the milky juice of the dandelion (*Leontodon Taraxacum*), especially in the juice of the roots. It possesses tonic, aperient, and diuretic properties.

**Tarazona** (tà-rà-thō'nà), an episcopal city of Spain, in the province of Saragossa, 57 miles W. N. W. of the town of Saragossa, on the Queiles. There is here an ancient episcopal palace and a cathedral, founded about the thirteenth century. Pop. 8790.

**Tarbell** (tar'bel), Ida M., writer, born in Erie Co., Pennsylvania, in 1857; was associate editor of the *Chautauquan*, 1883-91, and of *McClure's Magazine* after 1894. She attracted attention by her vigorous arraignment of the Standard Oil Company and its methods, also wrote *Lives of Napoleon*, *Lincoln*, *Madame Roland*, etc.

**Tarbes** (tàrh), a town of France, capital of the department of Hautes Pyrénées, situated 110 miles south of Bordeaux, on the left bank of the Adour. Its principal edifices are the cathedral, and the church of St. John (fourteenth century). The manufactures embrace leather, woollens, machinery, weapons, etc. Pop. 20,866.

**Tarboosh** (tar'būsh), a red woolen skull-cap or fez, usually ornamented with a blue silk tassel, and worn by the Egyptians, Turks, and Arabs.

**Tardigrada** (tar-di-gra'da: 'slow steppers'), the name applied by Cuvier to the family of edentate mammals, which includes the existing sloths and the extinct Megatherium.

**Tare** (tār), the common name of different species of *Vicia*, a genus of leguminous plants, known also by the name of *vetch*. There are numerous species and varieties of tares or vetches, but that which is found best adapted for agricultural purposes is the common tare (*Vicia sativa*), of which there are two principal varieties, the summer and winter tare. They afford excellent food for horses and cattle, and hence are extensively cultivated throughout Europe. (See *Vetch*.) The tare mentioned in Scripture (Mat. xiii, 36) is supposed to be the darnel (which see). *V. sativa* is found in fields in the United States.

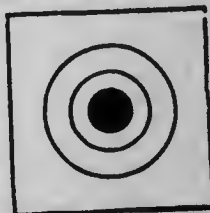
**Tare**, in commerce, a deduction made as equivalent to the real or approximate

weight of the cask, box, bag, or other package containing them. Tare is said to be real when the true weight of the package is known and allowed for, average when it is estimated from similar known cases, and customary when a uniform rate is deducted.

**Tarentum** (ta-ren'tum), a borough of Allegheny Co., Pennsylvania, on the Allegheny River, 21 miles N. E. of Pittsburgh. There are large plate and flint glass factories and steel mills, with various other industries. Pop. 7414. See *Taranto*.

**Target** (tār'get), (1) a shield or huckler of a small kind, such as those formerly in use among the Highlanders, which were circular in form, cut out of ox-hide, mounted on strong wood, strengthened by bosses, spikes, etc., and often covered externally with a considerable amount of ornamental work.

(2) The mark set up to be aimed at in archery, musketry, or artillery practice and the like. The targets used in rifle practice are generally square or oblong metal plates, and are divided into three or more sections, called *bull's eye*, *inner* (or *center*), and *outer*, counting from the center of the target to its edges; some targets have an additional division (called a *maggie*), situated between the outer and the inner. It is the marksman's aim to put his shots as near the central point as possible, as if he hits the bull's-eye there are counted in his favor 5 points, the center 4 points, the maggie 3 points, and the outer 2 points, or some similar proportions.



Target.

**Targum** (tār'gum), a translation or paraphrase of the Hebrew Scriptures in the Aramaic or Chaldean language or dialect, which became necessary after the Babylonian captivity, when Hebrew began to die out as the popular language. The Targum, long preserved by oral transmission, does not seem to have been committed to writing until the first centuries of the Christian era. The most ancient and valuable of the extant Targums are those ascribed to or called after Onkelos and Jonathan Ben Uzziel. All the Targums taken together form a paraphrase of the whole of the Old Testament, except Nehemiah, Ezra, and Daniel.

**Tarifa** (tà-ré'fà), a maritime town of Spain, in Andalusia, 52 miles southeast of Cadiz, and the most south-

erly town in Europe. It is surrounded by fortifications built by the Moors, and contains a very ancient Moorish castle. Pop. 11,780.

**Tariff** (tar'if), a list or table of duties or customs to be paid on goods imported or exported, whether such duties are imposed by the government of a country or agreed on by the governments of two countries holding commerce with each other. The tariff depends upon the commercial policy of the state by which it is framed, and the details are constantly fluctuating. The tariff has long been a leading political problem in the United States, and has fluctuated with the dominance of one or the other great party, the Republicans favoring a high tariff, protective of the manufacturing interests, the Democrats a low one, confined to revenue purposes. The opposition to a high tariff at first came from New England, but was afterwards shifted to the South, becoming so strong by 1832 as to lead to an attempt on the part of South Carolina to secede from the Union. A lower tariff policy was then adopted, and there were several changes until 1861, when the high tariff of the war period was adopted. The Republican party being long afterward in the ascendancy, the high tariff was continued until 1894, when the Democratic party was in power and passed a tariff bill much lowering the rates of duty. In 1897 they were again increased. During the succeeding years the feeling developed that they were too high and in 1909 a new bill was passed making many reductions yet leaving some leading articles in an unsatisfactory state. The policy of partial revision then came into favor, a permanent commission being appointed to study the several items subject to customs duties and recommend such changes as seemed desirable. At the end of 1911 this commission made an elaborate report on the wool industry, as a guide to the deliberations of Congress. The Democratic Congress passed a new tariff law in 1913, the main features of which were a longer free list. A Tariff Commission forms a part of the Revenue Bill passed by the House in 1916, and provides for a board of six members, appointed by the President, with the consent of the Senate, of which not more than three shall be of one political party. Its duty is to investigate the administration and fiscal effects of the tariff laws.

**Tarlatan** (tar-la-tan), a thin and fine fabric of cotton, mostly used for ladies' ball dresses. It is cheap, but does not stand washing.

**Tarn** (tärn), a river of Southern France, which rises on the south

slope of Mount Lozère, near Florac, in the department of Lozère; flows through the departments of Aveyron, Tarn, Haute-Garonne and Tarn-et-Garonne; and finally joins the Garonne. Its whole course is 230 miles, of which about 100 miles, beginning at Aibry, are navigable. **Tarn**, a department of Southern France, named from the above river; area, 2218 sq. miles. The surface is intersected by hills, which generally terminate in flat summits, on which, as well as their sides, cereals and vines are cultivated. The minerals include iron and coal, both of which are partially worked. Woolens, linens, hosiery, etc., are manufactured. The capital is Aibry. Pop. (1906) 330,533.

**Tarn-et-Garonne**, a department of France, named after its two chief rivers; area, 1436 square miles. This department belongs to the basin of the Garonne, which traverses it south to northwest, and receives within it the accumulated waters of the Tarn and Aveyron, which are both navigable. The arable land raises heavy crops of wheat, maize, hemp, tobacco, grapes and fruit of all kinds. The most important manufactures consist of common woolen cloth and serge, linen goods, silk hosiery, cutlery, leather, etc. Montauban is the capital. Pop. (1906) 188,553.

**Tarnopol** (tär-nó-pöl), a town of Galicia, Austria, on the left bank of the Sereth, 80 miles E. S. E. of Lemberg. It contains a Russian Catholic and a Greek Catholic church, castle, Jesuit college, gymnasium, etc. The inhabitants are chiefly employed in agriculture. Pop. 32,082.

**Tarnow** (tär'nöf), a town of Galicia, Austria, on a height above the right bank of the Biala, 48 miles E. S. E. of Cracow. It is well built, is the see of a bishop, has a cathedral, monastery, gymnasium, synagogue, infirmary, and manufactures of linen and leather. Pop. 31,691.

**Tarnowitz** (tär'nó-vits), a town of Prussia, in the province of Silesia, not far from the Polish frontier, with mines of iron and lead. Pop. 11,858.

**Taro** (tär'ró), a plant of the genus *Colocasia*. See *Taro*.

**Tarpan** (tär'pan), the wild horse of Tartary, belonging to one of those races which are by some authorities regarded as original. It is about the size of an ordinary mnle. The color is invariably tan or mouse, with black mane and tail. During the cold season the hair is long and soft, but in sum-

## Tarpaulin

mer much of it is shed. They are sometimes captured by the Tartars, but are reduced with great difficulty to subjection.



Tarpan.

**Tarpaulin** (tár-pá'lin), canvas well coated with tar, and used to cover the hatchways, boats, etc., on shipboard, and also to protect agricultural produce, goods in transit, etc., from the effects of the weather.

**Tarpeian Rock** (tár-pé'an), a precipitous rock forming part of the Capitoline Hill at Rome over which persons convicted of treason to the state were hurled. It was so named, according to tradition, from *Tarpeia*, a vestal virgin of Rome, and daughter of the governor of the citadel on the Capitoline, who, covetous of the golden bracelets worn by the Sabine soldiery, opened the gate to them on the promise of receiving what they wore on their left arms. Once inside the gate they threw their shields upon her, instead of the bracelets. She was buried at the base of the Tarpeian Rock.

**Tarpon** (tár'pón), or **TARPUM**, the *Megalops atlanticus*, a herring-shaped fish found on the southern coasts of the United States and in the West Indies. It reaches a length of 5 or 6 feet, and from a hundred to several hundred pounds weight, and is of giant strength. Though too coarse ordinarily for food, it is a great attraction to anglers. Its scales, which are of great size, are now largely used in ornamental work.

**Tarquinius** (tár-kwín'i-us), **LUCIUS**, surnamed *Priscus* (the first or the elder), in Roman tradition the fifth king of Rome. The family of Tarquinius was said to have been of Greek extraction, his father, Demaratus, being a Corinthian who settled in Tarquinii, one of the chief cities of Etruria. Having removed with a large following to Rome, Tarquinius became the favorite and confidant of the Roman king, Ancus

Martius, and at his death was unanimously elected his successor. According to Livy he made war with success on the Latins and Sabines, from whom he took numerous towns. Tarquinius also distinguished his reign by the erection of the Cloaca Maxima, the Forum, the wall round the city, and, as is supposed, he commenced the Capitoline Temple. After a reign of about thirty-six years he was killed in B.C. 578 by assassins, who were employed by the sons of Ancus Martius.

**Tarquinius**, **LUCIUS**, surnamed *Su-perbus* ('the proud'), the last of the legendary kings of Rome, was the son of Lucius Tarquinius Priscus. Tarquin, on reaching man's estate, murdered his father-in-law, King Servius Tullius (the date usually given for this event is B.C. 534), and assumed the regal dignity. He abolished the privileges conferred on the plebeians; banished or put to death the senators whom he suspected, never filled up the vacancies in the senate, and rarely consulted that body. He continued the great works of his father, and advanced the power of Rome abroad both by wars and alliances. By the marriage of his daughter with Octavius Mamilius of Tusculum, the most powerful of the Latin chiefs, and other political measures, he caused himself to be recognized as the head of the Latin confederacy. After a reign of nearly twenty-five years a conspiracy broke out by which he and his family were exiled from Rome (B.C. 510), an infamous action of his son Sextus being a chief cause of the outbreak. (See *Lucretia*.) He tried repeatedly, without success, to regain his power, and at length died at Cumæ in 495 B.C.

**Tarragon** (tár'a-gón; *Artemisia Dracunculus*), a strong erect perennial plant of the composite order, a native of Siberia, cultivated in gardens for flavoring dishes.

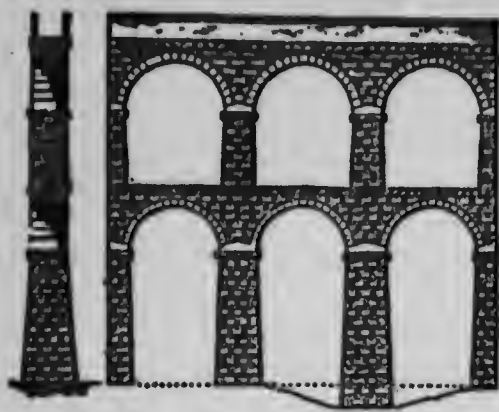
**Tarragona** (tár-a-gó'ná), a seaport of Spain, capital of a province of its own name, on the Francoli, at its mouth in the Mediterranean, on a limestone rock. The chief building is the large cathedral, a fine Gothic building partly of the eleventh century. The town was founded by the Phœnicians, and became of great importance under the Romans. In its environs are an ancient amphitheater, a circus, an aqueduct, etc. It was taken and sacked by the French under Suchet in 1811. It has a trade in corn, oil, wine, fruit, etc. Pop. 26,281.

**Tarrasa** (tár-rá'sá), a town of Spain, province of Barcelona, with



## Tarrytown

manufactures of cottons and woollens. Pop. 15,050.



Aqueduct of Tarragona.

**Tarrytown**, a village of Westchester Co., New York, on the Hudson River, 25 miles N. of New York City. It has several manufacturing industries; but is largely residential. Pop. (with North Tarrytown) 11,000.

**Tarshish** (tār'shish), a place frequently mentioned in the Old Testament. It is now generally identified by biblical critics with the Tartessus of the Greek and Roman writers, a district in Southern Spain, near the mouth of the Guadalquivir, settled by the Phoenicians.

**Tarsia-work** (tār'sl-a), a kind of mosaic woodwork or marquetry much in favor in Italy in the fifteenth century. It was executed by inlaying pieces of wood of different colors and shades into panels of walnut-wood, so as to represent landscapes, figures, fruits, flowers, etc. At Sorrento and other places the manufacture of wood-mosaic, in modern times, has become celebrated.

**Tarsius** (tār'sl-us), a genus of quadrumanous mammals of the lemur family inhabiting the Eastern Archipelago. In this genus the bones of the tarsus are very much elongated, which give the feet and hands a disproportionate length. *Tarsius spectrum*, the tarsier, seems to be the only species known. It is about the size of a squirrel, fawn-brown in color, with large ears, large eyes, and a long tufted tail. It is nocturnal in its habits, lives among trees, and feeds upon lizards.

**Tarsus** (tār'sus), in anatomy, that part of the foot which in man is popularly known as the ankle, the front of which is called the instep. It

corresponds with the wrist of the upper limb or arm, and is composed of seven bones. (See *Foot*.) In insects the tarsus is the last segment of the leg. It is divided into several joints, the last being generally terminated by a claw, which is sometimes single and sometimes double. In birds the tarsus is that part of the leg (or properly the foot) which extends from the toes to the first joint above; the shank.

**Tarsus**, an ancient city of Asia Minor, the capital of Cilicia, now in the province of Adana, in Asiatic Turkey. The Apostle Paul was born, and Julian the Apostate was buried there. Its inhabitants enjoyed the privileges of Roman citizenship, and the city rose to such distinction as to rival Athens, Antioch and Alexandria. It is situated on both banks of the Cydnus, and has a considerable trade. Pop. about 25,000.

**Tartan** (tār'tan), a kind of vessel used in the Mediterranean, both for commercial and other purposes. It is furnished with a single mast on which is rigged a large lateen sail; and with a bowsprit and fore-sail. When the wind is aft a square sail is generally hoisted.

**Tartan**, a well-known species of cloth, checkered or cross-harred with threads of various colors. It was originally made of wool or silk, and constituted the distinguishing badge of the Scottish Highland clans, each clan having its own peculiar pattern. An endless variety of fancy tartans are now manufactured, some of wool, others of silk, others of wool and cotton, or of silk and cotton.

**Tartar** (tār'tar), the substance called also *argal* or *argol*, deposited from wines incompletely fermented, and adhering to the sides of the casks in the form of a hard crust. When purified it forms cream of tartar. (See *Argal*, *Cream of Tartar*.) What is called *tartar emetic* is a double tartrate of potassium and antimony, an important compound used in medicine as an emetic, purgative, diaphoretic, sedative, febrifuge, and counter-irritant. *Tartar of the teeth* is an earthy-like substance which occasionally concretes upon the teeth, and is deposited from the saliva. It consists of salivary mucus, animal matter, and phosphate of lime.

**Tartaric Acid** (tār-tar'ik;  $C_4H_4O_6$ ), the acid of tartar. It exists in grape juice, in tamarinds, and several other fruits; but principally in bitartrate of potassium, or cream of tartar, from which it is usually obtained. It crystallizes in large rhombic prisms,

transparent and colorless, and very soluble in water. It is inodorous and very sour to the taste. A high temperature decomposes it, giving rise to several new products. The solution of tartaric acid acts with facility upon those metals which decompose water, as  $\text{Li}$  and  $\text{Al}$ . There are five modifications of tartaric acid, characterized chiefly by the differences in the action exerted by them upon a ray of polarized light; such as dextro-ordinary tartaric acid, levo-tartaric acid, para-tartaric or racemic acid, meso-tartaric acid, and meta-tartaric acid. Tartaric acid is largely employed as a discharge in calico-printing, and for making soda-water powders and baking powders. In medicine it is used in small doses as a refrigerant.

**Tartars** (tár'tarz), or TATARS, a vague term with no ethnological significance, usually applied to certain roving tribes which inhabited the steppes of Central Asia. More specifically, however, Tatar or Ta-ta appears to have been the name of a tribe of Mongols who occupied about the ninth century a district of Chinese Tartary on the Upper Amur. Though Tatar is the native form of their name, it has long been anglicized as Tartar, which is the form in common use, while their country is known as Tartary. The true Tartars formed part of the horde of Genghis Khan, when that conqueror carried his arms from the country known as Chinese Tartary to Europe, as well as to the successive hordes of similar origin who followed in their footsteps, and to the districts from which they came, or in which they settled; hence the names of Chinese Tartary, Independent Tartary, and European or Little Tartary, which comprised most of the Russian governments of Orenburg, Astrakhan, Ekaterinoslav, the Cossack provinces, and the Crimea.

**Tartarus** (tár'ta-rus), a deep and sunless abyss, according to Homer and the earlier Greek mythology, as far below Hades as earth is below heaven. It was closed by iron gates, and in it Jupiter imprisoned the rebel Titans. Later poets describe Tartarus as the place in which the spirits of the wicked receive their due punishment; and sometimes the name is used as synonymous with Hades, or the lower world in general.

**Tartary** (tár'ta-ri), a name formerly applied to the wide band of country extending through Central Asia from the  $\text{rivers}$  of Japan and Okhotsk in the east to the Caspian on the west, and including Manchuria, Mongolia, Turkistan, and all the south part of Russian Asia. It was used sometimes even to

include a large portion of Southeastern Russia. In a restricted sense it is identical with Turk-tan. It received its names from the Tartars or Tatars.

**Tartrate** (tár'trát), a salt of tartaric acid. Some of the tartrates are of considerable importance, such as tartar emetic and Rochelle salt. See *Tartar, Rochelle Salts*.

**Tarudant** (tár-rú-dánt'), a town of Morocco, at the southern foot of the Atlas, about 80 miles east from the Atlantic. Pop. about 8500.

**Tashkent** (tásh-kent'), or TASH-KEND', a town of Asiatic Russia, in the government of Turkestan, formerly in the khanate of Khokand, on the Tchirshik, near its confluence with Sir-Daria or Jaxartes, in a fertile oasis. It is surrounded by a lofty wall of dried bricks, about 12 miles in circuit, and is entered by twelve gates. The streets are very narrow, and the houses, composed of mud, are mean looking. The principal buildings are the castle, several large mosques, a bazaar, numerous colleges, and a number of old temples. The manufactures are silk, cotton, gunpowder, iron, etc. The trade, carried on chiefly by caravans, is very extensive. Tashkent was taken possession of by Russia in 1865. Pop. (1912) 271,700.

**Tasimeter** (ta-sím'e-ter), an apparatus for measuring changes in length, temperature, etc., of bodies, by means of variations in the electrical conductivity of carbon, the result of pressure.

**Tasmania** (ta-má'ni-a), formerly Van Diemen's Land, an island in the Southern Ocean, fully 100 miles south of Australia, from which it is separated by Bass Strait; greatest length, 196 miles; mean breadth, 165 miles; area, 24,330 square miles, or including islands, 26,215. The island may be roughly described as heart-shaped. The coasts, which are all much broken and indented, have some excellent harbors. The islands belonging to Tasmania are numerous, the principal being the Furneaux group, on the northeastern extremity. Tasmania is traversed by numerous mountain ranges, the chief summits of which are Mount Humboldt, 5520 feet; Mount Wellington, 4195 feet; and Ben Lomond, 5002 feet. The prevailing rocks are crystalline, consisting of basalt, granite, gneiss, quartz, etc. The chief rivers are the Derwent, the Huon, the Arthur, and the Tamar. There are several large lakes, Lake Westmoreland (45 sq. miles) being the largest. The climate is very mild. Mount Wellington is frequently covered with snow in the summer

months; but at Hobart, in its immediate vicinity, snow never falls. The mean temperature throughout the year is about 55°. The average rainfall is about 24.05 inches. Much of the soil of Tasmania is well adapted for cultivation. Wheat, oats, barley, potatoes, pease, beans, and hops are largely cultivated, and the fruit includes grapes, cherries, plums, quinces, mulberries, peaches, apricots, wainuts, filberts, almonds, etc. Fruit-preserving forms an important industry. Woodland was formerly general

and much of it still remains. Kangaroos and other herbivorous animals of the pouched kind are numerous. There are also two marsupial carnivorous animals called the Tasmanian wolf and the Tasmanian devil, both of which are destructive to sheep. The natural forests are chiefly of the eucalyptus or gum-tree, pine, and acacia tribe. Among the minerals are gold, silver, copper, iron, tin, coal, freestone, limestone, and roofing slate. Smelting-works have been erected at Hobart

for the iron which abounds in that district. The staple export from Tasmania is wool, and the other articles include gold, tin, timber, grain, fruit, hides, and bark. The frozen meat trade with Britain is large and important. Hobart, the capital, on a fine inlet of the south coast, and Launceston, on an inlet of the north, are the chief towns. Education is compulsory, and the higher education is under a council, which holds examinations and grants degrees.

Tasmania was discovered in 1642 by Abel Jansen Tasman, who named it after Van Diemen, the governor of the Dutch East Indies. It was visited by Cook in 1769, and during the next twenty years by various navigators. In 1797 Bass discovered the strait which has been called after him. The first settlement was

made in 1803 by a guard with a body of convicts, who settled at Restdown, but afterwards removed to the site now occupied by Hobart. The development of the country made slow progress until the land was divided into small allotments and farming stock and government pensions reckoned as capital. Convict labor was supplied, and at a very moderate expense farms were cleared for cultivation. Sheep, cattle, and horses were introduced, and the raising of stock has always been carried on with great success. Until

1824 Tasmania was a dependency of New South Wales, but in that year it was made an independent colony. It became one of the states of the Commonwealth of Australia in 1901. For a series of years the prosperity of the colony was retarded by the hostility of the natives and the depredations of escaped convicts, known by the name of bush-rangers. The aborigines have ceased to exist, in 1853 deportation was abolished, and about the same time the name of Tas-



mania was officially adopted on the petition of the colonists. Pop. 181,100.

**Tasmanian Devil.**

See *Dasyure*.

**Tasmanian Wolf.**

See *Thylacine*.

**Tasmanite** (taz'man-it), a translucent, reddish-brown fossil resin, occurring in Tasmania.

**Tasmannia** (taz-man'i-a), a genus of plants, consisting of one Tasmanian and two Australian shrubs, nat. order Magnoliaceae. The Tasmanian species, *T. odorata*, possesses aromatic qualities, particularly in its bark. Its fruit is used by the colonists for pepper.

**Tassiusudon** (tās-sē-sū-don'), capital of Bhutan State, and situated on the Godāda River about 130

miles N. W. of Goálpára. There is a palace where the Deb Rájá resides.

**Tasso** (tas'ó), BERNARDO, an Italian epic and lyric poet, father of the more famous Torquato, born of an ancient family at Bergamo in 1493; was educated with great care; entered the service of Guido Rangone, general of the pope, as a political emissary; and became secretary to the Prince of Salerno, whom he accompanied to Tunis. In 1530 he married Porzia de Rossi and retired to Sorrento. Subsequently he received the patronage of the Duke of Urhino, and in 1503 the Duke of Mantua appointed him governor of Ostiglia, where he died in 1509. He published numerous lyric poems, but his chief work is the epic of *L'Amadigi*, founded on the story of *Amadis de Gaul*.

**Tasso**, TORQUATO, an eminent Italian epic poet, son of the preceding, was born at Sorrento in 1544. He was early sent to the school of the Jesuits at Naples, and subsequently pursued his studies under his father's superintendence at Rome, Bergamo, Urbino, Pesaro, and Venice. At the age of sixteen he was sent to the University of Padua to study law, but at this time, to the surprise of his friends, he produced the *Rinaldo*, an epic poem in twelve cantos. The reputation of this poem procured for Torquato an invitation to the University of Bologna, which he accepted. Here he displayed an aptitude for philosophy, and began to write his great poem of *Gerusalemme Liberata* ('Jerusalem Delivered'). While engaged on it he secured a patron in Cardinal Louis d'Este, to whom he had dedicated his *Rinaldo*. He was introduced by the cardinal to the court of Alfonso II of Ferrara. Here he remained from 1505 to 1571, when he accompanied the cardinal on an embassy from the pope to Charles IX of France. Having quarreled with his patron, Tasso returned to Ferrara, and in 1573 brought out the *Aminta*, a pastoral, which was represented at the court. In 1575 he completed his epic of *Gerusalemme Liberata*. About this time he became a prey to morbid fancies, believed that he was persistently calumniated at court, and systematically misrepresented to the Inquisition. To such a pass, indeed, had this mania come in 1577 that the poet drew his poignard upon one of the domestics of the Duchess of Urbino. He was immediately arrested, but was set at liberty after two days' confinement. At his own request he returned to Ferrara, to the convent of St. Francis; but from here he made his escape, and traveled in disguise to his native place, Sorrento,

where he stayed with his sister Cornelia. He again asked permission to return to Ferrara, a request which the duke coldly granted. But in his excited and jealous condition of mind Tasso found it impossible to reestablish the old friendly relationship at the court. He fled from Ferrara again, but again returned. So outrageous had his conduct now become that he was seized by the duke's orders and confined as a madman in the hospital of St. Anne at Ferrara. Here he remained from 1579 to 1586, until he was released at the solicitation of Vincent di Gonzaga. Broken in health and spirit, he retired to Mantua, and then to Naples. Finally, in 1595, he proceeded to Rome at the request of the pope, who desired him to be crowned with laurel in the capitol, but the poet died while the preparations for the ceremony were being made. Tasso wrote numerous poems, but his fame rests chiefly on his *Rime* or lyrical poems, his *Aminta*, and his *Gerusalemme Liberata* (translated into English by Fairfax). His letters are also interesting.

**Tassoni** (tas-só'né), ALESSANDRO, an Italian poet, born in 1565; died in 1635; chiefly known from his mock-heroic poem *La Secchia Rapita* ('The Stolen Bucket'), founded on an incident that gave rise to war between the Modenese and Bolognese in the thirteenth century.

**Taste** (tást), the sense by which we perceive the relish or savor of a thing. The organs of this special sense are the *papillæ*, or processes on the surface of the tongue, and also certain parts within the cavity of the mouth and the throat, as the soft palate, the tonsils, and the upper part of the pharynx. See *Tongue*.

**Tatar-Bazarjik** (tá-tár'pá-zár-jék'), a town in Eastern Roumella on the Maritza. Pop. 17,549.

**Tatars.** See *Tartars*.

**Tate** (tât), NAHUM, an English poet, was born in Dublin about the year 1652; received his education in Trinity College; went to London, where he engaged in literary pursuits; was appointed poet laureate; and died in the Mint, whither he had retired from his creditors, in 1715. He was the author of several dramatic pieces; assisted Dryden in the second part of *Abasalom* and *Achitophel*; altered and arranged Shakespeare's *King Lear* for the stage; and wrote, in conjunction with Dr. Nicholas Brady, the metrical version of the Psalms which used to be appended to the English Book of Common Prayer.



**Tatian** (tā'shyan), a heresiarch of the second century, was born in Assyria about 120, and died about 172. He was educated in Greek philosophy; traveled extensively; caused himself to be initiated in the rites of various religions; and eventually embraced Christianity. Tatian became a disciple of Justin, after whose martyrdom he left Rome and journeyed into Mesopotamia, where he preached certain Gnostic and heretical doctrines. He seems to have dishelved in the divinity of Christ, and his teaching inculcated abstinence from wine, from animal flesh, and from marriage. As a Christian apologist he wrote *Oratio ad Græcos*, which is still extant, and his *Diatessaron* seems to prove the existence of four gospels about the middle of the second century.

**Tatius**, ACHILLES. See *Achilles Tatius*.

**Tatouay** (tat'ō-ā), a kind of armadillo (*Dasyus tatouay*, or *Xenurus uncinatus*) remarkable for the undefended state of its tail, which is devoid of the bony rings that inclose this member in the other armadillos, being only covered with brown hair.

**Tatra** (tā'trā). See *Carpathian Mountains*.

**Tatta** (tā'tā), a town in Karāchi District, Sind, on the Indus, about 50 miles east of Karāchi. Tatta has some manufactures of cotton and silk goods, but its commercial importance has greatly declined. Pop. 10,783.

**Tattersall's** (tat'er-salz), Knightsbridge Green, London, is the great metropolitan mart for horses, and headquarters of the turf, removed in 1865 from Grosvenor Place, where it was established by Richard Tattersall in 1773. A subscription room is open for betters on the turf, where they make and settle their bets.

**Tattie** (tat'tē), in the East Indies, a thick mat or screen, usually made of the sweet-scented cuscus-grass, and fastened upon a bamboo frame, which is hung at a door or window, and kept moist so as to cool the apartment.

**Tatting** (tat'ing), a kind of narrow lace used for edging, woven or knitted from sewing-thread, with a shuttle-shaped instrument.

**Tattoo** (ta-tū'), a beat of drum and bugle-call at night, giving notice to soldiers to repair to their quarters in garrison or to their tents in camp.

**Tattooing** (ta-tū'ing), a practice common to several uncivilized nations, ancient and modern, and to some extent employed among civilized peoples. It consists in pricking the skin in a de-

sign, and introducing into the wounds colored liquids, gunpowder, or the like, so as to make it indelible. This practice is very prevalent among the South Sea Islanders, among whom are used instruments edged with small teeth, somewhat resembling those of a fine comb. Degrees of rank are sometimes indicated by the greater or less surface of tattooed skin.

**Tauchnitz** (touh'nits). BERNHARD CHRISTIAN, BARON, a German publisher, born in 1816. His establishment at Leipzig, founded in 1837, is widely known from the collection of British authors issued from it, which numbers considerably over 2000 vols., and is continually increasing. Baron Tauchnitz was appointed in 1872 British consul-general for Saxony. He died in 1895.

**Taunton** (tān'tun, tan'tun), a parliamentary borough, Somerset, England, on the Tone, 45 miles s. s. w. of Bristol. The principal buildings and institutions are the parish churches of St. James and St. Mary Magdalene; a Wesleyan and a Congregational College; the library, and the museum of the Somersetshire Archaeological and Natural History Society; an old market house; the castle; the Shire Hall; a hospital, etc. The town was long celebrated for woolen, and afterwards for silk manufactures, but its chief trade now is in agricultural produce. Taunton is of great antiquity, and was a principal residence of the West Saxon kings. Here Judge Jeffreys held the infamous 'bloody assizes' in 1685. Pop. 21,182.

**Taunton**, a town, one of the capitals of Bristol Co., Massachusetts, on the Taunton River, 35 miles south of Boston. It is well built and contains a great number of handsome edifices. Its institutions include the Bristol Academy, organized in 1792, and a State insane asylum. Its manufactures are very extensive, embracing many large cotton and yarn mills, silverware factories, stove foundries, and locomotive works; also manufactures of printing presses, nails, shoe buttons, etc. Pop. 34,250.

**Taunus** (tou'nūs), a mountain range of Western Germany, mainly in the Prussian province of Hesse-Nassau, extending eastward from the Rhine, north of the Main; highest summit, Great Feldberg, 2886 feet. It is well wooded, and exhibits much picturesque scenery.

**Taurida** (tā'rē-dā), a government in the south of Russia, bounded north by Ekaterinoslav; east by the Sea of Azof; southeast, south, and west by the Black Sea, and northeast by the government of Kherson; area, 24,539

square miles. It is very irregular in shape and may be regarded as one large peninsula, subdivided into two minor peninsulas, one of which is the Crimea. It is watered by the Dnieper; the northern peninsula consists almost entirely of an extensive steppe, and the chief occupation of the inhabitants, who consist of Russians, is cattle-breeding and agriculture. Pop. 1,634,700. The capital is Simferopol.

**Taurus** (tā'rus), the Bull, one of the twelve signs of the zodiac, which the sun enters about the 20th April. Taurus is also the second zodiacal constellation, containing, according to the British catalogue, 141 stars. Several of these are remarkable, as Aldebaran, of the first magnitude, in the eye; the Hyades, in the face; and the Pleiades, in the neck.

**Taurus**, a mountain chain in Asiatic Turkey, stretching for about 500 miles from the Euphrates to the Aegean Sea, latterly running north of the Gulf of Adalia. In the east it takes the name of Ala Dag, in the west that of Bulghar Dag. It descends steeply to the sea on the south; northwards it merges gradually into the plateau of Asia Minor. It is connected by the Alma-Dag with the chain of Lebanon; and by Anti-Taurus, with Ararat, Elburz and the Caucasus.

**Tautog** (tā'tog), a fish (*Tautoga nigra* or *americana*) found on the coast of New England, and valued for food. See *Blackfish*.

**Tautphoeus** (tout'fē-ūs), BARONESS, novelist, daughter of James Montgomery, of Sathill, Ireland, born in 1807; died in 1893. She married a Hungarian nobleman and wrote novels in English, mainly of south German life. They include *The Initials*, *Quits*, and *At Odds*.

**Tavernier** (tā-ver-ne-ā), JEAN BAPTISTE, Baron d'Aubonne, the son of a Dutch merchant settled in Paris, was born at Paris about 1605, and died at Moscow in 1689. Before his twenty-first year he had visited a considerable portion of Europe, and he repeatedly traveled through Turkey, Persia, India, and other Eastern countries, trading as a diamond merchant. In 1669, having realized a large fortune, and obtained a patent of nobility from the French king, he retired to his estate of Aubonne, in the Genevese territories. He compiled, with the aid of French litterateurs, *Nouvelle Relation de l'Intérieur du Serail du Grand Seigneur, Ses Voyages*, and *Recueil de Plusieurs Relations*, which have been often reprinted and translated.

**Tavira** (tā-vē'rā), a seaport of Portugal, province of Algarve, on the Rio Sequa. The town is well built and has a considerable trade, especially connected with the sardine fisheries. Pop. 12,175.

**Tavistock** (tav'is-tok), a market town of England, county of Devon, in the valley of the Tavy, 16 miles north of Plymouth. It has a guildhall, public library, etc., and some remains of a once magnificent abbey. Copper, tin, manganese, arsenic, and iron are found in the neighborhood. Sir Francis Drake was a native, and the town possesses a colossal statue of him. Pop. 4392.

**Tavoy** (tā-vol'), a district in the Tenasserim division of British Burmah; area, 7150 square miles. The country is mountainous with thick forests and jungles, and the chief rivers are the Tavy and the Tenasserim. The chief town and the headquarters of the deputy-commissioner is Tavoy, situated about 30 miles from the mouth of the river of the same name. Pop. 22,371.—There is also an island of Tavoy, the largest and most northern of the extensive chain which fronts the Tenasserim coast. It is about 18 miles long and 2 broad, and on the eastern side there is a well-sheltered harbor called Port Owen.

**Tawing** (tā'ing), the manufacture of sheep, lamb, and goat skins into white leather. See *Tanning*.

**Tax** (taks), a contribution levied by authority from people to defray the expenses of government or other public services. A tax may be a charge made by the national or state rulers on the incomes or property of individuals, or on the products consumed by them. A tax is said to be *direct* when it is demanded from the very persons who it is intended or desired should pay it, as, for example, a poll-tax, a land or property-tax, an income-tax, taxes for keeping man-servants, carriages, dogs, and the like. It is said to be *indirect* when it is demanded from one person in the expectation and intention that he shall indemnify himself at the expense of another; as, for example, the taxes called customs, which are imposed on certain classes of imported goods, and those called excise duties, which are imposed on home manufactures or inland production. Taxes are also rates or sums imposed on individuals or their property for municipal, county, or other local purposes, such as police taxes, taxes for the support of the poor (poor-rates), taxes for the repair of roads and bridges, etc. In the United States and elsewhere taxes on real estate form the largest part of the local revenues, mu-

municipal revenues being almost entirely raised from this source. Adam Smith has laid down four principles of taxation, which have been generally accepted by political economists. These are: (1) The subjects of every state ought to contribute to the support of the government as nearly as possible in proportion to their respective abilities. (2) The tax ought to be certain, not arbitrary. (3) Every tax ought to be levied at the time or in the manner most convenient for the contributor. (4) Every tax ought to be so contrived as both to take out and keep out of the pockets of the people as little as possible over and above what it brings into the public treasury of the state. See also *Income-tax*, *Inheritance-tax*, *Customs*, *Excise*, etc.

**Taxaceæ** (taks-ä'se-è), a suborder of Coniferae, sometimes regarded as a distinct order, comprising the yew-tree (*Taxus*) and other trees or shrubs which inhabit chiefly the temperate parts of Europe, Asia, Africa, and America.

**Taxel** (taks-el), the North American badger (*Meles labradorica*). Its teeth are of a more carnivorous character than those of the true badger, and it preys on such small animals as marmots. Its burrowing powers are remarkable, its hole often being 30 feet long.

**Taxidermy** (taks-i-der-mi), the art of preparing and preserving the skins of animals, and also of stuffing and mounting.

**Taxodium** (taks-ö'di-um), a genus of plants, nat. order Coniferae. The *T. distichum*, or deciduous cypress, a common ornamental tree grown upon lawns, is a native of North Amer-



*Taxodium distichum*.

ica. The bark exudes a resin which is used by the negroes for dressing wounds, and the roots, which are hollow inside, are used for bee-hives.

**Tay** (tä), the longest river in Scotland, and the one that carries to the sea a greater volume of water than any other in the British islands. It rises on the north side of Ben Lui, near the borders of Argyleshire and Perthshire; is known in its earliest course as the Filian, and enters Lock Tay, after being joined by the Lochy, as the Dochart; issues thence as the River Tay, at Perth widens out into the Firth of Tay, and finally enters the North Sea. Its length is about 120 miles, its greatest breadth in the estuary 3½ miles, and the area drained 2400 square miles. It is navigable as far as Perth, but Dundee is the chief port. The salmon fisheries are important.

**Tay**, LOCH, a loch of Scotland, in the county of Perth, 15 miles long and about 1 mile broad; receiving at its southwest end the Lochy and the Dochart, and discharging at its northeast end at Kenmore by the Tay. It is 100 to 600 feet deep, and is well supplied with fish. On its northwest shores rises Ben Lawers.

**Tay Bridge**, a great railway bridge in Scotland crossing the estuary of the Tay from Fifeshire to Forfarshire at Dundee. A bridge was built here in 1878, but much of it was blown down by a violent storm in 1879. It was replaced by a much more substantial one, opened in 1887. This is more than 2 miles long, contains 85 piers, carries a double line of rails on a steel floor, and has an average height, above high-water, of 77 feet under four of the spans in the navigable channel. The piers are formed of cylinders embedded in the river bottom, and filled with concrete, while the superstructure is made of brickwork and malleable iron, braced by various stays and arches.

**Taygetus** (ta-ig'e-tus), a mountain range of Southern Greece (the Morea). See *Greece*.

**Taylor** (tä'lor), a borough of Lackawanna Co., Pennsylvania, 3 miles s. w. of Scranton. It has silk mills. Pop. 9940.

**Taylor**, a town of Williamson Co., Texas, 36 miles N. E. of Austin. It has cotton gins, compress oil mills, and other industries. Pop. 7785.

**Taylor** (tä'lor), BAYARD, writer and traveler, was born at Kennett Square, Pennsylvania, in 1825. He learned the trade of a printer, contributed to various magazines, made a journey through Europe on foot in 1844-45, and on his return published *Views Afoot in Europe*. This gained him a position on the staff of the New York

Tribune. He afterwards traveled extensively, and wrote works under the titles of *Eldorado* (1850); *Central Africa* (1854); *The Lands of the Saracens* (1854); *Visits to India, China, and Japan* (1855); *Northern Travel* (1858); *Crete and Russia* (1859); *Byways of*



Bayard Taylor

*Europe* (1869); and *Egypt and Iceland* (1874). He also published several novels, including *Hannah Thurston*, *The Story of Kennett*, and *John Godfrey's Fortunes*, and a number of volumes of poems. He was for some time United States secretary of legation at St. Petersburg (Petrograd), and later was United States minister at Berlin, where he died December 19, 1878.

**Taylor, Brook**, an English mathematician, born at Edmonton in 1685, was educated at Cambridge, and died in 1731. Chosen a fellow of the Royal Society, he became its secretary in 1714, an office which he retained four years. His chief works are: *Methodus Incrementorum Directa et Inversa* (London, 1715), and *Linear Perspective* (London, 1715). He was discoverer of the mathematical formula called *Taylor's Theorem*, of extensive application in the higher mathematics.

**Taylor, Sir Henry**, an English writer, born in 1800; died in 1886. At the age of fourteen he entered the navy; afterwards he became a clerk in the storekeeper-general's office; contributed to various periodicals, and undertook the editorship of the *London Magazine*, but soon afterwards accepted an appointment in the colonial office, where he remained for nearly fifty years. His contributions to literature are: *Isaac Comenianus*, a tragedy (1827); *Philip*

*van Artevelde*, a dramatic romance (1834); *The Statesman*, a series of essays (1836); *Edwin the Fair*, historical drama (1842); *The Eve of the Conquest*, and other poems (1845); *Notes from Life* (1847); *Notes from Books* (1849); *The Virgin Widow*, a comedy, afterwards named *A Sicilian Summer* (1850); and *St. Clement's Eve*, romantic drama (1862).

**Taylor, Isaac**, a voluminous writer, born at Lavenham, Suffolk, in 1786; died at Stanford Rivers in 1865. His life was passed without any noteworthy incident, and his published works include: *Elements of Thought* (London, 1823), *The Natural History of Enthusiasm* (1829), *The Natural History of Fanaticism* (1833), *Spiritual Despotism* (1835), *Physical Theory of Another Life* (1836), and various others.—His sister, **JANE TAYLOR** (1783-1824), published *Display, a tale* (1814); *Contributions of Q. Q.*, a series of essays; and, in conjunction with her sister ANN, *Original Poems and Hymns for Infant Minds*.—His son, **ISAAC TAYLOR**, canon of York, was born in 1820, and graduated as a wrangler at Trinity College, Cambridge, in 1853. He is the author of *Words and Places* (1864); *Etruscan Researches* (1874); *Greeks and Goths* (1879); *The Alphabet, an Account of the Origin and Development of Letters* (1883); *Origin of the Aryans* (1889), etc.

**Taylor, James Edward**, an American artist, born at Cincinnati, Ohio, in 1839. He began the study of art, but left it to engage in the Civil war. In 1863 he became artist and war correspondent for Frank Leslie; in 1867 was artist with the Peace Commission to the Indians. One of his best paintings is *The Last Grand Review*, made for General Sherman. Others of his paintings are in the Congressional Library at Washington. He died June 22, 1901.

**Taylor, Jeremy**, one of the greatest names in the Church of England, was born in 1613 at Cambridge; died at Lisburne, Ireland, in 1667. He was educated at Perse's Free School in his native place; entered, in 1626, as a sizar in Caius College, where he graduated Master of Arts; and in 1636 obtained by the patronage of Archbishop Laud a fellowship of all Souls' College, Oxford. In 1638 he was presented by Bishop Juxon to the rectory of Uppingham, in Rutlandshire, and in 1642 he was appointed chaplain in ordinary to Charles I. After the outbreak of the civil war he continued to attend Charles as chaplain, and when the parliamentary party proved victorious he was fre-



quently imprisoned for short periods. Eventually he retired into Wales, where he was received by the Earl of Carbery, under whose protection he was allowed to exercise his ministry and keep a school. Afterwards he removed to London, but in 1658 he accepted an invitation from Lord Conway to reside at his seat in Ireland. Here he remained until the Restoration, when he was elevated to the Irish see of Down and Connor, with the administration of that of Dromore. He was also, in the same year, made a privy-councillor for Ireland, and chosen vice-chancellor of the University of Dublin. The greater part of his writings consist of sermons and devotional pieces, and upon the former rests his fame as a master of varied English prose.

**Taylor, JOHN**, usually called the *water-poet*, was born in Gloucester about 1580, and died in 1654. He served an apprenticeship to a waterman, was at the taking of Cadiz, under the Earl of Essex, in 1596, and was many years collector of the wine dues exacted by the lieutenant of the Tower of London. He afterwards kept a tavern, first at Oxford and then at Westminster. His pieces to the number of sixty-three were published in a folio volume in 1630, but he was the author of a great many more both in prose and verse. They are characterized by a certain rough vigor not free from vulgarity.

**Taylor, PHILIP MEADOWS**, born at Liverpool in 1808; died in 1876. From being a merchant's clerk in Bombay he entered the Nizam's army; received an appointment as administrator of the state of Shorapore; maintained order in the Berar district during the mutiny of 1857; and received the rank of colonel, a companionship of the Star of India, and a commissionership of the Western Deccan districts. He published the *Confessions of a Thug* (1839), *Tippoo Sultaun* (1840), *Tara* (1863), *Ralph Darnell* (1865), *Manual of the History of India* (1870), and *A Noble Queen* (1878).

**Taylor, THOMAS**, the 'Platonist,' born in London in 1758; died at Walworth in 1835. He studied with a view to the dissenting ministry, but entered a banking-house, when all his leisure was devoted to classical and philosophical studies. He published, chiefly with the aid of patrons, about forty different works, the most remarkable of which are *Plato* (five vols. 4to, 1804), printed at the expense of the Duke of Norfolk, who kept almost the whole edition locked up till 1848; and *Aristotle*

(ten vols. 1806-12), printed at the expense of Mr. W. Meredith, who gave Taylor an annuity of £100, which he enjoyed till his death.

**Taylor, TOM**, born at Sunderland in 1817; died in 1880. He received his education at Glasgow University and Trinity College, Cambridge; became professor for two years in University College, London; was called to the bar (1845), and went on the northern circuit; appointed, in 1854, secretary to the Board of Health; wrote and adapted for the stage a great number of plays; and succeeded Shirley Brooks (1873) as editor of *Punch*. The most popular of his plays are: *New Men and Old Acres*, *Masks and Faces* (in collaboration with Charles Reade), *Still Waters Run Deep*, *The Overland Route*, and *The Ticket of Leave Man*. His historic dramas include: *The Fool's Revenge*, *Joan of Arc*, *'Twas Anne and Crown*, *Lady Glancarty*, *Anne Boleyn*, etc. He also published biographies of B. R. Haydon (1853), C. R. Leslie (1859), and Sir Joshua Reynolds (1865).

**Taylorville**, a city, capital of Christian Co., Illinois, on the south fork of the Sangamon River, 28 miles s. w. of Decatur. Its manufactures include paper, chemicals, wagons, etc.

**Taylor, WILLIAM**, born at Norwich, England, in 1765; died in 1836. He was educated for a mercantile career, but after a lengthened stay in Germany he resolved to devote himself to literature. His published works are: a translation of Bürger's *Lenore* (1796) and Lessing's *Nathan the Wise* (1805), *English Synonyms Discriminated* (1813), and a *Historic Survey of German Poetry* (1828).

**Taylor, ZACHARY**, twelfth president of the United States, born in Orange county, Virginia, in 1784. He entered the army in 1808, and rose to the rank of major; took command of the United States forces at the outbreak of the Mexican war; repeatedly defeated the Mexicans, and finally triumphed over Santa Anna in the battle of Buena Vista (1847). This was the most spectacular battle of the war, Taylor winning the victory over much larger numbers, and it gave him a wide reputation, he becoming a popular favorite under his army title of 'Old Rough and Ready.' This popularity brought him the Whig party nomination for President in 1848 and he was elected in the following November. Though with little education and no political experience, he showed good sense and judgment, but died in the second year of his term, July 9, 1850.

**Tayra** (t'ra; *Galera barbata*), a carnivorous animal allied to the glutton, found in South America. In color it is black, save a large white patch on the breast.

**Tchad** (châd). CHAD, or TSAD, a large fresh-water lake of Central Africa, in the Soudan, having the territories of Bornou, Kanem, and Bagirmi surrounding it; length, about 150 miles; breadth, about 100 miles; area, about 20,000 square miles, with a variable expanse according as it is the wet or dry season. Its principal feeder is the Shari from the south, and its shores are low and marshy. The lake (which has no outlet) swarms with turtles, fish, crocodiles, and hippopotami. It contains a number of small islands, which are densely peopled, as are also great part of its shores, especially on the west, where is the large town Kuka, capital of Bornou.

**Tcherkask** (cher'kask), or NOVOTCHERKASK, a town situated on the Don, and capital of the Don Cossack country, Russia. The town is well built, and has a cathedral, college, library, market place, etc. Pop. 52,005.

**Tcherkassy** (cher-kas'sé), a town, government of Kieff, Russia, situated on the Dnieper, 190 miles southeast of Kieff. It is built of wood, and has a considerable trade. Pop. 29,620.

**Tchernigov** (cher-ne'gov), TCHERNIGOFF, or TCHERNIGOW, a government of Little Russia, situated on the left bank of the Dnieper; area, 20,232 sq. miles. The country is chiefly an undulating plain, fertile for the most part, and watered by the Soj, the Desna, and the Dnieper. Agriculture and cattle-breeding are the chief employments; corn, linseed, timber, tobacco, and sugar are exported. Pop. 2,322,007.—TCHERNIGOV, the capital, is situated on the Desna, about 80 miles N. N. E. of Kieff. It is the see of an archbishop, has a cathedral, a college, hospital, etc., and a considerable trade. Pop. 27,028.

**Tchernozem** (chern'ô-zem), the name for a black soil in Russia of extraordinary fertility, covering at least 100,000,000 acres, from the Carpathians to the Ural Mountains, to the depth of from 4 to 20 feet, and yielding an almost unlimited succession of similar crops without preparation.

**Tcherny.** See *Czerny*.

**Tchudes** (chû'dés), a name applied by the Russians to the Finnic races in the northwest of Russia. It has now acquired a more general ap-

plication, and is used to designate the group of peoples of which the Finns, the Estonians, the Livonians, and Laplanders are members.

**Tea** (*Thea*), a genus of plants, nat. order Ternstroemiaceae (that to which the camellia belongs), comprising the species (*T. sinensis* or *chinensis*) which yields most of the tea of commerce. By different modes of culture this species has diverged into two distinct varieties, entitled *Thea viridis* and *Thea bohea*. The former is a large hardy evergreen plant with spreading branches and thin leaves from 3 to 5 inches long; the latter is a smaller plant, and differs from the other in several particulars. From both, according to the process of manufacture, black and green teas are procured. The tea plant is cultivated not only over a great part of China, but also in Japan, Tonquin, Cochin-China, Assam and other parts of India, and Ceylon. It has also been experimentally introduced into Carolina, Brazil, and Australia. Its growth is chiefly confined to hilly tracts; it is raised from seed, and the rearing of it requires great skill and attention. In seven years the plant attains the height of 6 feet, and the leaves are plucked off carefully one by one four times a year. In their green condition they are placed in a hot pan over a small furnace, and then rubbed lightly between the palms of the hands, or on a table. This process is repeated until the leaves become small, crisp, and curled. The black teas thus prepared include bohea, congou, souchong, and pekoe; the green teas, twankay, hyson-skin, young hyson, hyson, imperial, and gunpowder. Green tea gets less of the fire than black tea. The broken leaves, stalks, and refuse of the tea are compressed into solid bricks, which are imported by the Russians into the greater part of Central Asia, where (besides being used as a sort of coinage) they are sometimes stewed with milk, salt, and butter. There is considerable adulteration in the teas sent from China to the European market, and they are often artificially colored with a mixture of Prussian blue, or of gypsum and indigo carefully mixed. The infusion of tea-leaves in hot water yields a beverage which has little nutritive value, but it increases respiratory action, and seems to have a stimulative and restorative action on the nervous system. This is chiefly due to the essential oil and the theine (an alkaloid in its nature identical with the caffeine in coffee) which it contains, while the tannin, which is also present, acts as an astringent. If the

water is boiling, an infusion of ten minutes is sufficient to extract all the theine, and a longer period only adds to the tannin in the beverage, a result which is very hurtful to digestion. From historical sources we learn that tea was used in China as a beverage in the sixth century, and two centuries after its use had become common. In England we first find it mentioned about 1615 by an agent of the East India Company; in 1660 Pepys says in his diary, 'I did send for a cup of tea, a China drink, of which I never had drunk before'; and in 1664 the East India Company made a present to the king of 2 lbs. 2 oz. In the year 1678 the import of tea to Britain was 5000 lbs., but forty years after it reached 1,000,000 lbs. and is now more than 250,000,000. China, until recent years, held almost a monopoly in the production of tea, but now India and Ceylon have entered the market as important competitors, and the product of Japan is large. Britain is the principal tea consuming country in the world, coffee being less in favor there than in many other countries, the United States and Canada for example. Tea is also very largely used in Russia and in great part of Asia. The tax laid on tea and the effort to force the colonists to use it, was one of the chief instigating causes of the American Revolution.

**Teak** (tèk; *Tectona grandis*), a tree of the nat. order Verbenaceæ, a native of different parts of India, as well as of Burmah and the islands from Ceylon to the Moluccas. It grows to an immense size, and is remarkable for



Teak (*Tectona grandis*).

its large leaves, which are from 12 to 24 inches long, and from 6 to 18 broad. The wood, though porous, is strong and durable; it is easily seasoned and shrinks but little, and from containing a resin-

ous oil it resists the action of water, and repels the attacks of insects of all kinds. It is extensively used in ship-building and for many other purposes. — *African teak*, a timber similar to East Indian teak, is believed to be the produce of *Oldfieldia africana*, nat. order Euphorbiacæ.

**Teal** (tèl), the common name for ducks of the genus *Querquedula*, the smallest and most beautiful of the Anatidæ, or duck family. The common teal (*Q. crecca*) is an annual visitor to Britain, remaining in parts of Scotland all the year. North American species include the green-winged teal (*Q. carolinensis*) which is very like the common teal, and the blue-winged teal (*Q. discors*), somewhat larger than the common teal, and easily domesticated.

**Teasel** (tè'sei), the English name of several plants of the genus *Dipsacus*, nat. order Dipsacæ, allied to the composite order. One species (*D. sylvestris*) grows wild in England, and in this country in hedges from Massachusetts to Indiana. Another species, the fuller's teasel (*D. fullonum*), by some regarded as a mere variety, is cultivated for the sake of the awns of the head, which are employed to raise the nap of woolen cloths.

**Tebeth** ('sè'beth), the tenth month of the Jewish ecclesiastical year, beginning with the new moon in December and ending with the new moon in January.

**Technical Education.** The term technical education, properly speaking, includes the field of all instruction relating to the arts, sciences, professions, and trades; but in common use it is restricted to the field of the industrial arts, and more particularly to that instruction in which theory rather than practice bears a preponderating part. The courses offered extend over four years and lead to the B.S. degree, one or two further years of study being required for professional degrees, viz., C.E. (civil engineer), E.E. (electrical engineer), etc. The courses which may generally be found are the following: engineering usually in all branches, chemistry, physics, architecture, mining and metallurgy. For the two last-named subjects special schools have been developed, especially in those states where mining is the chief industry, such as Colorado, New Mexico, Montana, and Michigan. In addition to lectures and laboratory practice, in most technical schools practical experience, under actual conditions, is demanded from students before proceeding to a degree.

**Technology** (tek-nol'j-i), that branch of knowledge which deals with the various industrial arts. There are a number of schools of technology in the United States devoted to the study of civil, electrical, mining, and mechanical engineering and similar subjects. Among these are the Massachusetts Institute of Technology, at Boston, the Stevens Institute of Technology, at Hoboken, N. J., the Case School of Applied Science, at Cleveland, Ohio, the Towne Scientific School at the University of Pennsylvania, Sibley College at Cornell, the Armour Institute at Chicago, the Sheffield and Lawrence Scientific Schools, at Yale and Harvard respectively, the School of Mines at Columbia, etc.

**Teck**, ALEXANDER, PRINCE OF, was born in Kensington Palace, London, April 14, 1874, third son of the Duke of Teck and Princess Mary Adelaide. He served with honor at Matabeleland in 1890, and in South Africa, 1890-1900. On May 7, 1914, he was appointed Governor-General of Canada.

**Tecoma** (te-kō'ma), a genus of plants, nat. order *Dignoniacæ*. The species are erect trees or shrubs or climbing plants, with usually pinnate leaves, and terminal panicles of dusky red or orange flowers. There are about 80 species, some of them as *T. impetiginosa*, medicinal.

**Tectibranchiata** (tëk-ti-brank-i-a'-ta), a division of gasteropodous mollusca, comprehending those species in which the gills are protected by a shell, or by the mantle, including the sea-hare and others.

**Tecumseh** (te-kum'seh), or Tecumtha, chief of the Shawnee Indians, born in 1708. After taking part in numerous battles he joined his brother Elakwatawa in 1805 in trying to organize the Western Indians against the whites. During his absence his brother attacked General Harrison and was defeated at Tippecanoe, November 7, 1811. This put an end to Tecumseh's plans and in the war that followed he joined the British. He was killed at the battle of the Thames, October 5, 1813.

**Teddington** (ted'ing-tun), a town of England, in the county of Middlesex, on the Thames, and about 13 miles s. w. of London. Pop. 17,840.

**Te Deum** (të dë'um), a name (from the opening phrase, *Te Deum laudamus*) of the well-known Latin hymn usually ascribed to St. Ambrose and St. Augustine, although it cannot be traced farther back than the end of the fifth century. It is used in the ritual of Roman Catholic and Anglican churches.

**Teel** (tëi), TEEL-SKEED, an Indian name for *Sesamum indicum* and its seed. See *Sesamum*.

**Tees** (tëz), a river in England, which rises near Cross Fell, in Cumberland, and marks the southern limit of the county of Durham, to its mouth in the North Sea, where it forms an estuary. Its whole course is between 70 and 80 miles.

**Teeth**, the name given to certain hard structures growing out of the jaws of vertebrate animals, and serving as the instruments of mastication. The teeth of animals differ in shape, being destined for different offices. In man and the higher mammals two sets of teeth are developed, the early, milk, or deciduous teeth, and the permanent set. In fishes the teeth fall off and are renewed repeatedly in the course of their lives. Teeth do not belong to the skeleton, but to the skin or exoskeletal parts of the body, and are homologous with hairs. In man the teeth are imbedded in sockets in the upper and lower jawbones. There are thirty-two in all, sixteen in each jaw, and each consists of the crown or visible part, and the fangs or buried part. The four central teeth of each jaw having chisel-shaped crowns with sharp edges are called incisors; on each side of these four is the pointed canine tooth (which in the upper jaw is called the eye-tooth); on each side of these are two bicuspids teeth (premolars); and behind these again are the molar teeth, three on each side. (See *Dental Formula*.) The last of the permanent teeth to appear are the farthest back, grinding teeth, which, owing to their arrival between the seventeenth and twenty-fifth years, are called the wisdom teeth. Each tooth has a central cavity filled with a soft pulp containing blood-vessels and nerves; this cavity is surrounded by dentine, a hard substance composed of phosphate and carbonate of lime; outside the fang is a cement-like substance resembling bone; while outside the crown is a hard enamel. In young teeth the enamel is covered by a delicate membrane called "the skin of the teeth," which in adult teeth is worn off. Toothache is due to decay of the substance of a tooth, dental caries as it is called. When the enamel which covers the tooth becomes flawed the underlying dentine is exposed and soon breaks down. When the decay, passing inward, reaches the pulp which contains the blood-vessels and nerves it causes inflammation, aching, and suppuration. Any treatment of toothache, short of extraction, is seldom satisfactory if the



pulp has been actually attacked; but neuralgia is often mistaken for toothache. See *Dentistry*.

**Teetotalism.** See *Temperance*. *Sect-etices*.

**Teff** (*Eragrostis Abyssinica*), a grain extensively cultivated in Abyssinia, having seeds about the size of those of millet.

**Tegnér** (teng-när'), ESAIAS, a Swedish poet, born in 1782, studied at the University of Lund, became in 1812 professor of Greek literature, and in 1824 was appointed bishop of Växjö, where he died in 1846. Among his works may be mentioned his *Frithiofs Saga*, an epic poem, repeatedly translated into English; his national song of the *Goths*; *Lion*; and *The Children of the Lord's Supper*, translated by Longfellow.

**Tegucigalpa** (tä-gü-sä-gäl'pā), the capital of Honduras, on the Rio Grande, about 3370 feet above the sea, surrounded by mountains, with a venerable old church, a high school, and an active trade. Pop. about 35,000.

**Teguexin** (te-geks'in; *Teius Tegucanin*), a species of lizard inhabiting tropical America. A full-grown specimen may exceed 5 feet in length, and they are able to swim with great ease and rapidity.

**Teheran** (te-her-än'), capital of Persia, in Irak Ajemi, towards the northeast of the province, 68 miles south of the Caspian Sea, at the southern base of Mount Elburz. It is 4 miles in circuit, surrounded by a strong wall, flanked by numerous towers, with a broad dry ditch, and glacis. The city has six gates, from which the main streets lead to the bazaar in the center of the town. Since 1870 the city has been much improved, the streets being lighted with gas and laid with tramways. The principal edifice is the citadel-palace of the shah, which has considerable strength, but little architectural merit. During the summer months the court removes (on account of the intolerable heat) to more agreeable quarters on the heights to the north, and a third of the inhabitants (including the European embassies) follow the royal example. The principal manufactures are carpets, silks, cottons, and articles in iron. Pop. (in winter) 280,000.

**Tehri** (tä-rä'), a state of Hindustan. See *Garhwāl*. TEHRI is also a name for the state of Orchha (which see), and for its capital, an ill-built town with a pop. of 33,811.

**Tehuacan** (tä-wä-kän'), a town in the state of Puebla, Mexico, at the southern extremity of the high-

lands of Anahuac, on the right bank of the Salado, and 125 miles southeast of the city of Mexico. Pop. 7180.

**Tehuantepec** (tä-wän-tä-pek'), a town of Mexico, in the state of Oaxaca, 14 miles above the mouth of a river of the same name, falling into the Pacific Ocean. On account of a dangerous bar the river is little used for navigation. Pop., mostly Indians, 10,380. The town is near the south side of the ISTHMUS OF TEHUANTEPEC, the narrowest part of N. America, having the GULF OF TEHUANTEPEC on the Pacific side, the Bay of Campeachy on the Atlantic side; width, about 115 miles. There have been various schemes for constructing a canal or a ship railway across the isthmus, the most recent of the latter sort being that of an American engineer named Eads. See *Ship Railway*. A railroad now crosses the isthmus and a large and valuable trade has developed. It is expected to compete with the Panama Canal when finished, as furnishing a much shorter Atlantic-Pacific route from northern ports.

**Teignmouth** (tän'mnth), a seaport and market-town of England, in the county of Devon, at the mouth of the Teign, which is here crossed by a wooden bridge 1671 feet in length. It is divided into East Teignmouth and West Teignmouth. East Teignmouth, which is the more modern, is almost entirely appropriated as a watering-place. West Teignmouth, the port and principal seat of business, has a safe and commodious harbor. The fisheries employ a considerable number of the inhabitants. Pop. (1911) 9221.

**Teinds** (tēnds), the Scotch law term for tenths or tithes of the fruits of the land. In the majority of instances the teinds now belong to the owners of the land formerly paying them, to the crown, or other proprietors, they being charged in all cases with the payment of the parish minister's stipend.

**Telamon.** See *Atlantes*.

**Telantograph** (tel-an'tō-graf), a writing telegraph, invented by Professor Elisha Gray, based on a novel system of transmission, whereby a fac simile reproduction of the handwriting of the sender of a message is effected. See *Telegraph*.

**Teledu** (tel'e-dō), a Javanese carnivorous quadruped, family Mustelidae, allied to the skunk, and like it, when provoked, capable of diffusing a most abominable stench; the stinkard (*Mydaus melioeps*).

**Telegraph** (tel'e-graf), a general name for any instrument or apparatus for conveying intelligence beyond the limits of distance at which the voice is audible, the idea of speed being also implied. Thus the name used to be given to a semaphore or other appliances for signaling, which are now designated as *signaling apparatus*. The



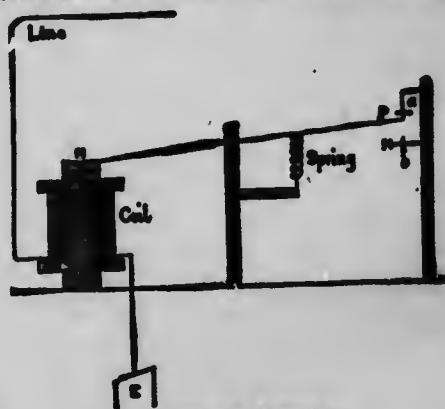
Single-needle Instrument.

word telegraph has come to be restricted in its application to the electric telegraph, which from its power of rapidly conveying elaborate communications to the greatest distances has completely out-rivalled all others. The electric telegraph, as comprising the entire system of apparatus for transmitting intelligence by electricity, consists essentially (1) of a battery or other source of electric power; (2) of a line-wire or conductor for conveying the electric current from one station to another; (3) of the apparatus for transmitting, interrupting, and if necessary reversing the current at pleasure; and (4) of the indicator or signaling instrument. The line wires for overhead lines are usually of iron, protected from atmospheric influence by galvanizing or by being varnished with boiled linseed-oil, a coating of tar, or other means, and are supported upon posts, to which they are attached by insulators. (See *Insulator*.) In underground lines the wires are insulated by a gutta-percha or other non-conducting covering, and inclosed in iron or lead pipes. The battery and line-wire are common to all telegraphic systems; it is in the method of producing the signals that the great variation exists; but in all of them advantage has been taken of one or another of the three following properties of the current: (1) its power of producing the deflection of a magnetic needle, as in the galvanometer (which see); (2) its power of temporarily magnetizing soft iron; and

(3) its power of producing chemical decomposition.

The *needle-telegraph* of Cooke and Wheatstone is an application of the first of these properties. This, the earliest form of telegraphic instrument, originally employed five needles, each worked by two wires. The number was subsequently reduced to two, and now only one wire is used. This hangs vertically, but can move to right or left between two stops. The signals are formed by combinations of the deflections in the two directions. These are variously combined to represent the letters of the alphabet, the Morse code being used. The needle-telegraph was never adopted out of England, and even here the Morse has been generally substituted for it.

The *electro-magnetic* instrument of Professor Morse is an application of the second of the above properties. By means of an electro-magnet, an armature which is attracted when the magnet is temporarily magnetized, a lever moved by the armature, and a style which moves with the lever, this instrument impresses a message in dots and dashes on a ribbon of moving paper, and by it forty words may be sent in a minute. This 'dot and dash' system which was invented by Morse is now in very general use. A modification of this instrument, called a *sounder*, in which the lever makes audible sounds by coming in con-



Receiver or Sounder.

tact with a brass rod, indicates the message by the length of the strokes produced. This is shown in the illustration, which shows the arrangement, by which the hammer-head H is attracted, and the arm H P is brought into contact with the pin a. Upon the cessation of the current, the spring brings down the arm upon the pin b. Frequently the Morse

is simultaneously a recorder and sounder. It being necessary that this instrument should produce sharp and distinct impressions, and the current being weak for stages over 50 miles, a relay, or subsidiary electro-magnetic circuit, is added to it in the case of longer distances. The transmitting instrument is a lever, which, on being pressed, permits the current from the battery to flow into the line-wire during the time the contact is made. Both on account of its intrinsic merits and for the sake of uniformity the Morse is the most extensively used system, being that in use in America and on the continent of Europe, and being also largely employed in Britain.

Hughes' printing telegraph is the instrument chiefly used by the submarine telegraph companies. It works with one line of wire, and has about three times the speed of the Morse system, with the advantage that the message is printed in the ordinary Roman type. The machine is rather complicated, but its principle can be easily understood. A wheel having type engraved on its rim is made to revolve at a known rate; a strip of paper, as in the case of the Morse, is drawn off a drum over a roller which lies under the rim of the revolving type-wheel; by means of the current the roller with the paper is raised against the type-wheel as the proper letter passes, and in this way the despatch is printed. The operator works on a keyboard much like that of a piano. Chemical telegraphs work on the principle that an iron wire pressing against a paper prepared with cyanide of potassium or other substance will, while a current is passing between the wire and the paper, produce a dark streak of Prussian blue or other mark, and when the current is interrupted the streak of pigment is interrupted. Bonelli's telegraph is worked by means of five wires. The message is set up in brass types in one line; the letters are common block letters: five styles, like the teeth of a comb, press against the raised portions of the type, and as the line of type is drawn through each style sends a current along its wire to a corresponding style pressing against prepared paper at the distant station, making a mark on the paper there corresponding to the raised portion of type which sends the current. The chief objection to Bonelli's telegraph is the five wires necessary between the stations. Autographic telegraphs are chemical telegraphs, and consist of a message written with a pen dipped in some non-conducting substance on a surface of tin-

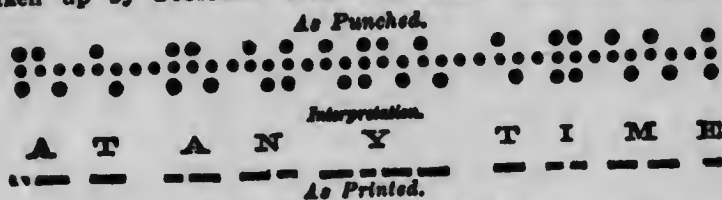
foil or other conducting material pasted on a cylinder which is made to revolve at a certain rate; a style presses against the surface, and is moved up or down the cylinder at a certain rate so as to describe a helical line; a current passes between the cylinder and style except when the non-conducting writing comes between them; at the distant station a similar cylinder covered with paper prepared with cyanide of potassium revolves at the same rate as the first cylinder; and its style being connected with the first style by means of the telegraph wire makes a mark of Prussian blue, which is a continuous helix, except when the current is interrupted at the first style. In this way a copy of the message in the handwriting of the sender is produced at a distant station. Bain's automatic telegraph is Bonelli's telegraph, wherein by adopting the Morse alphabet one wire is sufficient; and the type is simply a strip of paper with dots and dashes punched in it. In addition to the delicate *mirror* or *reflecting galvanometer*, which Sir W. Thomson invented in connection with the Atlantic telegraph, that distinguished electrician invented a self-recording instrument, consisting of a light coil of wire, very delicately suspended in a magnetic field the motions of which coil, when a current is passed through it, are the means by which messages are recorded. The coil is attached to a very light glass siphon in the shape of an exceedingly fine capillary tube, through which ink from a reservoir is drawn by electric attraction. The reservoir and the moving paper ribbon upon which the ink falls being oppositely electrified. The extremity of the siphon is not in contact with, but only very near the paper. When there is no current the ink traces a straight line; when the current is passing the marks or deviations constituting the letters are produced. The delicacy and rapidity of this instrument are even greater than those of the mirror galvanometer, and the siphon recorder accordingly is highly valued.

As early as 1747 Bishop Watson showed that signals might be sent through a wire stretched across the Thames by discharging a Leyden-jar through it. In 1753 there appeared in the Scots Magazine a letter signed C. M., in which the idea of signaling by means of electric discharges is put forward. Lesage, 1774, erected at Geneva a telegraph line consisting of twenty-four wires connected with the same number of pith-ball electroscopes, each representing a letter. Reusser, in Germany, pro-

posed in the same year to replace the electroscopes by spangled panes exhibiting the letters themselves. Volta's discovery of the galvanic pile, and Oersted's discovery of electro-magnetism, by supplying electricity of a kind more easily retained on the conducting wires, afforded much greater facilities for transmitting signals to a distance. Ampère, in 1820, proposed to utilize Oersted's discovery by employing twenty-four needles to be deflected by currents sent through the same number of wires; and Baron Schilling exhibited in Russia, in 1832, a telegraph model in which the signals appear to have been given by the deflections of a single needle. Weber and Gauss carried out this plan in 1833 by leading two wires from the observatory of Göttingen to the Physical Cabinet, a distance of about 9000 feet. The signal consisted in small deflections of a bar-magnet suspended horizontally with a mirror attached, on the plan since adopted in Thomson's mirror galvanometer. At their request the subject was earnestly taken up by Professor Stein-

Wheatstone and Cooke on the London and Birmingham and Great Western railways. The wires, which were buried in the earth, were five in number, each acting on a separate needle, but the expensiveness of this plan even led to its being given up, the needles, and finally the single-needle system replacing it.

This historical sketch may be completed by a statement of the more recent inventions of importance in telegraphic science. The first great improvement after the general introduction of the Morse system came in the *multiple* or *synchronous* system, which was first suggested as early as 1852. The early forms of this system proved unsatisfactory, but DeWey's later invention, introduced about 1885, supplied a practical multiplex telegraph, by which several messages could be sent simultaneously. The principle involved is the synchronous rotation of sets of mechanism at opposite ends of a line. The difficulty to be met is that of maintaining perfect synchronism. This system differs in principle



Wheatstone's Automatic System.

hell of Munich, whose inventions contributed more perhaps than those of any other single individual to render electric telegraphs commercially practicable. He was the first to ascertain that earth connections might be made to supersede the use of a return wire. He also invented a convenient telegraphic alphabet, in which, as in most of the codes since employed, the different letters of the alphabet are represented by different combinations of two elementary signals. His currents were magneto-electric, like those of Weber and Gauss. The attraction of an electro-magnet on a movable armature furnishes the means of signaling which is the foundation of Morse's telegraphic system, introduced in 1844, and notable for its convenient alphabet, now in use in all parts of the world. About the year 1837 electric telegraphs were first developed as commercial speculations in three different countries. Steinhell's system was experimented with at Munich, Morse's in America, and Wheatstone and Cooke's in England. The first telegraphs ever constructed for commercial use were laid down by

ple from that of *duplex telegraphy*, developed by a number of inventors, and now in general use in America and Europe. Edison's *quadruplex* system, introduced in 1884, is an improvement upon the duplex. In this two keys are provided in the sending circuit, and two relays, each having a coil in both the line-circuit and compensation-circuit. One key reverses the current, and the other brings into the circuit three times as much battery power, which permits of the two extra workings. A variety of other printing telegraphs have supplemented that of Hughes, including the Phelps and House machine, the Rogers, Gray's *telautograph*, and various others. In the Gray instrument two wires are used and written messages are reproduced. The writing instrument may be an ordinary pencil, the pen of the receiver being a glass tube, carrying its ink capillaryly. The duplication of the motions of the pencil at the transmitter is performed by current impulses controlled by the shortening or lengthening of two silk cords to which the pencil is attached. By a complex mechanism the



Impulses at the transmitter are so duplicated at the receiver as to cause two aluminum arms to shift the receiving pen along positions similar to those assumed by the sending pencil and the silk cords, so that the record at the receiver is always a fac simile of that at the transmitter, whether words, figures, signs, or sketches are made. The transmission of drawings can be made by this and several other instruments.

In the *printing telegraph* of recent invention the message is prepared by a species of typewriting machine, which punches holes in a paper tape, which tape is fed automatically through a transmitter, having minute levers which make connections through the holes in the tape and send corresponding impulses over the wire. The speed of this instrument depends on the rapidity with which the typewriter can be worked, as the tape can be sent through the transmitter at almost any speed. Two hundred or more words a minute can be sent. Despite the rapidity of these methods, however, the simple Morse system still holds its own, all more rapid ones suffering from some degree of complication. An interesting development of telegraphy is that of sending messages from moving trains. This is done by induction from an instrument in the train to an external wire. The cost and little need of this system has prevented it from coming into use. For the most recent and one of the most interesting discoveries in telegraphy see *Wireless Telegraphy*.

**Telegraph Cable.** See *Submarine Cable*.

**Telegraph-plant** (*Desmodium gyrans*), an Indian leguminous plant, with small lateral leaflets, which display a strange spontaneous motion, especially in a warm, moist atmosphere. They jerk up and down as if signaling, as many as 180 times in a minute, and also rotate on their axes.

**Telemachus** (te-lem'a-kus), a son of Ulysses and Penelope, who is reputed to have gone through many adventures in search of his father after the close of the Trojan war. He is the hero of a French prose epic by Fénelon (1699).

**Telemeter** (tei-em'e-ter), a device for measuring distances; a distance-meter. The simplest forms consist of telescopes containing parallel wires accurately spaced, or there may be two telescopes at stations of known distance apart, the difference in the angles of observation affording a basis for calculating the distance of the object observed.

This principle has been developed in the modern range-finder. Acoustic telemeters record the time between the flash of a gun and the hearing of the report.

**Teleology** (tei-e-oi'ô-ji), the science or doctrine of final causes; the doctrine which asserts that all things which exist were produced by an intelligent being for the end which they fulfill.

**Teleosaurus** (tei-e-ô-sa'rus), a genus of fossil crocodiles, occurring in the lower Jurassic rocks. They are found with marine fossils, and seem to have been especially fitted for an aquatic life.

**Teleostei** (tei-e-on'te-i), a large and important sub-class of the class of fishes, distinguished primarily by the usually bony nature of the skeleton as compared with the cartilaginous skeletons of some other sub-classes. Almost all our common fishes are included in this order. See *Ichthyology*.

**Telepathy** (tei-ep'a-thi), thought transference from mind to mind through intermediate space. This word was coined about 1886 by the Society for Psychical Research to indicate the supposed cause of various phenomena observed. These were very numerous and varied, and sufficed to convince many members of the Society that such a power existed, they maintaining that the facts observed by them admitted of no other explanation. These facts consisted of drawings made by a sensitive when surrounded by others, who concentrated their thoughts on the object to be drawn; the successes far surpassing those likely to be due to chance. In addition were communications received mentally from a distance, occasionally a very great one, conveying some intelligence of a personal character that was afterwards corroborated. Many maintain that the phenomena known as spirit communications are telepathic in their origin, and to sustain this give a great expansion to the power of thought transmission.

**Telephone** (tei'e-fôn), an instrument for transmitting the human voice or other sounds by means of electricity and telegraph wires. About the year 1860 the idea that sound-producing vibrations could be transmitted through a wire by means of electricity began to be recognized by several men of science. Reis of Frankfort invented an apparatus which could reproduce at a distant station the pitch of a musical sound by means of a discontinuous current along a telegraph wire. A great step in advance was made in 1876, when Prof. Graham Bell discovered an articulating telephone which depends upon the

principle of the undulating current, and by means of which the very quality of a note, and therefore conversation itself, could be reproduced at a distant station. Elisha Gray had made a similar invention at the same time, and Bell and Gray applied for a patent on the same day, Feb. 14, 1876. Bell's application came first and the patent was granted him. The telephone was first shown in public at the Centennial Exposition of 1876, at Philadelphia. Several varieties of telephonic apparatus are now in use for inter-communication between distant places. The Bell telephone in its common form is shown in the accompanying cut. A strong ordinary bar-magnet has round one of its ends a coil of fine silk-covered wire in metallic communication with the two terminals *ss*. One of the terminals communicates through a telegraph wire with one of the terminals of the coil of a precisely similar instrument at the other station, the remaining pair of terminals being connected

everywhere employed. The telephone is now an established institution throughout Europe and America. Copper wire is generally employed in the lines in preference to iron, on account of its superior power of electric conduction. Telephone exchanges exist in all the principal towns, subscribers to which have their houses or places of business in direct communication with each other. Long distance lines are also rapidly joining city to city, lines between New York and Chicago having been years in existence, while greater distances have been covered both in America and Europe. In the United States the telephone has made greater strides than in any other country. There is scarcely a village or small town but has its telephone exchange, while in the large cities there are many thousands in use. Throughout the country they may be found in many farm-houses and serve to reduce the isolation of the farmer's household. There are at present more than 22,000,000 miles of telephone wire in use in the United States and 37,000,000 in the world. See *Wireless Telephony*.



Bell Telephone Receiver.

## Telephote

(te'le-fōt), an instrument for telegraphing images of objects by the agency of electricity acting on selenium, the electrical resistance of which varies greatly with increase or diminution of light. It was invented in London in 1891.

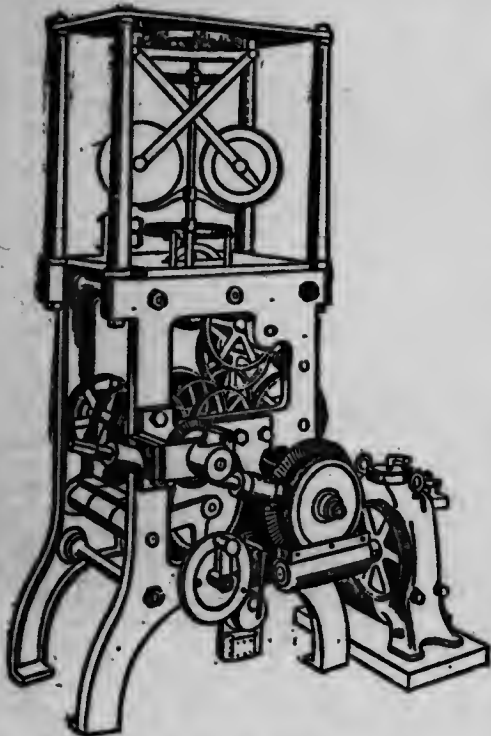
## Telescope

an optical instrument essentially consisting of a set of lenses fixed in a tube or a number of sliding tubes, by which distant objects are brought within the range of distinct, or more distinct vision. The law of action by which the telescope assists human vision is twofold, and that under all the varieties of its construction. A distant object viewed by the unaided eye is placed in the circumference of a large circle, having the eye for its center, and consequently the angle under which it is seen is measured by the minute portion of the circumference which it occupies. Now, when the distance is great, it is found that this angle is too small to convey to the retina any sensible impression—all the light proceeding from the object is too weak to affect the optic nerve. This limit to distinct vision results from the small aperture or pupil of the eye. The telescope substitutes its large object lens or reflector for the human eye, and consequently receives a quantity of light proportioned to its area or surface; hence a distant point, imperceptible by the eye alone, is rendered visible by the aid of the telescope. The rays of light, after transmission or reflection, converge to a point as they at

through the earth, or through a return wire. Just in front of the extremity of the magnet there is a thin plate of iron *p*, and in front of this again there is the mouth-piece of a speaking-tube *o*. By this last the sounds to be transmitted are collected and concentrated, and falling on the metal plate cause it to vibrate. These vibrations in their turn excite undulating electric currents which correspond exactly with the vibrations; that is, with the original sounds. The electric currents being transmitted to the receiving telephone cause corresponding vibrations in the plate or disc in it, and these reproduce to the ear the original sounds. A telephone invented by Edison is based upon the variation of resistance to the electric current of carbon with variation of pressure. The microphone, in the invention of which both Edison and Berliner claim priority, is the basis of the carbon telephone. It has not come into use, the Bell principle being

## Telescope

first proceeded from a point, and thus an image of the object is formed which, when viewed by the eye-piece or lens, is more or less magnified. The telescope therefore assists the eye in these two ways: it gathers up additional light, and it magnifies the object; that is to say, its image. The *refracting telescope* is constructed of lenses alone, which, by successive refractions, produce the desired effect. This instrument was formerly very cumbersome and inconvenient, inasmuch as its length had to be increased considerably with every accession of



Driving-clock of the 26-inch Equatorial Telescope of the U. S. Naval Observatory at Washington.

power; but the substitution of achromatic for ordinary lenses has rendered it more portable and convenient. The *reflecting telescope* is composed of specula or concave reflectors (see *Speculum*) aided by a refracting eye-piece. To this instrument we owe some of the most wondrous discoveries in astronomical science. The names of Newton, Gregory, Herschel, and Lord Rosse are connected with its history. The following diagrams exhibit the principles of construction and action in both sorts of tele-

## Telescope

scopes. In fig. 1, which illustrates the refracting telescope in its simplest form, A and B are two lenses of different focal lengths. Rays of light from a distant object falling upon the object-glass A are converged to a focus at C. The eye-glass B, placed at its focal distance from the point of convergence, gathers up the diverging rays and carries them parallel to the eye, magnifying the image formed at C. (See *Optics*.) The magnifying power of the instrument is as AC:CB,

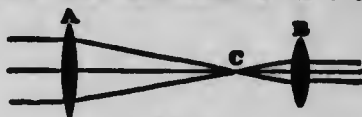


Fig. 1.

or as the focal length of one lens to that of the other. In this construction the object is seen inverted or turned upside down, and hence it is unsuitable for terrestrial purposes. To render the image erect, and thus show it in its natural position, a more complicated eye-piece, consisting of two additional lenses, is necessary. Another refracting telescope, consisting of two lenses in its simplest form, is called the Galilean telescope. It differs from the former in having a concave lens for its eye-glass, which lens is placed nearer the object-glass than the focus of this lens, producing an image which is not inverted. This kind of telescope is the one used in opera-glasses and field-glasses. Fig. 2 shows the structure



Fig. 2.

of the reflecting telescope as constructed by Dr. Gregory. AB is a large speculum perforated in the center; upon this fall the rays b, a and d, c, which are reflected to convergence at e. A smaller speculum, c, takes up the diverging rays and reflects them, slightly converging, through the aperture o, where they are received by a lens, and, after transmission, they intersect at s, and proceed to the eye-glass, whence they emerge parallel. The magnifying power of this instrument is great for its length. In the telescope invented by Sir William Herschel there is no second speculum, and no perforation in the center of the larger one placed at the bottom of the tube. The latter is fixed in an inclined position so that the image,

formed by reflection falls near the lower side of the tube at its open end or mouth, where it is viewed directly by an eyepiece, without greatly interfering with the light. This arrangement, in the case of large reflectors, is imposed by their great weight and difficult management. Were it otherwise the ordinary construction would be preferred, the inclination of the speculum being a disadvantage. Chromatic aberration, which arises from the different refrangibilities of the different colored rays, and leads to the formation, by a lens, of a separate image of a bright object for each colored ray, is remedied by achromatizing the lens, that is, by constructing it of two or more lenses of different kinds of glass, so that the colors, separated by one, shall be reunited by the others. (See *Achromatic*.) The most powerful refracting telescope yet made is that in the Yerkes Observatory, Wisconsin, which has an object-glass 40 inches in diameter. Next in size is the 36-inch telescope at the Lick Observatory, California. The Rosse telescope is the largest reflecting telescope, its lens being 6 feet in diameter. The Carnegie reflector, now making, will have a 100-inch lens.

**Telescopium** (tel-eskōp'i-um), a small southern constellation, was introduced by Louis de Lacaille in 1751 after extended observations. He placed the Telescopium between Ara and Sagittarius. The constellation is now obsolete.

**Telescribe** (tel-eskrīb) or phonograph recorder, an instrument for recording telephone conversations, perfected by Thomas A. Edison in 1914. A phonograph record takes down every sound that comes over the wire, the recording apparatus being started or stopped by pressing a button. The chief use of the telescribe is in fixing exactly important business agreements by telephone; in case of dispute its decision will be final as to what was said by the persons concerned.

**Telescriptor** (tel-eskrip'tor), a form of printing-telegraph with keyboard transmitter and an automatic receiver of the revolving type-wheel pattern. The operator strikes the keys exactly as if he were writing on a typewriter, and the words come out on a strip of paper that unrolls before him, while at the same time the message is being written before the eyes of the man at the other end of the line.

**Telford, THOMAS**, engineer, born in 1757 at Eskdale, Dumfriesshire; became a mason and worked at his trade in Edinburgh, which in 1782 he quitted for London. Here he was befriended by Sir William Pultney,

through whom he was appointed surveyor of public works for Salop. He then exchanged his original occupation for that of civil engineer, and was intrusted with the construction of the Ellesmere Canal. In the years 1803 and 1804 the parliamentary commissioners for making roads and building bridges in the Highlands of Scotland, and also those for making the Caledonian Canal, appointed Telford their engineer, and thus an immense amount of work was carried out by him. Above thirty harbors were built or improved by him, some of which, as at Aberdeen and Dundee, were upon an extensive scale. He superintended the construction of a number of large bridges, and the execution of numerous important works for the metropolis. Besides the 900 miles of



Thomas Telford.

roads laid in Scotland he engineered a system of roads through the more inaccessible parts of Wales, which involved the erection of the magnificent suspension bridge across the Menai Straits, begun in 1820, and the Conway bridge, begun in 1822. He employed a system of road-making since known as the Telford. In 1806 he was employed by the Swedish government to lay out a system of inland navigation through the central parts of that kingdom. He died in 1834, and was interred in Westminster Abbey.

**Tell.** See *Algeria*.

**Tell, WILLIAM**, a famous peasant hero of Switzerland, reputed to have done some daring and wonderful feats in his resistance to the tyranny of the Austrian governor Gessler, but now proved to have been a mythical personage. He



is said to have belonged to the canton of Uri, and to have united with others belonging to this canton and to those of Unterwalden and Schwyz in resisting the Austrians. In particular, having refused to do homage to Gessler's hat, set upon a pole, he was seized and condemned to death, but was granted his life on condition of shooting with an arrow an apple placed on the head of his own son. This he did successfully, admitting at the same time that a second arrow he had was intended for Gessler in case of failure. He was therefore still kept a prisoner; but while being conveyed over the Lake of Lucerne he managed to leap ashore, and soon after, having lain in wait for Gessler, he killed him.

**Tell-el-Kebir** (tel-e-ke-bēr'), a village of Egypt, where the British troops under Wolseley defeated those of Arabi Pasha, September 13, 1882.

**Teller** (tei'er), HENRY MOORE, statesman, was born at Granger, New York, in 1830; died in 1914. He was a lawyer in Illinois and Colorado and was a major-general of Colorado militia in the Civil War. In 1866 he was elected to the United States Senate; appointed secretary of the interior in 1882, and in 1885 and 1891 again elected senator. He withdrew from the Republican party in 1896 and was reelected in 1897 as an Independent Free-silver Republican, and as a Democrat in 1903.

**Tellicherry** (tel-i-cher'i), a seaport of Hindustan, in the presidency of Madras, a healthy and picturesque town, built upon a group of wooded hills, with a citadel or castle in excellent preservation. It is a mart for sandalwood, coffee, etc.

**Tellurium** (tel-lūr'i-um), a metal first recognized as a distinct element in 1798. Symbol Te, atomic weight 127.5, specific gravity 6.27. It is a brittle, silvery-white element, melting at 452°C. and boiling at 478°C. Occasionally found native, but is very rare, and is mostly obtained in combination with other elements. It combines directly with hydrogen to produce telluretted hydrogen, a highly poisonous gas. There are two chlorides, the dichloride and the tetrachloride. Bromides and iodides are known. With oxygen it forms the dioxide and the trioxide, and a monoxide has been described. Two acids exist, tellurous acid and telluric acid. No well-defined normal salts in which tellurium acts as a metallic radical are known. Tellurium is found in Transylvania and other parts of Hungary, in the Altai silver mines and in North America.

**Telpherage** (tel'fer-ij), a system for the automatic transport of goods by means of electricity devised by Fleeming Jenkin in 1881. It consists of a line of steel rods or cables suspended from brackets or posts, 70 feet apart, and serving at once as a supporter of weights and a conductor of electricity. Buckets or other receptacles are hung from the line by a wheel or pair of wheels, and a small electrical motor, hanging below the line, supplies the power. Trains of buckets filled with goods may be conveyed at one time, or they may be carried forward in a continuous stream. The system was developed in conjunction with Professors Ayrton and Perry.

**Telshi** (tyel'shē), a town of Russia, in the government of Kovno, 150 miles N.W. of Vilna. It has a population of 7700.

**Telugu** (te-lū'gu), or TELINGA, one of the languages of India, belonging to the Dravidian group, and spoken in southern India by about twenty-one millions of people. The Telugu are the most numerous branch of the Dravidian race, but are less enterprising than the Tamils. The language is allied in roots to the Tamil language, but differs considerably otherwise.

**Tembuland** (tem'bō-land), a district of the Transkeian Territories in eastern South Africa, which are bounded by Cape Colony, Basutoland, and Natal. Tembuland has an excellent climate and a fertile soil, which is well suited for pastoral and agricultural purposes. The coast regions are adapted to the growth of sugar, cotton, and coffee. The minerals include coal and copper. Pop. 231,151.

**Temesvar** (tem'esh-vār), a town of Hungary, in the Temes Banat, on the river Bega and the Bega Canal, 75 miles N.N.E. of Belgrade. It is strongly fortified, and is for the most part well built, with spacious streets and squares. The principal buildings are the Greek Orthodox cathedral and other churches, the government offices, town-house, theater, various schools and colleges, arsenal, civil and military hospitals. The manufactures consist of woollens, silks, paper, tobacco, etc. Held by the Turks from 1552 to 1716, Temesvar was retaken by Prince Eugene. Pop. 72,555.

**Temnikov** (tyem-nyi-kov'), a town in the Russian government of Tambov, on the Moksha. Pop. 5737.

**Tempē** (tem'pē), VALLEY OF, a beautiful valley of northern Greece, in Thessaly, on the Peneus, much celebrated

by the ancient poets, having Mount Olympus on the north and Mount Ossa on the south.

**Tempera.** See *Distemper*.

**Temperance Societies.** The first association for the purpose of influencing public opinion in order to check the evil of intemperance was a society formed at Moreau, New York, in 1808. It was followed in 1818 by the Massachusetts Society for the Suppression of Intemperance. In 1826 a new impulse was given to the movement by the establishment in Boston on a more extensive plan of the American Society for the Promotion of Temperance, the first annual report of which announced the formation of thirty, and the second of 220 auxiliary associations. By 1831 more than 2200 societies, embracing 170,000 members, were in correspondence with the parent society. Reports of the movement in America soon began to have an effect on the other side of the Atlantic. In August, 1820, a society was formed in Ireland, and before a year had passed sixty organizations, with 3500 members, were in existence. In 1838 a great impetus to the movement was given by the Rev. Theobald Mathew, a Roman Catholic priest, who succeeded in less than two years in persuading 1,800,000 of his countrymen to renounce the use of ardent spirits. The first temperance society in Scotland, was established at Maryhill, near Glasgow, in October, 1820, and the Greenock and Glasgow and West of Scotland Temperance societies were constituted soon afterwards. On the 14th of June, 1830, the first temperance society in England was founded at Bradford, and by the close of the year there were in existence some thirty associations, numbering about 10,000 members. These societies went no further than the resolve to abstain from ardent spirits, the use of fermented liquors in moderation being permitted. But the principle of total abstinence soon followed. In 1832 the war against intoxicating liquors of all kinds was opened in England by Joseph Livesey of Preston, and by 1838 the total abstinence, or teetotal, party had triumphed all along the line, the old temperate or moderation party having gradually disappeared. Of late years many of the advocates of total abstinence have sought to enforce their views by legislative measures, as exemplified in the celebrated Maine Liquor Law (for the suppression of the manufacture and sale of intoxicating beverages), so called from the state in which a prohibitory law

was first enacted. Some other states passed similar laws, but at the end of the century only three maintained prohibition, Maine, Kansas, and North Dakota. In the early years of the twentieth century an active movement was instituted in favor of local option and state prohibition of liquor selling, beginning in the South, where negro drunkenness had become a serious evil, and extending to some of the states of the North. As a result, on January 1, 1911, complete prohibition existed in nine states, these being Maine, Kansas, North Dakota, Georgia, Alabama, Mississippi, North Carolina, Oklahoma, and Tennessee. Since that date active progress has been made in the temperance cause and nine more states have been added to the list. These include Arizona, Arkansas, Colorado, Idaho, Iowa, Oregon, Virginia, Washington and West Virginia. Among the important developments in the temperance movement are the organizations known as the Independent Order of Good Templars and the Anti-Saloon League. (See these titles.) The Woman's Christian Temperance Union, long under the presidency of Frances E. Willard, has been an influential Society.

**Temperature** (tem'per-a-tür) may be expressed as the state of a body with regard to heat, or to its power of communicating heat to other bodies. It often refers to the atmospheric heat of a locality at a particular time. When we speak of a body having a 'high' or a 'low' temperature it is implied that the condition of heat in the body may be compared with the thermometer. See *Thermometer*.

**Temperature of Animals.** See

*Animal*.

**Tempering** (tem'per-ing), in metallurgy, the process of giving to metals, principally iron and steel, the requisite degree of hardness or softness, especially the process of giving to steel the necessary hardness for cutting, stamping, and other purposes. If heated and suddenly cooled below a certain degree it becomes as soft as iron; if heated beyond that degree, it becomes very hard and brittle. The process essentially consists in plunging the steel when red-hot into cold water or other liquid to give an excess of hardness, and then gradually reheating it until the hardness is reduced or brought down to the required degree. The excellence of all steel-cutting instruments depends on the degree of temper given to them. Different degrees of temper are indicated by different colors which the steel assumes. Thus

steel heated to 450°, and suddenly cooled, assumes a pale straw color, and is employed for making razors and surgical instruments. See *Steel*.

**Templars**, an order of knights which had its origin in the Crusades. Hugues de Payens, Geoffroi de St. Omer, and others established it in 1118 for the protection of pilgrims in Palestine. Subsequently its object became the defense of the Christian faith, and of the holy sepulcher against the Saracens. The knights took the vows of chastity, of obedience, and of poverty, like regular canons. King Baldwin II of Jerusalem gave them an abode in that city on the east of the site of the temple, and Pope Honorius II confirmed the order in 1128. The fame of their exploits procured them numerous members and rich donations. The knights wore a



Templar.

Monument in Temple Church, London.

The knights wore a white cloak adorned with an eight-pointed red cross (Maltese) on the left shoulder. The grand-master, the chief of the order, had the rank of a prince, and the order acknowledged the pope alone as its protector. The principal part of its possessions were in France. The Templars established themselves in England about 1185, taking up their headquarters in Fleet Street, London, at the place still known as the Temple. Being compelled, in 1291, to leave the Holy Land, they transferred their chief seat to the island of Cyprus. By this time the wealth and power of the order had increased to such an extent, and their arrogance and luxury in proportion, that it was deemed necessary to suppress it. The Templars were put an end to on the charge that they had ambitious designs on European thrones, and that they held heretical views. Philip IV of France and Pope Clement V played into each other's hands in the work of suppression and spoliation. The grand-master, Jacques de Molay, and sixty knights were inveigled to France on a hollow pretense, and were there seized by the king's orders (Oct. 13, 1307). After the mockery of a trial, and the most horrible tortures, fifty-four knights were burned alive (1310). Charles of Sicily and Provence imitated the example of Philip, and shared in the

plunder of the order. In England, Spain, Portugal, Italy, and Germany the Templars, at the pope's instigation, were arrested, but almost universally acquitted. The pope, at the Council of Vienne, in Dauphiny, solemnly abolished the order by a bull of March 2, 1312. The Templars maintained themselves longest in Germany, where they were treated with justice and mildness. The members who were discharged from their vows entered the order of St. John.

**Template.** See *Templet*.

**Temple** (tem'pl; Latin, *templum*), in architecture, an edifice designed for the performance of public worship. Magnificent temples were erected in ancient Greece and Rome, the Romans taking the Greek structures for models. The general arrangement of a Grecian temple is described in the article *Grecos*. The Egyptian temples were also remarkable structures. (See *Egypt*.) Perhaps the most famous temple in the world was that built by Solomon on Mount Moriah in Jerusalem. It is stated to have been an oblong stone building, 60 cubits in length, 20 in width, and 30 in height. On three sides were corridors, rising above each other to the height of three stories. The fourth or front side was open, and was ornamented with a portico, 10 cubits in width, supported by two brazen pillars. The interior was divided into the most holy place, which contained the ark of the covenant, and was separated by a curtain from the sanctuary, in which were the golden candlesticks, the table of the shew-bread, and the altar of incense. The temple was surrounded by an inner court, which contained the altar of burnt-offering. Colonnades, with brazen gates, separated this court of the priests from the outer court, which was likewise surrounded by a wall. This temple was destroyed by the Assyrians, and after the return from the Babylonish captivity a second temple, but much inferior in splendor, was erected. Herod the Great rebuilt it of a larger size, surrounding it with four courts, rising above each other like terraces, the lowest of which was 500 cubits square, and was surrounded on three sides by a double, and on the fourth by a triple row of columns. In the middle of this inclosure stood the temple, of white marble richly gilt, 100 cubits long and wide, and 60 cubits high, with a porch 100 cubits wide. This magnificent edifice was destroyed by the Romans in A.D. 70.

**Temple**, THE, a district of the city of London, lying between Fleet

Street and the Thames, and divided by Middle Temple Lane into the Inner and the Middle Temple, belonging to separate societies (see *Inns of Court*), each with its hall, library, and garden. The name is derived from the Knights Templars, who had their headquarters in England here. The district, which is extraparochial, being exempt from the operation of the poor-law, is occupied by lawyers.

**Temple**, a city of Bell Co., Texas, 35 miles s.s.w. of Waco. It is in a farming, cotton, and stock-raising section, and has railroad shops, cotton compresses, cotton-seed oil mills, etc. Pop. 10,993.

**Temple**, SIR WILLIAM, an eminent statesman, born in London in 1628, and educated at Emmanuel College, Cambridge. He afterwards passed six years in France, Holland, Flanders, and Germany. On his return (1654), not choosing to accept office under Cromwell, he occupied himself in the study of history and philosophy. After the Restoration (1660) he was nominated one of the commissioners from the Irish Parliament to the king. On the breaking out of the Dutch war (1665) he was employed in a mission to the Bishop of Münster, who offered to attack the Dutch, and in the following year was appointed resident at Brussels, and received the honor of a baronetcy. In conjunction with De Witt he concluded the treaty between England, Holland, and Sweden (Triple Alliance, 1668), the result being to oblige France to restore her conquests in the Netherlands. He also attended, as ambassador extraordinary, when peace was concluded between France and Spain at Aix-la-Chapelle (1668), and subsequently residing at The Hague as ambassador, became familiar with the Prince of Orange, afterwards William III. Recalled in 1669, Sir William remained in retirement at Sheen till 1674, when he was again ambassador to the states-general, and engaged in the Congress of Nimeguen, by which a general pacification was effected in 1679. He was instrumental in promoting the marriage of the Prince of Orange with Mary, eldest daughter of the Duke of York (James II, 1677). Shortly after his return he was elected to represent the University of Cambridge in Parliament. In 1681 he retired from public life altogether, and he died at Moor Park, Surrey, in 1699. Here Swift was an inmate of his house for some time. His *Memoirs* and *Letters* are especially interesting to the student of history. His *Miscellanies* consist of essays on various subjects: *Gardening*, *The Cure of the Gout*, *Ancient and*

*Modern Learning* (an essay in which originated the Phalaris Controversy—see *Bentley*), *Health and Long Life*, *Poems and Translations*, etc.

**Temple Bar**, an arched gateway between Fleet Street and the Strand in London and divided the City from Westminster. As the gate obstructed a crowded thoroughfare, it was found necessary to remove it (1878). It was reerected at Theobald's Park, Cheshunt, in 1888.

**Templet** (tem'plet), a pattern or mold used by masons, machinists, smiths, shipwrights, etc. It usually consists of a flat thin board, a piece of sheet-iron, or the like, whose edge is dressed and shaped to the required conformation, and is laid against the object being molded, built, or turned so as to test the conformity of the object thereto.



Templet for a Baluster.

**Tempo** (tem'pō; Italian for 'time'), in music, a word used to express the rate of movement or degree of quickness with which a piece of music is to be executed. The degrees of time are indicated by certain words such as *lento* (slow), *adagio* or *largo* (leisurely), *andante* (walking pace), *allegro* (gay or quick), *presto* (rapid), *prestissimo* (very rapid), etc.

**Temporal Bones.** See *Skull*.

**Temryuk** (tyem-ryūk'), a fortified town of South Russia, in the Kuban district of the Caucasus, on a peninsula on the south side of the Sea of Azov, in the bay of Temryuk. Pop. 14,476.

**Temporary Star**, a star appearing for a time, and then gradually vanishing away. In November, 1572, a star burst out in Cassiopeia with a brilliancy greater than that of any one near it. It rapidly increased in magnitude till it became visible at noon. Then it diminished in size, and in March, 1574, became invisible to the naked eye, nor has it been seen since. Later instances of the same kind have been observed.

**Tenacity** (te-nas'i-ti), the measure of the resistance of bodies to tearing or crushing. Tenacity results from the attraction of cohesion which exists between the particles of bodies, and the stronger this attraction is in any body the greater is the tenacity of the body. Tenacity is consequently different



in different materials, and in the same material it varies with the state of the body in regard to temperature and other circumstances. The resistance offered to tearing is called *absolute tenacity*, that offered to crushing, *retroactive tenacity*. The tenacity of wood is much greater in the direction of the length of its fibers than in the transverse direction. With regard to metals the processes of forging and wire-drawing increase their tenacity in the longitudinal direction; and mixed metals have, in general, greater tenacity than those which are simple.

**Tenail** (te'nail), **TENAILLE**, in fortification, an out-work or rampart raised in the main ditch immediately in front of the curtain, between two bastions, in its simplest form having two faces constituting a reëntering angle.

**Tenant** (ten'ant), in law, one who occupies, or has temporary possession of lands or tenements, the titles of which are in another, the landlord. A *tenant-at-will* is one who occupies lands or tenements for no fixed term other than the will of the landlord. A *tenant in common* is one who holds lands or tenements along with another or other persons. Each share in the estate is distinct in title, and on the death of a tenant his share goes to his heirs or executors. A *tenant for life* is one who has possession of a freehold estate or interest, the duration of which is determined by the life of the tenant or another. An estate for life is generally created by deed, but it may originate by the operation of law, as the widow's estate in dower, and the husband's estate by courtesy on the death of his wife. See *Landlord and Tenant*.

**Tenant-right**, a term specifically custom, long prevalent in Ulster, either ensuring a permanence of tenure in the same occupant without liability to any other increase of rent than may be sanctioned by the general sentiments of the community, or entitling the tenant of a farm to receive purchase-money amounting to so many years' rent, on its being transferred to another tenant; the tenant having also a claim to the value of permanent improvements effected by him. In course of time the advantages of tenant-right granted to the Ulster farmers were claimed by the farmers in the other provinces of Ireland, and the custom spread to a considerable extent. At last, under the management of Gladstone and Bright, the Landlord and Tenant Act of 1870 was passed. By it the Ulster tenant-right and other corresponding customs received the force of

law; and the outgoing tenant became entitled to compensation from the proprietor to an amount varying according to circumstances. The act contained other provisions giving compensation for improvements, but as it did not succeed in doing away with all grievances a fresh bill was prepared and passed under the name of the Land Law Act, 1881, which established a land commission to revise rents, and to fix them for fifteen years. This measure has been amended by subsequent acts. See *Ireland*.

**Tenasserim** (ten-as'er-im), a maritime division of Burmah, about 500 miles in length, and from 40 to 80 in breadth, with an area of 46,730 square miles. The eastern boundary of the district is formed by a range of mountains from 3000 to 5000 feet in height. The coast is for the most part rocky, and off the southern part of it the sea is studded by the innumerable islands, large and small, of the Mergui Archipelago. There are several good harbors, formed by the mouths of the rivers. Tenasserim is a hilly and densely wooded region, with here and there tracts of arable land. It passed into the hands of the British at the close of the first Burmese war in 1826. Pop. 1,159,558.

**Tenby** (ten'bi), a municipal borough and seaport of Wales, in the county of Pembroke, on the west side of Carmarthen Bay, on the point and northeast margin of a rocky peninsula. It has a fine old church and several other buildings of note, including the Welsh Memorial to the late Prince Consort, and carries on a considerable trade in fish and oysters. It is besides a bathing-place, celebrated for its fine sands, beautiful scenery, and agreeable climate. The old walls of the town are still to some extent preserved. Pop. 4362.

**Tench**, a teleostean fish, belonging to the carp family and genus *Tinca*, of which *T. vulgaris* (the common tench) is the type. It inhabits most of



Tench (*Tinca vulgaris*).

the lakes of the European continent, and attains a length of from 10 to 12 inches.

## Tender

The color is generally a greenish-olive above, a light tint predominating below. It is very sluggish, apparently inhabiting bottom-waters, and feeding on refuse vegetable matter. It is very tenacious of life, and may be conveyed alive in damp weeds for long distances. The flesh is somewhat coarse and insipid.

**Tender** (ten'der), in law, an offer of compensation or damages made in a money action. To make a tender valid the money must be actually produced. A tender made to one of several joint claimants is held as made to all. A tender of money for any payment is legal, and is called a *legal tender*, if made in current coin of the United States: in silver coins less than \$1, not exceeding \$10; in gold and silver coins, for any amount; in United States bank notes, except for duties on imports and interest on the public debt.

**Tender** (naval), a small vessel appointed to attend a larger one, and employed for her service in procuring stores, etc. In railways a tender is a carriage attached to the locomotive for carrying the fuel, water, etc.

**Tendon** (ten'dun), the name given to the 'sinews' by means of which muscles are inserted upon bones. They consist of bundles of white fibrous inelastic and very strong tissue disposed in bands, and separated by areolar or connective tissue.

**Tendotome** (ten'dō-tōm), in surgery, a subcutaneous knife, having a small oblong blade on the end of a long stem, and used for severing deep-seated tendons without making a large incision or dissecting down to the spot.

**Tendrac** (ten'drak), in zoölogy, a small insectivorous mammal, from Madagascar. It is about two-thirds the size of the common hedgehog.

**Tendrill**, in botany, a curling and twining thread-like process by which a plant clings to another body for the purpose of support. It may be a modification of the midrib, as in the pea; a prolongation of a leaf, as in *Nepenthes*; or a modification of the inflorescence, as in the vine. They have been divided into stem tendrils and leaf tendrils. Called also *clirrus*, and by the old authors *capreolus* and *clavicula*.

**Tenebrio** (te-nē'brī-ō), a genus of beetles, the type of the family *Tenebrionidae*. The larvae of one species (*T. molitor*) are the destructive meal-worms which infest granaries, flour-stores, etc.

**Tenedos** (ten'ē-dos), an island of Asiatic Turkey, on the west

## Teniers

coast of Asia Minor, 15 miles southwest of the Dardanelles, about 6 miles long and 3 miles broad. The channel which separates it from the mainland is 8 miles broad. The interior of the island is very fertile, and is remarkable for the excellence of its wines. Corn, cotton, and fruits are also produced. On the eastern side of the island, near the sea, is the town of Tenedos. Pop. about 4000. On it is the little seaport of Tenedos.

**Teneriffe** (ten-er-if'), *TENERIFFA*, the largest of the Canary Islands (which see), is of an irregularly triangular form, and has an area of about 782 square miles. It is of volcanic formation, composed principally of enormous masses and cones of trachyte, lava, and basalt, which culminate in the Peak of Teneriffe, 12,182 feet high. The coast consists of an almost uninterrupted series of lofty cliffs, and the only good harbor is that of Santa Cruz, the capital, on the northeast. The most remarkable feature of the interior is the celebrated Peak, the summit of which forms a crater half a league in circuit, and from which is obtained one of the most magnificent views in the world. Two eruptions have taken place since the colonization of the island by the Spaniards in 1496, namely, in 1706 and 1798, and at all times the internal activity of the volcano is indicated by frequent streams of hot vapor. The principal productions are maize, wheat, potatoes, pulse, almonds, oranges, guavas, apples, honey, wax, silk, cochineal, and wine. Cochineal, tobacco, and wine are the chief exports. Pop. 138,008.

**Tenesmus** (te-nes'mus), in medicine, a continual inclination to void the contents of the bowels, accompanied by straining, but without any discharge. It is a common symptom in dysentery, stricture of the urethra, etc.

**Teniers** (ten'e-ēr-z), *DAVID*, the name of two celebrated artists of the Flemish school, father and son, both natives of Antwerp, in which city the elder was born in 1582. Having studied under Rubens, he spent six years in Rome. On his return he occupied himself principally in the delineation of fair, rustic sports, and drinking parties, which he exhibited with such truth, humor, and originality, that he may be considered the founder of a style of painting which his son afterwards brought to perfection. His pictures are mostly small. He died in 1649.—His son was born in 1610, and was taught painting by his father, whom he excelled in correctness and finish. He became highly popular, was appointed court painter to the archduke Leopold

William, governor of the Netherlands, and gave lessons in painting to Don John of Austria. He specially excelled in outdoor scenes, though many of his interiors are masterpieces of color and composition. His general subjects were fairs, markets, merry-makings, guard-rooms, taverns, etc., and his pictures, which number over 700, are found in all the important public and private galleries of Europe. His etchings are also highly esteemed. He died at Brussels in 1690.

**Tenimber Islands.** See *Tímor*

**Tennant** (ten'ant), WILLIAM, a Scottish poet of some note, born at Anstruther, Fife-shire, in 1784, studied for some time at the University of St. Andrews, and becoming a good oriental linguist, was in 1835 appointed to the chair of oriental languages in St. Mary's College, St. Andrews, dying in 1854. His chief production is *Anster* (that is, Anstruther) *Fair*, a humorous poem of Scottish life in the same stanza as Byron's *Don Juan*, which it preceded, being published in 1812. Besides *Anster Fair*, Tennant was the author of several other poems and some dramas. None of them, however, attained any success. Grammars of the Syriac and Chaldean tongues were also published by him.

**Tennent**, SIR JAMES EMERSON, statesman and writer, was born at Belfast in 1794, and educated at Trinity College, Dublin. From 1845 to 1850 he was civil secretary to the government of Ceylon; in 1852 he was secretary to the Poor-law Board; and from 1852 to 1867 he held the post of secretary to the Board of Trade, on retiring from which he received a baronetcy. He was the author of several books of travel and other works, the most important being a valuable account of Ceylon (1859, two vols.). He died in 1869.

**Tennessee** (ten-es-sé'), a south-central State of the American Union, bounded on the north by Kentucky and Virginia, east by North Carolina, south by Georgia, Alabama, and Mississippi, and west by Arkansas and Missouri; area, 42,022 square miles. Tennessee is popularly divided into three sections. East Tennessee, an extensive valley, and agriculturally one of the most important sections of the State, stretches from the eastern boundary to the middle of the Cumberland table land, which has an average elevation of 2000 feet above the sea, and abounds in coal, iron, and other minerals. Middle Tennessee extends from the dividing line on the table land to the lower Tennessee River, and is a region of fertile terraces, includ-

ing the great elliptical basin of nearly 5000 square miles, known as the 'Garden of Tennessee.' West Tennessee extends from the Tennessee River to the Mississippi, the bottom lands along the latter stream being a low, flat; alluvial plain, covered with forests and with many lakes and swamps. The Unaka Mountains, a section of the Great Smoky range of the Appalachian chain, run along the eastern frontier, and have an average elevation of 5000 feet above the sea. The Mississippi, with the Tennessee and the Cumberland, drains three-fourths of the State. The two latter are navigable for a considerable distance, and other rivers with numerous tributaries supply valuable water power. The climate is very healthy, the mean temperature of winter being 37.8°, and of summer 74.4°. West Tennessee is extremely fertile and produces corn and cotton abundantly. Middle Tennessee is generally fertile, also the valleys of the east. The principal grain crops are Indian corn, wheat and oats; and cotton, tobacco, hay and forage are extensively cultivated. The rearing and fattening of live stock are carried on under peculiar advantages, and immense numbers of hogs grow up on the mast of the forests, which cover a very large area. The wool clip is large and excellent and much attention is paid to fine breeds of horses. The most valuable minerals are coal and phosphate, which are very abundant, the coal deposits underlying 5100 square miles. Gold, silver, copper and zinc are also found, and there is a small output of iron ore and lime. Tennessee is rich in fine marbles, limestone, and other building stones. There is some output of clay, barytes and metallic paints, and considerable bauxite. Petroleum, sulphur, chalybeate and salt springs are plentiful. The lumbering interest is very great, and the lumber and timber industries lead all others. Other manufactures are flour and gristmill products, foundry and machine shop products, cars and general shop construction, oil, cottonseed and cake, etc. Besides the facilities for traffic afforded by the navigable streams, internal communication is further provided for by an extensive system of railways. Among the educational establishments stand the University of Tennessee at Knoxville, the University of Nashville, Vanderbilt and Fisk Universities, the last for colored students. The chief towns are Nashville (the capital), Memphis, Chattanooga, Knoxville. The first settlements in this State were made shortly before the Revolution, and in 1784 the settlers organized the State

of Franklin, which existed until 1788. In 1796 it was admitted to the Union as the State of Tennessee. It joined the Southern Confederacy in 1861, though a great majority of the inhabitants of East Tennessee were Unionists. Pop. (1910) 2,184,780.

**Tennessee**, a river formed by the union of two streams in the eastern part of the State of Tennessee, flows southwest, passes through the northern part of Alabama, then flows north through the western part of Tennessee and Kentucky, and enters the Ohio, of which it is the largest tributary, about 10 miles below the confluence of the Cumberland. Length, 1200 miles. A great dam was completed on the Tennessee River in 1913, and a power plant with 60,000 horsepower opened at Hale's Bar, a few miles from Chattanooga. The dam, which is 1200 feet in length, with an average height of 52 feet, holds up a lake 30 miles long, and lets pass a larger volume of water than passes over any other navigable river dam in the United States. The power house and lock are equally gigantic.

**Tenniel** (ten'yel), JOHN, a famous illustrator, was born at London in 1820. He was almost entirely self-taught, and his first picture was exhibited while he was little more than a boy. He painted one of the frescoes in the House of Parliament in 1845; in 1851 became connected as an illustrator with *Punch*; and he also illustrated many books, including *Aesop's Fables*, *Ingoldsby Legends*, *Alice's Adventures in Wonderland*, etc. He died in 1914.

**Tennis** (ten'is), a game in which a ball is driven continually against a wall in a specially constructed court, and caused to rebound beyond a line at a certain distance by several persons striking it alternately with a racket, the object being to keep the ball in motion as long as possible without allowing it to fall to the ground. The game was introduced into England in the thirteenth century, and continued to be very popular with the nobility to the reign of Charles II. The modern game of rackets is a descendant of tennis. (See *Rackets*.) *Lawn Tennis* is a recent modification of the game. See *Lawn Tennis*.

**Tennyson** (ten'i-sun), ALFRED, LORD, third son of George Clayton Tennyson, rector of Somersby, in Lincolnshire, was born at the same place, August 6, 1809. He received his early education from his father, attended Louth Grammar School, and in due course proceeded to Trinity College,

Cambridge, where in 1829 he won the chancellor's medal by a poem in blank verse entitled *Timbuctoo*. As early as 1827 he had published, in conjunction with his brother Charles, *Poems by Two Brothers*, but his literary career may be said to date from 1830, when he published a volume entitled *Poems, chiefly Lyric*. It was not received with any great favor by the public, although it was recognized by many to contain much that distinguishes the true poet. Its success at least was sufficient to encourage the poet to prepare a second collection, which appeared in 1833, and contained such poems as *A Dream of Fair Women*, *The Palace of Art*, *Enone*, *The Lady of Shalott*, and others. At this time he sustained a great loss in the death of his friend Arthur Hallam, and this, with the severe criticism which his last volume received in *Blackwood's Magazine* and the *Quarterly Review*, may have occasioned his long silence. It was not till 1842 that he again appealed to the public with a selection of his poems in two volumes, and it is from this time that we find his work beginning to receive wide recognition. The collection then issued included *Morte d'Arthur*, *Locksley Hall*, *The May Queen*, and *The Two Voices*, all of which, it was almost at once acknowledged, entitled him to rank very high among modern poets. His reputation was more than sustained by the works that immediately followed. These were: *The Princess, a Medley* (1847); *In Memoriam* (1850), written in memory of his friend Arthur Hallam; and the *Ode on the Death of the Duke of Wellington* (1852). The latter was his first great poem after receiving the laureateship (1850) upon the death of Wordsworth. After that date hardly a year passed without his adding some gem to our language. *Maud and other Poems* was published in 1855, *Idylls of the King* followed in 1858; *Enoch Arden and other Poems*, in 1864; *The Holy Grail and other Poems*, in 1869; *The Window, or the Songs of the Wrens*, in 1870; and *Gareth and Lynette*, in 1872, the latter volume, which included the *Last Tournament*, completing the series of poems known as the *Idylls of the King*. In 1855 the University of Oxford conferred on Tennyson the honorary degree of D. C.L., and in 1869 the fellows of Trinity College, Cambridge, elected him an honorary fellow. So long ago as 1823 he had had printed for private circulation a poem entitled *The Lover's Tale*; in 1879 this was republished, together with a sequel entitled *The Golden Supper*. In the following year appeared *Balads*



and other Poems. Among his later compositions are the dramas, *Queen Mary* (1875), *Herold* (1876), and *The Cup*. The latter was successfully produced by Mr. Irving at the Lyceum Theatre in 1881, as had also been *Queen Mary*. *The Falcon*, another drama, was produced by Mr. and Mrs. Kendal in 1882, and *The Promise of May* was brought out at the Globe Theatre the same year. *The Cup* and *The Falcon* were published as a single volume in 1884, and in the same year appeared the historical drama of *Becket*. In 1885 appeared *Tiresias and other Poems*; in 1886 *Locksley Hall: Sixty Years After*, which also included *The Promise of May*; and in 1889 *Demeter and other Poems*, this last volume containing work of as high a quality as any of his previous writings. Tennyson was raised to the peerage in 1884 as Baron Tennyson of Aldworth, Sussex, and Freshwater, Isle of Wight. Few writers have developed so rare a mastery of English as a poetic instrument, and his works have a high rank in the literature of the nineteenth century. He died October 6, 1892.—His brother CHARLES (born 1808; died 1879) assumed the name of Turner by royal license on succeeding to property at the death of his grandmother. He published, in conjunction with his brother, *Poems by Two Brothers* (Louth, 1827), now a great bibliographical rarity. He became vicar of Grasby, Lincolnshire, in 1835, and published *Sonnets* (1804), *Small Tableaux* (1868), and *Sonnets, Lyrics, and Translations* (1873).

**Tenor** (ten'ur; in Italian, *tenore*), in music, is the more delicate of the two adult male voices, and its compass generally extends from C in the bass to G or A in the treble. The qualities of the tenor render it suitable to the expression of tender and delicate sentiments. In a vocal composition of four parts, for mixed voices, the tenor forms the second middle part, deeper than the alto, but higher than the bass; but in a song of the four male voices the tenor, as the first voice, leads the chief melody, and as the second is the higher middle voice. The clef of this voice is the C clef, placed upon the fourth line of the staff, as here shown.



**Tenpins**, a common game in the United States adapted from the older English game of ninepins. The pins (round pieces of wood) are set upright in triangular form at the end of a long level platform, and are bowled down by round bowls of varied size rolled down the length of the platform, the game

being counted by the number of pins that are caused to fall.

**Tenrec.** See *Tenrec*.

**Tent**, a portable dwelling-place, formed usually in the simplest manner, of canvas, for instance, stretched with cords upon poles. Tents are much used for private purposes and everywhere for army shelter. The soldiers' tents in the United States army have ridged tops, while those of the British army are circular, supported by a vertical pole in the center 10 feet high.

**Tentacle** (ten'ta-k'l), in zoölogy, an elongated appendage proceeding from the head or cephalic extremity of many of the lower animals, and used as an instrument of exploration and prehension. Thus the arms of the sea-anemone, the prehensile processes of the cirripeds and annelids, the cephalic feet of the cephalopods, the barbs of fishes, are termed tentacles.

**Tentaoulites** (ten-tak'ū-lits), a genus of fossil shells, found abundantly in Siberian and Devonian strata. Some writers regard them as tubicular annelids, while others refer them to the pteropoda.

**Tenthredo.** See *Saw-flies*.

**Ten'tyra**, or Tentyris. See *Don-derak*.

**Tenuirostres** (ten-ū-i-rost'rēs; slender-beaked), one of the

four sections into which the order Insessores of birds is divided. This group, represented by the humming-birds, creepers, sun-birds, hoopoes, etc., is characterized by the generally elongated bill, which usually tapers to a point.



HEADS OF TENUIROSTRES. a, Sun-bird (*Nectarinia* *afra*). b, Humming-bird (*Trochilus recurvirostris*). c, European Nuthatch (*Sitta Europea*).

**Tenures.** See *Land*.

**Tenure of.**  
**Teocallis** (tā-u-kal'is; 'houses of God'), the name given to the ancient temples of Mexico, of which there are extensive remains. They were generally solid four-sided truncated pyramids, built terrace-wise, with the temple proper on the platform at the summit. They were constructed of earth, faced with brick, and many still remain in a more or less perfect state. The principal existing specimens are those

of Oholula, near Mexico, and of Palenque, in Yucatan. See *Oholula* and *Palenque*.

**Teos** (tē'os), or **Tziros**, anciently a town on the coast of Ionia, in Asia Minor, opposite Samos, the birthplace of the poet Anacreon.

**Tepic** (tā-pēk'), a town of Mexico, in the state of Jalisco, pleasantly situated and rendered peculiarly attractive by terraced gardens and shady promenades. It has manufactures of woollens and sugar, and mines in the neighborhood. Pop. 15,488.

**Teplitz** (tāp'litz), or **Töplitz**, a town of Northern Bohemia, pleasantly situated in a valley between the Erzgebirge and Mittelgebirge, with a castle and fine park and gardens. It has celebrated thermal baths. The springs, seventeen in number, have a temperature varying from 90° to 108° and are efficacious in cases of gout and rheumatism. The bathing establishment is very complete, and during June and July the whole town is filled with visitors. Pop. 24,420.

**Terai.** See *Terai* and *Himalaya*.

**Teramo** (tā'ra-mō), a town of Southern Italy, capital of the province of same name, in an angle formed by the confluence of the Tordino and Vezzo. It is the see of a bishop, and has an old, though modernized, cathedral and remains of Roman baths and theater. Pop. 10,508.

**Teraphim** (ter'a-fim), household deities or images, revered by the ancient Hebrews. They seem to have been either wholly or in part of human form and of small size, were regarded as penates or household gods, and in some shape or other used as domestic oracles. They are mentioned several times in the Old Testament.

**Teratology** (ter-a-tol'ō-jī), the division of physiological and anatomical science devoted to the investigation of abnormalities in the structure of animals and plants, and to the determination of the exact nature of the deviation from a normal type of structure.

**Terbium** (ter'bi-um), was the name given to a supposed earth-metal now found to be nearly identical with erbium, and which has been resolved into several elements.

**Terburg** (ter'burg), or **TERBORCH**, **GERRARD**, a Dutch portrait and genre painter, born at Zwolle, near Overysse, about 1617. His father, a historical painter, gave him his first lessons in painting. He continued his

studies at Haarlem, and afterwards visited Germany, Italy, Spain, England, and France. On the meeting of the peace congress at Münster in 1648 he painted the assembled plenipotentiaries, which is now in the National Gallery, London. He subsequently visited Madrid, London, and Paris, whence he returned to Overysse, married, and became burgomaster of Deventer, dying in 1681. His portraits and pictures of social life are remarkable for elegance. He excelled in painting textile fabrics, particularly satin and velvet.

**Terce** (ters), is a legal life-rent amounting to one-third of her deceased husband's landed estates recognized by the law of Scotland in favor of a widow who has not accepted of any special provision.

**Terceira** (ter'se-ir-a), an island of the Atlantic, one of the Azores; greatest length 20 miles; average breadth 13 miles; area, 223 square miles. The soil possesses great natural fertility and heavy crops of grain, pulse, etc., and abundance of oranges, lemons, and other fruits are produced. The capital is Angra. Pop. 48,770.

**Terebinth** (ter'e-binth), the common name for various resinous exudations, both of a fluid and solid nature, such as turpentine, frankincense and Burgundy pitch, Canada balsam, etc. The volatile oil of various of these resins is called oil of terebinth, or oil of turpentine. Terebinth is also a name for the turpentine-tree (which see).

**Terebratula** (ter'e-brat'u-lā), a genus of deep-sea brachiopod bivalve molluscs found moored to rocks, shells, etc. One of the valves is perforated to permit the passage of a fleshy peduncle, by means of which the animal attaches itself. There are few living species, but the fossil ones are numerous, and are found most abundantly in the secondary and tertiary formations.

**Teredo** (te-rē'dō). See *Ship-worm*.

**Terek** (tyā'rek), a Russian river which descends from Mount Kasbek, on the north side of the Caucasus, and flows into the Caspian. A number of branches; total course, about 300 miles.

**Terence** (ter'ens), in full **PUBLIUS TERENTIUS AFR** (that is, 'the African'), a celebrated Roman comic writer, born in Africa, B.C. 185, and while a child bought by Publius Terentius Lucanus, a Roman senator, who took him to Rome and gave him a good education. His master having emancipated him, the young African assumed the name of his benefactor, and

soon acquired reputation and friends. About the year 161 he went to Greece, where he translated 108 of Menander's comedies. His translations appear to have been materials for future works of his own. Six comedies of Terence's alone are extant, and these are all he is known to have produced—*The Andrian*; *The Eunuch*; *Heautontimoroumenos*, or the *Self-tormentor*; *Phormio*, or the *Parasite*; *Hecyra*, or the *Stepmother*; and *The Adelphi*. His language is pure; but in originality and imagination he is inferior to his predecessor Plautus.

**Teresa**, St. (te-rě'se). See *Theresa*.

**Tereus** (tě-rūs). See *Philomela*.

**Terhune**, MARY VIRGINIA HAWES ('Marion Harland'), American author, born in Virginia in 1831. She began to write for the papers in 1846, and became a frequent contributor to the magazines. In 1856 she married the Rev. E. P. Terhune. Her many books include *Sunnybank* (1866), *Common Sense in the Household* (1871), and *Marion Harland's Complete Cook Book* (1903).

**Terlizzi** (ter-lit'sě), a town of South Italy, in the province of Bari. It contains a palace, with a good collection of pictures; and two churches, one of them enriched by some pictures of Titian. Pop. 23,394.

**Termini** (ter-mě-ně), a town of Sicily, in the province of Palermo, on a height in a rich and well-cultivated district, near the mouth of a river of the same name, which falls into the Tyrrhenian Sea. It is surrounded with walls, and defended by a strong castle. Corn, oil, olives, and other products of the district are exported, macaroni is largely made, and there is an active fishing industry. It is noted for its thermal saline baths, and contains many antiquities. Pop. 20,633.

**Termites** (ter'mits), a family of neuropterous insects, also known by the name of *white ants*. They have little affinity with the true ants, which are hymenopterous, although they resemble them in their mode of life. They are chiefly confined to the tropics, and are found very plentifully in Western Africa. They unite in societies, huddling their dwellings in the form of pyramids or cones, 10 or 12 feet high. These dwellings, which are so firmly cemented as to be capable of bearing the weight of three or four men, are divided off into several apartments as magazines, chambers, galleries, etc. Every colony of termites consists of a king and queen, both of which are much larger than the

other members of the colony, and of workers and soldiers without wings. The king and queen are the parents of the colony, and are constantly kept together, attended by a detachment of workers, in a large chamber in the heart of the hive, surrounded by stronger walls than the other cells. The queen is always gravid, the abdomen being enormously distended with eggs, which, as they are dropped, relays of workers receive and convey in their mouths to the minor cells throughout the hive. At the beginning of the rainy season a number of winged insects, both male and female, are produced. These, when mature, leave the hive for a nuptial flight, then shed their wings, and become the kings and queens of future colonies. The soldiers and workers, both neuter, or of no fully developed sex, and differing merely in the armature of the head, are distinct animals from the moment they leave the egg, the young differing from the adult of the same class only in size. The duties of the workers are to build the habitations, make covered roads, nurse the young, attend on the king and queen, and secure the exit of the mature winged insects; while to the soldiers, whose mandibles are powerfully developed for that purpose, is committed the defense of the community, which duty they perform systematically and with desperate courage. There are many species of termites, all of which are fearfully destructive to wood, destroying the timbers of houses and all sorts of wooden furniture. Entering from underground, they hollow out the interior, leaving only a deceptive shell, which in the end collapses.

**Termonde**. See *Dendermonde*.

**Tern** (*Sterna hirundo*), or *SEA-SWALLOW*, a genus of birds included in the gull family. The terns are distinguished by the long, slender, and straight bill, long and pointed wings, and forked tail. The legs are relatively shorter than in the gulls. The common tern or sea-swallow is a very active bird, seeming to have a ceaseless flight, and feeding upon small fishes. Its average length is 15 inches. The color is black on the head and neck, and ashy gray on the upper parts generally. Fourteen or more species of terns are found on the coasts of North America.

**Ternate** (ter'nāt), one of the Molucca Islands, in lat. 0° 48' N., lon. 127° 19' E.; area, about 25 sq. miles; contains a remarkable volcano (5600 feet), and produces tobacco, cotton, sago, sulphur, saltpeter, etc. The town Ter

nate is the seat of a native sultan and of the Dutch resident. Pop. 8000.

**Terni** (ter'nā; ancient *Interamna*), a town of Italy and a bishop's see, in the province of Perugia, on an island formed by the Nera. It has a handsome cathedral (1653, architect Bernini), several other churches, and some Roman antiquities, including the remains of an amphitheater. The celebrated falls of Velino or Terni are about 5 miles distant from the town. They were originally formed by the Romans to carry off the surplus waters of the Velino, which were constantly inundating the rich plains on its banks. Pop. (1906) 20,230.

**Ternstroemiaceæ** (tern-strē-mi-ā'-se-ē), a nat. order of polypetalous dicotyledonous plants, consisting of trees or shrubs, with alternate, simple, usually coriaceous leaves without stipules. The flowers are generally white, arranged in axillary or terminal peduncles, articulated at the base. This order is one of great economical importance, as it includes the genus *Thea*, from which the teas of commerce are obtained. The favorite garden *camellia* also belongs to it. The plants belonging to the order are principally inhabitants of Asia and America.

**Terpsichore** (tērp-sik'o-rē), one of the Muses, the inventress and patroness of the art of dancing and lyrical poetry.

**Terracina** (ter-rā-chē'nā; ancient, *Ansur*), a seaport of Italy and a bishop's see, in the province of Rome, on a gulf of the same name. It has a handsome episcopal palace, and a cathedral, in a kind of Italo-Byzantine style, on the site of an ancient temple. Pop. 7597.

**Terra Cotta** (ter'a kot'a; Italian, baked earth'), baked clay or burned earth, a similar material to that from which pottery is made, much used both in ancient and modern times for architectural decorations, statues, figures, vases, and the like. As now made it usually consists of potters' clay and fine powdered silica. It is produced of many different colors, the most pleasing being a rich red and a warm cream color. Large numbers of ancient statues, and especially statuettes, of terra cotta have been found in recent times, the most charming being the production of the city of Tanagra in Northern Greece (Boeotia).

**Terra del Fuego** (fwa'gō). See *Tierra del Fuego*.

**Terra di Sienna** (dē-sē'en-na), a brown ferruginous

ocher employed in painting, and obtained from Italy. It is calcined before being used as a pigment, and is thus known as burnt sienna.

**Terra Japonica.** See *Catechu*.

**Terranova** (ter-rā-nō'vā), a town of Sicily, in the province of Caltanissetta, on the Mediterranean, near the mouth of the river Terranova, was founded in the thirteenth century by the emperor Frederick II on the site of the ancient Geia. It is defended by a strong castle, and contains several handsome churches. There is some export trade in corn, wine, fruit, sulphur, and soda. Pop. 22,019.

**Terrapin** (ter'a-pin), the popular name of several species of fresh-water or tide-water tortoises constituting the family *Emyda*, distinguished by a horny beak, a shield covered with epidermic plates, and feet partly webbed. They are active in their habits, swimming well and moving with greater agility on land than the land-tortoises. They are natives of tropical and warmer temperate countries, many being natives of the United States. They feed on vegetables, fish, reptiles, and other aquatic animals. Their flesh is much esteemed. One species, called the salt-water terrapin (*Malaclemys concentrica*), is abundant in the salt-water marshes around Charlestown. The chicken tortoise (*Emys reticularia*), so named from its flavor, is also an esteemed American species.

**Terras.** See *Trass*.

**Terre Haute** (tār-ōt; usually pronounced ter-e-hōt'), a city, capital of Vigo county, Indiana, on the Wabash River and the Wabash and Erie Canal. It is well built, and has numerous churches and schools (the state normal school, Rose Polytechnic Institute, etc.). It is an important railroad center, with a large trade and is extensively engaged in distilling, brewing, meat slaughtering and packing, flour-milling, etc. There are oil wells and productive coal mines in the vicinity. Its manufactures are numerous. Pop. 68,000.

**Terrell** (ter'el), a city of Kaufman county, Texas, 32 miles E. of Dallas. It has various manufactures and a large trade in live stock and lumber. The South Texas Hospital for the Insane is located here. Pop. 7050.

**Terre-plein** (tār'plān), in fortification, the top, platform, or horizontal surface of a rampart, on which the cannon are placed.



**Terrestrial Magnetism.** See *Magnetism*.

**Terrier** (ter'i-er), the name originally given to any variety of dog that dug or burrowed in the ground in pursuit of its quarry. Its present use is restricted to small or moderately small dogs of a number of breeds. The type of the class is the fox terrier (*q. v.*). Terriers vary in size from the toy black and tan, and Yorkshire, very small breeds, to the Airedale (*q. v.*), the largest and heaviest of the class. The huli terrier, as its name implies, is a cross between the bulldog and the smooth-coated white terrier of early time. It is a quick, agile and powerful dog, of unfailing courage, and has been much used by the sporting fraternity as a pit dog, that is, a dog used for fighting when matched against one of its own breed. The Boston terrier is an American breed, originated about 1870. It arose from breeding a brindle three-quarter English bulldog which had one-quarter terrier, and a pure white terrier of stocky build and low on the legs. A further breeding and selection of this type as developed by the above cross, resulted in the standard Boston terrier, whose characteristics are a screw tail, a white blaze on the face and on chest and feet, a fine short and bright coat, and a deep, broad chest. It is a good tempered, courageous dog. There are many other breeds of terriers, as the Scotch, the Skye, the Bedlington, the Welsh and the Irish (*q. v.*), a very popular breed.

**Territory** (ter'i-tor-i), a section of the national domain not yet admitted to statehood. It has a governor, appointed by the President, with a legislature of certain limited powers. At present there are two—Alaska and Hawaii.

**Terror** (ter'er), REIGN OF, the term usually applied to the period of the French revolutionary government from the appointment of the revolutionary tribunal and the committee of public safety (April 6, 1793) to the fall of Robespierre (July 27, 1794). See *France (History)*.

**Terry** (ter'ri), ALFRED HOWE, soldier, born at Hartford, Connecticut, in 1827. He engaged in the Civil war as a colonel of volunteers; became a brigadier-general in 1862. He commanded a division in the army under Grant in the summer of 1864; became a major-general in the regular army, retiring in 1888. He died Dec. 16, 1890.

**Terry**, ELLEN ALICE, actress, born at Coventry, England, in 1848.

She appeared on the stage in a child's part in 1856, and continued acting until 1864, when she married and left the stage. She returned in 1867, and in 1888 appeared at the Lyceum Theater with Henry Irving, with whom she afterwards remained, making several tours in the United States. Among her best parts are *Portia*, *Pauline*, and *Ophelia*, she playing the last to Irving's *Hamlet*.

**Terschelling** (ter-skel'ing), an island of the Netherlands, 10 miles off the coast of Friesland, between the islands of Vlieland and Ameland. It is about 15 miles long by 3 broad, is flat and sandy, and exposed in some parts to inundation. The inhabitants are chiefly pilots and fishermen. Pop. 3685.

**Tertian Fever.** See *Ague*.

**Tertiary Formation.** See *Geology*.

**Tertullian** (ter-tul'yan), in full QUINTUS SEPTIMIUS FLORENS TERTULLIANUS, the earliest Latin father of the church whose works are extant, flourished chiefly during the reigns of Septimius Severus and Caracalla (A. D. 193-217), became a presbyter, and continued orthodox till he had reached middle age, when he went over to the Montanists (see *Montanus*), and wrote several books in their defense. His most celebrated work is the *Apologia*, a formal defense of Christianity addressed to the Roman magistrates. Among other works whose period is not known is *Adversus Hermogenem*, in which Tertullian maintains the doctrine of the creation of the world out of nothing as opposed to the eternity of matter *per se*. The works of Tertullian display great learning, much imagination, and a keen wit, but their style is bad. They are chiefly valuable for the light they throw on the doctrine and discipline of the church in the age in which he lived.

**Tesho-lama.** See *Lamaism*.

**Tesla** (tes'ia), NIKOLA, born at Smiljau, Servia, in 1857. Becoming a skilled electrician, he came to the United States in 1884 and in 1885 entered the Edison works at Menlo Park, New Jersey. He subsequently set up an establishment of his own in New York. He has made important inventions in lighting and other uses of electricity. His most valuable device is his oscillator, a combination of dynamo and engine.

**Tessellated Pavement**, a pavement of rich mosaic work, made of squares of marbles, bricks, or tiles, in shape and

disposition resembling dice, and known as *tesserae*.

**Tesserograph** (tes'ser-ô-gráf), the name applied to a machine for printing railway tickets as needed, invented by Robert Piscicelli Taeggi, an Italian engineer. One of these machines first in use in Italy printed any one of 400 different kinds of tickets at a cost of about one five-hundredths of a cent each.

**Test Acts**, include all statutes which require persons holding public offices to profess certain religious beliefs. In England, from the time of the Reformation onwards, a large number of such acts were passed in favor of the Established Church. The various test acts were for the most part repealed in 1829.

**Testament.** See *Will*.

**Testing** (test'ing), the process of examining various substances by means of chemical reagents, with the view of discovering their composition. The term testing is usually confined to such examinations as seek to determine what chemical elements or groups of elements are contained in any substance, without inquiring as to the quantity of these elements. Testing is carried out either by the application of chemical reactions to solid substances, or by the application of reagents in solution to a solution of the substance under examination.

**Test-papers**, slips of unsized paper, soaked in solutions of vegetable coloring matters, used as indicators of the presence of acids or of alkalies, and, in some instances, of special chemical compounds. The most common test-papers are litmus and turmeric papers.

**Testudo** (tes'tû-dô). See *Tortoise*.

**Testudo**, among the ancient Romans a cover or screen which a body of troops formed with their oblong shields or targets, by holding them over their heads when standing close to each other. This cover somewhat resembled the back of a tortoise, and served to shelter the men from missiles thrown from above. The name was also given to a structure movable on wheels or rollers for protecting sappers.

**Tetanus** (tet'a-nus), a spasmodic rigidity of the whole body, such as frequently results from wounds. The affection occurs more often in warm climates than in cold. If the lower jaw is drawn to the upper with such force that they cannot be separated the disorder is called *lock-jaw* (*trismus*). Tetanus frequently terminates fatally.



Roman Testudo, from Trajan's Pillar.

**Tête-du-pont** (tât-dû-pôn), in fortification, a work that defends the head or entrance of a bridge nearest the enemy.

**Tetrabranchiata** (te-tra-brank-i-â-ta), an order of Cephalopoda or cuttle-fishes, having four branchiae or gills, comprising the two families Nautilidae and Ammonitidae. Of this order the pearly nautilus may be regarded as the type, being the only living member of the order, though its fossil representatives (Orthoceras, Ammonites, etc.) are abundant. See *Nautilus*.

**Tetrahedron** (-hê'dron), in geometry, a figure comprehended under four equilateral and equal triangles, or a triangular pyramid having four equal and equilateral faces. It is one of the five regular solids.

**Tetra'o.** See *Grouse*.

**Tetrarch** (tet'rark), a title which originally signified the governor of the fourth part of a country. By the Romans the title was used to designate a tributary ruler inferior in dignity to a king.

**Tetrastyle** (tet'râ-stîl), in ancient architecture, having or a portico consisting of four columns.

**Tetuan** (tet-û-ân'), a town of Morocco, on the northern coast of Africa, 33 miles southeast of Tangier. It is about  $\frac{1}{2}$  mile from the Mediterranean, is surrounded by walls and defended by a castle, and carries on an active trade. The environs are extensively

planted with vineyards and gardens. Pop. 25,000.

**Tetzel** (tet'sel), JOHANN, a man whose name has become prominent in connection with the Reformation, was born about 1470, at Leipzig, where he studied theology. He entered the order of the Dominicans, and in 1502 was appointed by the Roman see a preacher of indulgences, and carried on for fifteen years a successful propaganda of them. It was his preaching in Saxony of the indulgence in behalf of the rebuilding of St. Peter's in Rome that roused Luther to revolt. Though many of the sayings attributed to him by his critics are fictitious, yet there is little doubt that he often indulged in frivolity and went farther in his promises than the teaching of his church authorized him to go. The best Roman Catholic historians condemn him for exaggeration. Tetzel died of the plague in 1518, in the Dominican convent at Leipzig. See *Luther*.

**Tenthis.** See *Squid*.

**Tentoburg Forest** (toi-to-bürg'), or TEUTOBURGER WALD, a hilly district of Germany, in Westphalia, where Arminius defeated the Roman general Varus, A.D. 9. See *Arminius*.

**Teutones** (tū'tun-ēz), a tribe of Germany, which, with the Cimbri, invaded Gaul in B.C. 113. In B.C. 102 they were defeated with great slaughter near Aquæ Sextiæ (Aix in the department of Bouches du Rhône) by the Roman general Marius. A tribe of the same name is mentioned by Pliny and others as inhabiting a district north of the Eibe, which appears to have been the original settlement of the Teutones before their invasion of Gaul. See *Teutonic Peoples*.

**Teutonic Knights** (tū-ton'ik nīts), a military religious order of knights, established toward the close of the twelfth century, in imitation of the Templars and Hospitalers. It was composed chiefly of Teutons or Germans who marched to the Holy Land in the Crusades, and was established in that country for charitable purposes. In the thirteenth century they acquired Poland and Prussia, and they long held sway over a great extent of territory in this part of Europe. The order began to decline in the fifteenth century, and was finally abolished by Napoleon in 1809.

**Teutonic Peoples**, a term now applied (1) to the High Germans, including the German

inhabitants of Upper and Middle Germany and those of Switzerland and Austria. (2) The Low Germans, including the Frisians, the Plattdeutsch, the Dutch, the Flemings and the English descended from the Saxons, Angles, etc., who settled in Britain. (3) The Scandinavians, including the Norwegians, Swedes, Danes and Icelanders. See *Philology, Indo-European Languages*.

**Tewfik Pasha** (tū'fik pa-sha'), MAHOMMED, Khedive of Egypt, eldest son of Khedive Ismail, was born in 1852, and succeeded to the viceroyalty by decree of the sultan, August 8, 1879, upon the forced abdication of his father. He was the sixth ruler of Egypt in the dynasty of Mahommed Ali Pasha. He died January 7, 1892. See *Egypt*.

**Tewkesbury** (tūks'be-ri), a market-town and municipal borough of England, in Gloucestershire, at the conflux of the Severn and Avon. The parish church is a noble pile of building in the Norman style, and one of the largest in England. It is part of the monastery of Tewkesbury. Pop. (1911) 5287.

**Texarkana** (teks-ar-kan'a), a town of Bowie Co., Texas, adjacent to a town of the same name, capital of Miller Co., Arkansas. The two towns form a single municipality. It has car and engine works, cotton-seed oil mills, manufactures of lumber, furniture, etc. Pop. of Texarkana, Texas, 9790; of Texarkana, Arkansas, 5655.

**Texas** (tek'sas), the most southwesternly of the Gulf States of the American Union, is bounded n. by New Mexico, Oklahoma, and Arkansas, e. by Oklahoma, Arkansas and Louisiana, w. by New Mexico, s. w. by Mexico, and s. e. by the Gulf of Mexico; extreme length, east to west, 825 miles; breadth, 740 miles; coast-line, 400 miles; area, 265,896 sq. miles. The surface in the northwest bears many mountains, which, in proceeding southeast, subside into hills and undulating plains, succeeded, on approaching the Gulf of Mexico, by low alluvial lands. These extend inland from 20 to 80 miles, are traversed by numerous rivers, and consist for the most part of rich prairie or forest land. The hilly region behind this is formed chiefly of sandstone and limestone ridges, separated by valleys of considerable fertility. The general slope of the country gives all the rivers a more or less southerly direction. The Rio-Grand, rising in New Mexico, forms the southwest boundary of the State. The Red River forms the greater part of the northern boundary. The other important rivers are the Colorado, the Brazos, the

Trinity, and the Sabine, which, during the greater part of its course, is the boundary between Texas and Louisiana. The great timber region of the state lies between the Sabine and the Trinity a region generally level and sandy in the south, with extensive pine forests, but rolling and fertile in the north. Between the Trinity and the Colorado prairie land extends, timbered along the streams, but in the north there is an extensive forest, extending through Central and Western Texas to the Red River and called the 'Cross Timbers.' The timber area embraces about 42,000,000 acres, 25,000,000 being in pines. The pecan tree, a valuable nut-bearing tree, is widely distributed and yields largely. Western Texas is chiefly prairie. A long chain of lagoons stretches along the Gulf of Mexico. The soil of Texas is, on the whole, extremely fertile. The staple products are cotton and maize, both of which are largely cultivated. In the lower or coast region, the sugar-cane and rice also grow luxuriantly. Wheat grows chiefly in the north and center. Rye, oats, barley, tobacco and sweet and white potatoes are grown to some extent, and both in the elevated and the lower levels fruits in almost endless variety are abundant. Texas leads the states in cotton production, yielding one-fifth of the world's crop. Sea-island cotton is grown in the south. Thousands of acres are under irrigation from flowing artesian wells, mainly in the southwest. The pastures are often covered with the richest grasses, and the rearing of cattle, sheep and swine is carried on very advantageously. The minerals include copper, of which there are large deposits; argentiferous galena, which is also abundant; coal, including a field of lignite about 6000 sq. miles in area; iron, occurring in very large quantities; asphaltum, which occurs abundantly; salt, obtained from rich salt springs; petroleum, of recent discovery and now very largely produced; saltpeter, marble, slate, potter and fire-clay, and fertilizers in great abundance. The manufactures of Texas, which increased 300 per cent. in the period from 1890 to 1910, depend largely for their raw materials upon the stock-raising, agricultural and mineral products of the state, and have been greatly stimulated by the rapid increase in the production of these materials. Galveston, an important commercial center in the state, is one of the largest ports of entry in the South, and Sabine is also a port of growing prominence. These avenues of transportation afford excellent opportunities for interstate, domestic, coastwise and foreign

commerce. The first permanent settlement in Texas was made at San Antonio by the Spanish in 1718. After Mexico won its independence Texas became one of the Mexican states. Several colonies of American citizens, invited by the Mexicans, settled in the eastern section, and gradually increased in numbers. Texas then revolted from the Mexican government, and in 1836 declared itself independent. Santa Anna attempted to reduce it, but failed, being himself beaten and taken prisoner at the battle of San Jacinto by General Houston. Texas now managed its own affairs as an independent republic till 1845, when it became one of the United States, and thus gave rise to a war which proved disastrous to Mexico. It joined the Confederates during the Civil War, and was the last state to submit. It was under military control till 1870, when it was restored to the Union. Austin is the capital, and other chief towns are Galveston, San Antonio, Houston, Dallas, Fort Worth, Waco, etc. Its growth has been rapid. Pop. 3,896,542.

**Texel** (teks'el), an island of the province of North Holland, 14 miles in length and 6 in its greatest breadth, situated at the entrance of the Zuyder Zee, and separated from North Holland by the narrow channel of Mars-Diep. The island furnishes excellent pasture for sheep, and it is noted for cheese made from sheep's milk. It is well secured with dikes of prodigious strength and height. Pop. 5954.

**Tezcoco** (tes-kō'kō), or **TEXCOCO**, a town of Mexico, in the department of Mexico, on the eastern shore of the Lake of Tezcoco. In ancient times it was the second city in the kingdom. Here are the remains of three pyramids, each measuring 400 feet along the base of their fronts. The modern town contains many handsome edifices, and carries on an active trade. Pop. 5980.

**Tezel** (tet'sl). Same as *Tetzel*.

**Thackeray** (thak'e-ri), **WILLIAM MAKEPEACE**, an English novelist and humorist, was born at Calcutta in 1811; died December 24, 1863. His father was in the civil service of the East India Company. At the age of seven Thackeray was sent to England for his education, and was placed at the Charterhouse School, London, afterwards continuing his studies at Cambridge. He left the university without taking a degree; and, being well provided for, he chose the profession of an artist. He spent several years in France, Germany and Italy, staying at Weimar, Rome



and Paris, but gradually became convinced that art was not his vocation, and having meanwhile lost his fortune, he resolved to turn his attention to literature. His first appearance in this sphere was as a journalist. Under the name of George Fitz-Boodle, Esq., or of Michael Angelo Titmarsh, he contributed to *Fraser's Magazine* tales, criticisms, verses, etc., which were marked by great knowledge of the world, keen irony, or playful humor. It was in this magazine that *The Great Hoggarty Diamond*, *Yellowplush Papers*, and *Barry Lyndon* appeared. In 1840 he published separately the *Paris Sketch-book*, in 1841 the *Second Funeral of Napoleon* and the *Chronicle of the Drum*, and in 1843 the *Irish*



William Makepeace Thackeray.

*Sketch-book*. None of these writings, however, attained to any great popularity. In 1841 *Punch* was started, and his contributions to that periodical, among others *James' Diary*, and the *Snob Papers*, were very successful. In 1846-48 his novel of *Vanity Fair* was published in monthly parts, with illustrations by himself; and long before its completion its author was unanimously placed in the first rank of British novelists. His next novel was the *History of Pendennis*, completed in 1850. In 1851 he delivered a course of lectures in London on the *English Humorists of the Eighteenth Century*, which was repeated in Scotland and America, and published in 1853. Another novel, *The History of Henry Esmond* appeared in 1852, and was followed by *The Newcomes* (1855), *The Virginians* (1859), a sort of sequel to *Esmond*; *Lovel the Widower*, *The Adventures of Philip*, and *Denis Duval*, which was left unfinished at his death. In 1855-56 he delivered a series of lectures in the United States—*The Four*

*Georges*, and afterwards in England and Scotland. In 1859 he became editor of the *Cornhill Magazine*, in which his later novels and the remarkable *Roundabout Papers* appeared, but he retired from that post in 1862. He wrote a good deal of verse, half-humorous, half-pathetic, and often wholly extravagant, but all characterized by grace and spontaneity. He undoubtedly ranks as the classical English humorist and satirist of the Victorian reign, and one of the greatest novelists, essayists, and critics in the literature. A collection of letters by Thackeray was published in 1887.—His daughter, ANNE ISABELLA (Mrs. Richmond Ritchie), born in 1838, inherited much of her father's literary talent. Her first story appeared in *Cornhill* in 1860, and was called *Little Scholars in the London Schools*. It was followed by the *Story of Elizabeth* in 1867. *Old Kensington*, which followed soon after, is probably the work by which she will be best known. Among her other works are *Blue Beard's Keys*, *Toilers and Spinners*, *Miss Angel* and *Mrs. Dymond*.

**Thais** (thā'ls), an Athenian courtesan, famous for wit and beauty, who was in Asia with Alexander the Great, and is said—on doubtful authority—to have induced him to burn the palace of Persepolis.

**Thalamifloræ** (thal-a-mī-flō'rē), a class of exogenous or dicotyledonous plants in which the petals are distinct and inserted with the stamens on the thalamus or receptacle.

**Thalberg** (tāl'berk), SIGISMUND, a celebrated pianist, was born in Geneva in 1812, received his first instruction on the pianoforte in Vienna, and already as a boy was famous as a performer. Towards the end of 1835 he went to Paris, where he at once established his fame. He subsequently visited England, the Netherlands, Russia and Italy, being everywhere received with the greatest enthusiasm. During the years from 1865 to 1868 he visited Brazil and the United States, and after several years' retirement on an estate he had purchased near Naples, he once more visited Paris and London (1862), and later Brazil. He died April 28, 1871. He left a number of compositions, including sonatas, studies, a concerto, several nocturnes, and other small pieces.

**Thaler** (tāl'er), a silver coin formerly in use in Germany, of the value of about 75 cents. See *Dollar*.

**Thales** (thā'lēs), a native of Miletus in Ionia, or, according to some, of Phœnicia, the earliest philosopher of Greece, and the founder of the Ionian

school, was born about 640 B.C. He is said to have made several visits to Egypt, where he received instructions from the priests, from whom he probably acquired a knowledge of geometry. After his return his reputation for learning and wisdom became so great that he was reckoned among the seven wise men, and his sayings were held in the highest esteem by the ancients. He died about B.C. 548. His philosophical doctrines were taught orally, and preserved only by oral tradition, until some of the later Greek philosophers, particularly Aristotle, committed them to writing. He considered water, or rather fluidity, the elemental principle of all things. His philosophical doctrines are, however, but imperfectly understood.

**Thalia** (tha-lī'a), one of the nine Muses. She was the patron of comedy, and is usually represented with the comic mask and the shepherd's crook in her hand. One of the Graces was also called Thalia.

**Thallium** (thal'i-um; from Gr. *thallos*, a green twig), a metal discovered by Crookes in 1861, in a deposit from a sulphuric acid manufactory in the Harz. In its physical properties thallium resembles lead, but is slightly heavier, somewhat softer, and may be scratched by the finger-nail. It fuses under a red heat, and is soluble in the ordinary mineral acids. In color it resembles silver, but is less brilliantly white. Its specific gravity varies from 11.8 to 11.9, according to the mechanical treatment to which it has been subjected. The tenacity of the metal is less than that of lead; it is possessed of very considerable malleability. Thallium and its salts impart an intense green color to a non-luminous flame; when a flame so colored is examined by the spectroscope one very brilliant green band is noticed, somewhat more refrangible than the sodium line D. (See *Spectrum*.) The salts of thallium are exceedingly poisonous. The symbol adopted for this metal is Tl, and the atomic weight 203.64. With oxygen it forms two compounds,  $Tl_2O$ ,  $Tl_2O_3$ . Small quantities of thallium appear to be widely distributed in nature, the metal frequently occurring in iron and copper pyrites, in native sulphur, etc.

**Thallogens** (thal'o-jens), one of the primary divisions of the vegetable kingdom, comprehending those cryptogamous plants which are extremely simple in their structure, and possess nothing like the green leaves of phanerogamous plants. They have no woody fiber properly so called, being mere masses

of cells. Thallogens include algae, characeae, fungi, and lichens.

**Thallus** (thal'us), in botany, a solid mass of cells, or cellular tis-

sue without woody fiber, consisting of one or more layers, usually in the form of a flat stratum or expansion, or in the form of a lobe, leaf, or frond, and forming the substance of the thallogens.

**Thames** (tems),

the most important river of Great Britain, is usually said to rise about three miles southwest of Cirencester in Gloucestershire, near a bridge over the Thames and Severn Canal, called Thameshead Bridge, but is

more properly formed by the Isis, Churn, Colne and Leach, which have their sources on the east side of the Cotswold Hills, and unite near Lechlade, where it becomes navigable for barges. Thence it flows E., past Oxford and Abingdon to Reading, after which its course is mostly E., with great bendings and windings, to its output in the North Sea, passing through London in its course. Below London it flows eastward to the Nore, a broad estuary, its mouth being about 60 miles below the capital. Its total course is estimated at 250 miles. It pursues a winding way through London, with an average width of about 1000 feet. The Basin of the Thames has an area of 5400 square miles, and belongs entirely to the upper part of the Secondary and to the Tertiary formations. The depth of the river in the fair way above Greenwich to London Bridge is 12 to 13 feet, while its tides have a mean range of 17 feet and an extreme rise of 22 feet. (See also *London*.) By means of numerous canals immediate access is given from its basin to those of all the great rivers of England.

**Thana** (tā'nā), TANNA, chief town of a district of the same name, Bombay Presidency 21 miles N. E. of Bombay city. It is a favorite residence with the Bombay officials. Pop. 16,011.



Thallus of *Fucus Vesiculosus*. 1, 1, Fructification. 2, 2, Air bladder.

**Thane** (than), a title of honor among the Anglo-Saxons. In England a freeman not noble was raised to the rank of a thane by acquiring a certain portion of land—five hides for a lesser thane—by making three sea-voyages, or by receiving holy orders. Every thane had the right of voting in the witenagemot, not only of the shire, but also of the kingdom, when important questions were to be discussed. With the growth of the kingly power the importance of the king's thanes (those in the personal service of the sovereign) rose above that of the highest gentry, ealdormen and bishops forming an inferior class. On the cessation of his actual personal service about the king the thane received a grant of land. After the Norman conquest thanes and barons were classed together. In the reign of Henry II the title fell into disuse. In Scotland the thanes were a class of non-military tenants of the crown, and the title was in use till the end of the fifteenth century.

**Thanet** (than'et), ISLE OF, a district of England in the county of Kent, at the mouth of the Thames, separated from the mainland by the river Stour on the south and the rivulet Nether-gong on the west, with an area of 41 sq. miles.

**Thanksgiving Day**, an annual festival of thanksgiving for the mercies of the closing year, originating in New England in 1621, after the first harvest at the Plymouth settlement. It slowly spread to the other colonies, and since 1803, when President Lincoln issued a proclamation recommending its national observance, his example has been followed by succeeding presidents, the last Thursday of November being chosen as Thanksgiving Day and kept as a holiday throughout the Union.

**Thann** (tan), Germany, in Alsace, has a fine Gothic church with a spire of open work 328 feet high, and has manufactures of woollens, cottons, etc. Pop. 7901.

**Thar and Parkar** (tur, pär'kur), a district in the east of Sind, British India. It is divided into two districts, the 'Pat' or plain of the Eastern Nara, and the 'Thar' or desert. Area, 12,729 sq. miles. Chief town, Umarmot or Amarmote, the birth-place of Akbar. Pop. 4924.

**Thaso** (thä'sö), the ancient *Thasos*, an island in the Aegean Sea, a few miles south of the Macedonian coast, belonging to Turkey.

**Thaxter** (thaks'ter), CELIA, an American poet, born in New

Hampshire, in 1835; died in 1894. She resided for years on the Isle of Shoals, and wrote *Among the Isles of Shoals*, *Drift Wood*, *Poems for Children*, etc.

**Thayer** (thä'er), ANNOTT HENDERSON, American figure painter, born in Boston in 1840. He was a pupil of Gérôme at the Paris Ecole des Beaux Arts. Among his best-known works may be mentioned *The Virgin*, *The Virgin Enthroned* and *Caritas*.

**Theatines** (thē'a-tins), an order of monks founded at Rome in 1524, principally by Glaupietro Caraffa (Pope Paul IV), archbishop of Chieti, in Naples (anciently *Theate*). They bound themselves to preach against heretics, attend the sick and criminals, and not to possess property or ask for alms. The order formerly flourished in France, Spain, and Portugal, but is now chiefly confined to the Italian provinces.

**Theater** (thē'a-ter; Greek, *theatron*), an edifice appropriated to the representation of dramatic spectacles. Among the Greeks and Romans theaters were the chief public edifices next to the temples, and in point of magnitude they surpassed the most spacious of the temples, having in some instances accommodation for as many as from 10,000 to 40,000 spectators. The Greek and Roman theaters very closely resembled each other in their general form and principal parts. The building was of a semicircu-



Theater of Segesta, Sicily — restored.

lar form, resembling the half of an amphitheater, and was not covered by a roof. In Greece the semicircular area was often scooped out in the side of a hill, but Roman theaters were built on the level. The seats of the spectators were all concentric, being arranged in tiers up the semicircular slope. The stage or place for the players was in front of the seats, being a narrow platform along the straight side of the theater. Behind this rose a high wall resembling the façade of

a building, this being intended to represent any building in front of which the action was supposed to take place. This was called in Greek *skēnē* (L. *scena*), the stage being called *proskēnion* (L. *proscenium*). The semicircular space between the stage and the lowest seats of the spectators was called *orchestra*, and was appropriated by the Greeks to the chorus and musicians, and by the Romans to the senators. Scenery, in the modern sense of the word, was not employed except in a very rude form, but the stage machinery seems in many cases to have been elaborate; and in particular there was a well-known machine or contrivance of some sort from which devices made their entrance as if from the sky. A good existing example of an ancient theater is that of Segesta in Sicily.

Between the decline of the ancient and the rise of the modern drama there is a long interval, in which the nearest approach to theatrical entertainments is found in miracle plays, mysteries, and interludes. These performances took place in churches, convents, halls, etc., or in the open air. In 1548 the Confraternity of the Trinity opened a theater in Paris, in which they performed secular pieces. The first theater erected in Italy seems to have been that of Florence, built in 1581, but the first building that approaches the modern style was one constructed at Parma in 1618. In England there were organized companies of actors as far back as the time of Edward IV, but as there were no regular playhouses the performances took place in tennis-courts, inn-yards, and private houses. The London Theater was built before 1570, and the Curtain in Shoreditch and the playhouses in Blackfriars and Whitefriars date from about the same time. Shakespeare's plays were brought out at the house in Blackfriars and at the Globe on the Bankside, both of which belonged to the same company, to whom James I granted a patent in 1603. The Globe was a six-sided wooden structure, partly open at the top and partly thatched. Movable scenery was first used on the public stage by Davenant in 1662, and about the same time this manager introduced women to play female characters, hitherto taken by boys and men. Modern theaters are all very much alike in their internal construction. The house is divided into two distinct portions, the auditorium and the stage, the former for the spectators, the latter for the actors and scenery, which is often of the most elaborate and realistic kind. The floor of the auditorium is always sloped down from the back of the house to the stage; several tiers of

galleries or balconies run in a semicircular or horseshoe form round the house. The seats in the galleries rise terrace-wise from the front, so as to allow the persons in the back rows to see on to the stage over the heads of those before them. Immediately in front of the stage is a space occupied by the orchestra. Part of the stage flooring is movable, either as traps through which actors or furniture ascend or descend, or in long narrow pieces which are drawn off at each side of the stage to allow the passage of the rising scenes. Within recent years there have been great improvements in the art of stage setting, for the production of naturalistic effects, and the stage of to-day presents an extraordinary advance over that of the past centuries.

**Thebes** (*thēba*), an ancient capital of Egypt, in Upper Egypt, on both sides of the Nile, about 300 miles S. E. of Cairo, now represented by the four villages of Luxor, Karnak, Medinet Hahu and Kurneh, as well as by magnificent ruins which extend about 9 miles along the river. When Thebes was founded is not known; the period of its greatest prosperity reaches from 1500 to 1000 B.C. The ruins comprise magnificent temples, rock-cut tombs, obelisks decorated with beautiful sculptures, long avenues of sphinxes, and colossal statues. The largest of the temples is that at Karnak, which is about 1½ mile in circumference. The great hall of the temple (or 'hall of columns'; see *Egypt*, section *Architecture*), the most magnificent in Egypt, measures 320 feet by 170, and the roof was originally supported by 134 gigantic columns, of which 12 forming the central avenue are 62 feet high and 11 feet 6 inches in diameter, the others, which are in rows on either side, being fully 42 feet in height and 28 in circumference. Within the temple courts are several obelisks of red granite; one—the largest obelisk known—is 108 feet 10 inches high and 8 feet square. Above Karnak are the village and temple of Luxor, the latter at one time connected with Karnak by an avenue of sphinxes (some of which still remain) about a mile long. The Memnonium or temple of Rameses II, and the temple and palace of Rameses III, on the other or left bank of the river, are objects of great interest, both for the grandeur of their architecture and the richness and variety of their sculptures. (For plan of former see *Egypt*.) Here are also the colossal statues of Amenoph III, one of them known as the vocal statue of Memnon (which see). In the interior of the mountains which rise behind are found



the tombs of the kings of Thebes, excavated in the rock, the most remarkable being that of Sethi I, discovered by Belzoni, and containing fine sculptures and paintings.

**Thebes**, a city of ancient Greece, the principal city of Boeotia, the birthplace of Pindar, Epaminondas, and Pelopidas, was situated about midway between the Corinthian Gulf and the Euboean Sea. Cadmus is said to have founded it in 1600 B.C. It lost much of its influence in Greece through its perfidious leagues with the Persians. Under the brilliant leadership of Epaminondas and Pelopidas it became the leading state in Greece, but its supremacy departed when the former fell at the battle of Mantinea (B.C. 362). From this time the city never recovered its former importance, and gradually disappeared from history. The modern Thebes or Thiva is an unimportant town of some 3000 inhabitants.

**Theca** (thē'ka), in botany, the spore-case of ferns, mosses, etc.

**Theft.** See *Larceny*.

**Theine** (thē'in). See *Coffeine*.

**Theism** (thē'izm), the belief or acknowledgment of the existence of God, as opposed to *Atheism*. See *Deism*.

**Theiss** (tis), a river of Hungary, formed in the east of the kingdom by the junction of the Black and the White Theiss, both descending from the Carpathians and flowing into the Danube about 20 miles above Belgrade; length, about 800 miles. It is the second river in Hungary, being inferior only to the Danube, with which, for about 100 miles, the lower part of its course is almost parallel. Its principal tributary is the Maros from the east.

**Themis** (them'is), goddess of law and justice among the Greeks, was the daughter of Uranus and Gaia (Heaven and Earth); according to some, of Helios, or the Sun.

**Themistocles** (the-mis'tu-kles), an Athenian commander, born in

514 B.C. On the second invasion of Greece by Xerxes, Themistocles succeeded by feigning in obtaining the command of the Athenian fleet, and in the battle of Salamis which followed (B.C. 480), the Persian fleet was almost totally destroyed, and Greece was saved. The chief glory of the victory is due to Themistocles. Subsequently he was accused of having enriched himself by unjust means, and of being privy to designs for the betrayal of Greece to the Persians. Fearing the vengeance of his countrymen, he, after many vicissitudes, took refuge at the Persian court. The Persian throne was then (465 B.C.) occupied by Artaxerxes Longimannus, to whom Themistocles procured access, and whose favor he gained by his address and talents, so that he was treated with the greatest distinction. He died in 449, according to some accounts by his own hand.

**Theobald** (thē'n-bald; often pronounced tib'aid), LEWIS, an English writer, born about 1690, was brought up to the profession of the law, but early turned his attention to literature, and wrote some plays, now quite forgotten. Pope was meanly jealous of him, and ridiculed him in his *Dunciad*. Theobald, however, had his revenge, his edition of Shakespeare (1733) completely supplanting Pope's. He did great service to literature by this painstaking work, many of his emendations having been adopted by subsequent editors. He died in 1744.

**Theobroma** (thē-o-brō'ma). See *Cacao*.

**Theocracy** (thē-ok'ra-si), that government of which the chief is, or is believed to be, God himself, the priests being the promulgators and expounders of the divine commands. The most notable theocratic government of all times is that established by Moses among the Israelites.

**Theocritus** (thē-ok'ri-tus), a Greek poet, born at Syracuse, who flourished about B.C. 280. We have under his name thirty idyls, or pastoral poems, of which, however, several are probably by other authors. Most of his idyls have a dramatic form, and consist of the alternate responses of musical shepherds. His language is strong and harmonious, and his poetical ability high, his bucolic poems being regarded as masterpieces of their kind.

**Theodolite** (thē-od'u-lit), a surveying instrument for measuring horizontal and vertical angles by means of a telescope, the movements of which can be accurately marked. This instrument is variously constructed, but



Themistocles.

its main characteristics continue unaltered in all forms. Its chief features are the telescope, a graduated vertical circle to which it is attached, two concentric horizontal circular plates which turn freely on each other, and two spirit-levels on the upper plate to secure exact horizontality, the whole being on a tripod stand. The lower plate contains the divisions of the circle round its edge, and the upper or vernier plate has two vernier divisions diametrically opposite. The



Theodolite.

plates turn on a double vertical axis. To measure the angular distance horizontally between any two objects, the telescope is turned round along with the vernier circle until it is brought to bear exactly upon one of the objects; it is then turned round until it is brought to bear on the other object, and the arc which the vernier has described on the graduated circle measures the angle required. By means of the double vertical axis the observation may be repeated any number of times in order to ensure accuracy. The graduated vertical circle is for taking altitudes or vertical angles in a similar way. The theodolite is a most essential instrument in surveying and in geodetical operations.

**Theodora** (thē-o-dō'ra), the wife of the Byzantine emperor Justinian, of low birth, at one time a dancer on the stage, and notorious for licentiousness. She later assumed the character of a pious benefactor of the church, and died in 548, aged forty. See *Justinian I.*

**Theodore** (thē-u-dōr), one of the most distinguished ecclesiastical writers of his age, born at Antioch about the middle of the fourth century.

Early in life he followed the example of Chrysostom in embracing the monastic life. He was ordained priest, and for fifty years distinguished himself as a zealous opponent of the heresies of Arius, Apollinarius, and others. From Antioch he removed to Tarsus, and in the year 392 or 394 was chosen bishop of Mopsuestia in Cilicia, dying in 429. Only a few fragments of his works are extant, the most important of them being commentaries on almost all the books of the Bible, and various polemical treatises. His doctrine approximated somewhat to that of Pelagius, and was later considered heretical.

**Theodore II**, King of Abyssinia, born in the province of Kwara in 1818, for many years a rebel, finally fought his way to the throne (1855). He was a man of great parts, an inveterate foe of Islamism, a born ruler, and an intelligent reformer. But intolerance of any power save his own finally made a tyrant of him; and in consequence of the imprisonment of Consul Cameron and other British subjects he brought upon himself a war with England, which ended, April 13, 1868, in the storming of Magdala and the death (supposedly by suicide) of Theodore. See *Abyssinia*.

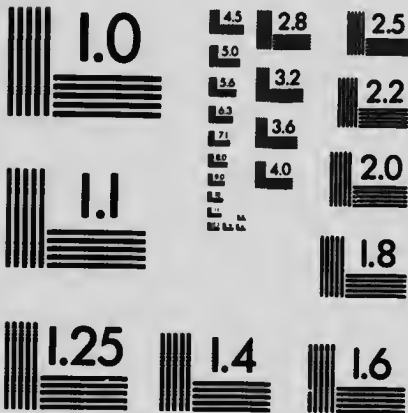
**Theodoret** (thē-od'u-ret), a distinguished ecclesiastical historian and theological writer, born at Antioch about the close of the fourth century, and in 420 or 423 raised to the bishopric of Cyrus or Cyrrhus. Becoming involved later in the quarrel between Nestorius and the overbearing and intolerant Cyril of Alexandria, he was deposed at the so-called robber council of Ephesus, a sentence which was reversed by the general council of Chalcedon in 451. Theodoret appears to have died in 457 or 458. The most important of his works consist of commentaries on numerous books of the Old Testament and on the Pauline epistles; *Ecclesiastical History*, *History of Heresies*, etc.

**Theodorie** (thē-od'u-rik), King of the Ostrogoths; born in A.D. 455, died in 526; was the son of Theodemir, king of the Ostrogoths of Pannonia. From his eighth to his eighteenth year he lived as a hostage with the Emperor Leo at Constantinople. Two years after his return he succeeded to the throne. In 493, after several bloody engagements, Theodorie induced Odoacer, who had assumed the title of King of Italy, to grant him equal authority. The murder of Odoacer at a banquet soon after opened the way for Theodorie to have himself proclaimed sole ruler. The-



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odoric ruled with great vigor and ability. He attached his soldiers to his service by assigning them a third part of the lands of Italy, on the tenure of military service; while among his Italian subjects, whom he conciliated by introducing an improved administration of justice, he encouraged industry and the arts of peace. Although, like his ancestors, he was an Arian, he never violated the peace or privileges of the Catholic Church.

**Theodosius** (thē-o-dō'shi-us), a Christian Roman emperor, born in Spain about 364, and selected by the Emperor Gratian, in 379, for his partner in the empire. To his care were submitted Thrace and the eastern provinces, which he delivered from an invasion of the Goths, concluding a peace with them in 382. On the defeat and death of Maximus (388) he became the sole head of the empire, Gratian having been previously killed in the war against Maximus. In 390 a sedition took place in Thessalonica, and in revenge for this act, Theodosius caused the people of the city to be invited to an exhibition at the circus, and when a great concourse had assembled they were barbarously murdered by his soldiery, to the number, it is computed, of 7000. St. Ambrose refused him communion for eight months on account of this crime, and Theodosius submitted humbly to the punishment. He died at Milan, A.D. 395, leaving the eastern portion of the empire to his son Arcadius, the western to his son Honorius. He distinguished himself by his zeal for orthodoxy, and his intolerance and persecution of Arianism and other heresies.

**Theology** (thē-o'i'o-ji; Greek *Theos*, God, and *logos*, doctrine) is the science which treats of the existence of God, his attributes, and the Divine will regarding our actions, present condition, and ultimate destiny. In reference to the sources whence it is derived, theology is distinguished into *natural* or *philosophical* theology, which relates to the knowledge of God from his works by the light of nature and reason; and *supernatural*, *positive*, or *revealed theology*, which sets forth and systematizes the doctrines of the Scriptures. With regard to the contents of theology, it is classified into *theoretical theology* or *dogmatics*, and *practical theology* or *ethics*. As comprehending the whole extent of religious science, theology is divided into four principal classes, *historical*, *exegetical*, *systematic*, and *practical theology*. Historical theology treats of the history of Christian doctrines. Exegetical theol-

ogy embraces the interpretation of the Scriptures and Biblical criticism. Systematic theology arranges methodically the great truths of religion. Practical theology consists of an exhibition, first, of precepts and directions; and secondly, of the motives from which we should be expected to comply with these. *Apologetic* and *polemic* theology belong to several of the above-mentioned four classes at once. The *scholastic theology* attempted to clear and discuss all questions by the aid of human reason alone, laying aside the study of the Scriptures, and adopting instead the arts of the dialectician.

**Theophrastus** (thē-o-fras'tus), a celebrated Peripatetic philosopher, was born at Lesbos early in the fourth century B.C., and studied at Athens, in the school of Plato, and afterwards under Aristotle, of whom he was the favorite pupil and successor. On the departure of Aristotle from Athens after the judicial murder of Socrates he became the head of the Peripatetic school of philosophy, and composed a multitude of books—dialectic, moral, metaphysical, and physical. We possess two entire books of his botany, but only fragments of his other works, such as those on *Stones*, on the *Winds*, etc.; and his *Characters* or sketches of types of character, by far the most celebrated of all his productions. He died in 287 B.C. To his care we are indebted for the preservation of the writings of Aristotle, who, when dying, intrusted them to his keeping.

**Theophrastus Paracelsus.**

See *Paracelsus*.

**Theosophy** (thē-os'u-fi), according to its etymology the science of divine things. But the name of *theosophists* has generally been applied to persons who in their inquiries respecting God have run into mysticism, as Jacob Böhme, Swedenborg, St. Martin, and others. At the present day the term is applied to the tenets of the Theosophical Society, founded in New York in 1875 by Henry S. Olcott, the objects of which are: to form the nucleus of a universal brotherhood of humanity, to promote the study of Eastern literature and science, and chiefly to investigate unexplained laws of nature, and the physical powers of man, and generally the search after divine knowledge—divine applying to the divine nature of the abstract principle, not to the quality of a personal God. The theosophists assert that humanity is possessed of certain powers over nature, which the narrower study of nature from the merely materialistic stand-point has

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## Thera

failed to develop. They maintain the Hindu doctrine of transmigration of souls. The membership in the United States is about 5000. Mrs. Annie Besant is at present the president of the society.

**Thera.** See *Sanatoria*.

**Therapeutæ** (ther-a-pū'tē), a Jewish sect of devotees of the first century after Christ, somewhat akin to the Essenes.

**Therapeutics** (ther-a-pū'tiks), that department of medicine which treats of remedies in the widest sense.

**Theresa** (te-rē'sa), ST., a religious enthusiast, born at Avila, in Spain, in 1515, who took the veil among the Carmelites at the age of twenty-four. Being dissatisfied at the relaxation of discipline in the order to which she belonged she undertook to restore the original severity of the institute. The first convent of reformed Carmelite nuns was founded at Avila in 1562, and was speedily followed by a number of others. She died in 1582, and was canonized by Pope Gregory XV in 1621.

**Theresiopel** (tā-rā-sē-ō'pel), or **MA-BIA-THERESIENSTADT** (Hung. *Szabacska*), a royal free town in Hungary, in the county of Bács, is more properly a district than a town, as it covers, with its numerous suburbs, an area of more than 600 square miles. It has manufactures of linen and woollen cloth, dye-works, tanneries, soap-boiling works, etc., and a trade in cattle, horses, hides, etc. Pop. 82,122.

**Thermæ** (ther'mē), a name often given to the large bathing establishments of ancient Rome.

**Thermidor** (ther'mi-dor), the eleventh month of the year in the calendar of the first French republic. It commenced on July 19th and ended on August 17th. See *Calendar*.

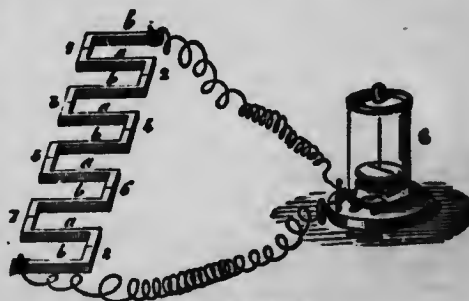
**Thermit**, the name given a mixture of aluminum powder or filings and powdered oxide of iron, used for welding the ends of iron rails or fractures in iron goods. If set on fire it yields a temperature of 5400° F., far above the melting point of iron. In burning it produces practically pure iron in a liquid state and oxide of aluminum as a slag. The molten iron fills the fracture or the space between the rails, which it welds in hardening.

**Thermodynamic Engine** (ther-mō-dī-nam'ik) any form of heat engine (as gas or steam engines) by means of which a percentage of the heat lost by one body called the source, on account of its con-

nection with another body called the refrigerator, is converted into kinetic energy or mechanical effect, and made available for the performance of work. The efficiency of a heat engine is the ratio of the heat available for mechanical effect to the total heat taken from the source. A reversible engine is called a perfect engine, because it is the most efficient engine between the temperatures of its source and the refrigerator.

**Thermodynamics**, that department of physical science which investigates the laws regulating the conversion of heat into mechanical force or energy, and vice versa.

**Thermo-electricity**, electricity produced at the junction of two metals, or at a point where a molecular change occurs in a part of the same metal, when the junction or point is heated above or cooled below the general temperature of the conductor. Thus when wires or bars of metal of different kinds, as bismuth and antimony, are placed in close contact, end to end, and disposed so as to form a periphery or continuous circuit, and heat then applied to the ends or junctions of the bars, electric currents are produced. The principle of the arrangement is shown in the accompanying figure, in which the bars marked *a* are antimony, those marked *b* bismuth. The junctions 1, 3, 5, 7 are to be at one temperature, the junctions 2, 4,



Thermo-pile.

6, 8 at another. *g* is a delicate galvanometer which measures the force of the current produced. The thermo-electric battery or pile, an apparatus much used in delicate experiments with radiant heat, consists of a series of little bars of antimony and bismuth (or any other two metals of different heat-conducting power), having their ends soldered together and arranged in a compact form; the opposite ends of the pile being connected with a galvanometer, which is very sensibly affected by the electric current

## Thermograph

induced in the system of bars when exposed to the slightest variations of temperature. To the combined arrangement of pile and galvanometer the name of *thermo-multiplier* is given. Two metal bars of different heat-conducting power having their ends soldered together, and the combined bar then usually bent into a more or less horseshoe or magnet form for the purpose of bringing their free ends within a conveniently short distance, designated a thermo-electric pair, are much used in thermo-electric experiments. But as the electric current developed in a single pair is very weak, a considerable number are usually combined to form a thermo-electric pile or battery. Bismuth and antimony are the metals usually employed, the difference in electro-motive force being greater between them than between any other two metals conveniently obtainable.

**Thermograph** (ther'mu-graf), a thermometer provided with a registering device; and mechanism for reading temperature. The United States Weather Bureau uses a crescent-shaped bulb filled with alcohol and hermetically sealed. Changes of temperature affect the curve of the bulb, and its alteration of form is communicated to a series of multiplying levers, which act upon a recording pen. Bartlett's thermograph is designed for greenhouses, it being electrically connected with dials in the house and office, so that changes in temperature can be readily noted.

**Thermometer** (ther-mom'e-ter), an instrument by which the temperatures of bodies are ascertained; founded on the property which heat possesses of expanding all bodies, the rate or quantity of expansion being supposed proportional to the degree of heat applied, and hence indicating that degree. The thermometer consists of a slender glass tube, with a small bore, containing in general mercury or alcohol, which expanding or contracting by variations in the temperature of the atmosphere, or on the instrument being brought into contact with any other body, or immersed in a liquid or gas which is to be examined, the state of the atmosphere, the body, liquid, or gas, with regard to heat, is indicated by a scale either applied to the tube or engraved on its exterior surface. The ordinary thermometer consists of a small tube terminating in a ball containing mercury, the air having been expelled and the tube hermetically sealed. A scale of temperatures is attached, in which there are two points corresponding to fixed and determinate temperatures, one, namely, to the temperature

of freezing water and the other to that of boiling water. In the thermometer commonly used in the United States and the British empire, known as Fahrenheit's thermometer, the former point is marked 32° and the latter 212°; where the zero of the scale, or that part marked 0°, is 32° below the freezing-point, and the interval or space between the freezing and boiling points consists of 180°. The zero point is supposed to have been fixed by Fahrenheit at the point of greatest cold that he had observed, probably by means of a freezing mixture such as snow and salt. In France and other parts of Europe, and nowadays in all scientific investigations, the Centigrade or Celsius scale is used. In this the space between the freezing and boiling points of water is divided into 100 equal parts or degrees, the zero being at freezing and the boiling-point marked 100°. Réaumur's thermometer, in use in Germany, has the space between the freezing and boiling points divided into 80 equal parts, the zero being at freezing. The following formulae will serve to convert any given number of degrees of Fahrenheit's scale into the corresponding number of degrees on Réaumur's and the Centigrade scales, and *vice versa*: let F, R, and C (the 0° of C. and R. being equal to F. 32°, and the three scales from freezing to boiling point being F. 180°, C. 100°, R. 80°, or in the ratio of 9, 5, 4) represent any corresponding numbers of degrees on the three scales respectively, then: (F.—32°) ×  $\frac{4}{9}$  = R.; (F.—32°) ×  $\frac{5}{9}$  = C.; R. ×  $\frac{9}{4}$  + 32° = F.; C. ×  $\frac{9}{5}$  + 32° = F.; C. ×  $\frac{4}{5}$  = R.; R. ×  $\frac{5}{4}$  = C. For extreme degrees of cold, thermometers filled with spirit of wine must be employed from its



Thermometer Scales.

great resistance to freezing temperatures, whereas mercury freezes at about 39° below zero on the Fahrenheit scale. On the other hand, spirit of wine is not adapted to high temperatures, as it is soon converted into vapor, whereas mercury does not boil till its temperature is raised to 660° F. As the ordinary thermometer gives the temperature only at the time of observation, the necessity for having an instrument which would show the maximum and minimum temperatures within a given period is easily apparent in all cases connected with meteorology, and various forms of instruments for this purpose have been invented. A common form of *maximum thermometer* consists of the ordinary thermometer fitted with a piston which moves easily in the tube. The instrument is placed horizontally, and the piston is pushed along the bore as the mercury advances, and is left at the highest point by the retreating fluid. This point is noted by the observer, who then erects the thermometer, causing the piston to sink to the mercury, the instrument thus being in condition for a fresh experiment. A similar action takes place in the spirit of wine *minimum thermometer*, the small movable piston being, however, immersed in the fluid and drawn back by the convex surface of the contracting fluid, being left at the point of greatest contraction. The maximum and minimum instruments combined form the *self-registering thermometer*.

**Thermo-pile.** See *Thermo-electricity*.

**Thermopylae** (ther-mop'e-lā), a narrow defile in Northern Greece, leading from Thessaly southward, between Mount Eta and the sea (the Mallac Gulf, now the Gulf of Zeïtouni), 25 miles north of Delphi, celebrated for its brilliant defense by 300 Spartans, together with allies, under Leonidas, against the Persian host under Xerxes, in 480 B.C.

**Theseus** (thē'sūs), a mythical king of Athens and famous hero of antiquity, son of Ægeus by Æthra, the daughter of Pittheus of Troezen, in Peloponnesus, of whom many notable deeds are related, as the slaying of the Minotaur and the freeing of Athens from the tribute of seven youths and seven maidens annually sent to Crete to be devoured by that monster. As king of Athens he is reputed to have governed with mildness, instituted new laws, and made the government more democratic.

**Thespis** (thes'pis), a native of a village near Athens, who lived in the sixth century B.C., reputed to be the inventor of tragedy and of the masks which the Greek actors always wore in

performing. His first representation took place in 535 B.C. See *Drama*.

**Thessalonians** (thes-a-lō'nī-ans), *EPISTLES TO THE*, two New Testament epistles written by St. Paul to the church at Thessalonica, in all probability during his long stay at Corinth, and therefore not very long after the foundation of the Thessalonian church on St. Paul's second missionary journey. A note at the end of each of the epistles in our *Authorized Version* states that they were written from Athens, but there can be little doubt that this is erroneous, and that they were really written at Corinth. They are the earliest of Paul's writings, and are characterized by great simplicity of style as compared with his other epistles. The genuineness of the first epistle has hardly ever been questioned, but according to the newer criticism, that of the second epistle is more than doubtful.

**Thessalonica** (thes-a-lō-nē'ka). See *Salonica*.

**Thessaly** (thes'a-lī), the northeastern division of Greece, mainly consisting of a rich plain inclosed between mountains and belonging almost entirely to one river basin, that of the Peneios (Salambría), which traverses it from west to east, and finds an outlet into the Ægean through the vale of Tempe. In the earliest times Thessaly proper is said to have been inhabited by Æolic and other tribes. Subsequently it was broken up into separate confederacies, and seldom exerted any important influence on the affairs of Greece generally. Thessaly was conquered by Philip of Macedon in the fourth century B. C., became dependent on Macedonia, and was finally incorporated with the Roman Empire. After the fall of the Byzantine Empire it fell into the hands of the Turks, became a part of the Ottoman Empire, although most of the inhabitants are Greeks. The greater portion of it was in 1881 incorporated with the kingdom of Greece. Capital Larissa. Pop. 344,000.

**Thetford** (thet'fērd), a municipal borough of England, partly in the county of Suffolk and partly in that of Norfolk, on both banks of the Ouse, here crossed by a handsome iron bridge. It is a place of great antiquity and has a remarkable Celtic mound called Castle Hill. Pop. 4778.

**Thetford Mines**, a city of Quebec province, Canada, 26 miles s. w. of Quebec. It has rich asbestos mines. Pop. (1913) 7500.

**Thetis** (thē'tis), a Greek divinity, a daughter of Nereus and Doris, therefore one of the Nereids. By Peleus,



to whom she was married, she became the mother of Achilles.

**Theuriet** (tô-re-à), ANDRÉ, a French poet and novelist, born in 1833; died in 1907. His novels are *Tante Aurélie*, *Deux Sœurs*, *La Chanoinesse*, etc. He also wrote some plays and volumes of general literature.

**Thian-shan** (tê'an-), or CELESTIAL MOUNTAINS, an extensive range of Central Asia, stretching from west to east from the Pamir plateau into the Desert of Gobi, forming in the west a barrier between the Russian and Chinese dominions. Its length is estimated at 1500 miles, and many of its summits rise to 16,000 or 17,000 feet, far beyond the limits of perpetual snow. Several are said to be much higher than this. They present numerous indications of volcanic agency.

**Thibet** (ti-bet). See *Tibet*.

**Thick-knee**. See *Stone-plover*.

**Thielt** (têlt), a town of Belgium, province of West Flanders, 14 miles S. E. of Bruges, with manufactures of llnens, cottons, woollens, lace, etc. Pop. 10,727.

**Thierry** (ti-er-ri), JACQUES NICOLAS AUGUSTIN, a French historian, born at Blois in 1795; died in 1856. He was for some time associated as secretary and coadjutor with St. Simon, whose socialistic views he embraced. In 1816 he published a treatise entitled *Des Nations et de leurs Rapports Mutuels*. He did not fail to perceive the theoretical vagaries of his master, from whom he separated in 1817. His celebrated work on the *Norman Conquest of England* was published at Paris in 1825, and attained great success both in France and in England. *Lettres sur l'Histoire de la France* appeared in 1827. In 1834 he published, under the title of *Deux Ans d'Études*, a series of admirable essays, and about the same time he was summoned by Guizot, then minister of public instruction, to Paris, and intrusted with the editing of the *Recueil des Monuments Inédits de l'Histoire du Tiers État*, for the collection of documents relative to the history of France. In 1840 he published *Récits des Temps Mérovingiens*.—His brother AMÉDÉE, born in 1797; died in 1873, was also a distinguished historian, his works chiefly dealing with Roman history.

**Thiers** (ti-är), a town in France, in the department of Puy-de-Dôme, on a hill washed by the Durole. It has considerable manufactures of cutlery and ironmongery, paper, candles, leather, etc. Pop. 12,601.

**Thiers** (ti-är), LOUIS ADOLPHE, president of the French republic, statesman and historian, was born at Marseilles in 1797. He studied law and at the age of twenty-two was admitted as advocate. He soon relinquished law, however, for literature and politics (1821). Going to Paris, he after a lengthened struggle with poverty began to write for the *Constitutionnel* and other journals, and during the years 1823 to 1830 made a great reputation as a political writer. He was at the same time engaged on his *Histoire de la Révolution Française*. Taking part with Armand Carrel and Mignet in the foundation of the *National* (1830), he subsequently assisted in editing it, strongly advocating constitutional liberty in its columns. During the July revolution of 1830 the office of the *National* was the headquarters of the revolutionary party, and in the government of Louis Philippe Thiers held several offices,



Louis Adolphe Thiers.

till in 1840 he found himself at the head of the ministry for a few months, and then retired into private life. After the revolution of 1848 he was elected deputy to the Assembly, and voted for the presidency of Louis Napoleon, but was ever after one of his fiercest opponents; and at the *Coup d'État* (Dec. 2, 1851) he was arrested and banished. Returning to France in the following year, he remained in comparative retirement till 1863, when he was elected one of the deputies for Paris. During the terrible crisis of 1870-71 he came to the front as the one supreme man in France. After the fall of Paris he was returned to the National Assembly, and on Feb. 17, 1871, he was declared chief of the executive power. The first duty imposed upon him as such was to assist in drawing up the treaty of peace, whereby France lost Alsace and

Lorraine and agreed to pay an enormous indemnity; his second was to suppress the Communist insurrection, which broke out within three weeks of the signing of the treaty. This done, his next task was to free the soil as quickly as possible from the invaders by the payment of the ransom, which also was effected in an incredibly short space of time. The Assembly in August, 1871, prolonged his tenure of office and changed his title to that of president. In Nov., 1872, Thiers declared himself in favor of the republic as a definitive form of government for France, and thus to some extent brought about the crisis which resulted in his being deprived of the presidency. He accepted his deposition with dignity, and went quietly into retirement. M. Thiers' chief works are: *Histoire de la Revolution Française* (6 vols., 1823-27), and *Histoire du Consulat et de l'Empire* (20 vols., 1845-62). The latter obtained for him the academic prize of twenty thousand francs. He died September 3, 1877.

**Thionville** (ti-on-vêi; German, *Diedenhofen*), a town of Germany, in Alsace-Lorraine, on the Moselle. It is walled and otherwise fortified, and during the Franco-German war it underwent a severe siege, falling into the hands of the Germans November 25, 1870. Pop. 10,000.

**Thirlmere** (therl'mër), a small lake in the county of Cumberland, England, 5 miles S. E. of Keswick, the main reservoir of the water supply of Manchester.

**Thirlwall** (thirl'wâl), CONNOP, an English bishop and historian, born at Stepney, Middlesex, in 1797. Educated at the Charter-house and at Trinity College, Cambridge, he subsequently studied law, and was called to the bar in 1825; but having exchanged the law for the church he was ordained in 1828, and soon after received the living of Kirby Underdale, in Yorkshire. His first important work was a translation of Schielemacher's *Gospel of St. Luke*, which appeared anonymously in 1825. His next work was that to which he owes his reputation—his *History of Greece*, the first edition of which appeared in Lardner's *Cabinet Cyclopaedia*, between 1835 and 1840. It was well received, and before the appearance of Grote's history was without a rival in the English language. In 1840 Thirlwall was presented by Lord Melbourne to the see of St. David's, which he held till within little more than a year of his death, which took place at Bath in 1875. In conjunction with Archdeacon Hare, Thirlwall published a translation of the sec-

ond version of the first two volumes of Niebuhr's *Roman History*. He was a member of the committee for the revision of the Old Testament.

**Thirsk**, a market town of England, in the North Riding of Yorkshire, 21 miles north by west of York. It consists of the old and new towns, separated by a small stream, over which are two substantial stone bridges; has a spacious market-place, a handsome church in the later English style; and manufactures of agricultural implements, etc. Pop. (1911) 12,793.

**Thirst**, the sensations experienced in animals from the want of fluid nutriment. The sensations of thirst are chiefly referred to the thorax and fauces, but the condition is really one affecting the entire body. The excessive pains of thirst compared with those of hunger are due to the fact that the deprivation of liquids is a condition with which all the tissues sympathize. Every solid and every fluid of the body contains water, and hence abstraction or diminution of the watery constituents is followed by a general depression of the whole system. Thirst is a common symptom of febrile and other diseases.

**Thirty Tyrants.** See *Greece (History)* and *Rome (History)*.

**Thirty Years' War** (1618 to 1648), a war in Germany, at first a struggle between Roman Catholics and Protestants; but subsequently it lost its religious character and became a struggle for political ascendancy in Europe. On the one side were Austria, nearly all the Catholic princes of Germany, and Spain; on the other side were, at different times, the Protestant powers and France. The occasion of this war was found in the fact that Germany had been distracted ever since the Reformation by the mutual jealousy of Catholics, Lutherans, and Calvinists. Certain concessions had been made to the Protestants of Bohemia by Rudolph II (1609), but these were withdrawn by his successor, Matthias, in 1614, and four years afterwards the Bohemian Protestants were in rebellion. Count Thurn at the head of the insurgents repeatedly routed the imperial troops, compelling them to retire from Bohemia, and (in 1619) invaded the Archduchy of Austria. Matthias having died in 1619, he was succeeded by Ferdinand II, who was a rigid Catholic, but the Protestants elected as their king Frederick, Elector Palatine, who was a Protestant. Efforts at mediation having failed, the Catholic forces of Ger-

many marched against Frederick, who, with an army of Bohemians, Moravians, and Hungarians, kept the field until November 8 (1620), when he was totally routed at Weissenberg, near Prague, by Duke Maximilian of Bavaria. The Protestant cause was now crushed in Bohemia, and the people of that province suffered cruel persecution. The dominions of Frederick, the Palatinate of the Rhine included, were now conquered, the latter being occupied by Count Tilly, assisted by the Spaniards under Spinola. At the Diet of Ratisbon (March, 1623) Frederick was deprived of his territories, Duke Maximilian receiving the Electorate. Ferdinand, whose succession to the throne of Bohemia was thus secured, had now a favorable opportunity of concluding a peace, but his continued intolerance towards the Protestants caused them to seek foreign assistance, and a new period of the war began. Christian IV of Denmark, induced partly by religious zeal and partly by the hope of an acquisition of territory, came to the aid of his German co-religionists (1624), and being joined by Mansfeld and Christian of Brunswick, advanced into Lower Saxony. There they were met by Wallenstein, Duke of Friedland, who, in 1626, defeated Mansfeld at Dessau, while Tilly was also successful in driving Christian back to Denmark. In the peace of Lübeck which followed (May, 1629) Christian of Denmark received back all his occupied territory, and undertook not to meddle again in German affairs. After this second success, Ferdinand again roused his people by an edict which required restitution to the Catholic Church of all churchlands and property acquired by them since 1555. To the assistance of the Protestants of Germany, in these circumstances, came Gustavus Adolphus, King of Sweden, who landed (1630) with a small army upon the coast of Pomerania. Joined by numerous volunteers, and aided by French money, he advanced, and routed Tilly at Breitenfeld (or the battle of Leipzig, September, 1631), victoriously traversed the Main and the Rhine valleys, defeated Tilly again near the confluence of the Lech and the Danube (April, 1632), and entered Munich. Meanwhile the emperor sought the aid of Wallenstein, by whose ability and energy Gustavus was obliged to retire to Saxony, where he gained the great victory of Lützen (Nov., 1632), but was himself mortally wounded in the battle. The war was now carried on by the Swedes under the chancellor Oxenstierna, till the rout of the Swedish

forces at Nördlingen (Sept., 1634) again gave to the emperor the preponderating power in Germany. The Elector of Saxony, who had been an ally of Gustavus, now made peace at Prague (May, 1635), and within a few months the treaty was accepted by many of the German princes. The Swedes, however, thought it to their interest to continue the war, while France resolved to take a more active part in the conflict. Thus the last stage of the war was a contest of France and Sweden against Austria, in which the Swedish generals gained various successes over the imperial forces, while the French armies fought with varied fortune in West Germany and on the Rhine. Meanwhile the emperor had died (1637), and had been succeeded by his son, Ferdinand III. The struggle still continued until, in 1646, the united armies of the French, under the great generals Turenne and Conde, and the Swedes advanced through Suabia and Bavaria. The combined forces of Sweden, Bavaria, and France were then about to advance upon Austria, when the news reached the armies that the Peace of Westphalia (1648) was concluded, and that the long struggle was ended.

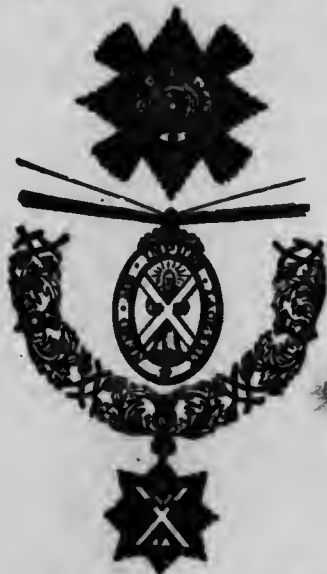
**Thisbe** (thiz'he). See *Pyramus and Thisbe*.

**Thistle** (thiz'l), the common name of prickly plants of the tribe Cynaraceæ, nat. order Compositæ. There are numerous species, most of which are inhabitants of Europe. The blessed-thistle, *Carduus benedictus* of the pharmacopœias, *Cnicus benedictus* or *Cirsium benedictum* of modern botanists, is a native of the Levant, and is a laxative and tonic medicine. The cotton-thistle belongs to the genus *Onopordum*. The common cotton-thistle (*O. Acanthium*) attains a height of from 4 to 6 feet. It is often regarded as the Scotch thistle, but it is doubtful whether the thistle which constitutes the Scottish national badge has any existing type, though the stemless thistle (*Cnicus acaulis* or *Cirsium acaule*) is in many districts of Scotland looked on as the true Scotch thistle. Some dozen species of thistle are common in the United States, spreading from New England to Florida, among them the Canada thistle, one of the severest pests of the farmer.

**Thistle**, ORDER OF THE, a Scottish order of knighthood, sometimes called the order of St. Andrew. It was instituted by James VII (James II of England) in 1687, when eight knights were nominated. It fell into abeyance during the reign of William and Mary, but was revived by Queen Anne

## Tholen

in 1703. The insignia of the order consist of a gold collar composed of thistles interlaced with sprigs of rue; the jewel, a figure of St. Andrew in the middle of a star of eight pointed rays, suspended from the collar; the star, of silver and eight-rayed, four of the rays being pointed, while the alternate rays are shaped like the tail-feathers of a bird, with a thistle in the center surrounded by the Latin motto *Nemo me impune*



Order of the Thistle—Star, Jewel, Badge and Collar.

*laccssit*; and the badge, oval, with the motto surrounding the figure of St. Andrew. The order consists of the sovereign and sixteen knights, besides extra knights (princes), and a dean, a secretary, the lion-king-at-arms, and the gentleman usher of the green rod.

**Tholen** (tō'len), an island in the province of Zealand, Holland, between the Scheldt and the Maas, with an area of about 50 sq. miles, and a pop. of 15,000.

**Tholuck** (tō'lyk), **FRIEDRICH AUGUST GOTTREU**, a German theologian, born in 1799; died in 1877. He was educated at the universities of Breslau and Berlin, and devoted himself to theology. Tholuck filled the chair of theology at Halle from 1826 till his death.

**Thomas**, **GEORGE HENRY**, general, was born in Virginia in 1816, and at the age of twenty entered the military academy at West Point, passing into the artillery as sublieutenant at

the age of twenty-four. He took part in the Mexican war (1846-47); was appointed professor at West Point in 1850; recalled to active service in 1855, and employed in Texas against the Indians. When the Civil War broke out Thomas had attained the rank of major, and being appointed lieutenant-colonel of volunteers, April 25, 1861, was some months later sent into Kentucky, where, in the following year, he defeated Zollikofer. As major-general of volunteers he took part in the battle of Murfreesborough, where he greatly distinguished himself; while at the bloody battle of Chickamauga, in September, 1863, he saved the Federal army from destruction by his stubborn resistance after the defeat of the Federal right, earning the name of 'The Rock of Chickamauga.' In 1865 he compelled the Confederates to raise the siege of Nashville, for which he received the thanks of Congress, and was raised to the rank of major-general in the regular army. The brevet ranks of lieutenant-general and general were offered him by President Johnson, but he declined them. He died in 1870.

**Thomas** (tom'as), **JOSEPH**, scholar and linguist, born in Cayuga Co., New York, in 1811, was, with Thomas Baldwin, author of *Baldwin's Pronouncing Gazetteer*. In 1851-52 appeared his first book of *Etymology*, followed by an edition of *Oswald's Etymological Dictionary*. In 1854 he prepared *A New and Complete Gazetteer of the United States*; and in 1855 *A Complete Geographical Dictionary of the World* (popularly known as *Lippincott's Gazetteer of the World*), and which for accuracy and completeness had scarcely an equal. In 1864 appeared his comprehensive *Medical Dictionary*; and in 1870 his *Universal Pronouncing Dictionary of Biography and Mythology*, which occupies a high place among books of reference. He died December 24, 1891.

**Thomas**, **THEODORE**, noted orchestral leader, born in Germany in 1835; died in 1905. His family moved to the United States in 1845, and he became an expert on the violin. His symphony concerts began in 1864, and for thirty years he was conductor of the Brooklyn Philharmonic Society. His later years were passed in Chicago, where the Symphony Hall was built through his efforts.

**Thomas à Kempis** (that is, *Thomas of Kempen*, his birthplace, in the archbishopric of Cologne) was born about 1380. At the age of twenty he retired to an Augustine convent near Zwolle, in Holland, where



he took the vows, and where, in 1471, he died sub-prior of the convent. He copied many MSS. in a beautiful hand and wrote numerous original works, including sermons, exhortations, ascetic treatises, hymns, prayers, etc. His name, however, would hardly be remembered were it not for its connection with the celebrated devotional work called *The Imitation of Christ*, 'De Imitatione Christi,' a work which has passed through thousands of editions in the original Latin and in translations. The authorship of this book has long been a disputed point; but it is generally ascribed to a Kempis.

**Thomasville**, a town and health resort, county seat of Thomas Co., Ga., 200 miles w. s. w. of Savannah. It has a lumber trade, various industries. Pop. 6727.

**Thomists**, Aquinas. See *Scholasticism*.

**Thompson**, ALMON HARRIS, born in Stoddard, N. H., in 1839; died in 1906. He became a member of the United States Topographic Engineers in 1870. In 1882 he was appointed geographer to the United States Geological Survey, and (1884-95) did important work in connection with the survey west of the Mississippi.

**Thompson**, BENJAMIN, COUNT RUMFORD, an American scientist and Bavarian administrator, born at Woburn, Mass., in 1753; died at Auteuil, near Paris, in 1814. He commanded the King's American Dragoons in the Revolutionary War, and became aide-de-camp and chamberlain at the court of the elector of Bavaria (1784-1802). He left funds to Harvard for the professorship of physical and mathematical sciences and to the American Academy of Arts and Sciences and the Royal Society of London for prizes for the most important discoveries in heat and light.

**Thompson**, DENMAN, actor and playwright, born near Girard, Pennsylvania, in 1833; died in 1911. He is best known by his *Joshua Whitcomb*, remodeled into the highly popular play of *The Old Homestead*, in which he long took the leading part.

**Thompson**, FRANCIS, an English poet, born at Ashton, Lancashire in 1860; died in London, November 13, 1907. His early life closely resembled that of DeQuincey, but he was finally befriended and launched upon the career of journalist and poet. His verse, while often eccentric and even forced, abounds in passages of rare beauty.

**Thompson**, JEROME, painter, was born at Middleborough, Massachusetts, in 1814; died in 1886.

Aside from portraits, his principal pictures are scenes from rustic American life, such as *The Apple Gathering*, *The Old Oaken Bucket*, *The Old Stage*, and *The Lost Lamb*. Many of his works have been made familiar by engravings.

**Thompson**, SIR JOHN SPARROW, Canadian statesman, born at Halifax in 1844; died in 1894. He entered early into public life and became premier of Nova Scotia in 1882. He was appointed attorney general of the Dominion in 1885 and became prime minister in 1892. He took part in the fishery treaty and the Behring Sea arbitration.

**Thompson**, LAUNT, sculptor, born in Queens Co., Ireland, in 1833; died in New York in 1894. From 1874 to 1881 he resided in Rome. He achieved great success as a portrait sculptor, and was elected a member of the Academy of Design in 1862.

**Thompson**, MAURICE, poet and novelist, born at Fairfield, Indiana, in 1844; died in 1901. His principal works are: *Hoosier Mosaics*, *The Witchery of Archery*, *A Tallahassee Girl*, *His Second Campaign*, and *Songs of Fair Weather*.

**Thompson**, ROBERT ELLIS, educator, was born in Ireland in 1844, came to America in 1857, was graduated from the University of Pennsylvania in 1865, and in 1873 was ordained minister in the Reformed Presbyterian Church. He was successively professor of mathematics, of social science, and of history and English literature in the University of Pennsylvania, and has been president of the Central High School of Philadelphia since 1894. He was editor of the *Penn Monthly*, 1870-80, and became editor of *The American* in 1880. He wrote *Social Science and Political Economy* and *Elements of Political Economy*.

**Thompson-Seton**, ERNEST EVAN, naturalist author, was born at South Shields, England, in 1860. He lived as a boy in the Canadian woods and on the western plains, became naturalist to the government of Manitoba, and wrote *Birds of Manitoba* and *Mammals of Manitoba*. He afterwards studied art and became an animal painter and illustrator. He also became an active lecturer and wrote many popular books describing the habits and intelligence of animals. The best known among these is *Wild Animals I Have Known*. Other writers followed him in this field and a controversy arose as to the truthfulness of their stories of animal intelligence. The conception

of the organisation of Boy Scouts, now so popular, is ascribed to him, though not the title, and he is the leading spirit in this organization in the United States (see *Boy Scouts*). His name was legally changed from Seton-Thompson to Thompson-Seton in 1901.

**Thoms** (toms), WILLIAM JOHN, an English author, born at Westminster in 1803; died in 1885. He was secretary to the Camden Society from 1838 to 1873; deputy-librarian to the House of Lords; originator and for many years editor of *Notes and Queries*, and author of various antiquarian works.

**Thomson** (tom'sun), SIR CHARLES WYVILLE, naturalist, born in 1830 in Linlithgowshire; died in 1882. Educated at the University of Edinburgh, he became professor of mineralogy and geology in Queen's College, Belfast, in 1854. In the dredging expeditions of the *Lightning* and *Porcupine* (1868-69) he took part, afterwards publishing in *The Depths of the Sea* (1869), the substance of his discoveries in regard to the fauna of the Atlantic. In 1869 he became fellow of the Royal Society; in 1870 professor of natural history in the University of Edinburgh. In 1872 he was appointed scientific chief of the *Challenger* expedition, which was absent from England 3½ years, during which time 68,800 miles were surveyed. On his return he was knighted, and entrusted by the government with the task of drawing up a report on the natural history specimens collected during the expedition. But he lived only to publish a preliminary account of the expedition, *The Voyage of the Challenger. the Atlantic* (1876-78).

**Thomson**, ELIHU, an American electrician, born in Manchester, England, March 29, 1853; came to the United States and subsequently secured more than 500 patents for inventions which included the Thompson method of electric welding. He was awarded the Grand Prix, in Paris, in 1889, for electrical inventions, received the decoration of Chevalier of the Legion of Honor, for electrical research, etc.

**Thomson**, JAMES, poet, was born in 1700, at Ednam, near Kelso, in Scotland, his father being minister of Ednam parish, and was educated at Jedburgh and the University of Edinburgh. He went in 1725 to London, where *Winter*, the first of his poems on the seasons, was published in 1726. In 1727 he published his *Summer*, his *Poem to the Memory of Sir Isaac Newton*, and his *Britannia*; in 1728 his *Spring* and in

1730 his *Autumn*. After traveling for some time on the Continent with the son of Sir Charles Talbot, the chancellor, he was rewarded with the post of secretary of briefs, which he held till the death of the chancellor (1737), when he received a pension of £100 from the Prince of Wales. Meanwhile he had brought on the stage his tragedy of *Sophonisba* (1729) and published his poem on *Liberty*, the cool reception of which greatly disappointed him. He now (1738) produced his tragedy of *Agamemnon*, and a third entitled *Edward and Eleanor*. In 1740 he composed the masque of *Alfred* in conjunction with Mallet; but which of them wrote the famous song, *Rule, Britannia*, is not known. In 1745 his most successful tragedy, *Tancred and Sigismunda*, was brought out and warmly applauded. The following year he produced his *Castle of Indolence*, a work in the Spenserian stanza. For a few years he held by deputy the comfortable post of surveyor-general of the Leeward Islands, and he died in 1748. He left a tragedy entitled *Coriolanus*, which was acted for the benefit of his relatives. Thomson was greatly beloved for his amiability and kindness of heart. His *Seasons*, on which his fame rests, abounds in sensibility and beauty of natural description. His *Castle of Indolence*, though not so popular as the *Seasons*, is highly esteemed, but his tragedies are almost forgotten.

**Thomson**, JAMES, poet, was born at Port-Glasgow, Scotland, in 1834, and was brought up at the Caledonian Orphan Asylum, both his parents having died when he was very young. He became a schoolmaster in the army, but quitted that occupation in 1862, and became clerk in a solicitor's office. In 1860 he became a contributor to the *National Reformer*, in which was published, under the signature 'B. V.', *The Dead Year*, *To Our Ladies of Death*, and the poem by which he is best known, *The City of Dreadful Night* (1874). Among his other works are: *Tasso and Leonora* (1856); *The Doom of a City* (1857); *Sunday at Hampstead* (1863); *Sunday up the River* (1868); *A Voice from the Nile* (1881), and *Insomnia* (1882). Thomson's verse is characterized by much brilliancy and traits of graceful humor, but its prevailing tone is one of despair. He died in 1882.

**Thomson**, JOHN, a landscape painter, born at Dalry, Scotland, in 1776, succeeded his father as minister of that parish in 1800, and exchanged that living for Duddingston, near Edin-

burgh, in 1806, dying there in 1840. Thomson early turned his attention to art, and produced a large number of landscapes, which are considered to rank him among the best painters of his native land.

**Thomson, JOSEPH**, an African explorer, was born at Penpont, Scotland, in 1858, and was educated at Edinburgh. When twenty years of age he accompanied Keith Johnston to Central Africa, assuming full charge of the expedition on the death of Mr. Johnston. In 1882 he explored the Rovuma in East Africa, and in 1884 made an important journey through Masai Land, in eastern equatorial Africa. Among his other achievements are an expedition to the Atlas Mountains, and one to the river Niger. He was a graphic writer, his published works including *Through Masai Land, To the Central African Lakes and Back, Travels in the Atlas and Southern Morocco, Life of Mungo Park*, etc. He died in 1896.

**Thomson, JOSEPH JOHN**, physicist, was born near Manchester, England, in 1856, a cousin of Lord Kelvin. He became professor of experimental physics at Cambridge in 1884, and wrote *Vortex Rings, Recent Researches in Electricity and Magnetism*, etc. He is especially notable for his researches into the constitution of the atom of matter, and the promulgation of the theory of the electron, now so widely accepted as the basic element of material nature. His studies into the characteristics of this have been intimate and profound.

**Thomson, THOMAS**, a Scottish chemist, born at Crieff in 1773; died in 1852. He adopted the medical profession, and embraced chemistry more especially as his favorite pursuit. In 1802 he published the first edition of his *System of Chemistry*, which obtained rapid success both in Great Britain and on the Continent. It was followed in 1810 by his *Elements of Chemistry*, and in 1812 by his *History of the Royal Society*. In 1813 he went to London and commenced there a scientific journal, the *Annals of Philosophy*, which he continued to edit till the end of 1820. The lectureship (afterwards the regius professorship) in chemistry in Glasgow University was conferred on him in 1817. His great work on the atomic theory was published in 1825, under the title of *Attempt to Establish the First Principles of Chemistry by Experiment*. In 1830-31 he published his *History of Chemistry*, in two volumes, and in 1836 appeared his *Outlines of Mineralogy and Geology*.

**Thomson, THOMAS**, antiquary, brother of the Rev. John Thomson, of Duddingston, was born at Dalry, Scotland, in 1708; died in 1852. He was called to the Scottish bar in 1793, appointed deputy-clerk register, 1800, and principal clerk of session, 1828. He was an early contributor to the *Edinburgh Review*, and president of the Bannatyne Club, for which and for the Maitland Club he edited numerous valuable works.

**Thomson, WILLIAM**, Archbishop of York, was born at Whitehaven, Feb. 11, 1819, and was educated at Shrewsbury School and Queens College, Oxford, of which he was successively fellow, tutor, and head. In 1859 he was chosen preacher of Lincoln's Inn, and in 1859 was appointed one of her majesty's chaplains in ordinary. Two years later (1861) he was raised to the episcopal bench as bishop of Gloucester and Bristol; but before he had held the appointment twelve months he was transferred to the archbishopric of York. Dr. Thomson was author of a number of works, including: *An Outline of the Necessary Laws of Thought; The Atoning Work of Christ, viewed in Relation to some Current Theories; Crime and its Excuses; Life in Light of God's Word (sermons); Limits of Philosophical Inquiry; Design in Nature*; and a series of essays entitled *Word, Work and Will*. He died in 1890.

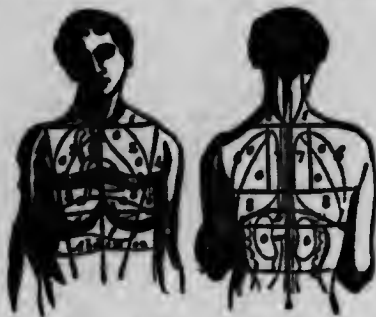
**Thomson, SIR WILLIAM** (Lord Kelvin), one of the greatest mathematicians and physicists, was born at Belfast, Ireland, in 1824, his father being James Thomson, professor of mathematics in Glasgow University. He was educated first at Glasgow University, and then at Peterhouse, Cambridge, where he graduated (1845) as second wrangler, and first Smith's prizeman, and was elected to a fellowship. In 1846 he was appointed professor of natural philosophy in the University of Glasgow, a post which he continued to hold. The same year he became editor of the *Cambridge and Dublin Mathematical Journal*, to which he contributed valuable papers on the mathematical theory of electricity, being also a distinguished contributor to Liouville's *Journal de Mathématiques*. Among the most important of his contributions to electrical science are the construction of several delicate instruments for the measurement and study of electricity. It is, however, in connection with submarine telegraphy that Sir William Thomson's name is most generally known, his services being rewarded, on the completion of the Atlantic cable of 1866, with knighthood and other honors.

He also made important additions to our knowledge of magnetism and heat, and invented an improved form of mariner's compass now in extensive use. He was president of the British Association at its Edinburgh meeting in 1871. He was the author, jointly with Professor Tait, of a well-known treatise on natural philosophy, and issued many valuable papers. A notable theory of his, the vortex theory of atomics, attracted wide attention, but was finally abandoned by its author as mathematically undemonstrable. He was created Baron Kelvin in 1892. He died December 17, 1907.

**Thor** (thor, tor), son of Odin by Jöðir (the earth), the Jupiter of the Teutons, the God of thunder. *Thursday* has its name from him. See *Northern Mythology*.

**Thoracic Duct** (tho-ras'ik). See *Lymph*.

**Thorax** (tho'raks), the chest, or that cavity of the human body formed by the spine, ribs, and breast-bone, situated between the neck and the abdomen, and which contains the pleura, lungs, heart, etc. The name is also ap-



THORAX IN MAN.

Thoracic regions denoted by thick black lines. 11, Right and left Humeral; 22, do. Subclavian; 33, do. Mammary; 44, do. Axillary; 55, do. Subaxillary or Lateral; 66, do. Scapular; 77, do. Interscapular; 88, do. Superior Dorsal or Subscapular.—Viscera or contents of Thorax, the position of which is indicated by dotted lines. a, Diaphragm; b, Heart; c, Lungs; d, Liver; e, Kidneys; f, Stomach.

plied to the corresponding portions of other mammals, to the less sharply defined cavity in the lower vertebrates, as birds, fishes, etc., and to the segments intervening between the head and abdomen in insects and other Arthropoda. In serpents and fishes the thorax is not completed below by a breast-bone. In insects three sections form the thorax, the *pro-thorax*, bearing the first pair of legs; the *meso-thorax*, bearing the second

pair of legs and first pair of wings; and and *meta-thorax*, bearing the third pair of legs and the second pair of wings.

**Thoreau** (tho'ro), HENRY DAVIE, writer on nature subjects, was born at Boston, Massachusetts, in 1817, and was educated at Harvard University, where he was graduated in 1837. From that time till 1840 he was engaged as a schoolmaster. Then for several years he occupied himself in various ways, in land-surveying, carpentering, and other handicrafts, but devoting a greater part of his time to study and the contemplation of nature. In 1845 he built for himself a hut in a wood near Walden Pond, Concord, Mass., and there for two years lived the life of a hermit. After quitting his solitude, Thoreau pursued his father's calling of pencil-maker at Concord, where he died in 1862. Besides contributing to the *Dial* and other periodicals, he published *A Week on the Concord and Merrimack Rivers* (1849), and *Walden, or Life in the Woods* (1854). After his death appeared *Excursions in Field and Forest*, *The Maine Woods*, *Cape Cod*, and *A Yankee in Canada*. Thoreau was a friend of Emerson, and imbibed much of his spirit and method of thought.

**Thorium** (tho'ri-um), the metal of which thorina is the oxide, discovered by Berzelius. It is in the form of a heavy metallic powder, has an iron-gray tint, burns in air or oxygen, when heated, with great splendor, and is converted into thorina or oxide of thorium. It unites energetically with chlorine, sulphur, and phosphorus. Hydrochloric acid readily dissolves it, with the evolution of hydrogen gas. The symbol of Thorium is Th, and the atomic weight 116.

**Thorn.** See *Hawthorn*.

**Thorn** (törn), a town and strong fortress of Prussia, province of East Prussia, on the Vistula. It consists of an old and a new town, has several churches, one of them containing a statue of Copernicus, who was born here; manufacture of machinery, soap, and a famous gingerbread; some ship-building, and a good trade. Pop. 29,626.

**Thorn-apple.** See *Datura*.

**Thorn-back Ray.** See *Ray*.

**Thornbury** (thorn'bu-ri), WALTER, a miscellaneous writer, born in London in 1828. Beginning his literary career in Bristol at the age of seventeen, he soon after settled in London, where for thirty years he was at-



most continuously at work writing for *Household Words*, *Once a Week*, *Athenæum*, etc. Among his numerous works are *Shakespeare's England*, *Songs of the Cavaliers and Roundheads*, *Haunted London*, *Legendary and Historic Ballads*, and a *Life of Turner*, under the supervision of Ruskin. He died in 1876.

**Thornhill** (thorn'hili), SIR JAMES, an English painter, born in 1676; died in 1734. He was much engaged in the decoration of palaces and public buildings, in which his chief works are to be found. Among his best efforts may be mentioned the dome of St. Paul's, the salon and refectory at Greenwich Hospital, and some rooms at Hampton Court. His forte was in the treatment of allegorical subjects.

**Throop**, a borough in Lackawanna Co., Pennsylvania, 4 miles from Scranton. It has coaling interests. Pop. 5133.

**Thorough-bass.** See *Bass*.

**Thoroughwort.** See *Boneset*.

**Thorpe** (thorp), BENJAMIN, an English scholar who greatly furthered the study of Anglo-Saxon; born in 1782; died in 1870. Among his numerous publications are an English edition of Rask's *Anglo-Saxon Grammar*, *Ancient Laws and Institutes of the Anglo-Saxon Kings*, *The Gospels in Anglo-Saxon*, an edition of *Beowulf*, *The Anglo-Saxon Chronicle*, *Northern Mythology*, etc.

**Thorpe**, FRANCIS NEWTON, an American author, born in Swampscott, Massachusetts, in 1857. He is author of *The Government of the People of the United States*; *The Story of the Constitution*; *The Constitution of the United States with Bibliography*; *The History of the Civil War*, and numerous other works on historical and political subjects. He was professor of American Constitutional History at the University of Pennsylvania, 1895-98.

**Thorwaldsen** (tor'vaid-sén), ALBERT BARTHOLOMEW (Bertel), a celebrated sculptor, born at Copenhagen November 19, 1770. At first he helped his father to cut figureheads in the royal dockyard, then, after some years' study at the Academy of Arts, he won the privilege of studying three years abroad. Going to Rome (1797) he was much impressed by the works of Canova, the sculptor, and Carstens, the painter, who were then residing there. It was not until 1803, however, that he became at all widely known. Then by a lucky chance he received a commission

from Sir Thomas Hope to execute in marble a statue of Jason, which the sculptor had modeled. This was so brilliantly executed that commissions flowed in upon him, new creations from his hand followed in quick succession, and his unsurpassed abilities as a sculptor became everywhere recognized. In 1819 he returned to Denmark, and his journey through Germany and his receptions at Copenhagen resembled a triumph. After remaining a year in Copenhagen and executing various works there, he returned to Rome, visiting on his way Berlin, Dresden, Warsaw and Vienna. He remained at Rome till 1838, when he undertook another journey to Copenhagen, being principally moved to this step by the contemplated establishment in that city of a museum of his works and art treasures. His return was a sort of national festival. The remainder of his life was spent chiefly in the Danish capital, where he died March 24, 1844. The Thorwaldsen Museum, opened in 1846, contains about 300 of the works of the sculptor. Thorwaldsen was eminently successful in his subjects chosen from Greek mythology, such as his *Mars*, *Mercury*, *Venus*, etc. His religious works, among which are a colossal group of *Christ and the Twelve Apostles*, *St. John Preaching in the Wilderness*, and statues of the four great prophets, display almost superior grandeur of conception. Chief among his other works are his statues of *Galileo* and *Copernicus*, and the colossal lion near Lucerne, in memory of the Swiss guards who fell in defense of the Tulleries.

**Thoth** (thoth, tōt), an Egyptian deity identified by the Greeks with Hermes (Mercury), to whom was attributed the invention of letters, arts, and sciences. The name is equivalent in significance to the Greek Logos, and Thoth is a mythical personification of the divine intelligence.

**Thou** (tō), JACQUES AUGUSTE DE, a French statesman and historian, born in 1553; died in 1617. Henry IV employed him in several important negotiations, and in 1593 made him his principal librarian. In 1595 he succeeded his uncle as chief-justice, and during the regency of Mary de' Medici he was one of the directors-general of finance. His greatest literary labor was the composition in Latin of a voluminous *History of My Own Times*, comprising the events from 1545 to 1607, of which the first part was made public in 1604. To this work, which is remarkable for its impartiality, he subjoined interesting *Memoirs of his own life*.

**Thought-reading.** See *Telepathy*.

**Thourout** (tō-rō), a town of Belgium, in the province of West Flanders, with various manufactures and a large trade. Pop. 10,146.

**Thousand and One Nights.**

See *Arabian Nights*.

**Thousand Islands**, a group of small islands, which really number about 1800, in the St. Lawrence immediately below Lake Ontario. They partly belong to Canada and partly to the State of New York, and have become a popular summer resort.

**Thrace** (thrās), or **THRACIA**, a name applied at an early period among the Greeks to a region lying north of Macedonia. By the Romans this country was regarded as divided into two parts by the Hæmus (or Balkan), the northern of which was called Mœsia and the southern Thrace. The Greeks early settled colonies on the coasts, and the country, besides possessing rich meadows and corn-lands, abounded in mines, while the Thracian horses and riders rivaled those of Thessaly. Of the rivers of Thrace, the largest and most celebrated was the Hebrus (now Maritza). Abdera, the birthplace of Democritus and Protagoras; Sestos, on the Hellespont, celebrated in the story of Hero and Leander; and Byzantium, on the peninsula on which Constantinople now stands, were the places the most worthy of note.

**Thrashing-machine**, a machine for separating grain from the straw, and in which the moving power is that of horses, oxen, wind, water, or steam. The thrashing-machine was invented in Scotland in 1758 by Michael Stirling, a farmer in Perthshire; it was afterwards improved by Andrew Meikle, a millwright in East Lothian, about the year 1776. Since that time it has undergone various improvements. The principal feature of the thrashing-machine as at present constructed, is the three rotary drums or cylinders, which receive motion from a water-wheel, or from horse or steam power. The first drum which comes into operation has projection ribs called beaters on its outer surface, parallel to its axis. This drum receives a very rapid motion on its axis. The sheaves of grain are first spread out on a slanting table, and are then drawn in with the ears foremost between two feeding rollers with parallel grooves. The beaters of the drum act on the straw as it passes through the rollers, and beat out the

grain. The thrashed straw is then carried forward to two successive drums or *shakers*, which, being armed with numerous spikes, lift up and shake the straw so as to free it entirely from the loose grain lodged in it. The grain is made to pass through a grated floor, and is generally conducted to a winnowing-machine connected by gearing with the thrashing-machine itself, by which means the grain is separated from the chaff. Improved machines on the same principle, many of them portable, are extensively used in the United States and Britain, those of the former country being particularly light and effective. In American thrashers two modes are employed for separating the straw from the grain; the 'endless aprons' answer an excellent purpose when not driven too rapidly, and make clean work. The 'vibrator' consists of a series of inclined fingers, the rapid shaking motion of which tosses up the straw and shakes out the grain; to the machine is attached a measuring hopper, showing the quantity of grain passing through it. Another machine for thrashing rye carries the straw through unbroken, for binding in bundles. The portable steam thrashing-machine, moved from farm to farm, may perform the thrashing-work of a wide district for the whole season.

**Thrasimene** (or **TRASIMENUS**), **LAKE**. See *Perugia, Lago di*.

**Thread** (thred), a slender cord consisting of two or more yarns, or simple spun strands, firmly united together by twisting. The twisting together of the different strands or yarns to form a thread is effected by a thread-frame or doubling and twisting machine, which accomplishes the purpose by the action of bobbins and flyers. Thread is used in some species of weaving, but its principal use is for sewing.

**Thread-worms**, the name for thread-like intestinal worms of the order Nematoda. The *Oxyuris vermicularis* occurs in great numbers in the rectum of children particularly. See *Nematelmia*.

**Three Rivers**, a city of St. Joseph Co., Michigan, on the St. Joseph River, 25 miles s. of Kalamazoo. Manufactures cars, railroad supplies, electric motors, furniture, tools, pulleys, paper, etc. Pop. 5072.

**Three Rivers**, or **TROIS RIVIÈRES**, a town and port of entry of Quebec, Canada, 95 miles N. E. of Montreal, at the confluence of the rivers St. Maurice and St. Lawrence. It has an extensive trade in timber, and important manufactures of ironware, and if

one of the oldest towns in the province, being founded in 1634. It is the residence of a Roman Catholic bishop, and contains a cathedral. Pop. 9981.

**Thresher-shark**, also called the **FOX-SHARK**, a genus of sharks containing but one known species (*Alopias vulpes*), with a short conical snout, and less formidable jaws than the white shark. The upper lobe of the tail fin is very elongated, being nearly equal in length to the rest of the body, and is used as a weapon to strike with. Tail included, the thresher attains a length of 13 feet. It inhabits the Atlantic and the Mediterranean. See *Shark*.

**Thrift**. See *Sea-pink*.

**Thrips**, a genus of minute insects, order Hemiptera, suborder Homoptera, closely allied to the Aphides. They are extremely agile, and seem to leap rather than fly. They live on flowers, plants, and under the bark of trees. *T. cerealium* is a common species, scarcely a line in length or in extent of wing, residing in the spathes and husks of cereals, especially wheat, to which it is most injurious.

**Throat** (thrōt), the anterior part of the neck of an animal, in which are the oesophagus and windpipe, or the passages for the food and breath. See *Larynx*, *Oesophagus*, *Trachea*, *Diphtheria*, *Croup*, etc.

**Thrombosis** (throm-bō'sis), the formation of a clot in the heart or a blood-vessel which may block the vessel, causing serious results.

**Throstle**. See *Thrush*.

**Thrush**, the name applied popularly to several insectorial birds. The true thrushes (*Turdidæ* or *Merulidæ*) form a family of dentostrual passerine birds, including the song-thrush or throstle, the missel-thrush, the blackbird, etc. They feed upon berries, small molluscs, worms, etc. Their habits are mostly solitary, but several species are gregarious in winter. They are celebrated on account of their powers of song; and are widely diffused, being found in all the quarters of the globe. Nine species of the thrush family are found in the United States. These include the wood thrush, found east of the Mississippi and south to Guatemala, the liquid, half plaintive notes of which exceed in sweetness those of any other American bird. The notes are few in number, but possess a charm beyond description. The common robin also is a member of the thrush family. There

are several European species, among which are included the missel thrush and the song thrush of Britain. These are also sweet singers.

**Thrush**, a disease common in infants who are ill fed. (See *Aphthæ*.) The name is also applied to an abscess in the feet of horses and some other animals.

**Thua'nus**. See *Thou*.

**Thucydides** (thū-sid'i-dēz), the greatest of all the Greek historians, was born in Attica about 471 B.C. He was well born and rich, being the possessor of gold mines in Thrace, and was for a time a prominent commander during the Peloponnesian war, which forms the subject of his great work. For many years he suffered exile (being accused of remissness in duty); but appears to have returned to Athens the year following the termination of the war, namely in B.C. 403. He is said to have met a violent death, probably a year or two later, but at what exact time, and whether in Thrace or Athens, is not known. His history consists of eight books, the last of which differs from the others in containing none of the political speeches which form so striking a feature of the rest, and is also generally supposed to be inferior to them in style. Hence it has been thought by various critics to be the work of a different author, of Xenophon, of Theopompus, or of a daughter of Thucydides; but it is more probable that it is the author's own without his final revision. The history is incomplete, the eighth book stopping abruptly in the middle of the twenty-first year of the war. As a historian Thucydides was painstaking and indefatigable in collecting and sifting facts, brief and terse in narrating them. His style is full of dignity and replete with condensed meaning. He is unsurpassed in the power of analyzing character and action, of tracing events to their causes, of appreciating the motives of individual agents, and of combining in their just relations all the threads of the tangled web of history. The best translations are by Jowett and Dale.

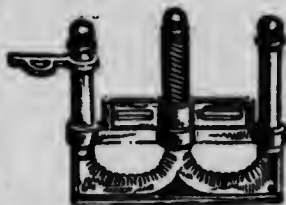
**Thugs**, the name applied to a secret among the Hindus, whose occupation was to waylay, assassinate, and rob all who did not belong to their own caste. This they did, not so much from cupidity as from religious motive, such actions being deemed acceptable to their goddess Kālī. The government first took active measures against them in 1831 and 1835, and Thuggery is now practically extinct.

**Thuja.** See *Arbor Vita*.

**Thule** (thù'le), the name given by the ancients to the most northern country with which they were acquainted. According to Pytheas it was an island six days' voyage to the north of Britannia, and accordingly it has often been identified with Iceland. Some have imagined it to be one of the Scotch islands, others the coast of Norway.

**Thumb-screw**, a former instrument of torture for com-

pressing the thumbs. It was employed in various countries, Scotland in particular. Called also *Thumbkins*.



Scotch Thumb-Screw, time of Charles I.

**Thun** (tön), a town of Switzerland, in the canton of Bern, beautifully situated at the northwestern extremity of the lake of its own name, at the point where the Aar issues from it. It is the seat of the Swiss military school, and the chief place of arms in the country. Pop. 6069.—The lake is 10 miles long, 2 broad, and about 720 feet deep. At its southeastern extremity it receives the surplus waters of the Lake of Brienz by the Aar, which again emerges from its northwestern extremity.

**Thunder.** See *Lightning*.

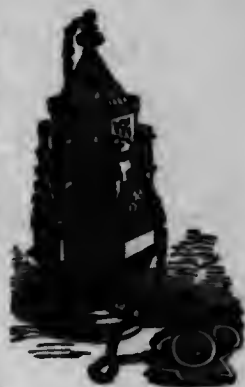
**Thunder-fish**, a species of fish of the family Siluridæ, found in the Nile, which, like the torpedo, can give an electric shock. It is the *Malapterurus electricus* of naturalists.

**Thundering Legion.** See *Aurelius Antoninus*.

**Thurgau** (túr'gau), a canton in the northeast of Switzerland, bounded mainly by the Lake of Constance and the cantons of Zürich and St. Gall; area, 381 square miles; capital Frauenfeld. It differs much in physical conformation from most other Swiss cantons, in having no high mountains, though the surface is sufficiently diversified. The whole canton belongs to the basin of the Rhine, to which its waters are conveyed chiefly by the Thur and its affluents, and partly also by the Lake of Constance, including the Untersee. The principal crops are grain and potatoes; large quantities of fruit are also grown. In many places the vine is successfully cultivated. The manufactures consist

chiefly of cottons, hosiery, ribbons, lace, etc. Pop. 113,221.

**Thurible** (thú-ri-hl), a kind of censers of metal, sometimes of gold or silver, but more commonly of brass or latten, in the shape of a covered vase or cup, perforated so as to allow the fumes of burning incense to escape. It has chains attached, by which it is held and swung at high mass, vespers, and other solemn offices of the Roman Catholic Church.



Thurible.

**Thüringerwald** (tú'ring-ér-vált), or **FOREST OF THURINGIA**, a mountain chain in the center of Germany, stretching southeast to northwest for about 60 miles. Its culminating points are the Beerberg and the Schneekopf, which have each a height of about 3220 feet. The mountains are well covered with wood, chiefly pine. The minerals include iron, copper, lead, cobalt, etc.

**Thuringia** (thú-rin'ji-a; German, *Thüringen*, tú'ring-en), a region of Central Germany situated between the Harz Mountains, the Saale, the Thüringerwald, and the Werra, and comprising great part of Saxe-Weimar, Saxe-Coburg-Gotha, and other small adjoining states.

**Thurles** (thur'les), a town in Ireland, in the county of Tipperary, on both banks of the Suir, with considerable trade, a Roman Catholic cathedral and college, etc. Pop. 4411.

**Thurlow** (thur'ló), EDWARD, LORD, lord-chancellor of England, was born at Little Ashfield, near Stowmarket, Suffolk, in 1732, and in 1778 was made lord-chancellor, being raised to the peerage as Baron Thurlow. Pitt suspected Thurlow of intriguing with the Prince of Wales, and from this time an open disagreement took place between them. Pitt demanded his dismissal, to which the king at once agreed, and he was deprived of the great seal in June, 1792. He died in 1806.

**Thurman** (thur'man), ALLEN GRANBERRY, statesman, born at Lynchburg, Virginia, in 1813. He entered Congress in 1845, and was elected to the supreme bench of Ohio in 1851, occupying the position of chief-justice. Ohio sent him to the United States Sen-



ate in 1860, where he became the recognized leader of the Democratic party. He was the author of the act to compel the Pacific railroad corporations to fulfill their obligations, known as 'the Thurman act.' In 1888 he received the nomination of the Democratic party for the vice-presidency, but was defeated. He was called 'the old Roman' because of his special devotion to the Republic. He died December 12, 1895.

**Thursday** (thurz'dä; that is, 'Thor's day'), the fifth day of the week, so called from the old Teutonic god of thunder, Thor. See *Thor*.

**Thursday Island**, a small island in Normanby Sound, Torres Straits. It is a government station, and the harbor — Port Kennedy — is one of the finest in this quarter. It is in the direct tract of all vessels reaching Australia by Torres Straits; is the center of a large and important pearl and bêche-de-mer fishery; and is a depot of trade with New Guinea.

**Thurso** (thurso), a seaport of Scotland, in the county of Caithness, on the shore of the bay of the same name. The chief trade is the exportation of grain, cattle, agricultural produce and excellent paving-stones. Pop. 3723.

**Thurston** (thurs'tun), ROBERT HENRY, physicist, was born at Providence, Rhode Island, in 1839; died in 1903. He graduated at Brown University in 1859; served in the navy during the Civil war; became assistant professor of natural philosophy at the Naval Academy in 1865, professor of mechanical engineering at the Stevens Institute in 1871, and director of Sibley College, Cornell University, in 1884. His experiments and inventions were of great value to his profession. He wrote *History of the Growth of the Steam Engine, Friction, and Lubrication, Materials of Engineering*, etc.

**Thyestes** (thi-es'téz), in Greek mythology, son of Pelops and Hippodamia, and grandson of Tantalus. Having seduced the wife of his brother Atreus, the latter, in revenge, served up to him the body of his own son at a feast. See *Atreus*.

**Thylacine** (thi'a-sën; *Thylacinus cynocephalus*), a carnivorous marsupial animal inhabiting Tasmania, and commonly known as the Tasmanian wolf. In size it is generally about 4 feet in total length, though some specimens attain a much greater size. It is nocturnal in its habits; of a fierce and most determined disposition, and is very destructive to sheep and other ani-

mals. It has an elongated and somewhat dog-like muzzle, and a long tapering tail; the fur is grayish-brown with a series of bold transverse stripes, nearly black in color, beginning behind the shoulders and ending at the tail.

**Thylacoleo** (thi-a-kô'le-ô), a remarkable extinct carnivorous marsupial, whose bulk and proportions appear to have equaled the lion. Its fossil remains are found in Australia.

**Thyme** (tim; *Thymus vulgaris*), a small plant of the nat. order Labiata, a native of the south of Europe, and frequently cultivated in gardens. It is from 6 to 10 inches high, with narrow, almost linear leaves, and whitish or reddish flowers; has a strong aromatic odor, and yields an essential oil, which is used for flavoring purposes. The fragrant wild thyme found in several of the United States is the *Thymus Serpyllus* of botanists. Both species afford good bee-pasture.

**Thymelacæ** (thi-me-lä'se-ë), the Daphne family, an order of exogenous plants, consisting of shrubs or small trees, rarely herbs, with non-articulated, sometimes spiny branches, with tenacious bark. The leaves are alternate and opposite, and the flowers spiked and terminal. The fruit is nut-like or drupaceous. The species are not common in Europe; they are found chiefly in the cooler parts of India and South America, at the Cape of Good Hope and in Australia. See *Daphne* and *Lace-bark Trees*.

**Thymus Gland** (thi'mus), a ductless temporary organ situated in the middle line of the body. After the end of the second year of life it decreases in size, and almost or wholly disappears at puberty. It is covered in front by the breast-bone, and is on the front and sides of the windpipe. Its functions are still undetermined.

**Thyroid Cartilage.** See *Larynx*.

**Thyroid Gland** (thi'roid), a ductless structure in man which covers the anterior and inferior part of the larynx and the first rings of the windpipe. It is of a reddish color, and is more developed in women than in men. It may become abnormally enlarged, as in *goitre*. Its use is not at all clear, but it probably exerts some influence on the blood and circulation, especially in childhood.

**Thyrus** (thi'r'sus), among the Greeks, a wand or spear wreathed with ivy leaves, and with a pine-cone at the top, carried by the followers of Bacchus as a symbol of devotion. In an-

cient representations it appears in various forms.



Various forms of Thysrus, from ancient Vases.

**Thysanura** (this'a-nū'ra; 'fringe-tailed'), an order of apterous insects that undergo no metamorphosis, and have, in addition to their feet, particular organs of motion, generally at the extremity of the abdomen. The group is often divided into two families, Poduridæ or spring-tails, and Lepismidæ or sugar-lice, etc. Recently it has been divided into two orders by Sir John Lubbock: 1. Coliembōia, comprising those members known as spring-tails, and nearly co-equal with the Poduridæ; 2. Thysanura (restricted), comprising those whose anal bristles do not form a spring, as the Lepismidæ. See *Poduridæ*, *Lepismidæ*.

**Tiara** (ti-ā'ra), originally the cap of the Persian kings. The tiara of the pope is a high cap, encircled by three coronets with an orb and cross of gold at the top, and on two sides of it a chain of precious stones. The miter alone was first adopted by Damasus II in 1048. It afterwards had a plain circlet of gold put round it. It was surmounted by a coronet by Boniface VIII. The second coronet was added by Benedict XII, the third coronet by Urban V.

**Tibbus** (tib'us), a people of the Eastern Sahara, probably allied in race to the Berbers.

**Tiber** (ti'ber; Italian, *Tevere*; anciently, *Tiberis*), a celebrated river of Italy, which rises in the Apennines, in Tuscany, and, after a general southerly course of about 240 miles, falls into the Mediterranean by two mouths (one of them artificial). It traverses the city of Rome, here forming the island and anciently called *Insula Tiberina*. About ninety miles of its course are navigable for small vessels; those of

about 140 tons burden reach Rome. It is subject to floods, and carries down quantities of yellowish mud, hence its designation 'the yellow Tiber.' See *Rome*.

**Tibe'rias.** See *Galilee*, *Sea of*.

**Tiberius** (ti-bē'ri-us), in full, **TIBERIUS CLAUDIUS NERO CÆSAR**, a Roman emperor, born B.C. 42, was the son of Tiberius Claudius, of the ancient Claudian family, and of Livia Drusilla, afterwards the wife of the emperor Augustus. Tiberius became consul in his twenty-eighth year, and was subsequently adopted by Augustus as his heir. In A.D. 14 he succeeded to the throne without opposition. Dangerous mutinies broke out shortly afterwards in the armies posted in Pannonia and on the Rhine, but they were suppressed by the exertions of the two princes, Germanicus and Drusus. The conduct of Tiberius as a ruler was distinguished by an extraordinary mixture of tyranny with occasional wisdom and good sense. Tacitus records the events of the reign, including the suspicious death of Germanicus, the detestable administration of Sejanus, the poisoning by that minister of Drusus, the emperor's son, and the infamous and dissolute retirement of Tiberius (A.D. 27) to the Isle of Caprea, in the Bay of Naples, never to return to Rome. The death of Livia in A.D. 29 removed the only restraint upon his actions, and the destruction of the widow and family of Germanicus followed. Sejanus, aspiring to the throne, fell a victim to his ambition in the year 31; and many innocent persons were destroyed owing to the suspicion and cruelty of Tiberius, which now exceeded all limits. He died in March, 37.

**Tibesti** (tē-bes-tē'), a region of the Eastern Sahara, supporting a scanty population of the Tibbu race.

**Tibet**, or **THIBET** (ti'bet, ti-bet'), a country occupying the south portion of the great plateau of Central Asia, lying between lon. 73° and 101° E., and lat. 27° and 36° N., and extending east and west from Cashmere and the Karakorum range to the frontiers of China; area about 700,000 sq. miles. Its plains average about 10,000 feet in height, and many of its mountains have twice that altitude. In Tibet nearly all the great rivers of South and East Asia take their rise (Indus, Brahmaputra, Hoang-ho, Yang-tse-kiang, etc.), and there are numerous salt and freshwater lakes, situated from 13,800 to 15,000 feet above the sea-level. The climate is characterized by the excessive dryness of

the atmosphere, and the severity of the winter. From October to March vegetation is almost wholly dried up, and the cold is intense. Notwithstanding the inclemency of the weather there is a great abundance of wild and domestic animals. Of these the most remarkable is the yak, which exists both wild and domesticated. It supplies food and clothing, and is also used as a beast of burden. Other animals include the musk-deer, the Cashmere goat, wild sheep, wild horses and fat-tailed sheep. Agriculture is practiced to a comparatively small extent, suitable localities being rare. Minerals include gold, copper, iron, borax and rock-salt. Tibet does a large trade with China, exchanging gold-dust, incense, idols and European and Indian goods, for tea, silks and other Chinese produce. The capital is Lhasa. The form of government is a hierarchy. The religion is Buddhism in a form known as Lamalism (which see), of which Tibet is the principal seat. The *lamas* or priests form a large proportion of the population, and live in monasteries; the two grand *lamas* being regarded as the religious and political heads of the state. Remains of an earlier creed exist in the Boupo, a religion evolved from Shamanism, but much influenced by Buddhism, and frequently confounded with the old school of the Buddhists. The inhabitants are of an amiable disposition, but much averse to intercourse with foreigners, few of whom have been able to gain admittance to the country. Recently, however, the country has been traversed by persistent explorers and its general characteristics learned. The manners and mode of life of the people are rude. Polyandry is a common custom. The language is allied to Chinese, and has been written and used in literature for 1200 years. Tibet was governed by its own princes till the commencement of the 18th century, but since 1720 it has been a dependency of China. A Chinese functionary is always stationed at the residence of the grand lama, and a Chinese governor with a military force is stationed in each of the principal towns. A recent event was the sending of a Chinese force to the country to seize the Dalai Lama, who was suspected of ambitious views, and who fled to India, putting himself under British protection. The population is estimated at from 2,000,000 to 3,000,000, though by some it is supposed to be considerably larger.

**Tibia** (tib'l-a), a kind of pipe, the commonest musical instrument of the Greeks and Romans. It had holes at proper intervals, and was fur-

nished with a mouthpiece. For the tibia in anatomy see *Leg*.

**Tibullus** (ti-bul'us), ALBIUS, a Roman elegiac poet, who belonged to the equestrian order, and died in the flower of his age, about B. C. 18. His poems are among the most perfect of their kind, but their moral tone is that of a reckless voluptuary. We possess four books of elegies under his name, but the third and part of the fourth are spurious.

**Tic Douloureux** (dô'lô-rê), a painful affection of a facial nerve, a species of neuralgia. It is characterized by acute pain, attended with convulsive twitchings of the muscles, and continuing from a few minutes to several hours. It occurs on one side of the face, and may be caused by a diseased tooth, by inflammation in the ear passage, by exposure to cold, by dyspepsia, etc. The removal of the cause is the natural remedy; and warm applications, the employment of electric currents over the nerve, and morphia administered subcutaneously, are sometimes efficient.

**Ticino** (ti-ché'nô; German and French, *Tessin*), a river of Switzerland and North Italy, which rises in Mount St. Gothard, and after a course of about 120 miles joins the Po on the left. It traverses Lake Maggiore and separates Piedmont from Lombardy.

**Ticino** (German and French, *Tessin*), a canton in the south of Switzerland; area, 1088 square miles. The northern and greater part of this canton is an elevated and mountainous region, the Splügen, St. Bernardin, and Mount St. Gothard forming its northern boundary. The chief river is the Ticino, and there are numerous small lakes. Lake Maggiore is partly within the canton. In the north the principal occupations are cattle-rearing and the preparation of dairy produce. In the south the olive, vine, figs, citrons, and pomegranates are grown. Manufactures and trade are unimportant. The chief towns are Bellinzona, Locarno, and Lugano. Pop. 138,638, most of whom are Catholics and speak Italian.

**Tickell** (tik'el), THOMAS, an English man of letters, born in Cumberland in 1686. His success in literature and in life was mainly due to Addison, who procured for him in 1713 an under-secretaryship of state. In 1725 he was appointed secretary to the lords-justices of Ireland, a post he held till his death in 1740. His chief works are *Prospect of Peace*, a ballad entitled *Colin and Lucy*, and a fine elegy on the death of Addison.

**Ticket-of-leave**, a certificate given to a convict by which he is permitted to go at liberty, under certain restrictions, before the expiration of his sentence. This system exists in Britain and a similar system, known as parole, has recently been adopted in parts of the United States. It amounts to a conditional pardon, dependent upon the conduct of the prisoner.

**Ticking** (tik'ing), a strong cloth, commonly made of twilled linen or cotton and of a striped pattern. It is chiefly used for covering mattresses for beds.

**Ticknor** (tik-nur), GEORGE, historian, born at Boston in 1791; died there in 1871. He was graduated from Dartmouth College in 1807, and was admitted to the bar in 1813. In 1815 he embarked for Europe, and visited the chief capitals for the purpose of pursuing his studies. On his return in 1820 he was appointed professor of modern languages and literature in Harvard University. In 1835 he resigned his professorship, and for the next three years traveled in Europe with his family. In 1849 he published a *History of Spanish Literature*, corrected and enlarged editions being subsequently published. It was at once recognized by scholars as a work of value, and has been translated into Spanish and German. After completing some works of minor interest he produced, in 1863, a *Memoir of Prescott*, the historian, with whom he had long maintained a close friendship.

**Ticks**, a family of the Acarida, or mites, class Arachnida. Ticks are parasitic animals, possessing oval or rounded bodies, and mouths, in the form of suckers, by which they attach themselves to dogs, sheep, oxen, and other mammals. Birds and reptiles are also annoyed by the attacks of certain species and man is subject to their attacks.

**Ticonderoga** (ti-kon-deg-a), a village in Essex Co., New

York, situated upon the stream connecting lakes George and Champlain. It figured prominently during the colonial and revolutionary period, having a fortress built by the French in 1755, which was attacked by the British in 1758 and captured by Ethan Allen in 1775. The ruins of the old fort remain an object of interest. Pop. 2475.

**Tidal Motor**, a motive power receiving its energy through the lift and fall of the tides acting upon a suitable apparatus.

**Tide** (tid), the rising and falling of the water of the sea, which occurs periodically, as observed at places on the coasts. The tide appears as a general wave of water, which gradually elevates itself to a certain height, then as gradually sinks till its surface is about as much below the medium level as it was before above it. From that time the wave again begins to rise; and this reciprocating motion of the waters continues constantly, with certain variations in the height and in the times of attaining the greatest degree of height and of depression. The alternate rising and falling of the tide-wave are observed to take place generally twice in the course of a lunar day, or of 24 hours 49 minutes of mean solar time, on most of the shores of the ocean, and in the greater part of the bays, firths, and rivers

which communicate freely with it. The tides form what are called a *flood* and an *ebb*, a *high* and *low* water. The whole interval between high and low water is often called a *tide*; the water is said to *flow* and to *ebb*; and the rising is called the *flood-tide* and the falling the *ebb-tide*. The rise or fall of the waters, in regard to elevation or depression,

is exceedingly different at different places, and is also variable everywhere. The interval between two succeeding high-waters is also variable. It is shortest about new and full moon, being then about 12 hours 19

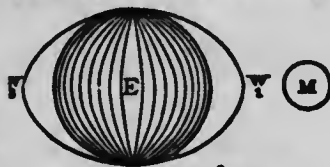


Fig. 1

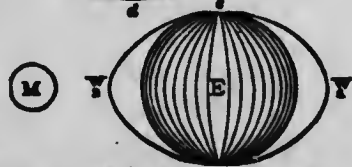


Fig. 2

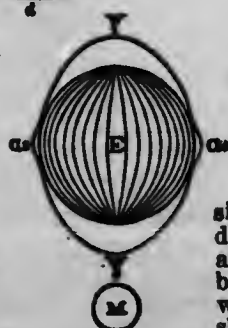


Fig. 3

Tides.



minutes; and about the time of the moon's quadratures it is 12 hours 30 minutes. But these intervals are somewhat different at different places. Tides are caused by the attraction which the sun and moon exert over the water of the earth. The moon is the nearest of the heavenly bodies to the earth, and the mobile nature of water leads it to yield readily to the attractive influence. Those parts of the waters directly under the moon's vertical path in the heavens are drawn out towards the moon. At the same time the moon attracts the bulk of the earth, and, as it were, pulls the earth away from the water on the surface furthest from it, so that here also the water is raised, although not quite so much as on the nearer side. The waters being thus heaped up at the same time on these two opposite parts of the earth, and the waters situated half-way between them being thus necessarily depressed, two high and two low tides occur in the period of a little more than one revolution of the earth on its axis. The sun's influence upon the tides is evidenced in its either increasing or diminishing the lunar tide, according as the sun's place in the heavens coincides with the line of the moon's attraction, or the reverse. It is this difference which produces what are known as *spring* tides and *neap* tides. Spring tides occur at new and full moon, and are the result of the gravitating influence of both sun and moon; neap tides occur when the moon is in her quarters, and are not so high as the spring tides, the lunar influence being lessened by the sun's force acting in a direction at right angles to it. The accompanying figures illustrate the theory of the tides, *E* being the earth, *M* the moon, *S* the sun, *w*, *w*, the water raised up by attraction on the opposite sides of the earth. Fig. 1 shows spring tide at new moon, fig. 2 spring tide at full moon, the low tides being at *c* and *d*. Fig. 3 illustrates the neap tides, *a*, *a*, being small tides caused by the sun alone. The interference of coasts and irregularities in the ocean beds cause the great variations as to time and range in the actual tides observed at different places. In some places, as in the German Ocean at a point north of the Straits of Dover, a high tide meets low water, and thus maintains perpetual mean tide. In the case cited high water transmitted through the Straits of Dover encounters low water transmitted round the north of Scotland, and *vice versa*. The interval of time at any place between noon and the time of high water on the day of full or new moon is called the *establishment* of the

port. The height of the tide differs greatly in different localities. In the Pacific Ocean it is generally small, frequently not exceeding two feet. It is much higher in the contracted waters of the British coast than in the open waters of American ports. In bays, where the inflowing waters are lifted through contraction, the tides are necessarily high, and this is especially the case in the long and narrow Bay of Fundy, where the tides are exceptionally high, rising from 50 to 70 feet, while the rush of water into and out of the bay is very rapid.

**Tidore** (tî'dör), one of the Moluccas (which see).

**Tieck** (têk), LUDWIG, a German writer, born at Berlin in 1773. He was educated at the University of Halle, and at Göttingen and Erlangen, and having returned to Berlin came forward as a writer of tales and romances, inciting his tale of *Abdallah*, and a novel entitled *William Lovell*. His *Peter Lebrecht*, a *History without Adventures*, and *Peter Lebrecht's Volksmärchen* displayed great imaginative power and rich humor. At Jena in 1799-1800 he entered on friendly relations with the Schlegels, Novalis, Brentano, and others, and through this association arose what has been denominated as 'the Romantic School of Germany.' In 1799 he published *Romantische Dichtungen*, and in 1804 appeared his comedy *Kaiser Octavianus*. His *Phantasus*, however, gave the first sign of his having freed himself from the mysticism and extravagance of his earlier works. In 1817 he visited England, where he collected material for his *Shakespeare*; and on his return resided at Ziebingen till 1819, when he removed to Dresden. From this period his writings, as exemplified in his *Tales*, bear the true stamp of genius. These tales were ultimately published complete in twelve volumes (Berlin, 1853), the principal being *Dichterleben* ('A Poet's Life—Shakespeare'); *Der Tod des Poeten* ('The Poet's Death—Camões'); the *Witches' Sabbath*; and *Aufbruch in den Cevennen* ('Revolt in the Cevennes'), an incomplete work. In 1826 he published his *Dramaturgische Blätter*. His study of Shakespeare resulted in *Shakespeare's Vorschule*, and the continuation of the German translation of Shakespeare commenced by Schlegel. His last story of importance was *Vittoria Accorombona* (1840). On the accession of Friedrich William IV Tieck was invited to the Prussian court in 1841, invested with a considerable pension and the rank of a privy-councillor, and thenceforward acted as a sort of supervisor of the Prussian

stage. He died at Berlin on April 28, 1853.—His brother, CHRISTIAN FRIEDRICH (born in 1776; died in 1851), was celebrated as a sculptor.

**Tiel** (tēi), a town in Holland, in the province of Geiderland, 19 miles w. s. w. of Arnhem, on the right bank of the Waal. It carries on a considerable general trade. Pop. 10,788.

**Tientsin** (tē-en-tsen'), a town in the north of China, and the river-port of Peking, 70 miles away, and with which it communicates by the Pei-ho River and by a railway line. The Pei-ho is navigable only by native craft, and large vessels have their cargoes transhipped outside the mouth of the Taku roadstead. A large import trade is carried on, chiefly in European goods (Tientsin being one of the treaty ports). The principal imports are cottons, sugar, opium, paper, and tea; exports, dates, cotton, camel's wool, and coal. The Taku forts were taken by the British and French in 1860, and the capture of Peking followed. Since then the defenses of the Pei-ho have been immensely strengthened. The city is surrounded by a lofty wall with towers and presents a mean appearance by its great expanse of low houses. The foreign quarter, however, which is outside the main city, is well built. Pop. estimated at about 800,000.

**Tierra del Fuego** (tē-er'a dei fwā'gō; 'Land of Fire'), a large group of islands at the southern extremity of South America, separated from the mainland by the Strait of Magellan. It consists of one large island and numerous smaller islands, with a total area of about 32,000 square miles. The eastern part of the group belongs to the Argentine Republic, the western part to Chile. These islands consist chiefly of mountains covered with perpetual ice and snow, or clothed with stunted forests, mainly evergreen-beech. The climate is wretched. The natives in the northeast resemble the Patagonians in color, stature, and habits; but those in the southeast are short and stunted, uncivilized in their habits, and pass a most degraded existence. Tierra del Fuego was discovered by Magalhaens (Magellan) in 1520, and named 'Land of Fire' from the numerous fires he saw on its coast during the night.

**Tiers-état** (ti-ār-zā-tā; 'third estate'), the name given in the ancient French monarchy to the third order of the nation, which, together with the nobility and clergy, formed the *états généraux* (states-general). It consisted of the deputies of the bourgeoisie,

that is, the free inhabitants of the towns and communes who did not belong to either of the other two estates. In 1789 the states-general, or rather the *tiers-état* by itself, assumed the name of the National Assembly.

**Tiffany** (tif'a-ni), LOUIS COMFORT, American artist and art manufacturer, born in New York City in 1848. In 1880 he began to devote himself almost entirely to the production of decorative glass. The *Favrile* glass, which he discovered, is favorably known in both Europe and America.

**Tiffin** (tif'in), a city, capital of Seneca co., Ohio, is situated on the Sandusky River, 40 miles s. e. of Toledo. It is the seat of Heidelberg University and the college of Ursuline Sisters. Natural gas and oil are produced and it is the shipping point for large quantities of wheat and corn. The manufactures include stock food, chemicals, grain, coal, woolen goods, farming implements, emery-wheels, pottery, glass, well-drilling machinery, etc. Pop. 13,217.

**Tiflis** (tif-lis), capital of Russian Caucasasia. Manufactures include cotton and silk, leather, soap, etc. The artisans of Tiflis are celebrated as silversmiths, gunsmiths, and sword makers. Pop. 303,150.—The government has an area of 17,000 sq. miles; produces cereals, fruits, etc. Pop. 1,000,000.

**Tiger** (tī'ger; *Felis tigris* or *Tigris ro-galis*), a well-known carnivorous animal, possessing, in common with the lion, leopard, etc., five toes on the front feet and four on the hinder feet, all the toes being furnished with strong retractile claws. The tiger is about the height of the lion, but the body is longer and the head rounder. It is of a bright fawn-color above, a pure white below, irregularly crossed with black stripes. The tiger is an Asiatic animal, attaining its full development in India, the name of 'Bengal tiger' being generally used as synonymous with those specimens which appear as the typical and most powerful representatives of the species. The tiger also occurs in Java and Sumatra. In habits it is far more active and agile than the lion, and exhibits a large amount of fierce cunning. It generally selects the neighborhood of water-courses as its habitat, and springs upon the animals that approach to drink. 'Man-eaters' are tigers which have acquired a special liking for human prey. The natives destroy tigers by traps, pits, poisoned arrows, and other means. Tiger-hunting is a favorite Indian sport.

**Tiger-beetle** (*Cicindela campestris*), a species of cole-

opterous insects which are swift and active in their movements, and prey upon other insects.

**Tiger-cat**, a name of not very definite signification, sometimes given to some of those animals of the family *Felidae* which are of middling size, and resemble the tiger in their form or markings, such as the chati, the margay, the ocelot, the serval, etc., which see.

**Tiger-flower** (*Tigridia pavonia*), a Mexican bulbous plant of the nat. order *Iridaceæ*, frequently cultivated in gardens on account of the magnificence of its flowers. The stem is about 1 foot in height, with sword-shaped leaves. The flowers are large, of a singular form, and very evanescent. The petals are of a fine orange-red towards the extremity; whitish or yellowish and beautifully spotted at the base.



**Tiger-lily** (*Lilium tigrinum*) a native of China, common in American gardens. Having scarlet flowers turned downward, the perianth being reflexed. It is remarkable for having axillary buds on the stem. The bulbs are eaten in China and Japan.

Tiger-lily (*Lilium tigrinum*).

**Tiger-moth** (*Arctia caja*), a genus of lepidopterous insects, the caterpillars of which are well known under the popular name of 'woolly bears.' The moth is colored red and brown. The larvæ feed on dead-nettles.

**Tighe** (ti), MARY BLACKFORD, an Irish poetess, born in Dublin in 1774, and married to Henry Tighe in 1793. Her writings were published after her death in 1810. Her chief poem is *Psyche*, or the *Legend of Love*, written in the Spenserian stanza. Her other poems are short occasional pieces, frequently of a religious cast.

**Tiglath-pile'ser.** See *Assyria*.

**Tigra'nes.** See *Armenia*.

**Tigré.** See *Abyssinia*.

**Tigris** (ti'gris), a river in Western Asia, having its principal source in the Turkish province of Diarbekir, on the southern slope of the Anti-Taurus, a few miles to the east of the Euphrates. It flows generally southeast, passes Diarbekir, Mosul and Bagdad, and joins

the Euphrates somewhat more than 100 miles from its embouchure in the Persian Gulf, after a course of 1100 miles, the united stream being known as the Shatt-el-Arab. Large rafts, supported by inflated skins, are much in use for the transport of goods. The region between the Tigris and the Euphrates is known as Mesopotamia.

**Tikus.** See *Bulau*.

**Tilden** (til'den), SAMUEL JONES, statesman, born in New Lebanon, New York, in 1814. He was elected to the State assembly in 1845, and in 1846 was a member of the State Constitutional Convention. From 1855 more than half the railway corporations in the North were his clients. By 1868 he had become the leader of the Democratic party in New York State. His determined opposition and practical measures broke up the Tweed ring. He was elected in 1874 Governor of New York and in 1876 was Democratic candidate for President. The election was so close that a contest arose, the dispute being finally settled by the decision of an Electoral Commission. The electoral vote, as declared finally, was 185 for Hayes; 184 for Tilden. In 1880 and in 1884 a renomination was pressed upon him, but declined. The greater portion of his fortune (which was estimated at \$5,000,000) he devoted to public uses, but the will was contested and the estate went to the next of kin. He died August 4, 1886.

**Tile** (til), a term applied to a variety of articles made either for ornament, such as inlaid paving tiles (see *Encaustic Tiles* and *Mosaic*), or for use, as in tile-draining (see *Draining*) and roofing, which last are made similarly to bricks, and of similar clay.

**Tiliaceæ** (til-i-a'se-è), the lime-tree family, a nat. order of polypetalous dicotyledonous plants, consisting chiefly of trees or shrubs, with simple, toothed, alternate leaves, furnished with stipules. The species are generally diffused throughout the tropical and temperate parts of the globe. They have all a mucilaginous wholesome juice, and are remarkable for the toughness of the fibers of their inner bark, which is used for various economical purposes under the name of *bast*. Among the most important genera are *Tilia* and *Corchorus*, the former containing the common lime, the latter jute.

**Till**, a name given in Scotland to unstratified stony bowlder-clays, and now extended by geologists to any similar surface or drift deposit.

**Tillandsia** (til-and'si-a), a genus of epiphytes, belonging to the nat. order Bromeliaceae, natives of tropical America. *T. amana* and *T. splendens* are cultivated in hothouses on account of the singular variety and splendor of the colors of the spathe and flower-spikes. *T. usneoides* is a native of the Southern United States, where it hangs in festoons from trees.

**Tiller** (til'er), the lever or handle of the helm by which the rudder of a vessel is turned. See *Steering Apparatus*.

**Tillman** (til'man), BENJAMIN RYAN, statesman, born in South Carolina in 1847. A farmer until 1886, he began to agitate for industrial education and other reforms; was elected Governor of South Carolina in 1890 and 1892 and United States Senator in 1894. As a member of the Senate he has been radical in his views and very pronounced in his expression of them. He instituted in his state a system of selling liquor under State control and founded an industrial school for boys, the largest in the South. He died July 3, 1918.

**Tillotson** (til'ot-sun), JOHN, an English prelate, son of a clothier near Halifax, was born in 1630. In 1647 he became a student of Clare Hall, Cambridge, and was elected a fellow in 1651. He was a Presbyterian preacher until 1662, when he submitted to the Act of Uniformity, and was chosen preacher to the society of Lincoln's Inn, and lecturer at St. Lawrence, Jewry, in 1664. After becoming a D.D. in 1666, he was made king's chaplain, and presented to a prebend of Canterbury. He was subsequently appointed dean of Canterbury, and in 1689 he became dean of St. Paul's. During the suspension of Archbishop Sancroft, Tillotson exercised the archiepiscopal jurisdiction, and in 1691 reluctantly accepted the archbishopric. His liberal views rendered him obnoxious to the advocates of orthodoxy, and he was assailed with great animosity after his acceptance of the primacy. He died in 1694. Tillotson's sermons were at one time very popular.

**Tilly** (til'i, tî-yè), JOHANN TIERCKLAES, COUNT OF, one of the most celebrated generals of the seventeenth century, born about 1559, in Walloon Brabant. After being educated by the Jesuits he served successively in the Spanish, Austrian, and Bavarian armies. On the outbreak of the Thirty Years' war he led the army destined to crush the Protestants in Bohemia. (See *Thirty Years' war*.) He defeated them on the White Mountains (Nov., 1620), and in

1622 conquered the Palatinate, defeating several Protestant commanders. On August 27, 1626, he defeated Christian IV of Denmark in Brunswick, and compelled him to return to his own country. In 1630 Tilly succeeded Wallenstein as generalissimo of the imperial troops. The act by which he is best known in history is the bloody sack of Magdeburg, May 10, 1631, the inhabitants being ruthlessly slaughtered. Gustavus Adolphus met him at Breitenfeld, near Leipzig, September 7, and Tilly was entirely beaten, and was himself wounded. In a subsequent engagement with the Swedes on the Lech a cannon-ball shattered his thigh, and caused his death in 1632.

**Tilsit** (til'sit), a town of East Prussia, on the Memel, by means of which it carries on a large trade. Manufactures include iron castings, machinery, paper, cloth, soap, oils, leather, cheese, etc. Pop. 37,148. The town is celebrated for the peace concluded here in July, 1807, between Russia and Prussia and Napoleon. See *Prussia*.

**Tilt-hammer**, a large and heavy hammer worked by steam or water power, and used in forgings. It has been largely superseded by the steam-hammer, but is still advantageously used with light work. Cogs (a:



Tilt-hammer.

at c c in cut) being brought to bear on the tail of the hammer (a), its depression causes the head (d) to be elevated, which, when the tail is liberated, falls with considerable force by its own weight.

**Tilton** (til'tun), THEODORE, author, was born in New York City in 1855; died in 1907. He was chief editor of the *Independent*, 1863-71, and of the *Golden Age*, 1871-74. He wrote *The Scaton's Tale* (poems, 1867); *Sanctum Sanctorum* (1869); *Tempest Tossed* (1874); *Thou and I* (poems, 1882), etc.

**Timber** (tim'bër), a general term applied to wood used for constructive purposes, as that of the different kinds of fir and pine, the oak, ash, elm, beech, sycamore, chestnut, walnut, mahogany, teak, etc. The sap in



timber is the great cause of its decay; hence, at whatever period timber is felled, it requires to be thoroughly seasoned before being used in building. The object of seasoning is partly to evaporate the sap, and partly to reduce the dimensions of the wood so that it may be used without further shrinking. Timber seasons best when placed in dry situations, where the air has a free circulation round it. Wood for building becomes compact and durable after two or three years' seasoning. But this mode of seasoning only removes a portion of the aqueous and volatile matter from the wood; the extractive and soluble portion still remains, and is likely to ferment on the reabsorption of the moisture. It is often extremely difficult to preserve wood which is to be exposed to the weather, or is to remain in a warm and moist atmosphere. No entirely satisfactory process has yet been discovered for the preservation of timber and the prevention of dry rot. The most successful method consists in extracting the sap, in excluding moisture, and in impregnating the vessels of the wood with antiseptic substances, such as creosote. The sap may be extracted by *water seasoning*, in which the green timber is immersed in clear water for about two weeks, being then seasoned in the usual manner. It has also been proposed to extract the sap by means of an air-pump. The *charring* of timber on the outside is commonly supposed to increase its durability, but experiments on this subject do not agree. The exclusion of moisture by covering the surface with a coating of paint, varnish, tar, etc., is a well-known preservative of wood exposed to the weather. But painting is no preservative against the internal or dry rot. Only wood thoroughly seasoned should be painted. Resinous woods are more durable than others, and the impregnation of wood with tar, bitumen, and other resinous substances undoubtedly promotes its preservation. Wood impregnated with drying oils becomes harder and more capable of resisting moisture. Common salt (chloride of sodium) is a well-known preservative. The immersion of seasoned timber in sea-water is generally admitted to promote its durability. Sir W. Burnett found that the application of chloride of zinc to wood was a good preservative. Creosote is now extensively used for the preservation of wood. See also *Kyanizing*.

**Timbrel** (tim'brel), a kind of drum, tabor, or tabret, which has been in use from the highest antiquity, and is much the same as the tambourine.

**Timbuctoo** (tim-buk'tō), or **Tombuctoo**, a city of Africa, one of the leading emporia of the interior trade of that continent, is situated 6 miles north from the main stream of the Niger, in the Western Soudan. The city mostly consists of clay houses, the chief building being a large mosque. It is almost entirely dependent on commerce, being a center of caravan trade from the north and of traffic along the Niger. The leading articles are gold and salt; and there is also an extensive traffic in European goods. Permanent pop. estimated at 5000.

**Timby**, THEODORE RUGGLES, an American inventor, born at Dover, New York, in 1822; died in 1900. He invented the revolving turret for the original monitor, the mole-tower system of defense, the revolving-tower and shield system, the American turbine water-wheel, and the method of firing heavy guns by electricity.

**Time** (tim), in music. See *Music*.

**Time**, the general idea of successive existence, or that in which events take place, space being that in which things are contained. (See *Space*.) *Relative time* is the sensible measure of any portion of duration, often marked by some phenomenon, as the apparent revolution of the celestial bodies, more especially of the sun, or the rotation of the earth on its axis. Time is divided into years, months, weeks, days, hours, minutes, and seconds; but of these portions the years and days are marked by celestial phenomena. (See *Day*, *Year*.) The instruments employed for measuring time are clocks, watches, chronometers, hour-glasses, and dials; but the three first are those chiefly used.

**Timoleon** (ti-mō'le-un), a native of Corinth, Greece, born about 400 B.C. He was passively involved in the assassination of his brother Timophanes, who wished to usurp the supreme power, and spent twenty years in voluntary exile. On the invitation of his fellow-citizens he returned and took command of the troops sent to Sicily to aid the Syracusans against Dionysius the Younger and the Carthaginians (344 B.C.). He expelled Dionysius from Syracuse (343 B.C.), and totally routed the Carthaginians (339 B.C.). Having restored their liberty to the Syracusans, and recalled the exiles and fugitives, he gave the citizens a new and more stable constitution, and finally, having accomplished his mission, voluntarily laid down his power and retired into private life. All Sicily mourned his death, which oc-

curred in 337 A.D., and he was buried at the expense of the city.

**Timor** (tî'môr), the largest and most eastern of the Lesser Sunda Islands, in the Asiatic Archipelago, southeast of Celebes, is politically divided between Holland and Portugal; area, about 12,350 square miles. The coast is rocky, but has two safe harbors; Koepang on the south, the headquarters of the Dutch, and Dilli on the north, the chief station of the Portuguese portion. The island is mountainous, and has frequently suffered from earthquakes. The plains produce tropical products in abundance, and the mountain slopes are covered with the fruits of Southern Europe. Agriculture is little attended to. The natives are partly Papuans, partly Malaya. The trade, chiefly in the hands of Chinese, is carried on mostly through Koepang. The exports are sandal-wood, trepang, wax, horses, tortoise-shell, birds'-nests, etc. Pop. about 400,000.

**Timor Laut** (lout), or **ENIMBER ISLANDS**, a group of islands of the Indian Archipelago lying between Timor and New Guinea. The largest, Timor Laut, or Yumdens, is about 80 miles long by 25 broad, and is mountainous and densely wooded. The natives resemble those of New Guinea. Pop. 25,000.

**Timothy** (tim'o-thi), a disciple of St. Paul, was born in Lycaonia, Asia Minor, probably at Lystra, of a Gentile father and Jewish mother. When St. Paul visited Lystra on his second missionary journey Timothy became an active fellow-worker with the apostle, and he accompanied him and Silas in the further course of their mission. He went with Paul to Philippi and Berea, and remained alone in the latter city, afterwards rejoining the apostle at Athens, from which city he was sent to Thessalonica. After remaining there some time he again joined Paul at Corinth. Five years later he is found with his master at Ephesus, whence he was sent with Erastus into Macedonia and Achaia to prepare the churches for Paul's meditated visit. Timothy met the apostle again in Macedonia, and preceded him on his journey to Jerusalem. He again appears at Rome with Paul at the time when the epistles to the Colossians, Philippians, and Philemon were written. Timothy was on one occasion left at Ephesus when Paul went into Macedonia (1 Tim. i. 3). According to tradition, he served as the first bishop of Ephesus. He is said to have been martyred in the reign of Domitian or Nerva.

**Timothy** **EPISTLES** TO, two books of the New Testament attributed to St. Paul. These epistles, along with that to Titus, are called the pastoral epistles, as to the genuineness of which there has been considerable controversy. By the early Christian fathers they were almost universally accepted as genuine, and their genuineness is also supported by external testimony. They were, however, rejected by Marcion, Basilides, and other Gnostic heretics. In modern times both views have been ably advocated. Their genuineness is chiefly attacked on the grounds that their style differs from that of the acknowledged epistles of St. Paul, that the heresies alluded to in the epistles betray a later age, that the ecclesiastical polity of the epistles is too complete to belong to the time of the apostles, and that it is difficult to find any part of the apostle's life to which they can be assigned. Biblical critics generally meet the last difficulty by assigning them to a period after the close of the narrative in the Acts, the second epistle to Timothy being written while St. Paul was undergoing a second imprisonment in Rome.

**Timothy-grass** (*Phleum pratense*), a hard coarse grass with cylindrical spikes from 2 to 6 inches long. It is used mixed with other grasses for permanent pasture, and grows best in tenacious soils. It is extensively cultivated in the United States and the British Isles. Timothy Hanson first recommended it, hence its name. Swine refuse it.

**Timur** (tî'môr), called also **TIMUR BEG** and **TIMUR LENK** (that is, *Timur the Lame*), and, by corruption, **TAMEPLANE**, a celebrated oriental conqueror of Mongol or Tartar race, born in the territory of Kesh, near Samarcand, in 1336. His ancestors were chiefs of the district, and Timur by his energy and abilities raised himself to be ruler of all Turkestan (1370). By degrees he conquered Persia, and the whole of Central Asia, and extended his power from the great wall of China to Moscow. He invaded India (1398), which he conquered from the Indus to the mouth of the Ganges, massacring, it is said, on one occasion 100,000 prisoners. On his way from India to meet the forces of Bajazet, the Turkish sultan, he subjugated Bagdad, plundered Aleppo, burned down the greater part of Damascus, and wrested Syria from the Mamelukes, after which he overran Asia Minor with an immense army. Bajazet's army was completely defeated on the plain of Ancyra (Ankara) in 1402, and the sultan was

taken prisoner. The conquests of the Tartar now extended from the Irtish and Volga to the Persian Gulf, and from the Ganges to the Grecian Archipelago. He was making mighty preparations for an invasion of China when death arrested his progress at his camp at Otrar, beyond the Sir-Daria, in 1405, and his empire immediately fell to pieces. He was fanatical in his religion, and although no conquests were ever attended with greater cruelty, devastation, and bloodshed, he was in a measure a patron of science and art, and is also reputed author of the *Institutions of Timur* and the *Autobiography of Timur*, both translated into English.

**Tin**, a hard, white, ductile metal; atomic weight 118; chemical symbol Sn (from *L. stannum*). Tin appears to have been known in the time of Moses; and the Phœnicians traded largely in the tin ores of Cornwall. The mountains between Galicia and Portugal, and those separating Saxony and Bohemia, were also productive of tin centuries ago, and still continue unexhausted. Tin occurs in the Malay Peninsula, the island of Banca, India, Mexico, Bolivia, Peru, the United States, Australia, etc. In the United States there are rich deposits of both vein ore and stream-tin, but they are yet little worked, the extraction of the tin being difficult. The most important localities are the Straits Settlements, Banca, and Bolivia. In Australia tin is found in New South Wales and Victoria; also occurs in Tasmania. There are only two ores of tin; the native binoxide, called *tin-stone*, and the double sulphide of tin and copper, called *tin-pyrites*. The former is the only ore used for obtaining metallic tin. It occurs in various crystallized forms, in deep lodes blended with several other metals, as arsenic, copper, zinc, and tungsten, when it is known as *mine-tin*; or, in disseminated masses in alluvial soil, in which state it is called *stream-tin*. Mine-tin, when reduced to the metallic state, yields *block-tin*, while stream-tin yields a purer sort called *grain-tin*. The ore is first ground and washed, and then roasted in a reverberatory furnace to expel the sulphur and arsenic. Mixed with limestone and fuel, it is again fused in a furnace for about eight hours, the earthy matters flowing off with the lime, while the oxide of tin, reduced to a metallic state, falls by its own weight to the bottom, and is drawn off. The tin, still impure, is again moderately heated, when it melts and flows off into the refining basins, leaving the

greater part of the foreign metals in a solid state. The molten tin is stirred in order to disperse the gases, and, when partially cool, it separates in zones, the upper consisting of nearly pure tin, while the under is so impure that it must be melted again. The upper layer is removed, cast into blocks, and sold as *block-tin*, the purest specimens being called *refined-tin*. Tin-pyrites, the other ore of tin, contains from 14 to 30 per cent. of tin, and is found in Cornwall, in Saxony, and in Bolivia. Pure tin has a fine white color like silver. It has a slightly disagreeable taste, and emits a peculiar sound when rubbed. Its hardness is between that of gold and lead, and it is very malleable. Specific gravity 7.28. Melting point about 230° C. Tin is very flexible, and when bent emits a crackling sound, sometimes called the *cry of tin*. It loses its luster when exposed to the air, but undergoes no further alteration. Oxygen combines with tin, forming protoxide of tin or *stannous oxide* ( $\text{SnO}$ ); *sesquioxide* ( $\text{Sn}_2\text{O}_3$ ), and dioxide or *stannic oxide* ( $\text{SnO}_2$ ). The compounds of chlorine with tin are dichloride or *stannous chloride* ( $\text{SnCl}_2$ ), *sesquichloride* ( $\text{Sn}_2\text{Cl}_3$ ), and *stannic chloride* ( $\text{SnCl}_4$ ). Stannic chloride has long been known as the *fuming liquor of Libavius*, so called from Libavius, a chemist of the sixteenth century. Tin also combines with phosphorus and with sulphur. *Stannic sulphide* ( $\text{SnS}_2$ ) has long been known in chemistry as *aurum mosaicum* or *mosaic gold*. Tin will unite with arsenic and with antimony, but does not readily combine with iron. Combined with copper it forms bronze, bell-metal, and several other useful alloys. With lead it forms pewter and solder of various kinds. *Tin-plate* is formed by dipping thin plates of iron into melted tin; they are afterwards cleaned with sand and steeped for twenty-four hours in water acidulated by bran or sulphuric acid. Tin is principally employed in the formation of alloys. Its oxides are used in enameling, and for polishing the metals, and its solution in nitro-muriatic acid is an important mordant in the art of dyeing, rendering several colors, particularly scarlet, more brilliant and permanent. Tin-plate is used for roofing, the making of culinary utensils, etc.

**Tinamou** (tin'a-mō), the name given to a genus and family of birds occurring in South America, and allied in some respects to the ostrich and emeu. They somewhat resemble a partridge, and vary in size from that of a pheasant down to that of a quail. The

great tinamou (*Tinamus brasiliensis*) is about 18 inches long, and inhabits the forests of Guiana.



Great Tinamou (*Tinamus brasiliensis*).

**Tinavelly.** See *Tinneveli*.

**Tincal** (ting'kal), the commercial name of borax in its crude or unrefined state. See *Borax*.

**Tincture** (tingk'tūr), a spirituous solution of the active principles of some vegetable or other medicinal substance.

**Tindal** (tin'dal), MATTHEW, an English controversial writer, born about 1657; entered Lincoln College, Oxford, in 1672; became a fellow of All Souls', and received the degree of LL.D. After the revolution he sat as a judge in the Court of Delegates. In 1706 he published a treatise entitled *The Right of the Christian Church*, attacking hierarchical supremacy. This work excited the animosity of the high church clergy, and the House of Commons ordered it, together with two defenses of it written by Tindal, to be burned by the common hangman. In 1730 he published his most famous work, *Christianity as Old as the Creation, or the Gospel a Republication of the Religion of Nature*, in which he maintains that there has been no revelation distinct from the internal revelation of the law of nature in the hearts of mankind. He died in 1733.

**Tindall**, or TYNDALE, WILLIAM, a martyr to the Reformation, born about 1484 in Gloucestershire, and educated at Oxford. After taking orders he went as a tutor to Gloucestershire, where, in consequence of his opinions in favor of the reformation doctrines, he was reprimanded by the chancellor of the diocese. He then removed to London, where he probably began his English version of the New Testament, and subsequently proceeded to Germany,

visiting Luther at Wittenberg. Having completed his translation he got it partly printed in quarto at Cologne; but he had to flee from this town, and the complete work was printed in octavo at Worms. The greater part was sent to England, and the prelates Warham and Tunstall collected all copies they could seize or purchase, and committed them to the flames. The only fragment of the quarto edition known to exist is preserved in the British Museum. Of the first octavo edition only two copies remain, one in the Baptist Museum at Bristol, the other (imperfect) in the library of the Chapter of St. Paul's. Revised editions were soon issued by Tindall himself. Tindall also translated the Pentateuch, and subsequently Jonah. In 1530 he took up his residence at Antwerp. In 1535 he was thrown into prison at Vilvorde near Brussels, and being found guilty of heresy he was strangled in 1536 and his body burned at the stake. Tindall's translation of the Scripture is highly esteemed for perspicuity and noble simplicity of idiom.

**Tinder** (tin'dér), any substance artificially rendered readily ignitable but not inflammable. Before the invention of chemical matches it was the chief means of procuring fire. The tinder, ignited by a spark from a flint, was brought into contact with matches dipped in sulphur. Tinder may be made of half-burnt linen, and of various other substances, such as amadou, touchwood, or German tinder (which see).

**Tinea.** See *Ring-worm*, also *Clothes-moth*.

**Tin-foil**, pure tin, or an alloy of tin and lead, beaten into leaves about eighth part of an inch thick. When coated with mercury it forms the reflecting surface of glass mirrors.

**Tinneveli** (tin-é-vel'i), a town in the southeast of India, in the presidency of Madras, the largest town of the district of the same name, the administrative headquarters of which are at Palamkotta (which see) on the other side of the Tambraparni River. It has an interesting ancient temple and is an active Protestant missionary center. Pop. 40,469.—The district, which occupies the extreme southeastern corner of the Indian peninsula, has an area of 5381 square miles. Pop. 2,050,007.

**Tinning** (tin'ing), the process of covering or coating other metals with a thin coat or layer of tin, to protect them from oxidation or from corrosion by rust.

**Tinos** (té'nōs), or *TINO* (anciently *Tenos*), an island in the Grecian



**Archipelago**, one of the Cyciades, immediately southeast of Andros; area, about 85 sq. miles. It produces barley, silk, wine, figs, oranges, and honey. There is a town of the same name near the south coast. Pop. of the island 12,300; of the town, about 2000.

**Tin-plate.** See *Tin*.

**Tintoretto** (tên-tô-ret'tô), the surname of a Venetian historical painter, GIACOMO or JACOPO ROBUSTI, born at Venice in 1518; died there in 1594. He studied for a few days under Titian, but, being dismissed without explanation by his master, he afterwards pursued his studies alone, and endeavored, according to his own motto, to unite Titian's colorings with the drawing of Michael Angelo. He painted many works for his native city, among which are a *Last Judgment*, the *Israelites Worshipping the Golden Calf*, a *Crucifixion*, the *Marriage of Cana*, the *Miracle of St. Mark* ('*Miracolo dello Schlavo*'), his masterpiece. His portrait, by himself, is in the Louvre; and there are many of his paintings in Germany, Spain, France, and England. Equal in several respects to Titian or Paul Veronese, he wants the dignity of the former, and the grace and richness of composition of the latter. His manner of painting was bold, with strong lights, opposed by deep shadows. His execution was very unequal.

**Tinoceras** (ti-nos'er-as), or TINO-THERIUM, a genus of mammals now extinct, found in the Eocene, and representing the order Dinocerata. The individuals were all large, some of them nearly equaling the elephants, while the brain was smaller than that of any living or fossil mammal.

**Tippecanoe** (tip-pe-ka-nô'), a river of Indiana, which rises in the N. part of the State, flows W. S. W. and S. 200 miles, and empties into the Wabash 10 miles above Lafayette. It is famous for the battle fought near its mouth, November 7, 1811, in which the Indians, under Tecumseh's brother, the prophet, were defeated by General Harrison.

**Tipperah** (tip-pê-râ), a district of British India, in the Chittagong division of Bengal, area, 2491 square miles. Capital, Cornilla.

**Tipperary** (tip-pêr-â-ri), an inland county in Ireland, in the province of Munster; area, 1659 square miles. The soil is extremely fertile; the chief crops are oats, potatoes, and wheat. The highest elevation is 3000 feet; the level country forms part of the

great central plain of Ireland, and includes some branches of the Bog of Allen. It is drained mainly by the river Suir. Mineral productions comprise coal, copper, zinc and argentiferous lead; slates of good quality are extensively obtained near Killaloe. Grazing is the principal employment, and there are numerous dairies. Chief towns: Clonmel, Carrick-on-Suir, Nenagh, Thurles, Cashel, Tipperary and Roscrea. Pop. 160,232.—TIPPERARY, the county town, situated on the river Arra, 98 miles S. W. of Dublin, in a district called, from its fertility, the 'Golden Vale.' It has a large trade in butter. Pop. 6281.

**Tippoo Sahib** (ti-pô' sa'hîb), Sultan of Mysore, son of Hyder Ali, born in 1749, succeeded his father in 1782. (See *Hyder Ali Khan*.) He continued the war in which his father was engaged with the British, and abandoned the Carnatic in order to check the British advance on the Malabar coast. In April, 1783, he forced the British commander, Matthews, to surrender at Bednore. Matthews and a part of the garrison were put to a shameful death. Mangalore also fell into his hands; but in March, 1784, being deprived of the assistance of the French by the Treaty of Versailles (Sept., 1783), he was induced to sign the Treaty of Mangalore on advantageous terms. In 1789 he attacked the Rajah of Travancore, an ally of the British. An offensive and defensive alliance was concluded (June, 1790) between the East India Company, the Peshwa of the Mahrattas, and the Nizam. In the campaign of 1790 and 1791 several places were reduced by the allies, and Tippoo was finally besieged in his capital, Seringapatam. By a peace concluded in Feb., 1792, the sultan agreed to relinquish half his territory and to pay 33,000,000 rupees. But Tippoo was unwilling to submit to this loss and entered into negotiations with the French. Suspecting that Tippoo's preparations were connected with Bonaparte's invasion of Egypt, the Company determined to anticipate hostilities, and on Feb. 22, 1799, in connection with their allies, they declared war against the sultan. Tippoo was defeated in two battles, and retreated to Seringapatam; which place was attacked by General Baird on May 4, and completely reduced, Tippoo perishing in the assault.

**Tipton** (tip'tun), a town in Staffordshire, England, 8 miles W. N. W. of Birmingham. It depends chiefly on its manufactures of heavy iron goods. Pop. 31,763.

**Tipula** (tip'u-la), a genus of dipterous insects or flies, of which the great crane-fly (*T. gigantea*) is a typical species. See *Crane-fly*.

**Tiraspol** (tye-ras-pol'y'), a town of South Russia government Kherson, on the Dniester. Pop. 31,616.

**Tirlemont** (tirl-mōp), a town of Belgium, in South Brabant. It has a church dating from the ninth century, and manufactures of woollens, breweries, and a large trade. Pop. 18,544.

**Tirnau** (tir'noū), TYRNAU, a royal free town of Hungary, county of Pressburg. Pop. 13,181.

**Tirnova** (tir'nō-vā), or TER'NOVA, a town of Bulgaria, capital of province of same name. Pop. 12,185.

**Tirol.** See *Tyrol*.

**Tirpit.** (teer'pitz), ALFRED, GRAND ADMIRAL VON, a German commander, born in 1849. He entered the navy at sixteen; saw service in South America and the West Indies and in the Franco-German war. He was made a rear-admiral in 1895, and in 1898 became secretary of state for the Admiralty, the head of the German navy. He is a man of great personal force and has done much to build up the German navy.

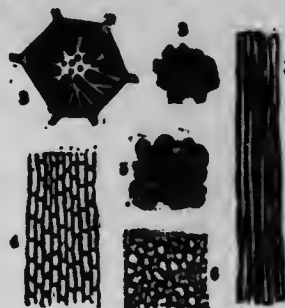
**Tiryns** (ti'rins), a very ancient ruined city of Greece, in the Peloponnesus, in the plain of Argolis, about 3 miles from the sea, with remains of Cyclopean walls, and of a palace of the eleventh or tenth century B.C., excavated by Schliemann.

**Tischendorf** (tish'en-dorf), LOBE-GOTT FRIEDRICH KONSTANTIN, a German biblical critic, born in 1815, studied at Leipsic, and in 1845 became professor extraordinary there, becoming professor ordinary of theology in 1850. He made several visits to the East, and brought back valuable MSS., the most remarkable being (in 1859) the famous Sinaitic Codex (which see). Tischendorf was continually engaged in editorial labors, and was broken down by overwork in 1873. He died at Leipsic in 1874.

**Tisio.** See *Garofalo, Benvenuto*.

**Tissue** (tish'ū), (1) in animal anatomy, the texture or grouping of anatomical elements of which the systems of organs are composed. Thus in special histology we speak of *muscular tissue*, or flesh; *osseous tissue*, or bone; *adipose tissue*, or fat; *cartilaginous tissue*, or gristle; *pigmentary tissue*, or coloring matter seen in the skin, etc.; *areolar, cellular, or connective tissue*, widely distributed in every part of the

body, and serving to bind together and consolidate other parts and tissues. (2) In vegetable anatomy, the minute elementary structures of which the organs of plants are composed. Plant tissues



VEGETABLE TISSUE.

- 1, Prosenchyma or Woody Tissue. 2, Horizontal section of Prosenchymatous Tissue. 3, Do. do. of a Single Cell, showing the successive layers of deposit in the interior which give hardness and firmness to the wood of plants. 4, Cylindrical Parenchyma. 5, Round or Elliptical Parenchymatous Tissue. 6, Spongiform or Stellate Tissue.

are composed of elementary membrane and elementary fiber, and the principal forms under which they exhibit themselves constitute *cellular tissue*, *fibrous tissue*, and *vascular tissue*.

Experiments have been made in keeping pieces of animal tissue alive in proper media outside of the body. So far they can be kept alive only for a certain length of time—from three to fifteen days—but it is believed that death may be rather contingent than necessary, due to the accumulation of waste products. Alexis Carrel has devised a system of artificial rejuvenescence, by washing the tissue from time to time in Ringer's solution and by placing it in a medium of plasma and distilled water. The excised heart of a turtle will, under appropriate conditions, continue beating for several days.

**Tit.** See *Titmouse*.

**Titania.** See *Mab*.

**Titanic**, WRECK OF THE. On the night of April 14-15, 1912, took place the greatest disaster recorded in the history of ocean travel, the total wreck on her maiden trip, of one of the two largest ships that had ever been built, with the loss of 1635 of her passengers and crew. The Olympic and Titanic, of 66,000 tons each, were launched by the White Star Line—the Olympic in 1910, the Titanic in 1911. These floating palaces were of equal dimensions, having a total

length of 882½ feet, breadth 92½ feet, and height from bottom of keel to top of the captain's house 105½ feet. Their decks numbered 11, and they were equipped with 15 watertight bulkheads, the claim being made that they were unsinkable. While of 66,000 tons displacement, their registered tonnage was 45,000 tons. The Titanic, the one of these twin steamers with which we are specially concerned, was capable of carrying 5000 passengers, and had an average speed of 21 knots. She was prepared in almost every particular for the comfort, enjoyment and safety of her passengers, being equipped with such unusual appliances as salt-water swimming pools, squash racquet courts, sun parlors and other pleasure devices. The one contingency unprovided for was that of sufficient lifeboats to carry those on board in the improbable event of an accident. Her watertight compartments were deemed sufficient.

The Titanic left Southampton, England, on April 10, 1912, in charge of Captain E. J. Smith, a navigator of long experience, her crew and passengers numbering 2340. A disaster was threatened at the outset, the suction made by her great bulk as she began her course being so great as to drag the American liner New York from her quay, a perilous collision being imminent. Proceeding on her eventful voyage, Sunday, April 14, found her in the seas southeast of Newfoundland, then infested with icebergs to an unusual extent. News of the presence of these bergs was received by wireless messages from other vessels, but there was no abatement in the speed of the Titanic, her record rate of 21 knots an hour being maintained. At 10.25 at night her wireless operators sent news of disaster far over the seas, their message being picked up by a number of ships within range. It stated that the Titanic had struck an iceberg and needed immediate assistance, her position being given as latitude 41° 46' north, longitude 50° 14' west. The shock of the collision with the berg had been so slight that few of those on board apprehended danger until an hour or more had passed. Then it grew apparent that the ship was fatally wounded and was slowly filling and the lifeboats were hastily lowered and set afloat, the men on board holding heroically back and putting the women and children on board. Unfortunately the boats were not capable of holding one third of the passengers and crew, yet no panic took place, the greatest heroism was shown, and when the great ship finally plunged beneath the waters, at 2.20 A. M., carrying more than 1600 \*) inevitable death, she did so with

the band playing, and without a cry of despair from the doomed multitude.

It was at break of day that the Carpathia, reached by the call for aid, came within sight of the lifeboats. Those who had not perished from exposure were taken on board and the ship's head was turned backward for New York, whence she had sailed. She arrived with the rescued on the evening of Thursday, April 18. Those alive numbered 705. Several died on the voyage homeward. The story told indicated that the berg had rent the side of the Titanic through a great part of her length, rendering many of her waterproof compartments useless. The disaster would probably not have occurred in a head-on collision. The loss was great, not only in life, but in value of the ship and cargo, estimated at \$12,500,000. A number of multi-millionaires and prominent persons were aboard. Investigation into the causes of the disaster led to more adequate safety regulations.

**Titanium** (ti-tā'ni-um), a metal discovered in 1791. It is found combined with oxygen in several minerals, and occurs especially in iron ores, which hence receive the name of titaniferous iron ores. Titanium is a dark green, heavy, amorphous powder, and some authorities doubt its metallic character. The ores of this metal include menachanite, from Menachan in Cornwall, where it was originally found; iserine, from the river Iser in Silesia; sphene, rutile, brookite, etc.

**Titans** (ti'tans), in Greek mythology, the sons and daughters of Urānus (Heaven), and Gē (Earth). They were twelve in number, six sons and six daughters. They rose against Urānus, and deposed him, raising Cronus, one of their number, to the throne. They were afterwards overcome by Zeus, and thrown into Tartarus.

**Titchener, EDWARD BRADFORD**, an Anglo-American psychologist, born at Chichester, England, in 1867. He studied at Brasenose College, Oxford, and at the University of Leipzig, and was extension lecturer at Oxford until 1892. He has been Sage professor of psychology there since 1895, and has gained international fame. His best-known works include *Experimental Psychology* (1901-05); *Lectures on the Experimental Psychology of Thought Processes* (1909); and *Textbook of Psychology* (1909-10).

**Tithe** (tith; Anglo-Saxon, *teōtha*, 'a tenth part'), the tenth part of the increase yearly arising from the profits of lands, the stock upon lands, and the industry of the occupants, al-

lotted to the clergy for their maintenance. The custom of giving and paying tithes is very ancient, and was legally enjoined by Moses (Lev. xxvii, Dent. xiv, and elsewhere). In 778 Charlemagne established the payment of tithes in those parts of the Roman Empire under his sway, dividing them into four parts: one to maintain the edifice of the church, the second to support the poor, the third the bishop, and the fourth the parochial clergy. Similar laws were afterwards enacted in various countries of Western Europe. Their payment was first enjoined in England by a constitutional decree of a synod held in 786. Offa, king of Mercia, in 794 made a law giving the tithes of all his kingdom to the church, and similar laws were enacted by Athelstan and Canute. The first mention of tithes in statute law is in 1285. In the earliest arrangement a man might give the tithes to what priests he pleased, which were called *arbitrary consecrations of tithes*; but when dioceses were divided into parishes, the tithes of each parish were allotted to its own particular minister. It is now generally held that tithes are due of common right to the parson of the parish, unless there be a special exemption. The parson of the parish may be either the actual incumbent or else the appropriator of the benefice. (See *Impropriations*.) Tithes in English law are of three kinds: 1. *prædial*, arising immediately from the soil, as corn, hay, fruit, etc.; 2, *mixed*, such as calves, lambs, pigs, fowls, wool, etc.; 3, *personal*, arising from the profits of personal industry in a trade, profession, or occupation. They are divided into *great* and *small*. Great tithes are chiefly corn, hay, and wool, and belong to the rector; small tithes are chiefly mixed and personal tithes, and belong to the vicar. Originally all the land in the kingdom, except crown and church lands, was tithable. By acts passed in the reign of Henry VIII, however, tithes could be temporarily redeemed by the payment of a lump sum. The circumstance that tithes were enacted from dissenters and the difficulties of collecting them, long led to constant bickerings between the clergy and the people. The popular demand for a measure of commutation was at last met by the Tithe Commutation Act (1836). This act, amended by subsequent statutes, provides for the conversion of all the uncommuted tithes in England and Wales into a corn and rent charge, payable in money, and estimated on the average price of a bushel of corn for the seven years ending at the preceding

Christmas. In Ireland the tithes were commuted into a money rent charge in 1838, which by the Irish Church Act of 1869 was vested in the commissioners of church temporalities, with power to sell such rent charge at 22½ years purchase to the landowner. The tithes in Scotland are called *teinds* (which see). Tithes were collected in Virginia in colonial times, and Patrick Henry first won fame as an orator by his vigorous defense of those who refused to pay them. The lack of an established church has kept this form of taxation out of the United States, all church support being voluntary.

**Tithing** (tith'ing), an ancient subdivision of England, forming part of the hundred, and consisting of ten householders and their families held together in a society, all being bound for the peaceable behavior of each other, the chief of whom was the *tithing-man*.

**Tithonus** (ti-thō'nus), in Greek mythology, a son, or brother, of Laomedon, king of Troy. He was beloved by Eos (Aurora, Morning), who importuned Zeus to make him immortal. Her prayer was granted, but she had neglected to ask for continual youth, and in time her lover took on all the signs of extreme age. Tithonus' prayer to the gods to be relieved of the burden of old age was answered by his being metamorphosed into a grasshopper.

**Titian** (tish'i-an), or TIZIANO VECCELIO (tit-si-ä'no ve-chel'li-ö), one of the most distinguished of the great Italian painters, and head of the Venetian school, was born at Pieve de Ca-



Titian.

dore, in the Carnic Alps, in 1477. He studied under Giovanni Bellini of Venice, and in 1507 was associated with the painter Giorgione in executing certain frescoes. In 1611 he was invited to



Padua, where he executed three remarkable frescoes which are still to be seen there. In 1512 he completed the unfinished pictures of Giovanni Bellini, his former master, in the Sala del Gran Consiglio at Venice, and the senate were so pleased that they gave him an important office. To this period are attributed his pictures of the *Tribute Money* and *Sacred and Profane Love*. In 1514 he painted a portrait of Ariosto at Ferrara, and after his return to Venice he painted an *Assumption of the Virgin* (1516), considered one of the finest pictures in the world; it is now in the Academy of the Fine Arts in Venice. About 1528 he produced his magnificent picture, *The Death of St. Peter the Martyr*—a picture, says Algarotti, 'in which the great masters admitted they could not find a fault,' unfortunately destroyed by fire in 1867. In 1530 the Emperor Charles V invited him to Bologna to paint his portrait and execute various other commissions. In 1532 he again painted the emperor's portrait, and he is said to have accompanied Charles to Madrid, where he received several honors. He remained, it is said, three years in Spain, in which country many of his masterpieces, such as *The Sleeping Venus*, *Christ in the Garden*, *St. Margaret and the Dragon*, are still to be found. In 1537 he painted an *Annunciation*, and in 1541 he produced *The Descent of the Holy Ghost on the Apostles*, *The Sacrifice of Abraham*, and *David and Goliath*. In 1543 he painted his picture of *The Virgin and San Tiziano*; and in 1545 he visited Rome, where he painted the famous group of *Pope Paul III, the Cardinal Farnese, and Duke Ottavio Farnese*. He was patronized as warmly by Philip II as by his father, Charles V. Of Titian's private life but little is known. He died of the plague in 1576, aged ninety-nine, having painted to the last with almost undiminished powers. Titian excelled as much in landscape as in figure-painting, was equally great in sacred and profane subjects, in ideal heads and in portraits, in frescoes and in oils; and though others may have surpassed him in single points, none equaled him in general mastery. As a colorist he is almost unrivaled, and his pictures often reach the perfection of sensuous beauty.

**Titicaca** (tit-ä-kä'kä), a lake on the northwestern frontiers of Bolivia, situated in a valley of the Andes, 12,600 feet above sea-level; estimated area, 5300 square miles. It contains several islands, and abounds with fish.

**Titlark.** See *Pipit*.

**Title-deeds,** in law, are the documents, such as mortgages, conveyances, etc., which afford evidence of the ownership of real property.

**Titles of Honor,** appellations given to certain persons in virtue of particular offices or dignities possessed by them, or as marks of distinction and special rank. They have existed probably among all peoples. Such were in Rome the titles of Magnus (Great) and Africandus (African); and the epithets Cæsar, the name of a family, and Augustus, which were gradually applied to all who filled the imperial throne. See *Nobility*, *Peer*, and *Address (Forms of)*.

**Titling.** See *Pipit*.

**Titmouse** (tit'mous), TIT, or TOM-TIT, the name given to a number of denti-rostral insectivorous birds inhabiting most parts of the world. They are very active little birds, continually flitting from branch to branch, devouring seeds and insects and not sparing even small birds when they happen to find them sick and are able to put an end to them. Their notes are



Blue Titmouse, male and female (*Parus caeruleus*).

shrill and wild. They build in the hollows of trees, in walls, etc. The great titmouse (*Parus major*) is between five and six inches long, and inhabits Europe generally. There are various other European species, and several occur in the United States, some of them known as *chickadees* (which see).

**Titration** (ti-trä'shun), in chemical analysis, a process for ascertaining the quantity of any given constituent present in a compound, by observing the quantity of a liquid of known strength (called a *standard solution*) necessary to convert the constituent into another form. The reaction is

usually marked by a change of color or by the formation of a precipitate.

**Titus** (tí'tus), or in full, **TITUS FLAVIUS SARPINUS VESPASIANUS**, a Roman emperor, born A.D. 40, was the eldest son of the Emperor Vespasian. He served with credit as a military tribune in Germany and Britain, and accompanied his father in the war against the Jews as commander of a legion. When Vespasian became emperor (69) Titus was left to conduct the war in Judea. He took Jerusalem (A.D. 70), and after visiting Egypt returned to Rome in triumph, and was associated with his father in the government of the empire. He became sole emperor in 79, and showed himself an enlightened and munificent ruler, distinguished by benevolence and philanthropy. He died Sept. 13, 81, after a reign of a little over two years and two months. His brother Domitian was strongly suspected of having poisoned him.

**Titus**, a disciple and assistant of the apostle Paul, and the person to whom one of the canonical epistles of the New Testament is addressed. He was a gentile by origin, and probably a native of Antioch. He labored with Paul in Asia Minor, Macedonia and Crete, and is said to have been the first Christian bishop of Crete.

**Titus**, **EPISTLE TO**, one of the three pastoral epistles of the New Testament (the remaining two being those addressed to Timothy), believed to have been written by St. Paul after his first imprisonment at Rome. The topics handled are the same which we find in the other two kindred epistles. See *Timothy, Epistles to*.

**Titus Livius**. See *Livius*.

**Titusville** (tí'tus-víl), a city of Crawford Co., Pennsylvania on the Pennsylvania and New York Central railroads. It has steel and forge works, oil refineries and manufactures of iron, radiators, saddlery, etc. Pop. 9000.

**Tiumen** (työ-män'), a town in the government of Tobolsk, Western Siberia, on the Tura, an affluent of the Tobol. It is the center of the Western Siberian trade, and has various manufactures. Pop. 29,588.

**Tiverton** (tí'ver-tun), a municipal borough of England, in the county of Devon, pleasantly situated 12 miles north by east of Exeter. It consists of several well-formed streets, and has a spacious market place, guildhall, assembly rooms, public baths, etc.; and important manufactures of lace. Pop. (1911) 50,705.

**Tivoli** (tí'vö-lí; the ancient *Tíber*), a town of Central Italy, 17 miles E. N. E. of Rome (connected by tramway), on the left bank of the Tevere (or Anio), which here forms fine falls. It has steep, narrow, and ill-paved streets, and houses in general poorly built; with a modern handsome cathedral, and some other churches. It was a favorite resort of the ancient Romans, and among the remains in the town and neighborhood are the circular temple of the Sibyl, the ruins of Hadrian's villa, the villa of Mæcenas, etc. The wine of Tivoli was famous in ancient times. Pop. 12,881.

**Tiziano**. See *Titian*.

**Tlaxcala** (tlas'ká-lá), a state of Mexico, surrounded nearly on all sides by the state of Puebla; area, 15,957 square miles. Pop. 172,315. The capital, which bears the same name, was once an important city. Pop. 2715.

**Tlemçen** (tlem-sen'), a town of Algeria, in the province of Oran, 70 miles S. S. W. of the city of that name, finely situated 2500 feet above the sea. Pop. 24,060.

**T. N. T.** See *Trinitrotoluol*.

**Toad** (töd), the name applied to various genera of tailless amphibians. Toads have a thick, bulky body, covered with warts or papillæ. They have no teeth, and the tongue is fixed to the front of the mouth, but the posterior extremity is free and protrusible. The hind feet are but slightly webbed. They leap badly, and generally avoid the water, except in the breeding season. Their food consists of insects and worms. Toads have a most unprepossessing aspect and outward appearance. The bite, saliva, etc., of the common toad of Europe (*Bufo vulgaris*) were formerly considered poisonous, but no venom or poison apparatus of any kind exists in these creatures. The toad is easily tamed, and exhibits a considerable amount of intelligence as a pet. It lies torpid in some hole during winter. Insects are caught by a sudden protrusion of the tongue, which is provided with a viscid secretion. There are several species of toads in the United States. The Surinam toad is described in the article *Pipa*. The toad is extremely tenacious of life, but experiments have conclusively shown that there is no truth in the oft-repeated stories of the creature being able to support life when inclosed in solid rock for immense periods of time. Dr. Buckland has shown that when excluded from air and food, frogs and toads, in virtue of

their slow circulation and cold-blooded habits, might survive about a year or eighteen months at most.

**Toad-fish**, a name sometimes given to the *Lophius piscatorius*.

See *Angler*.

**Toad-flax**, the English name of various plants of the genus *Linaria*, order Scrophulariaceæ. The common toad-flax is *L. vulgaris*, which in its general habits is not unlike flax. The flowers are of a bright yellow; the corolla labiate, resembling that of snapdragon in shape, but provided with a long spur. It grows in hedges and fields, and is a reputed purgative and diuretic. The ivy-leaved toad-flax (*L. cymbalaria*) is often found trailing over old walls. Allied to this genus is the *Antirrhinum* (which see).

**Tobacco** (to-bak'ō), a very important plant, belonging to the nat. order Atropacæ, or night-shade order. The introduction of the use of tobacco forms a singular chapter in the history of mankind. According to some authorities smoking was practiced by the Chinese at a very early date. At the time of the discovery of America tobacco was in frequent use among the Indians, and the practice of smoking, which had with them a religious character, was common to almost all the tribes. (See *Calumet*.) The name tobacco was either derived from the term used in Hayti to designate the pipe, or from Tabaca in St. Domingo, whence it was introduced into Spain and Portugal in 1559 by a Spaniard. It soon found its way to Paris and Rome, and was first used in the shape of snuff. Smoking is generally supposed to have been introduced into England by Sir Walter Raleigh, but Camden says the practice was introduced by Drake and his companions on their return from Virginia in 1585. It was strongly opposed by both priests and rulers. Pope Urban VII and Innocent IX issued bulls excommunicating such as used snuff in church, and in Turkey smoking was made a capital offense. In the canton of Bern the prohibition of the use of tobacco was put among the ten commandments, immediately after that forbidding adultery. The *Counterblast* or denunciation written by James I of England is a matter of history. All prohibitions, however, regal or priestly, were of no avail, and tobacco is now the most extensively used luxury on the face of the earth. The most commonly cultivated tobacco plant (*Nicotiana tabacum*) is glutinous, and covered with a very short down; the stem upright, 4 or 5 feet high,

and branching; the leaves are lanceolate, sometimes two feet long; the flowers are terminal and rose-colored. A less esteemed species is *N. rustica*, distinguished by a short yellowish-green corolla. All the tobacco plants are natives of America, and that continent has continued the principal producer, the chief tobacco-growing country being the United States, and the chief localities being Kentucky, North Carolina, and Virginia. The *N. quadrivalis* and *N. repanda* have white or yellow corollas. The latter is cultivated to some extent in Cuba and is known as Yara tobacco. There are five leading types of tobacco grown in the United States—the Seed Leaf, White Burley, Heavy Shipping or Dark, Yellow, and Perique. Tobacco owes its principal properties to the presence of a poisonous alkaloid named nicotine (see *Nicotine*). The cultivated forms of the present day are highly developed and very sensitive. In some localities the plants are shielded with slats or cheese-cloth. Clayey soils yield heavy leaves; sandy soils, light. All plants except those which are to be kept for seed are topped. When the leaves begin to turn yellow the plants are cut close to the ground, and afterwards carried to the dry-shed, where they are hung up in lines to dry. Artificial heat is sometimes used. Priming, which is also largely practiced, consists in removing the leaves in the order in which they mature. When perfectly dry the leaves are stripped from the stalks and packed in boxes, in which they are allowed to heat and sweat or ferment. Cigarette tobacco is cured in large drying ovens and is consequently light in color and without the agreeable cigar-leaf aroma. Snuff is tobacco ground to a powder and perfumed. Chewing tobacco consists of pressed cakes or plugs, or of a spongy mass of fine threads called 'fine cut,' and is flavored with vanilla, sugar, licorice, etc. Pipe tobacco is sold in rolls of the natural leaf, or it may be cut fine. In the manufacture of cigars the leaves are saved for 'wrappers,' while smaller pieces, sometimes of inferior grade, are used as 'fillers.'



Virginia Tobacco  
(*Nicotiana glauca*)

As the best leaf is grown in Cuba, so also are the best cigars made there. The leaf used for the manufacture of Manila cheroots is grown chiefly on the island of Luzon. Tobacco is one of the most profitable crops in the United States; about one-half of the production is absorbed for home use, the other being exported, the far largest customer being Britain. The plant has numerous insect enemies, among them being the Northern tobacco-worm (*Protoparce cecus*), and *P. carolina*, the tobacco-worm of the Southern States. These are called, when adult, sphinx-moths; they are strong, rapid flyers, and at twilight are often mistaken for humming-birds. The eggs are laid singly on the tobacco leaves, and quickly hatch; the larva—hornworm—is a voracious feeder and inflicts much damage, particularly in the large, 'wrapper' leaves. The greasy cutworm (*Agrostis ypsilon*) is another pest. The tobacco-fly or flea-beetle (*Crepidodera cucumeris*) lives through the winter in a winged state. The annual tobacco crop of the United States ranges from 700,000,000 to 1,000,000,000 pounds, much surpassing that of other countries, and its consumption there also much exceeds that of any other country.

**Tobago** (tō-bā'gō), an island of the British West Indies, belonging to the Windward group, was annexed in 1889 to Trinidad; area, 114 square miles. Two-thirds of the island are covered with primeval forests, and out of a total area of 73,313 acres, only about 10,000 acres are cultivated. Sugar, rum, molasses, and coconuts are the chief productions; but attention is now being turned to the cultivation of cocoa and coffee, for which the soil and climate are admirably adapted. This island is one of the most healthy of the West Indies. Tobago was discovered by Columbus in 1498, and was ceded to Great Britain by France in 1763. Principal town, Scarborough. Pop. 18,751.

**Tobit** (tō'bit), Book of, one of the Old Testament apocryphal books, rejected by the Jews and Protestants, but included in the Roman Catholic canon. It contains an account of some remarkable events in the life of Tobit, a Jew of the tribe of Naphtali, carried captive to Nineveh, and his son of the same name.

**Toboggan** (tō-bog'an), a kind of sledge, of Indian invention, made of a piece of birch bark or similar material, with the front end turned up and a rope attached by which it was drawn over the snow. This was in use in Canada and was adopted and

improved by the fur-traders and explorers of that country. Lately it has become used for sport in cities of cold climates. As such it is made of carefully prepared hickory splints, from 5 to 15 feet long, the sides strongly braced, and is used to slide down a snow-covered hillside or an artificial slope covered with frozen snow, called a toboggan slide.

**Tobol** (tō-bol'), a river of Siberia, which rises in the west slope of the Ural Mountains, in the government of Orenburg, and joins the Irtysh at the town of Tobolsk, after a course of about 550 miles.

**Tobolsk** (tō-bolsk'), capital of the government of Tobolsk, Western Siberia, on the left bank of the Irtysh. It has a cathedral, arsenal, barracks, a large prison for Siberian exiles, a theater, etc. The climate is exceedingly severe in winter. Pop. 21,401. The government comprises the north-western part of Siberia, and has an area of 539,659 square miles, and a population of 1,650,700. Its mineral products, of the Ural region, include iron, copper, gold, silver, and platinum. The north is widely forested; the south fertile, yielding wheat, oats, and other grains.

**Tocantins** (tō-kān-tēns'), a river of Brazil, which rises in lat. 14° S., flows northward, receives the Araguay, and enters the Atlantic by the Pará estuary, forming one mouth of the Amazon. The entire course is 1590 miles, and is navigable for 1080; but navigation is much impeded by sandbanks and rapids.

**Tocqueville** (tok-vēl), ALEXIS CHARLES HENRI CLEREL DE, a French writer, born in 1805; died in 1859. Being commissioned by the government to proceed to the United States to report upon the penitentiary system, the results of his inquiry were published in 1833 under the title *Du Système Pénitentiaire aux États-Unis et de son application en France*. His most celebrated work, however, was *La Démocratie en Amérique* ('Democracy in America,' two vols. Paris, 1834), which was translated into the principal European languages. In 1849 he accepted the portfolio of foreign affairs, but soon resigned it. After the *coup d'état* of 1851 he lived retired from public affairs. He wrote also *L'Ancien Régime et la Révolution*; *Histoire Philosophique du Règne de Louis XV.*, etc.

**Todas** (tō'das), a race inhabiting the upper part of the Neilgherry Mountains, in Southern India. They are few in number, and under the influence



of polyandry and intemperance they are rapidly disappearing. Their language is Dravidian.

**Toddy** (tod'i), the name given by the English to the sweet juices which are extracted from the different species of the palm tribe, including the cocoanut tree. When newly drawn from the tree it is a sweet, cool, refreshing beverage, but when it has been allowed about ten or twelve hours to ferment it becomes highly intoxicating. The name toddy is also given to a mixture of spirits, hot water, and sugar.

**Todhunter** (tod'hun-ter), ISAAC, mathematician, was born at Rye, England, in 1820; studied at University College, London, and afterwards graduated as senior wrangler at St. John's College, Cambridge, where he resided as fellow, tutor, and principal mathematical lecturer until his death in 1884. He wrote a series of popular textbooks on mathematics, a *History of the Mathematical Theories of Attraction* and *the Figure of the Earth* (two vols., 1873), etc.

**Todleben** (tôt'la-bén), FRANCIS EDWARD, COUNT, a Russian general and military engineer, born in 1818; died in 1884. After leaving the schools of Riga he entered the College of Engineers at St. Petersburg, and served against the Circassians in 1848. In 1854 he took the chief part in the defense of Sebastopol, and after the peace of 1856 wrote a *Narrative of the War in the Crimea*. During the Russo-Turkish war Todleben was sent (in 1887) to reduce Plevna. The place was soon invested, and Osman Pasha, the Turkish commander, was compelled to surrender at discretion. For his services Todleben was created a count, and he subsequently became commander-in-chief of the Russian army in Turkey. He was afterwards appointed governor of Odessa, and later, of Wilna.

**Todmorden** (tod'mor-den), a town of England, partly in Lancashire, partly in Yorkshire (West Riding), on the Calder, in a beautiful and romantic valley, 21 miles N. N. E. of Manchester. It has extensive manufactures of cotton goods. Pop. 25,455.

**Tody** (tô'di), the name of certain tropical birds, genus *Todus*, family Todidae. They are birds of gaudy plumage, and feed on insects, worms, etc. The most elegant species is the *T. regius* (royal or king tody), a native of Cayenne and Brazil. The green tody (*T. viridis*) is also a pretty bird, about the size of a wren. It is very common in Jamaica.

**Tofana.** See *Aqua Tofana*, under *Aqua*.

**Toga** (tô'ga), the principal outer garment of wool worn by Roman citizens. It covered the whole of the body except the right arm, and was originally worn by both sexes until the matrons adopted the *stola*. The *toga virilis*, or manly gown, was assumed by Roman youths when they attained the age of fourteen. The variety in the color, the fineness of the wool, and the ornaments attached to it indicated the rank of the citizen; generally it was white.



Roman Senator wearing the Toga.

**Togo** (tô'gô), HEIFACIRO, a Japanese admiral, who took an active part in the war with China in 1894, and opened the war with Russia in 1904 by an attack on the Russian fleet at Port Arthur. On May 27-28, 1905, he annihilated a powerful Russian fleet in the Korean Straits, winning one of the most notable of naval victories.

**Togoland** (tô'gô-land), a German protectorate on the Slave Coast, Guinea, acquired in 1885. It lies between the British Gold-Coast Colony and Dahomey, with a coast line of 12 miles, but a wide expansion inland, the total area being estimated at 33,000 sq. miles. Various tropical plants are grown, and palm oil, gum and palm kernels are exported. Pop. estimated at 900,000, with less than 200 whites.

**Tokar** (tô'kar), a town of the Eastern Soudan, south of Suakin, the scene of two battles between English and Arabs in February, 1884. Pop. 20,000.

**Tokat** (tô-kât'), a town of North-eastern Asia Minor, 75 miles south of the Black Sea, near the Yesilirmak. Pop. about 30,000.

**Tokay** (tô-kâ'), a town of Hungary, at the conflux of the rivers Theiss and Bodrog; pop. 5110. This town is celebrated for the wine grown in its vicinity, especially for a fine, rich, sweet variety. Inferior and imitation wines are often sold under this name.

**Tokens** (tô'kens), pieces of money current by sufferance, and not coined by authority; or coins only nomi-

## Tokio

ually of their professed value. In England tokens first came into use in the reign of Henry VIII, owing to the want of authorized coins of lower value than a penny. Stamped tokens of lead, tin, and even leather were issued by vintners, grocers, and other tradesmen during the time of Elizabeth, and were extensively circulated, being readily exchanged for authorized money at the shops where they were issued. Token money has been frequently issued in other countries.

**Tokio** (tō'kē-ō), or Tokyo, formerly called Yeddo, the capital of Japan, and chief residence of the mikado, is situated on a bay of the same name, on the s. e. coast of Hondo, the largest of the Japanese islands, and is connected by rail with Yokohama and Kanagawa. The bulk of the houses are of wood, but there are many new buildings of brick and stone, and an imperial palace has been erected near the center, as also



public offices, etc. The greater part of the town is flat, and intersected by numerous canals crossed by bridges. The streets of the modern city have been made fairly wide and regular; they are kept clean and some of them are traversed by railways. Gas has been introduced, and the sanitary arrangements have been improved. Education is well organized, and there are numerous private and elementary schools. Tokio contains the imperial university, the most important educational institution of the

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empire, with full faculties and an attendance of about 4000 students. This city may be considered the center of the political, commercial, and literary activity of Japan. Its foreign trade is limited, on account of the shallowness of the bay and rivers, but manufactures are active and developing. Its population, once estimated at 1,500,000, fell off till in 1872 it was about 780,000. It has since rapidly increased and in 1909 was 2,168,151, ranking as the fifth city in the world.

**Toland** (tō'land), JOHN, an English deist, born in 1669; died in 1722. He entered Glasgow University in 1687; was graduated M.A. from Edinburgh in 1690, and afterwards studied theology at Leyden. In 1696 he published his *Christianity not Mysterious*, which created a great sensation, and was burnt by the hangman at Dublin, by order of the Irish parliament, in 1697. He subsequently settled down as a voluminous pamphleteer in London. Of his other works the chief were: *Life of Milton* (1698), accompanying an edition of his writings, *Anglia Libera* (1701), *Socinianism Truly Stated* (1705), and *Pantheisticon* (1750). In the last of these works Toland distinctly avowed himself a pantheist.

**Toledo** (tō-lē'dō; anciently *Toletum*), a city of Spain, in New Castile, capital of a province of the same name, on a rocky eminence washed by the Tagus, and 1820 feet above the sea, 55 miles southwest of Madrid. It is the see of an archbishop, who is primate of Spain. The streets are narrow and steep, and the houses crowded together. Toledo contains a ruined alcazar, or palace and fortress, dating from 1551, and a Gothic cathedral, one of the grandest in the world, completed in 1492, in the style of the thirteenth century; also other interesting buildings. The Toledo sword-blades, renowned for many centuries, are manufactured in a large building (a government establishment) on the Tagus, about a mile from the town. Toledo was taken by the Romans in 193 B.C., and is celebrated in the history of Spain. It was successively the seat of government under the Goths, Moors, and kings of Castile. Pop. 23,317. Province: area 5919 sq. miles. Pop. 376,814.

**Toledo**, a city, capital of Lucas Co., Ohio, on the Maumee River, about six miles from Lake Erie, and 65 miles s. s. w. of Detroit. Toledo is the northern terminus of the Miami and Erie Canal, and the center of several extensive railway lines. It has an excellent harbor and is one of the largest

grain-shipping points of the country; also ships large quantities of iron-ore, coal, lumber, provisions, live stock, etc. Manufactures are important, beer and wine being largely produced and many other articles made. Boat- and ship-building are large industries. The city has some notable public buildings, and possesses a zoölogical garden. Pop. 168,497.

**Tolentino** (tō-lan-tē'nō), a town of Central Italy, in the province of Macerata, with a fine cathedral. Here Pope Pius VI, in 1797, concluded a humiliating peace with Bonaparte, and in the neighborhood, in 1815, Murat, at the head of the Neapolitans, was defeated by the Austrians under Bianchi. Pop. (commune) 13,197.

**Toleration.** See *Religious Liberty*.

**Toleration, Act or.** See *Act of Toleration*.

**Tolima** (tō'is-mā), a state of the Republic of Colombia, intersected by the upper course of the Magdalena, and embraced between the two chief chains of the Cordillera; area, 18,400 sq. miles. It produces cacao, sugar, maize, and tobacco, and is rich in gold and silver. The volcano of Tolima has a height of 17,600 feet. Pop. 305,185. Capital, Neiva.

**Toll** (tōl), a tax paid, or duty imposed, for some liberty or privilege or other reasonable consideration; such as (a) the payment claimed by the owners of a port for goods landed or shipped there; (b) the sum charged by the owners of a market or fair for goods brought to be sold there; (c) a fixed charge made by those intrusted with the maintenance of roads, streets, bridges, etc., for the passage of persons, goods, and cattle. See *Roads*.

**Tolstoi** (tōl'stoi), COUNT LEO NIKOLAEVITCH, a celebrated Russian novelist, born Aug. 28, 1828. In 1851 he accompanied his brother to the Caucasus and entered the army, and during the Crimean war took part in the defense of Sebastopol. At the close of the war he retired to his estates and devoted himself to literary composition and schemes for the education and social improvement of the peasantry. Eventually he gave himself up to working out the higher problems of life experimentally—working along with the peasantry in a sort of communistic life. Among his earliest writings of moment are his vivid sketches from Sebastopol. His three great novels are the *Cossacks*, *War and Peace*, and *Anna Karenina*. His later writings are all mostly directed

towards an explanation of his peculiar social and mystic religious ideas. Among them are *Confessions*, *My Religion*, *The Search for Happiness*, *Two Generations*, *Infancy and Youth*, *Death*, *Great Problems of History*, *What is My Life?* *The Kreutzer Sonata*, etc. Regarded as one of the leading writers and reformers of the world, he was annoyed in his old age by visitors and the social duties which interfered with his life pursuits, and left home secretly with an idea of escaping these distractions. The weather to which he was thus exposed brought on inflammation of the lungs, and he died November 19, 1910.

**Toltecs** (tōl'teks), a prehistoric people of Mexico and Central America, to whom the Aztecs and the Mayas ascribed their arts and ancient monuments. See *Mexico*.

**Tolu-balsam** (tō-lō'), a resin or balsam obtained from a tree of tropical South America, the *Myrospermum* (*Myroxylon*) *toluiferum* or *peruiferum*. Tolu-balsam becomes hard and may be pulverized, has a pleasant aromatic flavor, and is used in certain medicinal preparations.

**Toluca** (tō-lō'kā), a Mexican city, capital of the State of Mexico, 45 miles s. w. of the federal capital; situated 8500 feet above the sea. The city has a cathedral, a theater, etc., and is noted for its hams and sausages. Pop. 25,940.

**Toluol** (tōl'ū-ol). See *Trinitrotoluene*.

**Tomahawk** (tom'ā-hāk), the light battle-axe of the North American Indians. The head was origi-



Tomahawks of the North American Indians.

nally of stone attached to the shaft by thongs, etc., but steel heads were afterwards supplied by American and European traders. The Indians could throw the tomahawk with remarkable accuracy.

**Tomato** (tō-mā'tō, tō-mā'tō; *Lycopersicon esculentum*), a plant belonging to the nat. order Solanaceæ.

## Tomb

Formerly known also as *Love Apple*. It is a native of South America, but has been introduced into most other warm or temperate countries. It is cultivated for the sake of its fruit, which is fleshy, usually scarlet or orange, irregularly shaped, and is largely used in sauces,



Tomato (*Lycopersicum esculentum*).

stews, and soups, as well as eaten by itself. The plant is a tender, herbaceous annual, with yellow flowers, and has come into high repute, and its cultivation has rapidly extended in many parts of the world. Its general use as food has been chiefly within recent times.

**Tomb** (tūm), any sepulchral structure, usually a chamber or vault formed wholly or partly in the earth, with walls and a roof, for the reception of the dead. See *Sarcophagus*, *Burial* and *Funeral Rites*.

**Tombac**, **TOMBAK** (tom'bak), an alloy, consisting of from about 75 to 85 parts copper, mixed with 25 to 15 parts zinc, and used as an imitation of gold for cheap jewelry. When arsenic is added it forms white tombac.

**Tombigbee** (tom-'big'bē), a river which rises in Tishomingo county, Mississippi, and after an irregular course of 450 miles joins the Alabama River 45 miles above Mobile; the united stream is called Mobile River below the junction. It is navigable for 410 miles from Mobile Bay.

**Tomcod** (tom'kod), an American name for certain small cod-fishes.

**Tomelloso** (tom-el-lo'sō), a town of Spain in La Mancha, 50 miles E. N. E. of Ciudad Real. It has lately risen into importance as a center of the wine trade, a great part of the claret and 'cognac' of commerce being here produced. Pop. 13,929.

**Tompkins** (tom'kins), **DANIEL D.**, vice-president, was born in Westchester Co., New York, in 1774; died in 1825. He was elected to Congress in 1804, was governor of New York 1807-17, and was vice-president of the United States during President Monroe's two

terms. He was energetic in the war against England and aided in having slavery abolished in New York.

**Tommy Atkins**, a name given to the privates of the British army. It is said to have originated in the custom of making out blanks for military accounts with the name, 'I, Tommy Atkins,' etc. Kipling has immortalized it in verse.

**Tom of Coventry**, or **PEEPING TOM**. See *Godiva*.

**Tomsk**, a town of Western Siberia, capital of the government of Tomsk, on the right bank of the Tom, on the great road to China. Manufactures include cloth, leather, and soap; and there is an extensive trade in furs, fish, and cattle, obtained in exchange for articles of European and Chinese manufacture. Pop. 112,083.—The government of Tomsk has an area of 331,159 square miles, and a pop. of 2,412,700. It is watered by the Obi and its tributaries.

**Tonawanda** (ton-a-won'da), a town of Erie Co., New York, on the Niagara River, 11 miles S. E. of Niagara Falls. Bridges connect it with North Tonawanda, on the opposite side of Tonawanda creek. It has a large pine lumber trade, engine, boiler, and steel works, and wooden ware factories. An armory is located here. Pop. 8200.

**Ton** (tun), a denomination of weight equivalent to 20 hundredweights (contracted to cwt.), or 2240 lbs. In the United States goods are sometimes weighed by the short ton, of 2000 lbs., the hundredweight being reckoned at 100 lbs.; but it has been decided by act of Congress that, unless otherwise specified, a ton weight is to be understood as 2240 lbs. avoirdupois.

**Tone** (tōn), in music, the sound produced by the vibration of a string or other sonorous body; a musical sound. Nearly every musical sound is composite, that is, consists of several simultaneous tones having different rates of vibration according to fixed laws, which depend on the nature of the sonorous body and the mode of producing its vibrations. The simultaneously sounding components are called *partial tones*; that one having the lowest rate of vibration and the loudest sound is termed the *prime*, *principal*, or *fundamental tone*; the other partial tones are called *harmonics* or *over tones*.

**Tone**, **THEOBALD WOLFE**, Irish patriot, born at Dublin, Ireland, in 1763; educated at Trinity College; studied law in London, and was called to the bar at the Middle Temple (1798). He was an ardent sympathizer with the doctrines of the French revolution, and hav-



## Tonga Islands

ing promoted the combination of the Irish Catholics and Dissenters he founded the society of United Irishmen in 1791. The discovery of his secret negotiations with France drove him to the United States (1795). He sailed for France in 1796, and became brigadier in Hoche's projected expedition to Ireland. He served in the Bavarian army in 1797, and in 1798 he was captured on board a French squadron bound for Ireland. He was brought to Dublin, and sentenced to death by a court-martial, but committed suicide in prison, November 19, 1798.

**Tonga Islands** (tong'gā). See *Friendly Islands*.

**Tongataboo** (tong-gā-tā'bō), or TONGA-TABU, one of the most southern of the Friendly Islands, in the Pacific Ocean. It is of coral formation, about 60 miles in circuit. Its soil is extremely fertile. See *Friendly Islands*.

**Tongking**. See *Tonquin*.

**Tongres** (ton-gr; Flemish, *Tongerren*), a town of Belgium, in the province of Limburg, on the Geer, 12 miles southwest of Maastricht. Tongres has a church (Nôtre Dame) dating from 1240. Pop. 9152.

**Tongue** (tung), the organ found in the mouth of most vertebrate animals, which exercises the sense of taste, and also assists in speech and in taking food. The name tongue is also given to very different structures in Invertebrata. In man the tongue is attached by its base or root to the hyoid bone, its other extremity being free. The upper surface is convex with a fibrous middle septum, called the *raphe*. The front two-thirds of the tongue are rough, and bear the *papillæ*, in which the sense of taste resides. The posterior third is smooth, and exhibits the openings of numerous mucous glands. The substance of the tongue consists of numerous muscles. The *papillæ*, which cause the characteristic roughness of the tongue, are of three kinds, *circumvallate*, *fungiform*, and *filiform*. The largest or *circumvallate* papillæ number from eight to ten, and occupy the posterior part of the upper surface. They vary from 1/10th to 1/12th inch in diameter. The *fungiform* papillæ are scattered irregularly, the *filiform* over the front. In structure the *papillæ* are like those of the skin (which see), and contain capillary vessels and nervous filaments. Numerous *follicles* and *mucous* or *lingual* glands exist on the tongue, the functions of these latter being the secretion

## Tonic Sol-fa System

of mucus. The nervous supply is distributed in the form of three main nerves to each half of the organ. The *gustatory* nerves and the *glossopharyngeal* branches are the nerves providing the tongue with common sensation, and also with the sense of taste; while the *hypoglossal* nerve invests the muscles of the tongue with the necessary stimulus. The conditions necessary for the exercise of the sense of taste are: firstly, the solution of the matters to be tasted; secondly, the presence of a special gustatory nerve; and thirdly, that the surface of the tongue itself be moist. The top and edges of the tongue are more sensitive to taste than the middle portion. The sense of touch is very acute in the tongue.

**Tonic** (ton'ik), or KEY-NOTE, in music, the first or fundamental note of any scale, the principal sound on which all regular melodies depend, and in which they or their accompanying basses naturally terminate.

**Tonic**, in medicine, any remedy which improves the tone or vigor of the fibers of the stomach and bowels, or of the muscular fibers generally. Tonics may be said to be of two kinds, medical and non-medical. Medical tonics act chiefly in two ways: (1) indirectly, by first influencing the stomach and increasing its digestive powers; such being the effect of the vegetable bitters, the most important of which are calumba, chamomile, cinchona bark, gentian, taraxacum, etc. (2) Directly, by passing into and exerting their influence through the blood; such being the case with the various preparations of iron, certain mineral acids, and salts. The non-medical tonics are open-air exercise, friction, cold in its various forms and applications, as the shower-bath, sea-bathing, etc.

**Tonic Sol-fa System**, in music, a system of notation and teaching which has recently been widely spread among the English-speaking population of the globe, chiefly through the untiring efforts of the Rev. John Curwen, of Plaistow, who obtained the leading features of his plan from Miss Glover, of Norwich. The following is an outline of the system: As of the two relations of musical sounds, those of pitch and key (see *Music*), the latter is of transcendent importance, every means should be taken to impress this fact on the mind and ear of the learner. Any diatonic scale is a natural scale, whether it is founded on the key of C, D, E, or on any other tone thus represented by a letter-name in the ordinary notation. The tonic or key-

note of the scale is always called *doh*, the second *ray*, the others *me*, *fah*, *soh*, *lah*, *te*, successively, no matter what the absolute pitch of the sound may be, the initials only being ordinarily used in printed music: thus, *d*, *r*, *m*, *f*, *s*, *l*, *t*. To designate a sound of absolute pitch, the tonic-solfaist uses the first seven letters of the alphabet just as the followers of the other musical system do. Time and accent are marked thus | : |, or | : : |, or | : : : |, etc.; the space between the lines and dots indicating the aliquot parts of the bar (the beat or pulse), the line showing the strong accent, the short line the medium accent, and the colon the weak accent. Accidental or chromatic tones are indicated by a change in the vowel sounds of the syllables; thus, *doh*, *ray*, *fah*, etc., when sharpened become *de*, *re*, *fe*, etc.; and *me*, *te*, etc., flattened become *ma*, *ta*, etc. The higher octaves are marked *d* |, *r* |, *m* |, etc., the lower *d* |, *r* |, *m* |, etc. The last two lines of the psalm tune French would therefore be printed thus:—

Key F.

:s|d|:t|l:s|s:fe|s:m|r:d|d:t|d  
In teaching the system great use is made of the *modulator*, a chart which represents pictorially in an upright position the relative places of the notes of the scales, the chromatic notes, the closely related scales, etc.

**Tonka** (ton'ka), *TONGA*, the fruit of the *Dipteria odorata* or *Coumarouna odorata*, a shrubby plant of



Tonka Bean Plant (*Dipteria odorata*).

Gulana, nat. order Leguminosæ, suborder Papilionaceæ. The fruit is an oblong, dry, fibrous drupe, containing a single seed. The odor of the kernel is

tremely agreeable. It is used in perfumery. Called also *Tonkin bean*, *Tonquin bean*. See *Coumarin*.

**Tonnage** (tun'ij), a word originally signifying the number of tons weight which a ship might carry with safety, but now used to denote the gauge of the vessel's dimensions, and the standard for tolls, dues, etc. It is generally assumed that 40 cubic feet shall constitute a ton, and the tonnage of a ship is considered to be the multiple of this ton which most closely corresponds with the internal capacity of the vessel. Formerly the rule was to multiply the length of the ship by the breadth, assume the depth to be the same as the width, multiply by this assumed depth, and divide the product by 94, the quotient being the tons burden. But this mode was found to be both misleading and dangerous; for as harbor and light dues, towage, etc., were charged according to tonnage, shipowners had their vessels built so deep and narrow that they were often unseaworthy. An improved system was introduced in 1835. The depth from the deck to the bottom of the hold is taken at different places, and the breadth is measured at different elevations in depth. If the vessel is a steamer an allowance is made for the space occupied by the engine-room, boilers, coal-bunks, etc. In vessels with a break or poop in the upper deck, the tonnage of this poop space must be ascertained and added to the ordinary tonnage. This system of measurement is in common use in the United States and British countries.

**Tonnage and Poundage** were duties formerly imposed in England on exports and imports. Tonnage was a duty upon all wines imported. Poundage was an *ad valorem* duty of 12d. in the pound on all merchandise imported or exported. They were first levied by agreement, and were granted by parliament to the crown for a limited period in 1370. They were afterwards granted to successive sovereigns until 1787, when they were finally abolished.

**Tonquin** (ton-kên'), *TONGKING*, the most northern province of Anam in Asia; area, between 40,000 and 50,000 square miles. The chief river is the Song-ka. The principal agricultural products are rice, cotton, spices, and sugar; and the province is rich in timber and minerals. The climate is unhealthy. By treaty dated June, 1884, Tonquin was ceded to France. Pop. estimated at from 8,000,000 to 10,000,000. See *Anam*.

**Tönsberg** (tuns-bérg'), a town in Norway, situated on a fjord branching off from Christiania Fjord. (See *Christiania*.) Many vessels belong to the town. Pop. 8620.

**Tonsilitis** (ton-si-lit'us). See *Quinsy*.

**Tonsils** (ton'sils), in anatomy, two oblong suboval bodies situated on each side of the throat or fauces. Their minute structure resembles that of the closed sacs or follicles of Peyer in the intestine, and their function is not yet understood. See *Palate*.

**Tonsure** (ton'shür), the name given to the bare place on the heads of the Roman Catholic and Greek priests, formed by shaving or cutting away the hair and keeping it so. The custom of cutting away the hair in token of the dedication of a person to the service of God is mentioned as early as the fourth century. Shaving the hair precedes consecration: it is performed by the bishop. The tonsure admits the subject into holy orders, and the extent of the tonsure increases with the rank held.

**Tontine** (ton-tén'), a kind of life annuity, so called from its inventor Tonti, an Italian of the seventeenth century. A tontine is an annuity shared by subscribers to a loan, with the benefit of survivorship, the annuity being increased as the subscribers die, until at last the whole goes to the last survivor, or to the last two or three, according to the terms on which the money is advanced. By means of tontines many government loans were formerly raised in England.

**Tooke** (tök), JOHN HORNE, son of John Horne, a rich poulterer, was born in Westminster, England, in 1736. He was educated at Westminster and Eton, afterwards proceeding to St. John's College, Cambridge. In 1760 he entered the church, and obtained the living of New Brentford. A close friendship with Wilkes ended in a public altercation in 1770 and 1771. The year 1771 also witnessed his contest with Junius, in which, in the general opinion, he came off victor. In 1773 he resigned his benefice to study for the bar (to which from being in orders he was not admitted); and by his legal advice to Mr. Tooke, of Purley, he became that gentleman's heir, and assumed his name. In 1777 he was prosecuted for a seditious libel condemning the American war, and his trial resulted in a year's imprisonment, and a fine of £200. He was a short time member of parliament for Old Sarum. He died in 1812. He wrote several political pamphlets and an in-

genious linguistic work entitled *Epea Pteroenta, or the Diversions of Purley*.

**Toole** (töl), JOHN LAWRENCE, a comedian, born in London in 1833, and was educated at the City of London School. After serving for some time as a clerk he took to the stage, and made his first appearance at the Haymarket in 1852. In 1880 he commenced the management of the Folly Theater, London, which he later on reconstructed and named after himself. In 1874 he visited America, in 1888 he published his *Reminiscences*, and in 1890 made a successful tour in the Antipodes. He was one of the most popular actors on the stage, and inimitable in his personation of semipathetic and semi-ludicrous characters. Among his most successful impersonations were *Paul Pry*, *Caleb Plummer* in the *Cricket on the Hearth*, *Uncle Dick* in *Uncle Dick's Darling*, etc.

**Toombs** (töms), ROBERT, secessionist, was born in Wilkes Co., Georgia, in 1810; died in 1885. He was elected to the United States Senate in 1853 and 1859, became a leader in the Secession party in Georgia and resigned from the Senate to join the Confederate cause. He was Secretary of State in the Confederate Congress in 1861; Senator, February, 1862; and resigned to become a brigadier-general in the army, but won no distinction as a soldier. He refused to take the oath of allegiance to the United States government after the war and remained rebellious till his death.

**Toon** (tön), TOONA, the wood of an East Indian tree, the *Cedrela Toona*, nat. order *Cedrelaceæ*. It is sometimes called *Indian mahogany*, and also *Indian cedar*. Another species (*C. Australis*) yields the so-called cedar-wood of New South Wales. Toonwood is highly valued as a furniture wood, and is used for door-panels, carving, etc. See *Cedrela*.

**Toorgoneff**. See *Tourguenieff*.

**Tooth**. See *Teeth*.

**Toothache** (töth'äk), a well-known affection of the teeth, arising from various causes. Inflammation of the fangs of the teeth is a common cause. If the inflammation is not reduced matter forms, and the result is a gum-boil. Caries is a frequent cause of toothache, the outer part of the tooth rotting away and exposing the nerve. Neuralgic toothache is a purely nervous variety, and may occur either in sound or carious teeth. As a preventive against toothache the teeth should be kept scrupulously clean, and when they show

symptoms of decay the services of a skillful dentist should be had recourse to. The decay of a tooth is very often arrested by stopping or filling up the cavity.

**Tooth-shell.** See *Dentalium*.

**Toothwort.** See *Dentaria*.

**Toowoomba** (tō-wūm'bā), the principal town of the Darling Downs district of Queensland, Australia, 100 miles west of Brisbane. It occupies one of the best localities in Southern Queensland, in the center of a large agricultural settlement; contains a number of religious, educational, and other public buildings, and many handsome private residences. Wine is produced in the vicinity. Pop. 9137.

**Topaz** (tō'paz), a mineral, ranked by mineralogists among gems, characterized by having the luster vitreous, transparent to translucent; the color yellow, white, green, blue; fracture subconchoidal, uneven; specific gravity, 3.499. It is harder than quartz. It is a silicate of aluminium, in which the oxygen is partly replaced by fluorine. It occurs massive and in crystals. The primary form of its crystal is a right rhombic prism. Topazes occur generally in igneous and metamorphic rocks, and in many parts of the world, as Cornwall, Scotland, Saxony, Siberia, Brazil, etc. The finest varieties are obtained from Brazil and the Ural Mountains. Those from Brazil have deep yellow tints; those from Siberia have a bluish tinge; the Saxon topazes are of a pale wine-yellow, and those found in the Scotch Highlands are of a sky-blue color. The purest from Brazil, when cut in facets, closely resemble the diamond in luster and brilliance.

**Tope** (tōp), a popular name for a species of Buddhist monument intended usually to mark some important event. The oldest monuments of this kind are spherical or elliptical cupolas, resting on a circular or rectilinear base, with an umbrella-shaped structure on the apex. See *Dagoba*.

**Tope** (*Galeus canis*), a European fish of the shark family, attaining a length of six feet.

**Topeka** (tō-pē'kā), a city of Kansas, capital of the State and county seat of Shawnee Co., on the Kansas River, 67 miles w. of The Missouri River. It has wide, well-built streets, and contains a handsome State house, State memorial building, State hospital for the insane, reform school, Washburn College, Bethany College, etc. It has ex-

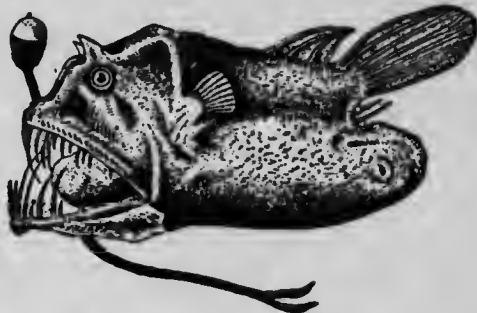
tensive railroad shops, flour mills, creameries, packing houses, foundries and other industries. Since 1885 there have been no saloons in the city. Pop. 47,385.

**Top-Haneh.** See *Constantinople*.

**Tophet.** See *Gehenna*.

**Töplitz.** See *Teplitz*.

**Torch-fish** (tōrch'fish), a deep-sea, pediculate fish which is found off Madeira. The first dorsal spine



Torch-Fish (*Liuophryte lucifer*).

carries a luminous bulb above the eyes which resembles a torch.

**Torgau** (tōr'gou), a strongly fortified town of Prussia, province of Saxony, 45 miles E. N. E. of Merseburg, on the Elbe. Pop. 12,299.

**Tormentil** (tōr'men-tīl; *Potentilla Tormentilla*), a trailing plant common in healthy or waste places. See *Potentilla*.

**Tornado** (tor-nā'dō), a term applied to hurricanes and whirlwinds in general, such as are prevalent in the West Indies and on the west coast of Africa about the time of the equinoxes and in the Indian Ocean about the time of changes in the monsoons. They are accompanied with severe thunder and lightning and torrents of rain, but are of short duration and limited area. It is especially applied to the very destructive whirling storms, of very narrow width and brief duration, common on the plains of the Mississippi valley and occasionally appearing beyond this area. Originating in an overhanging cloud, a tornado sends down a funnel-shaped cloud to the ground, the lower portion long and narrow. This is caused by an immensely rapid vertical whirl in the air, capable of twisting off the limbs of great trees and of destroying whatever it touches. The tornado is a traveling storm, its track usually a narrow one, but often several hundred miles in



## Tornea

length. Death and destruction are left in its path, especially where this passes through a town or city, and tornadoes are greatly feared in the localities subject to their visitations.

**Tornea** (tor'ne-ō), a seaport of North Finland, Russia, at the mouth of the River Tornea, which rises in Sweden and forms part of the boundary between it and Russia. It has an active trade in timber, fish, pitch, furs, etc., and near by is a hill which tourists ascend at the summer solstice to view the midnight sun. Pop. 1500.

**Toronto** (tō-ron'tō), one of the chief cities of the Dominion of Canada, capital of the province of Ontario, situated in the county of York, on a small bay on the northwest coast of Lake Ontario, 315 miles w. s. w. of Montreal. Its site is low, but rises gently from the water's edge to a height of above 100 feet. The fine bay in front of the city forms a splendid harbor. The town is regularly built, the streets cross each other at right angles, and are wide, well paved, and in general of handsome architecture. The common material is brick, of a pleasing light color; the public buildings are numerous, and many of them very handsome. The churches most worthy of notice are the Anglican and the Roman Catholic cathedrals, both in the pointed style, the Metropolitan Church (Methodist), and St. Andrew's Church (Presbyterian). Among secular buildings the finest (almost completely destroyed by fire in 1890) is the University of Toronto; the others comprise the lieutenant-governor's residence; the magnificent new Parliament Buildings; Osgoode Hall, the seat of the provincial law courts; the normal school buildings; Trinity College, in connection with the Protestant Episcopal, a highly ornate building; the Upper Canada College; the custom-house; the post-office; the public library; the Government School of Practical Science; and the group of buildings where the annual industrial exhibitions are held. Charitable and benevolent institutions are numerous. Queen's Park, in which the university is situated, is the principal public park. The university is one of the best equipped in America; and besides Trinity College there is Knox College, a Presbyterian theological institution; Wycliffe College, an Anglican theological school; McMaster University, supported by the Baptists; the Upper Canada College; the Provincial Normal and Model Schools; two schools of medicine, two colleges of music, a veterinary college, etc. The industries include iron-foundries and en-

## Torpedo

gineering works, agricultural implement factories, breweries, carriage-works, tanneries, soap-works, boot and shoe factories, piano and organ factories, stove foundries, etc. There is a large export trade in flour, grain, live-stock, etc. Toronto was founded in 1794. The latest official census gives a population of 376,538, but the city subsequently took a census through its police department, the returns of which were as follows:

Ward 1.....	63,704
" 2.....	60,204
" 3.....	54,758
" 4.....	71,860
" 5.....	72,897
" 6.....	83,589
" 7.....	18,395

Total ..... 425,407

**Torpedo** (tor-pe'do), the name of fishes allied to the rays, forming the type of the family Torpedinidæ, and noted for their power of giving electrical shocks by means of specially-developed electrical organs. The electrical organs consist of two masses placed on each side of the head, and composed of numerous vertical gelatinous columns separated by membranous septa, and richly furnished with nervous filaments. The production of electricity by these fishes is explicable on the ground of the conversion of an equivalent of nerve force into electric force by the electric organ; just as, under other circumstances, nerve force is converted into motion through the muscles. The power of the discharge varies with the health and size of the fish. The torpedoes occur in typical perfection chiefly in the Mediterranean Sea, and in the Indian and Pacific Oceans. A specimen may measure 4 ft. long, and weigh from 60 to 70 lbs.

**Torpedo**, a name for two distinct classes of submarine destructive agents, namely, torpedoes proper, which are moveable, and are propelled against an enemy's ship; and submarine mines, which lie stationary in the water. Of the first class, called *offensive torpedoes*, there are three principal types: (a) the 'automobile,' of which the Whitehead is the best-known form; (b) the 'towing torpedo' of Captain Harvey; and (c) the 'spar' or 'out-rigger' torpedo. The Whitehead, or fish torpedo, may be described as being a cigar-shaped vessel, varying from 14 to 22 feet in length, and from 14 to 21 inches in diameter, the largest weighing 2000 pounds. It is made of specially prepared steel, and is divided into three compartments; the war head contains the charge, consisting of wet gun-cotton, trini-

tro-toluol or some other high explosive. This charge is exploded by a priming charge of dry guncotton which in turn is fired by a primer struck by a firing pin carried in the war nose screwed into the head of the torpedo before discharging. The central portion of the torpedo contains the air flask in which air, compressed to 2500 pounds to the square inch pressure, is carried for driving the propelling engine. The after part contains the engine, which is of reciprocating design; the horizontal steering gear which consists of a gyroscope driven by a spiral spring. Any deflection of the torpedo from the line on which it was fired causes the gyroscope to act on a steering engine which moves the horizontal rudders and restores the torpedo to its proper course. The compartment also contains the automatic vertical steering gear.

The range of torpedoes may be as high as 10,000 yards at a speed of 25 knots an hour, but shorter ranges (up to 2500 yards) are more practical and at the shorter ranges speeds up to 50 knots per hour have been attained.

In recent practice the use of torpedoes has been almost entirely confined to submarines, which use a short-range torpedo carrying a very large charge of high explosive. The long range guns of modern battleships and battle cruisers precluding a sufficiently near approach for the use of torpedoes. There are several forms of torpedo operated from shore. Of these the Brennan carries in its interior two drums on which is wound piano wire. The wires pass out of the rear and are attached to powerful engines on shore.

These reel the wires off the drums, causing the latter to rotate rapidly and to act upon the propellers. Increased speed in the engines causes the torpedo to move more rapidly, while it can be steered by checking one of the wires, these acting on vertical rudders in the torpedo. The operating range is a mile or more. In the Sims-Edison torpedo there is a 'float' from which the torpedo is suspended, so that it hangs about six feet below the surface. Here an electric motor forms the propelling agency, it being worked from shore through an electric cable which is paid out as the torpedo advances towards its mark. Another form, the Lay torpedo, has compressed carbonic acid gas for its motive power, the working of the engine being controlled by an operator on shore through an electric cable. Both these forms can be exploded by aid of the electric current through the cable, their speed being about 10 or 11 knots per mile. The three wire-controlled forms mentioned can be fully controlled

only from a fixed base and are thus fitted to be discharged only from shore, it being evidently a difficult problem to control their movements when discharged from a moving base, as a ship or torpedo-boat. To the latter the Whitehead, or other self-moving form, is well adapted, but it is unlikely that the wire-controlled forms are ever likely to be used except from shore stations. The Whitehead is the form commonly in use. In addition to these types of traveling torpedoes several kinds of fixed torpedoes are in use, known as torpedo mines or submarine mines. These have been for many years effectively used in warfare, and are of two types, the *self-acting* and the *controlled*. The first type is fired either mechanically or electrically. A common mechanical device consists in a set of pins projecting at different angles from the head of the torpedo, any one of which being struck is driven down on a fulminating base. The electrically fired are anchored so as to float 5 to 20 feet below the surface, or may be ground mines with a buoyant float. The electric circuit is completed and the mine fired when float or mine is struck by a passing vessel. The *controlled* mines have wires leading to shore stations. In one form the closing of the circuit at the station does not fire the mine, which must be touched by the vessel to complete the firing circuit. In another form observers watch the movement of the vessel and fire the mine from shore when the ship is over the torpedo. The spar or outrigger torpedo consists simply of a metal case containing the explosive substance (gunpowder, gun-cotton, dynamite, etc.), and fitted with a fuse constructed so that it can be fired at pleasure, or exploded by contact with a ship's side. It is screwed on to a long spar, which is usually fixed in the bow of a swift boat or steam-launch, which endeavors to reach and push the torpedo against the hostile vessel. Stationary torpedoes or submarine mines, such as are placed in channels or coasts to prevent the approach of an enemy's vessels, usually consist of a strong metal case containing an effective explosive, such as gun-cotton, etc., and having a fuse or cap which will explode the charge on the slightest contact; or the explosion may be effected by means of electricity, the operator firing it at will from the shore.

**Torpedo-boat.** The modern torpedo-boat is a small war-ship equipped with torpedo tubes as its chief weapons of offense. It must be capable of high speed, able to launch its torpedoes effectually and seaworthy in pro-

## Torpedo Net

portion to its size. There are two main types, the torpedo-boat destroyer and the torpedo-boat, a smaller type of 200 to 400 tons displacement which has been largely superseded by the destroyer type and relegated to harbor and coast defense. This type is equipped with two or three torpedo-tubes, several three-inch guns and smaller arms. It has a speed of from 25 to 30 knots. The torpedo-boat destroyer is a larger vessel usually of 900 to 1200 tons displacement, though larger vessels in this class have been built. From four to eight torpedo tubes are carried and four 4-inch guns, together with lighter pieces. A destroyer has a speed of about 30 knots per hour and is highly efficient both as a scout and as a defense against submarines. Originally designed for night attacks on larger ships the development of rapid-firing guns and searchlights has been such that operations of this character are rare though destroyers were actively engaged on both sides during naval engagements in the European war (q. v.). The motive power of these vessels is steam generated by fuel oil for the sake of space, economy and convenience. They are driven by high powered quadruple expansive engines operating twin propellers and are sufficiently seaworthy to accompany a battleship fleet on the high seas.

Originally a torpedo-boat consisted simply of a small boat filled with explosive which was itself destroyed in the explosion. Such vessels were used as early as 1585 at Antwerp. Submarine craft carrying torpedoes which were to be affixed to the bottom of the enemy ships followed. Surface craft appeared in the American Civil War, most of them using torpedoes on long spars attached to their bows, but it was not until 1877 when Herreshoff brought out the first torpedo-boat fitted to discharge Whitehead Torpedoes that the principles of the modern vessel of this class were established.

**Torpedo Net.** A net made up of steel links which is carried on a warship as a defense against submarine torpedoes. The usual practice is to suspend the net from the ends of booms pivoted at the inboard end to the side of the ship. When the ship is at rest these booms are swung out horizontally and the net unfurls, falling to a sufficient depth to protect the hull. When the ship is in motion the net is of no use and the booms are swung in, the net being furled and lying in a shelf.

**Torquay** (tor-ké'), a seaport and watering-place of England, on the south coast of Devonshire, pleas-

## Torrens System,

antly situated on a series of heights and depressions on the north side of Torbay. It is well built, and consists principally of two streets, of several commanding terraces, and of a great number of isolated cottages and villas, with gardens attached. It has several handsome churches, a town-hall, assembly-rooms, etc., and a long pier forming an excellent promenade. The water supply and drainage system are excellent. For invalids its climate in winter is among the best in England. Here William of Orange landed in his invasion of 1688. Pop. (1911) 38,772.

**Torque** (tork), or TORC, a personal ornament worn by certain ancient nations, as by the ancient Britons, Gauls, and Germans. It consists of a stiff collar, formed of a number of gold wires twisted together, and sometimes of a thin metal plate, generally of gold, and was worn round the neck as a symbol of rank and command.

**Torquemada** (tôr-kâ-má'da), JUAN DE, a Spanish Cardinal born at Valladolid in 1388; died in 1468. He entered the Dominican Order in 1403 and became noted for his theological writings and took part in many important church councils.

**Torquemada**, TOMAS DE. See *Inquisition*.

**Torre Annunziata** (tor'râ a-nôn-tse-h'tâ), a seaport in the province of Naples, Italy, at the foot of Vesuvius, on the Bay of Naples. Pop. 28,084.

**Torre Del Greco** (del grâ'kô), a seaport of Italy, in the province of Naples, on the Gulf of Naples, at the foot of Mount Vesuvius. The town has suffered much by eruptions of Vesuvius. Pop. 35,328.

**Torrens** (tor'renz), LAKE, a large shallow salt lake of South Australia, about 90 miles N. of Spencer's Gulf. Length, about 130 miles; average breadth, 20 miles. In the dry season it is merely a salt marsh.

**Torrens System**, a system of registration of titles to real estate originated by Robert S. Torrens, and first brought legally into operation in South Australia in 1858. Something of the same character had been employed in Austria in 1811 and Hungary in 1855, and Denmark had registered titles by judicial decree as early as 1550. But the Torrens system differed from these earlier forms, and gradually spread through the Australian provinces and to the Fiji and New Guinea Islands. In all

these the registration of titles was made compulsory on the alienation of crown lands, but was otherwise voluntary. Only fee simple titles could be registered, and the title obtained by registration became indefeasible.

From Australia the system spread to various colonies in America, to Norway, Denmark, Germany and Austria, to England in 1862 and Ireland in 1865. In these, leaseholds for life or for twenty years were included. Absolute, qualified or possessory titles may be registered in England; only absolute titles in Ireland. In Canada the system was adopted in the several provinces at various dates from 1871 to 1906, the act being compulsory on alienation of crown lands, except in British Columbia, and voluntary otherwise except in Ontario, where it is wholly voluntary.

The registration of land titles under statutes usually known as 'Torrens Acts' has been adopted in many parts of the United States. Illinois in 1895 was the first to adopt it. The act was held there to be unconstitutional, but was re-enacted in 1897, the point of objection being removed. The same happened in Ohio, a law being passed in 1896 and repealed as unconstitutional in 1898. It was re-enacted in 1913 when the Constitution was amended. Various other States adopted it, New York, in 1908, being among the latest to do so. The method pursued differs in form in different States, the local procedure varying widely. The claim to the title must be definitely passed on by examiners of title and in the event of a contest, this needs to be passed upon by a court. The decree, when given, becomes absolute and conclusive after a period varying in different States and Territories, ranging from thirty days in Massachusetts and the Philippines to five years in California. The title, when registered is, generally speaking, indefeasible, the exceptions being by private parties for fraud, for varying periods and under varying conditions.

To protect the indefeasible quality of the registered title, provision is generally made for an 'assurance fund,' the proceeds of which are used for the reimbursement of any one injured by reason of the decree upon which the registration was based. Such a person must bring suit within a fixed period, varying from six to ten years in different States. A constitutional amendment submitted in 1915 in Pennsylvania provided that new courts should be established for carrying the system into effect in that State. In the same year a Torrens bill was brought

before the Legislature of Michigan. These were the latest States to take action upon the system.

**Torres Strait** (tor'rez), the strait which separates Australia from New Guinea, being about 80 miles across. It is crowded with islands, shoals, and reefs, rendering its navigation difficult.

**Torres Vedras** (tor'r'sh va'drash), LINES OF, so-called from a village in Portugal 24 miles northwest of Lisbon. These stupendous works, constructed by Wellington in 1810, consisted of two fortified lines, the one 20 miles in length, the other, in the rear of the former, 24 miles in length, forming an impregnable barrier between the French troops and Lisbon. The lines of Torres Vedras saved Lisbon, baffled a well-appointed French army, and gave Wellington a fair opportunity to enter upon offensive operations. See *Spain*.

**Torrey** (tor'ri), JOHN, botanist, born at New York in 1796; died in 1873. He became a physician in New York and engaged in botanical study, publishing the first volume of his *Flora of the Northern United States* in 1824. With Prof. Gray he produced a *Flora of North America* in 1838. He was professor of chemistry at Princeton College, 1830-54, and botanist of the Geological Survey of New York. In 1860 he presented his herbarium, containing about 50,000 specimens, to Columbia College.

**Torricelli** (tor-ri-chel'le), EVANGELISTA, an Italian physicist, born in 1608; died in 1647. Torricelli's name is important in the history of science as the discoverer of the law on which the barometer depends. See *Barometer*.

**Torrington** (tor'ing-tun), a borough of Torrington township, Litchfield Co., Connecticut, on the Naugatuck river, 26 miles w. by N. of Hartford. Its manufactures are of brass, machinery, needles, automobile accessories, hardware, etc. Pop. 20,000.

**Torsion Balance** (tor'shun), an instrument employed to measure the intensities of very small forces. It consists of a fine wire, silk thread, or the like, suspended from a fixed point, and having a horizontal needle attached, the force being measured by the resistance to twisting which the filament exhibits when the force (that of attraction, for instance) acts on the needle.

**Torsk** (*Brosmus vulgaris*), a fish of the cod tribe found in great quantities off the Orkney and Shetland Islands, where it constitutes a consider-



## Torso

able article of trade. It is, when salted and dried, a savory stock-fish. It is from 18 to 30 inches long, and is called also *tusk*.

**Torso** (tor'sō; Italian), an art term signifying the trunk of a statue of which the head and the extremities are wanting. The *torso* of Hercules, in the Belvedere at Rome, is considered by connoisseurs one of the finest works of art remaining from antiquity.

**Torstenson** (tor'sten-sun), LINNARD, a Swedish general, born in 1603; died in 1651; distinguished in the Thirty Years' war (which see). He was appointed leader of the Swedish army in Germany in 1641, and commanded it for five years.

**Tort**, in law, denotes injustice or injury. Actions upon torts or wrongs are all personal actions for trespasses, nuisances, assaults, defamatory words, and the like.

**Tortoise** (tort'is), the name applied to various genera of reptiles included in the order Chelonia, along with the turtles and their allies. The



Common or Greek Tortoise (*Testudo Graeca*).

distinctive features of the tortoises and other Chelonians consist in the modification of the skeleton and of the skin-structure or scales to form the well-known bony box in which their bodies are inclosed, the upper portion of which is the *carapace*, the lower the *plastron*. The Testudinidae or typical land-tortoises have short stunted limbs adapted for terrestrial progression; the short toes are bound together by the skin, and have well-developed nails. The carapace is strongly convex, and is covered by horny epidermic plates. The horny jaws are adapted for cutting, or may be divided into serrated processes. The head, limbs, and tail can be completely retracted within the carapace. Though capable of swimming, the tortoises proper are really terrestrial animals, and are strictly vegetable feeders. The most familiar example is the common Greek or European tortoise (*Testudo Graeca*) so frequently kept as a household pet, and which occurs chiefly on the eastern borders of the Mediterranean. These animals some-

times live to a great age (over 100 years according to some), and hibernate through the colder season of the year. They attain a length of 12 inches. A much larger species is the great Indian tortoise (*T. Indica*), which attains a length of over 3 feet and a weight of 200 lbs. Its flesh is reckoned food of excellent quality, as are also its eggs. The box tortoise of India and Madagascar (*Cinyxia arachnoides*) is remarkable for the curious development of the front part of the plastron, which shuts over the anterior aperture of the shell like a lid when the animal retracts itself. In the box tortoise of North America (*Cistudo Carolina*) the hinder part of the plastron forms a lid. It is included among the Emydæ or terrapins. (See *Terrapin*.) Other genera include the alligator terrapin (*Chelydra serpentina*) of America, also called the 'snapping turtle.' (See *Snapping Turtle*.) The mud or soft tortoises (*Trionychidæ*) occur in Asia, Africa, and North America. They have soft fleshy lips, and no horny plates are developed in the skin. Very frequently also the ribs are not so modified as to form a hard carapace, as in other chelonians. See also *Turtle*.

**Tortoise-shell**, a name popularly applied to the shell or rather the scutes or scales of the tortoise and other allied chelonians, especially to those of the *Chelonia imbricata* (the hawk's-bill turtle), a species which inhabits tropical seas. The horny scales or plates which form the covering of this animal are extensively used in the manufacture of combs, snuff-boxes, etc., and in inlaying and other ornamental



Hawk's-bill or Tortoise-shell Turtle (*Chelonia imbricata*).

work. It becomes very plastic when heated, and when cold retains with sharpness any form it may be molded to in its heated state. Pieces can also be welded together under the pressure of hot irons. It is now largely imitated by horn and cheap artificial compounds.

**Tortoise-shell Butterfly**, a name given to two British butterflies, the small tortoise-shell (*Vanessa urticae*) and the large tortoise-shell (*V. polychlora*), from the coloring of the wings.

**Tortola** (tor-tō'la), a British West Indian island, chief of the Virgin Islands; area, 26 sq. miles. It is bare and rugged, rising to a height of 1600 feet. It contains Roadtown, the capital of the group. Pop. 3431.

**Tortona** (tor-tō'nā), a town in Northern Italy, 12 miles east of Alessandria, in the province of Alessandria. The principal edifice is the cathedral (1575). Pop. 7889.

**Tortosa** (tor-tō'zā), a fortified city of Spain, in Catalonia, 48 miles southwest of Tarragona, on the Ebro. There is a cathedral dating from 1374, but the other buildings are unimportant. An active trade is carried on. Pop. 24,452.

**Tortugas** (tor-tō'gās), or DRY TORTUGAS, a group of ten small, low, barren islands belonging to Florida, about 40 miles w. of the most western of the Florida Keys. On Loggerhead Key there is a lighthouse 150 feet high. Fort Jefferson, on one of the islands, was a penal station during the Civil war.

**Torture** (tor-tūr), the arbitrary and especially excessive infliction of pain judicially, whether to extort confession or to aggravate punishment. Torture has been common in all the nations of modern Europe, and it was also practiced by the ancient Romans. The practice was first adopted by the church in the early middle ages, and when the old superstitious means of discovering guilt (as in ordeal by fire and water) lost their efficacy torture became general in Europe. Though never recognized by the common law of England, it was employed there as late as the reign of Charles I, and in Scotland torture was not wholly abandoned till very near the close of the seventeenth century. Every reader is familiar with the horrid tortures inflicted on those accused of witchcraft, and on many of the Covenanters, by means of thumbkins, the boot, etc., in order to discover alleged hiding-places and the like. In the German States torture continued to be practiced under certain restrictions till the close of the eighteenth century. The chief instrument of torture was the rack (which see).

**Toru Dutt**, a Hindu girl of wonder-ful precocity, born at Calcutta in 1856; died in 1877. She spent several years in England and

France, studied the literature of these countries with avidity, and at eighteen published a critical essay, showing strange maturity, on Leconte de Lisle. She next studied Sanskrit and translated Sanskrit texts into English blank verse. In 1876 she published *A Sheaf Gleaned in French Fields*, being English translations of about 200 French poems. After her death, in her twenty-second year, was published a romance in French, *Le Journal de Mlle d'Arvers*, and *Ancient Ballads and Legends of Hindustan*.

**Tory** (tō'ri), a political party name of Irish origin, first used in England about 1679, applied originally to Irish Catholic outlaws, and then generally to those who refused to concur in the scheme to exclude James II from the throne. The nickname, like its contemporaneous opposite, *Whig*, in coming into popular use became much less strict in its application, until at last it came simply to signify an adherent of that political party in the state who disapproved of change in the ancient constitution, and who supported the claims and authority of the king, church, and aristocracy; while their opponents, the *Whigs*, were in favor of more or less radical changes, and supported the claims of the democracy. In modern times the term has to some extent been supplanted by *Conservative*.

**Totara** (to-tā'ra; *Podocarpus totara*), a timber-tree of New Zealand, allied to the yew.

**Totem** (tō'tem), a rude picture of some natural object, as of a bird or beast, used by the American Indians as a symbol and designation of a family or tribe. A similar practice has been found to prevail among other savage peoples, and some theorists have given it a very wide extension on purely conjectural grounds.

**Toucan** (tou'kan; *Rhamphastos*), a genus of scansorial or climb-



Red-billed Toucan (*Rhamphastos erythrorhynchus*).

ing birds of the family Rhamphastidae. These birds inhabit the tropical regions of South America, and are distinguished by a large keeled bill. The bill is about 8 inches long, and its substance is hollowed out into air-cells, thus being comparatively light. The toucans feed on fruits, seeds, insects, etc. The prevailing colors among the toucans are yellow, black, and red. The bill is frequently very brilliantly colored.

**Touch**, the sense of feeling and the senses. It resides in the skin (see *Skin*), and is exercised through certain structures situated in the papillae of the true skin and connected with terminal filaments of sensory nerves. These structures have some variety of form, and are called tactile cells, tactile corpuscles, compound tactile corpuscles, Pacinian corpuscles, etc. All the kinds are to be regarded as terminal organs of the sensory nerves, acting as the media by which impressions made on the skin are communicated to the nerve fibers. Although the sense of touch is diffused over the whole body, it is much more exquisite in some parts than in others. Experiment shows the tip of the tongue to be the most sensitive surface, the points of the fingers come next, while the red part of the lips follow in order. The neck, middle of the back, and the middle of the arm and thigh are the least acute surfaces.

**Touch-me-not.** See *Impatiens*.

**Touch-needles.** See *Touchstone*.

**Touch-paper**, paper steeped in saltpeter, which burns slowly, and is used as a match for firing gunpowder, etc.

**Touchstone**, a variety of extremely compact siliceous schist, used for ascertaining the purity of gold and silver. Known also as *black jasper* and *basanite*. It was called *Lydian stone*, or *lapis Lydia*, by the ancients, be-

cause found in Lydia in Asia Minor. A series of needles (called *touch-needles*), of which the composition is known, are used for comparison with the article to be tested. When the color of the streak produced by both the needle and the trinket on the stone is the same the quantity of alloy they contain is supposed to be similar.

**Touchwood**, a soft white substance into which wood is converted by the action of such fungi as *Polyporus ignarius*. It is easily ignited, and continues to burn for a long time like tinder.

**Toul** (töl), a town of France, department of Meurthe-et-Moselle, on the Moselle, 12 miles west of Nancy. It is strongly fortified, and has a fine Gothic cathedral, completed in the fifteenth century. Toul was taken in the Franco-German war after a siege of five weeks, September 23, 1870. Pop. 9523.

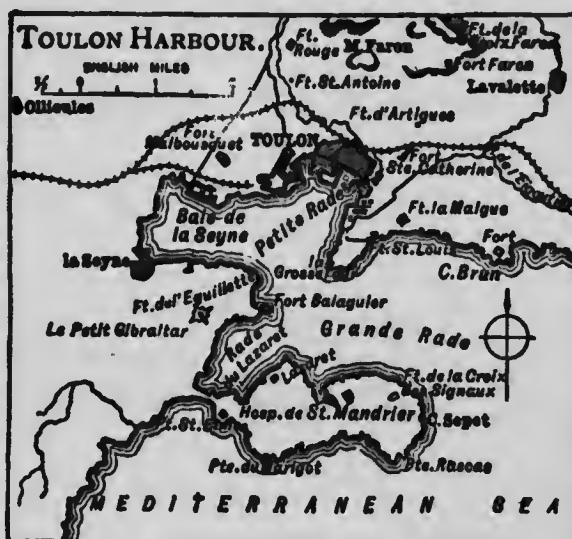
**Toula.** See *Tula*.

**Toulon-sur-**

**Mer** (tö-lön-sur-mär),

a seaport, and after Brest the most important naval station of France, in the department of the Var, situated on a bay of the Mediterranean, 42 miles E. S. E. of Marseilles. It is defended by numerous forts and redoubts, and strong forts and outworks occupy all the heights surrounding the town. Toulon

has a cathedral, originally Romanesque, of the eleventh century, a good town-hall, theater, etc., besides the arsenal and other marine establishments, which are on a most extensive scale. The chief harbors and docks are separated from the roadstead by moles, which are hollow and bomb-proof, and lined by batteries, and the storehouses, shipyards, workshops, etc., are most complete. The trade is not important. Toulon suffered severely at the hands of the republicans in 1793 after the withdrawal of the British, whom the inhabitants had voluntarily admitted, and who destroyed here the French republican fleet. Pop. 101,602.



## Toulouse

**Toulouse** (tò-lòs), a town of Southern France, capital of the department of Haute-Garonne, on the Garonne (which is navigable and crossed by three bridges), 100 miles S.E. of Bordeaux. The streets are narrow and irregular, and the houses generally unpretentious. Among remarkable public buildings are the cathedral, the church of St. Sernin, the Hotel de Ville, and the



St. Sernin, Toulouse.

Palais de Justice. Toulouse has university faculties, a Roman Catholic university, a lyceum, and other educational institutions, public library of 60,000 vols., etc. It is the chief entrepôt of the district for agricultural produce and general trade, and is an important industrial center. It is a place of great antiquity, and rose to eminence under the Romans, who embellished it with a capitol, amphitheater, and other edifices of which vestiges still remain. It was the capital of the kingdom of the Visigoths from 419

till 508, when Clovis gained possession of it. Subsequently it became the capital of Aquitaine, was long governed by independent counts, and in the thirteenth century fell a prey to the cruel hights of the Inquisition (see *Albigenses*), and then was joined to the French crown. The French were defeated by the British under its walls in 1814. Pop. (1911) 140,576.

**Touraco** (tò-rak'ò), a name of insensorial birds of the genus *Corythaix* or *Turacus*, natives of Africa, and allied to the Scansores, or climbing



Touraco (*Corythaix erythrolophus*).

birds. Their prevailing color is green, varied in some species with purple on the wings and tail. They feed chiefly on soft fruits, and frequent the highest branches of the forest trees.

**Touraine** (tò-rân), an ancient province of France, bounded north by Maine, east by Orléanais and Berry, south by Berry and Poitou, and west by Anjou and Poitou. It now forms the department of Indre-et-Loire.

**Tourcoing** (tòr-kwā), a town of France, department of Nord, 9 miles N. N. E. of Lille; a well-built thriving manufacturing town, the staple manufactures being woolen, cotton, linen, and silk stuffs, besides dye-works, soap-works, sugar refineries, machine works, etc. Pop. 82,644.

**Tourgee** (tòr-zhā'), ALBION WINEGAR, novelist, born at Williamsfield, Ohio, in 1838; died in 1905. He served through the Civil war, and in 1866 engaged in the practice of law at Greensboro, N. C. He took an active part in the Constitutional conventions of 1868 and 1875, and was judge of the Superior Court, 1868-73. In 1897 he was appointed United States Consul of Bordeaux, France. His best-known novel was *A Fool's Errand*. He wrote also *Bricks Without Straw* and other novels, and some legal works.



**Tourguenieff** (tör-gen'yef), I V A N SENEYEVITCH, a celebrated Russian novelist, born at Orel in 1818; died near Paris in 1883. He belonged to a noble and ancient family, and was educated at Moscow, St. Petersburg, and Berlin. In 1842 he obtained an appointment in the ministry of the interior; but having written an article displeasing to the authorities, he was shortly afterwards banished to his paternal estate. For some years he led the life of a country gentleman, gaining an intimate acquaintance with Russian peasant life. His first important publication was translated into English under the title of *Russian Life in the Interior, or the Experiences of a Sportsman*. It was followed by a great number of short tales and dramas, contributed principally to Russian periodicals. His earliest novels were *A Nest of Nobles* (1850), and *On the Eve* (1859). A powerful politico-social novel, *Fathers and Sons*, was published in 1861, and met with much adverse criticism in Russia. His other works include *Smoke*, *Spring Floods*, *Virgin Soil*, etc., all of which have been translated into English. Tourguenieff has been ranked with the greatest masters of fiction.

**Tourmaline** (tör'ma-lin), a mineral occurring crystallized in three-sided or six-sided prisms, terminated by three-sided pyramids, the primary form being a rhomboid. It scratches glass easily, has a specific gravity of 3, and consists principally of a compound silicate and borate of alumina and magnesia. Tourmaline occurs most commonly in igneous and metamorphic rocks, especially in granite, gneiss, and mica-slate. Some varieties are transparent, some translucent, some opaque. Some are colorless, and others green, brown, red, blue, and black. Red tourmaline is known as *rubellite*, blue tourmaline as *indicolite*, and black tourmaline as *schorl*. The transparent varieties include various well-known jewelry stones, as the Brazilian sapphire, the Brazilian emerald, etc. Prisms of tourmaline are much used in polarizing apparatus, and it possesses powerful electric properties.

**Tournai** (tör-nä; in Flemish, *Doornik*, *dör'nik*), a town of Belgium, in the province of Hainaut, on both sides of the Scheldt, which is here crossed by seven bridges and lined by fine quays. The streets are for the most part spacious, with well-built houses. Among the principal edifices are the cathedral, an ancient structure in the Romanesque style; the Church of St. Brice (twelfth century); and the old monastery of St.

Martin, now used as a town-house. The leading manufactures are linens, woollens, cottons, and Brussels carpets. Tournai is one of the oldest towns of Belgium, and was anciently the chief town of the Nervii, and afterwards the residence of some of the early Frankish kings. Pop. (1904) 36,744.

**Tournament** (tör'na-ment), or **Tourney**, a common sport of the middle ages, in which parties of mounted knights encountered each other with lances and swords in order to display their skill in arms. Tournaments reached their full perfection in France in the ninth and tenth centuries, where they first received the form under which they are known to us. They were introduced into England soon after the Conquest by the Normans. *Jousts* were single combats between two knights, and at a tournament there would often be a number of jousts as well as combats between parties of knights. The place of combat was the *lists*, a large open place surrounded by ropes or a railing. Galleries were erected for the spectators, among whom were seated the ladies, the supreme judges of tournaments. A knight taking part in a tournament generally carried some device emblematic of a lady's favor. Tournaments gradually went out with the decline of chivalry.

**Tournefort** (törn-för), JOSEPH PITTON DE, a French botanist, born in 1656. He was educated by the Jesuits, and in 1683 became professor of botany at the Jardin des Plantes, Paris. He visited Greece and Asia Minor, and wrote *Voyage au Levant*. His chief work is entitled *Institutiones Rei Herbariæ* (three vols., Paris, 1700). He died in 1708, being then professor of medicine in the Collège de France.

**Tourneur** (tör'ner), CYRIL, an English tragic poet, of whose existence we have little certain information beyond the respective dates of his first and last extant works (1600-13). The two plays on which his fame rests are *The Atheist's Tragedy* (1607) and *The Revenger's Tragedy* (1611).

**Tourniquet** (tör'ni-ket), an appliance employed in the practice of surgery to stop bleeding, its use being only intended to be temporary. Some kind of ligature twisted tight with a stick forms a simple tourniquet.

**Tours** (tür), a town of France, capital of the department of Indre-et-Loire, on the left bank of the Loire 145 miles by rail southwest of Paris. The Loire is here crossed by two suspension bridges, a railway bridge, and a fine stone bridge 1423 feet long. Many

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of the streets are spacious and elegant, and there are several historic chateaux in the neighborhood. The principal edifice is the cathedral (Tours being an archbishopric), flanked by two towers, 205 feet high, a fine building begun in the twelfth, completed in the sixteenth, century. Of the old abbey church of St. Martin of Tours only two towers remain. The modern buildings include the Church of St. Joseph, the theater, and the museum. Manufactures include silk, cloth, carpets, chemicals, etc., and there is a large printing and publishing establishment. Tours was known to the Romans by the name of Caesarodunum. In later times it became famous for its silk manufactures, and had a population of 80,000, when the revocation of the edict of Nantes deprived it of nearly half its inhabitants, a blow from which it has never recovered. In 1870 Tours was the seat of the government of national defense. Pop. 61,507.

**Tourville** (tôr-vîl), DE, ANNE HILARION DE COLENTIN, COUNT, a distinguished French admiral, born at Tourville, La Manche, in 1642; died at Paris in 1701. He entered the navy in 1660, became a captain in 1667, and was created vice-admiral in 1689. He defeated a Dutch-English fleet off the Isle of Wight in July, 1690. In 1692 he was ordered to attack a far superior Dutch-English fleet off La Hogue, and was defeated. He was created a marshal in 1693, and in 1694 destroyed a Dutch and English trading fleet off Cape St. Vincent.

**Toussaint-Louverture** (tô-san-lô-ver-tûr), a distinguished negro, born a slave in the Island of Hayti in 1743. After the insurrection of 1791 Toussaint served in the army of the blacks, and later rose to be their leader. He displayed great military and political ability, and in 1796 the French government appointed him general-in-chief of the troops in San Domingo. After a severe struggle with insurrectionary movements he assumed supreme civil authority, and in 1801 was completely master of the island. He was appointed president for life of the Republic of Hayti, and under his vigorous government the commerce and agriculture of the island began to revive. But Napoleon did not choose to see him independent, although professedly loyal to France, and sent a powerful expedition to subdue Toussaint, who was forced to surrender. After a vigorous resistance he was seized and sent to France, where he died in prison, on the 27th of April, 1803.

**Tower** (tou'er), CHARLEMAGNE, diplomat, was born at Pottsville, Pennsylvania, in 1848. He was graduated at Harvard in 1872; was admitted to the bar in 1878; became an officer and director in several corporations; and in 1897 was appointed Minister to Austria-Hungary. In 1899 he was made Ambassador to Russia, and in 1902 to Germany, returning in 1908. He is the author of *The Marquis de La Fayette in the American Revolution*.

**Tower of London**, a celebrated ancient fortress in London, consisting of a collection of buildings of various ages on a somewhat elevated position on the north bank of the Thames, outside the old city walls. It covers about 13 acres, and is surrounded by a battlemented wall flanked with massive towers, and encircled by a moat. There is also an inner line of circumvallation broken by towers, and interspersed with other buildings. In the center is the White Tower, the keep of the old fortress, around which are grouped the chapel, the jewel-house, barracks, and other buildings. The Tower was a first-class mediæval fortress, and served at once as a palace, a prison, and a place of defense. The White Tower was built by Gundulf, bishop of Rochester, for William I, in 1078. It was successively strengthened by various English sovereigns. The regalia, consisting of the royal crowns, scepters, etc., are now kept and exhibited in the jewel-house. The armory contains a fine collection of armor and weapons. In the part called the Bloody Tower the two young princes, sons of Edward IV, were murdered. The Tower is now chiefly used as an arsenal, and has a small military garrison of the yeomen of the guard. It is governed by a constable and deputy-constable. The governorship is still a post of distinction. The White Tower was slightly damaged on January 24, 1885, by an explosion, the work of Irish dynamitards.

**Town.** See *City*.

**Town-clerk**, the clerk to a municipal corporation, elected by the town-council. In the United States, an officer who acts as custodian of civic or municipal records, and enters all the official proceedings of a city, town, or borough. In England his chief duties are to keep the records of the borough and lists of burgesses and to take charge of the voting papers at municipal elections.

**Town-council**, the governing body in a municipal cor-

poration elected by the legal voters. The principal duties of this body are to manage the property of the city, impose taxes for public purposes, pass laws for the good government of the town, for the prevention of nuisances, and the like.

**Townshend** (toun'zend), CHARLES, second viscount, an English statesman, born at Rainham, Norfolk, in 1674; succeeded to the peerage in 1687, and took his seat as a Whig in the House of Peers in 1695. After acting as a commissioner for arranging the Scottish Union (1706), he was joint plenipotentiary with Mariborough in the conference at Gertruydenburg (1709), and then, as ambassador to the states-general, signed the Barrier Treaty. For this he was censured by the House of Commons, and declared an enemy to the queen and kingdom. He thereupon entered into communication with the Elector of Hanover, who, on his accession as George I, appointed Townshend secretary of state, 1714. In 1717 he became lord-lieutenant of Ireland; and he was again secretary of state from February, 1721, to May, 1730, when he retired on account of differences with his brother-in-law and colleague, Sir Robert Walpole. He died in 1738.

**Townshend** (toun'zend), CHARLES, grandson of the above, born in 1725; entered the House of Commons in 1747, and became a commissioner of trade and plantations in 1749. He was a lord of the admiralty in 1754, member of the privy-council in 1756, secretary of war in 1761-63, chancellor of the exchequer in 1766. He supported Granville's stamp-act (1765), and introduced the celebrated resolutions for taxing the American colonies (June 2, 1767). He died in 1767. From so often changing his political opinions he was known as the 'weathercock,' but he had a great reputation for oratory and ready wit.

**Township** (toun'ship), a subdivision of a county, without reference to its population. Townships in the central and western United States are frequently square areas of six miles to a side. In England, a township is a division of a parish which has a constable, and may have overseers of the poor belonging to itself.

**Townsville** (tounz'vii), the chief municipality of North Queensland, Australia, on Cleveland Bay, about 850 miles N. W. of Brisbane. Being the port of an immense territory, including several gold-fields and a large area of pastoral country, there is a large shipping trade. Extensive harbor im-

provements have been made. Pop. 12,717.

**Toxicology** (tok-si-koi'ô-jî), the science of poisons and antidotes. See **Poison**.

**Toxotes** (toks'o-têz), an East Indies genus of fishes, with two species. See **Archer-fish**.

**Tracery** (trâ'se-ri), the ornamental stonework in the lead of a Gothic window, arising from the mullions, and presenting various combinations of curved or straight lines.

**Trachea** (trâ'ke-a), or WINDPIPE, in anatomy, the name given to the tube extending from the larynx (which see) down into the chest to a point opposite the third dorsal vertebra, where the tube divides into two chief divisions or bronchi (which see), one of which supplies each lung with the air necessary for respiration or breathing. The trachea in man is of cylindrical form, about 4½ inches long, and from ¾ to 1 inch in diameter, and is composed of from sixteen to twenty rings or zones of gristly or cartilaginous nature, separated and connected by fibrous tissue. Each cartilage forms an imperfect ring, being unclosed behind, and having the gristly edges merely joined by fibrous membrane. The windpipe is lined by delicate mucous membrane which is covered by epithelial cells provided with delicate vibratile processes or cilia. All mammals, reptilia, and birds possess a trachea, but some amphibia want this organ; the lungs in such cases springing directly from the larynx. The cut shows the trachea A A, the epiglottis B, the larynx C, and the œsophagus D.



Trachea — Section through part of face and neck.

**Tracheotomy** (trâ-ke-ot'o-mi), LARYNGOTOMY, or **Bronchotomy**, an operation in which an opening is made into the trachea or larynx, as in cases of suffocation.

**Trachoma** (tra-kô'ma), a specific contagious form of inflammation of the conjunctiva of the eye. It is associated with filthy conditions and is common in Egypt, Arabia and parts of Europe. Individuals suffering with the disease are denied entry to the United States.

**Trachyte** (trâ'kit), a compact volcanic rock, breaking with a rough surface, and often containing crys-

## Tracing-paper

tals of glassy felspar, and sometimes hornblende and mica. This rock is extremely abundant among the products of modern volcanoes.

**Tracing-paper** (trā'sing), transparent paper which enables a drawing or print to be clearly seen through it when laid on the drawing, so that a pen or pencil may be used in tracing the outlines of the original. It is prepared from smooth unsized white paper rendered transparent by a varnish made of oil of turpentine with an equal part of Canada balsam, nut-oil, or other oleo-resin.

**Tractarianism** (trak-tā'-ri-an-izm), the name usually given to a system of religious opinion and practice promulgated within the Church of England in a series of papers entitled *Tracts for the Times*, and published at Oxford between 1833 and 1841.

**Traction-engine.** See under *Steam Engine*.

**Tracy** (trā'si), BENJAMIN FRANKLIN, statesman, born at Oswego, New York, in 1830. He became brevet brigadier-general in the Civil war, United States district attorney in 1866, and judge of the New York Court of Appeals in 1889. In 1889 he became Secretary of the Navy under President Harrison. He was an unsuccessful candidate for mayor of New York in 1897. Died Aug. 6, 1915.

**Trade, BOARD OF.** See *Board*.

**Trade Dollar,** a silver dollar of the United States, containing 378 troy grains of silver and 42 troy grains of alloy. Dollars of this description, issued under Act of Congress of Feb. 12, 1873, were legal tender to the amount of \$5. Those issued under the Act of July 22, 1876, possessed no legal tender power. The trade dollars were intended for trade with countries doing business on a silver basis; hence the name.

**Trade-mark,** a peculiar mark used by a manufacturer to distinguish his own productions from those of other persons. Such marks can now be registered and protected in all the more important countries, and between these also there is a general reciprocity as to protection. Regarding trade-marks many nice questions may arise, and it is not easy to define what constitutes a valid trade-mark. A mere descriptive title or a geographical name will not constitute a proper trade-mark; what it is best to select is some invented word or words, or a word or words having no reference to the character or quality (though suggestive of excellence),

## Trades-unions

some distinctive device, figure, emblem, or design, or a written signature or copy of such. Any mark or name calculated to mislead as to the real nature or origin of the goods will be vitiated. In the United States trade-marks are registered at the Patent Office, at a fee of \$25, the right running for thirty years.

**Tradescantia** (trad-es-kan'she-a), a genus of lily-like plants, nat. order Commelinaceæ. The species are natives of America and India, and many of them are cultivated as ornamental plants in flower gardens. They are well marked by their three sepals, three petals, three-celled capsule, and filaments clothed with jointed hairs. *T. virginica*, a United States species, is known by the name of *spiderwort*. It has succulent stems, shining grass-like leaves, and blue or purple flowers, and it is common in the flower borders of gardens. Other species are cultivated.

**Trades-unions.** A trade society has been defined as 'a combination of workmen to enable each to secure the conditions most favorable for labor'; and although trades-unions, as they are generally called, almost always have other objects in view in addition to that specified in the definition, that object is their distinguishing one. Combinations of this sort in Great Britain are considerably more than three centuries old, for there is a statute of the year 1548 expressly directed against them. They are looked upon as the lineal descendants of the mediæval guilds. Trades-unions generally endeavor to regulate the prices and the hours of labor, and in many cases the number of men engaged by an employer, the number of apprentices which may be bound in proportion to the journeymen employed by a master, and the like. As accessories these unions may collect funds for benefit societies, and undertake the insurance of tools, libraries, and reading-rooms; but their fund, to which every member must regularly contribute a stated sum, is principally reserved for enabling the men to resist, by strikes and otherwise, such action on the part of the employers as would tend to lower the rate of wages or lengthen the hours of labor. That trades-unions enable the men to benefit by the state of trade more than they otherwise would have done would appear from the fact that the worst-paid trades are those without unions. Trades-unions are also said to have furthered the safety of the laborer by producing beneficial modifications of the conditions in which he works. Some hostility against trades-unions has been



produced by the outrages of a more or less serious nature of which some of the unions, or members of them, have been guilty, such outrages being directed against the property of employers, or against the persons and tools of non-union men. The Trades Unions of the United States originated within the last century, and have united into general organizations embracing large numbers of workmen. The oldest of these, the Knights of Labor, originated in 1869. The American Federation of Labor, organized in 1887, includes the great bulk of the local unions, both of the United States and Canada. It has a membership of about 2,000,000, representing about 27,000 local unions in the two countries. Britain has also a general Federation of Trades-Unions and similar organizations exist in other parts of Europe and elsewhere. See *Labor Organizations*.

**Trade-wind**, one of those perpetual or constant winds which occur in all open seas on both sides of the equator, and to the distance of about 30° north and south of it. On the north of the equator their direction is from the northeast (varying at times a point or two of the compass either way); on the south of the equator they proceed from the southeast. The origin of the trade-winds is this:—The great heat of the torrid zone rarefies and makes lighter the air of that region, and in consequence of this rarefaction the air rises and ascends into the higher regions of the atmosphere. To supply its place colder air from the northern and southern regions rushes towards the equator, which, also becoming rarefied, ascends in its turn. The heated air which thus ascends into the upper regions of the atmosphere being there condensed flows northward and southward to supply the deficiency caused by the under-currents blowing towards the equator. These under-currents coming from the north and south are, in consequence of the earth's rotation on its axis, deflected from their course as they approach the equatorial region, and thus become northeast and southeast winds, constituting the trade-winds. The belt between the two trade-winds is characterized by calms, frequently interrupted, however, by violent storms. Trade-winds are constant only over the open ocean, and the larger the expanse of ocean over which they blow (as in the Pacific) the more steady they are. In some places the trade-winds become periodical, blowing one-half of the year in one direction and the other half in the opposite direction. See *Monsoon*.

**Tradition** (tra-dish'un), in its general application, is any knowledge handed down from one generation to another by oral communication. It plays a very important part in the Jewish and Roman Catholic churches. In theology, the term is specifically applied to that body of doctrine and discipline, or any article thereof, supposed to have been put forth by Christ or his apostles, and not committed to writing, but still held by many as an article of faith.

**Traducianism.** See *Creationism*.

**Trafalgar** (commonly tra-fai'gar, more correctly tra-fai-gar'), a low and sandy cape on the southwest coast of Spain, at the northwest entrance of the Strait of Gibraltar. The famous naval battle in which Nelson lost his life, after defeating a larger French and Spanish fleet under the command of Villeneuve and Gravina, was fought off this cape, October 21, 1805. The Franco-Spanish fleet lost 19 ships out of 33.

**Tragacanth** (trag'a-kanth), a variety of gum familiarly termed gum-dragon or gum-tragacanth.

It is the produce of several species of the genus *Astragalus*, leguminous plants natives of the mountainous regions of Western Asia. In commerce tragacanth occurs in small twisted thread-like pieces, or in flattened cakes, in color whitish or yellowish, devoid of taste or smell.

It is demulcent, and is used in coughs and catarrhs, and to make lozenges and pills. It is employed also in calico-printing.

**Tragedy** (traj'e-di), a dramatic poem, representing an important event or a series of events in the life of some person or persons, in which the diction is elevated and the catastrophe melancholy. Tragedy originated among the Greeks in the worship of the god Dionysus or Bacchus. See *Drama*.

**Tragopan** (trag'ö-pan), a name of certain beautiful birds of the genus *Oriornis*, and of the family Phasianidae, closely allied to the common



Tragacanth (*Astragalus gummiifer*).

## Tragopogon

fowl. *O. satyra*, a common species, is a native of the Himalayas. The plumage is spotted, and two fleshy protuberances hang from behind the eyes. When the bird is excited it can erect these protuberances until they look like a pair of horns. A large wattle hangs at either side of the lower mandible.

**Tragopogon.** See *Goats'-beard*.

**Train-bands**, a force partaking of militia and volunteers, instituted by James I and dissolved by Charles II. The term was afterwards applied to the London militia, from which the 3d regiment of the line originated, and in which the renowned John Gilpin was a captain.

**Trains**, ARMORED, railway trains of which the engine and carriages are protected from small-arm fire by armor in the shape of high parapets of iron or steel plating. Loopholes in the armor allow the men to use their rifles.

**Training Colleges.** See *Normal Schools*.

**Trajan** (tră'jan), in full, MARCUS ULPIUS TRAJANUS, a Roman emperor, born in Spain 52 A.D., was the son of Trajanus, a distinguished Roman commander under Vespasian. He served against the Parthians and on the Rhine, where he acquired so high a character that Nerva adopted him and created him Cæsar in 97.



Trajan.

Nerva died in 98, and Trajan, who was then in Germany, peaceably succeeded to the throne. He made peace with the German tribes, and proceeded to introduce enlightened measures of reform into the public service. One of his greatest military achievements was his defeat of the Dacians, and the reduction of Dacia to a Roman province. It is supposed that it was in commemoration of this war that he erected at Rome the column which still remains under his name. In 103 he wrote the famous epistle to Pliny, governor of Pontus and Bithynia, directing him not to search for Christians, but to punish them if brought before him; and on no account to listen to

anonymous charges. For some years Trajan occupied himself with the work of administration, but in 114 he set out on an expedition against the Parthians which resulted in the reduction of Armenia to a Roman province. He died in Cilicia in 117 A.D., after having nominated Hadrian as his successor. He is said to have been sensual in his private life, but his good qualities as a ruler were such that even 250 years after his death senators greeted a new emperor with the wish that he might be more fortunate than Augustus and better than Trajan.

**Trajan's Column.** See *Rome*.

**Trajan's Wall**, a fortified line in (the Dobruška (Roumania), extending E. from the Danube to Kustendji on the Black Sea, a distance of 37 miles. It is a double, in some places a triple, earthwork on the south side of a natural fosse consisting of a narrow marshy valley. Another wall of the same name, built by a Roman legion, 105-155 A.D., extends from the Pruth E. to the Black Sea.

**Tralea** (trá-lé'), a town and seaport in Ireland, in the county of Kerry, on the river Lee, 55 miles southwest of Limerick. It has an active trade in farm produce. By means of a canal vessels up to 300 tons can discharge their cargoes within 100 yards of the town. Pop. 9687.

**Trammel** (tram'el), an instrument for drawing ovals, used by joiners and other artificers. One part consists of a cross with two grooves at right angles; the other is a beam-compass



Trammel.

carrying two pins which slide in those grooves, and also the describing pencil.

**Tramp**, the colloquial name for vagrants or wanderers. The term 'tramp' in general use means a wandering, disorderly person, without visible means of support, though vagrant in a wider sense is applied to many persons who cannot be classed as tramps. In England laws have been enacted for many centuries for the regulation of vagrancy. In the United States tramps were formerly so few that before the Civil war they received little attention. Later, partly owing to the disbandment

of the armies, the scattering of the camp-followers, the disastrous times of 1878, and the increase of foreign vagrants by immigration, they increased so largely, besides becoming so dangerous and vicious in character, that the evil was so great as to attract public attention. Now many of the states have promulgated vagrancy laws to abate the nuisance. It has been found, however, that severe treatment is not a great deterrent.

**Tramway** (tram'wā), the English name for street railways, which see; also *Electricity* and *Trolley*.

**Trance** (trans), a condition resembling sleep, in which consciousness and many of the vital functions are suspended, and during which the action of the heart is diminished and the breathing reduced. The subjects of trance are usually hysterical, and in some cases it is induced by exhausting disease or emotional disturbance. In this condition the face is pale, the limbs relaxed, the mental functions are in abeyance, no effort at rousing will produce a return to consciousness, and this state may last from a period of several hours to many weeks or months. When the trance lasts for a lengthy period food is taken in a mechanical way at intervals by the sleeper. Most cases recover. The term is also applied to a sort of ecstatic state in which some persons are said to fall.

**Trani** (trā'nē), a seaport in South Italy, province of Bari, on the Adriatic, 26 miles northwest of Bari, with old walls and bastions, and a cathedral. Pop. 34,688.

**Tranquebar** (tran-kwe-bār'), a seaport in the district of Tanjore, Madras Presidency, India, formerly a Danish settlement and a busy port. Pop. 13,142.

**Transbaikalia** (trans-bi-kā'li-a), a Siberian province, E. of Lake Baikal; area, 240,780 sq. miles. It has an elevated, well-watered surface, and climate dry and extreme both in summer and winter. Agriculture and trade are limited; gold is found to some extent. Pop. 742,200.

**Transcaspiian Region** (trans-kas'pi-an), a territory to the E. of the Caspian recently annexed by Russia. It has an area of 220,000 sq. miles, mostly uninhabited desert, and is traversed by the Transcaspiian Railway, which connects Samarcand with the Caspiian Sea.

**Transcaucasia** (trans-kā-kā'shi-a), that part of the lieutenancy of the Caucasus which lies S.

of the main Caucasus ridge, and which includes the governments of Kutais, Tiflis, Elisabethpol, Erivan, Kara, etc.

**Transcendental** (trans-sen-den'tai), a term applied in the system of philosophy founded by Kant to all those principles of knowledge which are original and primary, and which are determined *a priori*, such as space and time. They involve necessary and strictly universal truths, and so transcend all truth derived from experience, which must always be contingent and particular. The term *transcendentalism* is now generally used in a sense not very different from mysticism, or for that which is vague and illusive in philosophy. In mathematics the term is applied to quantities that cannot be expressed in ordinary algebraic terms.

**Transept** (tran'sept), in architecture, the transverse portion of a church which is built in the form of a cross; that part between the nave and choir which projects externally on each side, and forms the short arm of the cross in the general plan. See *Cathedral*.

**Transfusion** (trans-fū'shun), the transmission of blood from the veins of one living animal to those of another, as from one of the lower animals into a man, or from man to man, with the view of restoring the vigor of exhausted subjects. This operation is a very old one, but seems to have generally ended in failure until about 1824, the chief cause of failure probably being the want of due precautions to exclude the air during the process. It is now occasionally resorted to as a last measure in cases of great loss of blood by hemorrhage, especially in connection with labor.

**Transit** (tran'sit), in astronomy, (a) the passage of a heavenly body across the meridian of any place,



TRANSIT OF MERCURY.

a, Mercury. The dotted line shows the path.

a phenomenon which is usually noted by a transit instrument. The determination of the exact times of the transits of the

heavenly bodies across the meridian of the place of observation enables the astronomer to ascertain the differences of right ascensions, the relative situations of the fixed stars, and the varied motions of the sun, planets, and comets, in respect to the celestial meridians.

(b) The passage of one heavenly body over the disk of a larger one; but the term is chiefly restricted to the passage of the inferior planets, Mercury and Venus, over the sun's disk. The transits of Venus are of great importance in astronomy, as they afford the best means of determining the sun's parallax, and consequently the dimensions of the planetary system. These transits are of rare occurrence, four taking place in 243 years, at intervals reckoning from the transit of 1874, in the order of 8, 122, 8, and 105 years, which gives the transit years 1882 (Dec. 6), 2004, 2012, 2117. The transits of Mercury occur more frequently, but they are of far less astronomical interest, as they cannot be used for the same purpose, the planet being too distant from us.

**Transit Instrument**, an important instrument adapted for observing the exact time of the passage of heavenly bodies across the meridian. (See *Transit*.) It consists essentially of a telescope fixed at right angles to a horizontal axis, which latter has its ends directed exactly to the east and west points of the horizon, so that the line of collimation or optical axis of the telescope may move in the plane of the meridian. The instrument is susceptible of certain nice adjustments, so that the axis can be made perfectly horizontal, and at right angles to the plane of the meridian, in which plane the telescope must move. It is generally used in connection with the mural circle (which see).

**Transkei** (trans'ki), a division on the east coast of Cape Colony, Africa, extending southward from the Kei River to Tembuland, and bordering on the Indian Ocean; area, 2552 sq. miles. The interior rises to an elevation of about 9800 feet. It is a very fertile region, with dense forests. Many cattle and sheep are raised. Copper and coal are found. Pop. 177,647; 1700 whites.

## Transmigration of the Soul,

or METEMPSYCHOSIS, (met-emp-si-kō'sis), the passage which, according to the belief of many races and tribes at all times, the soul after the death of the body makes through the bodies of the lower animals or other human bodies, or, it may be, through plants or inanimate

objects. In the teaching of the Brahmanic Hindus it has its foundation in the belief of the connection of all living beings, and of the gradual purification of the spiritual part of man and its return to the common source and origin of all things—God. The Buddhists accept a similar doctrine, but with them the ultimate goal of the soul is not absorption by the Deity, but annihilation, Nirvana. Transmigration also formed part of the teaching of the Egyptian priests. The doctrine probably passed from Egypt into Greece, where it was never generally current, but was confined to the mysteries and some philosophic systems.

**Transvaal** (trans-vāl'), now VAAL RIVER COLONY, was originally formed by part of the Boers, of Dutch descent, who left Cape Colony in 1836 for Natal, and quitted that colony on its annexation by Great Britain in 1845. Its independence was recognized by the British government in 1852. It lies north of the Vaal River and south of the Limpopo River, and is bounded on the west by Bechuanaland, east by Portuguese territory, Swaziland, and Zululand, south by Natal and the Orange River Colony. Area, 114,300 sq. miles. Its population is 1,686,212, of whom about 300,000 are whites. Its largest town is Johannesburg, with a population of 237,220. This city is a gold-mining center. The region is a plateau of from 1500 to 6000 feet elevation. It is well suited to agricultural and stock-raising pursuits, and large numbers of farm animals are kept. The great wealth of the region is in its mineral resources, notably gold, diamonds, and coal. The gold mines have the greatest output in the world, and the diamond product is of considerable value.

In 1877, owing to a war with the Kaffirs, a British force assisted the Boers and the territory was annexed to Great Britain. Troubles ensued, the Boers rose in arms in 1880 and defeated the British in 1881 at Majuba Hill. Their independence was then recognized, though their foreign relations remained under British supervision. The rapid development of the gold-mining industry brought new elements of difficulty into the problem, the Boers refusing to the multitude of foreign miners who sought their country any political privileges, while laying upon them the great burden of taxation. The discontent of the Uitlanders (outlanders) led, in 1895, to an invasion of the republic by a party of British settlers under Dr. Jameson. This was easily suppressed by the Boers, and the troubles grew more prominent



as years went on until in 1899 a petition, signed by 21,000 British subjects, was sent to the queen pointing out their grievances. The negotiations which followed proved ineffective, and conditions grew so strained that the British government called out 25,000 of the reserve forces. In reprisal the Boer government demanded that all troops on the frontier should be instantly withdrawn and that no more troops should be sent to South Africa. This demand not being complied with, a Boer force at once invaded Natal, where they invested Ladysmith, and for a time had much success. In 1900 the tide of the war turned, the British forces increasing until nearly 250,000 men were in the field under Lord Roberts. Ladysmith and the other besieged towns were relieved, and though the Boers fought with great courage and skill they were so largely outnumbered that their case grew hopeless. Bloemfontein, Johannesburg, and Pretoria were occupied, and the Transvaal Republic, with the Orange Free State, which had joined it in the war, were proclaimed British colonies. President Kruger fled to Europe, where he sought in vain for European intervention, and the war on the part of the Boers became a series of guerilla raids, continued until but a handful of fighting men were left. In May, 1902, a treaty of peace was signed, and the two republics passed under British rule, the terms granted them being very favorable. For the restoration and restocking of the Boer farms, which had been ruined during the war, £3,000,000 were given by the British government, which also agreed to make loans, free of interest for two years, for the same purpose; while no special tax was to be laid on the colonies to pay the expenses of the war. The total cost of the war to Great Britain was about £233,000,000 or \$1,165,000,000. In the years that have succeeded these events the possessions of the suffrage by the Boers has, in a measure, given them possession of the country again, they forming a majority of the inhabitants, this resulting in the election of one of their late leaders to the chief post of authority in the colony. The Transvaal and Orange Free State now form States of the Union of South Africa, organized in 1910.

**Transylvania** (tran-sil-vā'ni-a; German, *Siebenbürgen*; Hungarian, *Erdély*), a grand-principality belonging to the crown of Hungary, forming the southeastern portion of the Austrian Empire; area, 21,213 square miles. The surface is mountainous, the Carpathian chain covering its southern

and eastern frontier, and sending out numerous ramifications into the interior. The chief rivers are the Aluta or Alt, the Maros, and the Szamos, all flowing directly or indirectly into the Danube. The forests are extensive and valuable; the vine flourishes everywhere, and the crops include maize, wheat, rye, hemp, flax, tobacco. The minerals are important, and include gold, silver, copper, lead, coal, salt and iron. The chief towns are Hermannstadt, Kronstadt, Bistritz and Szamos-Ujvar. Education is in a very backward state. The population (2,456,838) is very mixed, including Roumanians, Magyars, Germans, Gypsies, Jews, Bulgarians and others. Since 1867 it has been an integral part of the Kingdom of Hungary.

**Trap**, a term rather loosely and vaguely applied by the earlier geologists to some or all of the multifarious igneous rocks that belong to the paleozoic and secondary epochs, as distinct from granite on the one hand, and the recent volcanic rocks on the other. Trap-rocks often assume a terraced appearance, whence their name from *trappa*, the Swedish for a stair. Their composition may be described as consisting chiefly of felspar and hornblende. Trap-rocks of crystalline structure are distinguished as greenstones, basalts, clink-stones, compact felspar, and felspar porphyries; while the softer and more earthy varieties are known as claystones, claystone porphyries, amygdaloids, trap-tuffs, and wackes. *Basalt* (which see) is the most compact, the hardest, and the heaviest of the trap-rocks. The hill scenery of trappean districts is often picturesque.

**Trapa** (trapa), a genus of plants, order Onagraceæ, consisting of several species, floating in water, and having long jointed root-stocks, with hair-like roots. They yield edible seeds. *T. natans* of Central and Southern Europe has received the name of water-caltrops from its four-horned fruits. These, which are called Jesuits'-nuts in Italy, and water-chestnuts in France, are ground into flour and made into bread in the south of Europe. *T. bispinosa* yields the Singhara-nuts of Northern India.

**Trapani** (trā'pā-nē; ancient, *Drepanon* or *Drepanum*), a fortified seaport town in Sicily, capital of the province of the same name, 47 miles w. s. w. of Palermo, on a peninsula shaped like a sickle, and hence its ancient name, from the Greek *drepanē*, a sickle. It has a cathedral of no great merit, lyceum, nautical school, etc. There is a good trade, and the fisheries are extensive. At a short distance E. N. E. of the

## Trap-door Spider

town is Mount San Giuliano, the ancient Eryx. (See *Eryx*.) Pop. 68,988.

## Trap-door Spider, a name given to

certain spiders that have the habit of constructing tubular dwellings in the ground, some-



Trap-door Spider and Nest.

times a foot or more in depth, and an inch or so in diameter, closed by a sort of hinged door. They belong to several genera, and are found in Southern Europe, Western United States, and elsewhere. The dwelling is lined with the silky substance spun by the insect, and the hinge of the door is formed of the same, the door itself being constructed sometimes of earthy particles connected by threads,

sometimes of leaves, etc. Some species construct nests that have a main tube and one or more branches, the latter having a door where they join the main tube. *Cteniza Sauvagei* of Corsica, *Nemesia* (*Mygdale*) *cementaria* of S. W. Europe, and *Cteniza Californica* of the United States are examples.

## Trapezoid

(trap'e-zoid), or TRAPEZIUM, a quadrilateral figure of unequal sides, and consequently unequal angles. It is different from a parallelogram, which is a quadrilateral figure with the opposite sides



lateral figure equal.

**Trappe, LA.** TRAPPISTS. See *La Trappe*.

**Trasimenus, LACUS.** See *Perugia, Lago di*.

**Trass,** a volcanic production, consisting of ashes and scorice thrown out from the ancient Eifel volcanoes, on the Rhine, near Coblenz. It is equivalent, or nearly so, to the puzzolana of the Neapolitans, and is used as a cement. The same name is given to a coarse sort of plaster or mortar made from several other argillio-ferruginous minerals, used to line cisterns and other reservoirs of water.

**Traun** (troun), LAKE OF, a small but beautiful lake in Upper Austria near the town of Gmunden. The river Traun passes through the lake and enters the Danube.

**Trautenau** (trou'te-nou), a town of Northern Bohemia, in

the valley of the Riesengebirge, with flax-spinning and other industries. Pop. 16,096.

**Travancore** (trav-an-kör'), a native Indian state, subsidiary to the presidency of Madras, occupying the extreme southwest of the peninsula; area, 7091 square miles. It is for the most part hilly, and is bounded on the east by the Western Ghats, elsewhere chiefly by the sea, having Cape Comorin in the extreme south. The climate is healthy, and the soil fairly fertile. The principal products are iron, plumbago, timber, pepper, areca nuts, sugar, cocoa, coffee, tea, etc. Pop. 2,952,157.

## Traveler's Tree

(*Ravenna Madagascariensis* or *Urania speciosa*), an arborescent plant, native of Madagascar, having the appearance of a palm about 30 feet in height and forming the only species of the genus to which it belongs. Its trunk terminates in a bundle of leaves, each of which is borne by a petiole 6 or 8 feet in length and has a blade about 6 feet long. The seeds of this tree, ground into flour, are eaten by the natives, and the water contained in the cup-like sheaths of its leaf-stalks was formerly believed to be an aid to travelers.

**Traveling Sidewalk,** a platform moving in a continuous manner with a uniform rate of speed for the purpose of transportation. It was first suggested in 1870, but not put to practical use until 1893, at the Columbian Exposition, Chicago. One with three parallel platforms was a feature of the Paris Exposition, 1900. It was a belt or loop railway, with one or more intermediate steps between the first stationary and the third fast-moving platform, which was furnished with seats. Two speeds enabled a passenger to mount or alight easily on or from the rapid platform. In some cities this principle is taken advantage of in the large stores as a traveling stairway or escalator.

**Traverse City** (trav'ers), a city, county seat of Grand Traverse Co., Michigan, on the west arm of Grand Traverse Bay, 147 miles N. of Grand Rapids. It has a good harbor and is a summer resort. Here is the Traverse City State Hospital. The manufactures are fruit baskets, wooden dishes, furniture, etc., and it is a fruit and potato center. Pop. 12,115.

**Travertine** (trav'ertēn), a white concretionary limestone, usually hard and semicrystalline, de-

posited from the water of springs holding carbonate of lime in solution. Travertine is abundant in different parts of



Travertine with impressions of leaves.

Italy, and a large proportion of the edifices of ancient and modern Rome are built of this stone.

**Travnik** (trāv'nĕk), a town of Bosnia, on the Lasva. It has a garrison of Austrian troops. Pop. 6261.

**Trawling** (trā'ling), a mode of fishing in which a net in the form of a large bag, with a strong framework keeping the mouth properly distended, is dragged along the bottom of the sea. It is the mode chiefly adopted in deep-sea fishing, and in British waters has largely developed in recent years, being much prosecuted by small steam vessels specially built for the purpose, but it is not allowed within three miles of the shore. Cod, whiting, and other white fish are taken by it in large numbers, and some kinds of flat fish, as soles, can scarcely be taken in any other way. Trawling can be practiced only on a smooth bottom, as a rough bottom would destroy the net. See *Net*.

**Traz-os-Montes** (trāsh-os-mōn'tāsh; trāz-ōs-mōn'tēs), Beyond the Mountains'), a northeast frontier province of Portugal; area, 4260 square miles. The province is fertile in parts, and the wine-growing district of Alto Douro is the native country of port. The chief towns are Villa Real and Braganza. Pop. 427,358.

**Treacle** (trē'kl). See *Sugar*.

**Treacle-mustard**, a name for the plant *Erysimum cheiranthoides*, also called *worm-seed*. See *Erysimum*.

**Tread-mill**, an instrument of punishment, of modern origin, consisting of a large wheel, about 20 or

25 feet wide, with steps on its external surface, upon which criminals are placed. Their weight sets the wheel in motion, and they maintain themselves in an upright posture by means of a horizontal bar fixed above them, of which they keep hold while moving their feet from step to step. The power thus obtained may be applied to the same purpose as water-power, steam, etc. The tread-mill has recently been abandoned in most penitentiaries. It was introduced into the prisons of Great Britain about 1820.

**Treason** (trē'zn), *HIGH*. Treason, the *crimen læsæ majestatis* of the Roman law, is that crime which is directly committed against the supreme authority of the state, and is considered to be the greatest crime that can be committed. Formerly in England certain offenses against private superiors were ranked as *petit* or *petty treason*, and it was in opposition to such offenses that treason against the sovereign was called high treason; eventually high treason was made the only treason. In a monarchy it is considered to be the betraying or the forfeiting of allegiance to the monarch; but in a republic it has reference to the government or the whole community. The concealment of treason is called *misprision* of treason. (See *Misprision*.) In the United States treason consists in levying war by a citizen against the country, or adhering to its enemies. The penalty is death.

**Treason-felony**, a term commonly used in Britain to designate such offenses as seeking or intending to deprive the sovereign of any of the royal powers or prerogatives, to levy war within the realm in order to forcibly compel a change in the royal measures, to intimidate either house of Parliament, or to excite an invasion in any part of the country. Treason-felony is punishable with penal servitude for life or for a term not less than seven years, or with imprisonment for a term not exceeding two years with or without hard labor.

**Treasure Trove** (trēzh'ur trōv), coin, gold, silver-plate, or bullion found hidden in the earth or in any private place, the owner of which is not known. In Britain such treasure belongs to the crown; but if the owner is known, or is ascertained after the treasure is found, the owner and not the crown is entitled to it. It is, however, the practice of the crown to pay the finder the full value of the property on its being delivered up. On the other hand, should the finder conceal or appropriate it he is guilty of an indictable

offense punishable by fine and imprisonment. In the United States such treasure, under the common law, belongs to the government, though the right is seldom, if ever, enforced. If the treasure is found on the surface, not hidden in the earth, the law is construed that the finder, not the government, is entitled to it.

**Treasury** (tréz'h'ur-i), the department of a government which has control over the management, collection, and expenditure of the public revenue. The Treasury department in the United States is in charge of the Secretary of the Treasury, appointed by the President and Senate, and a member of the President's Cabinet. It has sole charge of the national finances, under the laws of Congress, collects the revenue, pays all expenditures, audits all accounts, has charge of public buildings, national banks, coinage and paper money.

**Treaty** (tré's'ti), an agreement, league, or contract between two or more nations or sovereigns formally signed by commissioners properly authorized, and ratified by the several sovereigns or the supreme power of each state. Some of the great world treaties were the congress of Vienna (see *Vienna, Congress*), which assembled on November 1, 1814, to reorganize the political system of Europe after the first overthrow of Napoleon; the misnamed 'Holy Alliance' (q. v.) of 1815; the congress of Aix-la-Chapelle (q. v.), held in 1818, terminating the military occupation of France; the congress of Berlin (q. v.) at the close of the Russo-Turkish war of 1877-78. Transcending in importance all other treaties were those concluded in 1919, following the great European war (q. v.) of 1914-18. (See the following articles, also *Peace, International; League of Nations; Arbitration, International*.)

### Treaty of Peace with Germany.

This treaty, which formally ended the European war (q. v.), was drawn up at a conference at Paris (see *Peace, International*) and was signed at Versailles June 28, 1919. The signatory powers were the United States, the British Empire, France, Italy, Japan, Belgium, Bolivia, Brazil, China, Cuba, Ecuador, Greece, Guatemala, Haiti, Hedjaz, Honduras, Liberia, Nicaragua, Panama, Peru, Poland, Portugal, Roumania, Serb-Croat-Slovene State (Yugoslavia), Siam, Czechoslovakia, Uruguay and Germany. China refused to sign because of the clauses assigning to Japan the German rights in Shantung (see *Kiao-Chau*).

Part I of the treaty comprises the Covenant of the League of Nations, which

functions through a Council and an Assembly. The Council consists of the first five signatory powers and four others to be selected. The Assembly consists of representatives of all members of the League (including representatives of Canada, Australia, South Africa, New Zealand and India). Members have each one vote and not more than three representatives. Article ten of this Covenant pledges the members to 'respect and preserve as against external aggression the territorial integrity and existing political independence of members of the league. Nothing in the league is deemed to affect the validity of international engagements, such as treaties of arbitration or regional understandings like the Monroe Doctrine, for securing the maintenance of peace.' Colonies and territories taken from the central powers and not yet able to stand alone shall be governed by mandatories on behalf of the league.

Part II defines the revised boundaries of Germany, in accordance with the cessation of territory agreed to in later clauses.

Part III deals with political clauses for Europe. Germany recognizes the full sovereignty of Belgium over the contested territory of Moresnet (Moresnet Neutre) and renounces in favor of Belgium all rights and title over Prussian Moresnet west of the road from Liège to Aix-la-Chapelle. Belgium is given rights and title over Eupen and Malmédy, plebiscites to be taken later. The Grand Duchy of Luxembourg ceases to form part of the German Zollverein. As compensation for destruction of coal mines in northern France, Germany cedes to France the coal mines in the Sarre (Saar) Basin, the government of this territory to be entrusted to a commission of the League of Nations; at the end of fifteen years a plebiscite will be taken to determine permanent nationality of inhabitants. The territories of Alsace and Lorraine, ceded to Germany by France in 1871, are restored to French sovereignty as from the date of the armistice, November 11, 1918. Germany acknowledges and will respect strictly the independence of Austria; this independence shall be inalienable, except with the consent of the League of Nations. The complete independence of the Czech-Slovak state is recognized, to include 'the autonomous territory of the Ruthenians to the south of the Carpathians.' A part of Silesia is renounced in favor of Czechoslovakia. Germany recognizes the complete independence of Poland, and renounces in her favor certain territory in the German provinces of East Prussia, West Prussia, Posen and Silesia. Germany renounces all rights over Danzig, which is made a free city within the



Polish customs frontiers. The frontier between Germany and Denmark (Schleswig) to be fixed by plebiscite. Fortifications, military establishments, and harbors of Heligoland to be destroyed by German labor and at German expense. Germany accepts the abrogation of the Brest-Litovsk treaty (see *Russia*).

Part IV includes Germany's renunciation of her rights and titles over her overseas possessions. In this part occurs the much discussed Shantung clauses, in which Germany renounces 'in favor of Japan' all her rights, titles and privileges—particularly those concerning the territory of Kiaochow, railways, mines and submarine cables, which she acquired in 1898, and of all other arrangements relative to the province of Shantung. The cables from Tsingtao to Shanghai and from Tsingtao to Chee Foo are acquired by Japan. The movable and immovable property owned by the German state in the territory of Kiaochow is acquired by Japan.

Part V provides for the reduction of the strength of the German military force to 200,000 within three months, and a further reduction to 100,000 after March 31, 1920; conscription is abolished; all forts in German territory to the west of a line 50 kilometers east of the Rhine shall be dismantled; naval force reduced to six battleships, six light cruisers, twelve destroyers, twelve torpedo boats; no submarines to be included; personnel not to exceed 15,000. The armed forces of Germany must not include any military or naval air forces.

Part VI provides for the repatriation of prisoners of war and makes arrangements for caring for the graves of soldiers and sailors.

Part VII arraigns William II, formerly German Emperor, for 'a supreme offense against international morality and the sanctity of treaties.' Germany agrees to the trial of the ex-Kaiser by an international high court.

Part VIII deals with reparation. Germany accepts full responsibility for all damages caused to the allied and associated governments and their nationals and must begin to reimburse all civilian damages with an initial payment of 20,000,000,000 marks during 1919, 1920 and the first four months of 1921. The full amount of Germany's reparation is to be determined by a Reparation Commission. Germany undertakes to deliver to France 7,000,000 tons of coal per year for ten years; to Italy, 34,500,000 tons from 1920 to 1924; to Belgium 8,000,000 tons annually for ten years. Germany is to pay shipping damages on a ton-for-ton basis by a cession of a large part of her

merchant, coasting and river fleets, and will devote her economic resources to the rebuilding of the devastated regions. Germany must make reparation also by delivering large numbers of horses, cows, sheep and goats to France and Belgium. A commission is to determine what quantities of dyestuff and chemical drugs are to be delivered by Germany. Rights in thirteen cables, including the two Emden-Azores and the two Azores-New York cables are renounced in favor of the principal allied and associated powers. Various trophies, archives and works of art, including the original Koran of the Caliph Othman (to be given to the King of the Hedjaz); and the skull of the Sultan Mkwawa (Ochwawa), which was removed from German East Africa (to be given to the British government), are to be restored.

Part IX contains the financial provisions. Among other things, Germany agrees to pay the cost of the armies of occupation so long as maintained; this to be a first charge on German resources.

Part X is entitled 'Economic Clauses' and sets forth arrangements for payment of pre-war debts, etc.

Part XI provides that aircraft of the allied and associated governments shall be given full liberty of passage and landing over and in German territory and equal treatment with German planes in the use of German airdromes.

Part XII deals with ports, canals and railways, providing for the internationalizing of the Elbe from the junction of the Vltava, the Vltava from Prague, the Oder from Oppa, the Niemen from Grodno, and the Danube from Ulm; the opening of the Kiel Canal to free passage of war and merchant ships of nations with which Germany is at peace; the establishing of a General Rhine Commission; and arrangements for railroad and terminal facilities to aid Czecho-Slovakia.

Part XIII establishes an international labor organization.

Part XIV deals with the occupation by the Allies of German territory for fifteen years, or less, according as Germany fulfils her obligations.

Part XV has a number of miscellaneous provisions, dealing with the Swiss-French arrangements for the control of Haute-Savoie and Gex.

These fifteen parts (comprising 440 articles) constitute the treaty of peace with Germany, some 80,000 words, the longest treaty ever drawn.

On behalf of the United States, President Wilson and his associates signed the treaty at Versailles, June 28, 1919. It was ratified by the German National Assembly July 9, 1919; by the British

## Treaty of Peace

House of Commons, July 21; by the Canadian House, Sept. 12; by France, Oct. 2; by Italy, Oct. 7; by Japan, Oct. 30, 1919. Peace became effective Jan. 10, 1920, for all the nations except the United States, which had not then ratified the treaty.

## Treaty of Peace with Austria.

There are 14 parts in the treaty with Austria, many of them duplicating the treaty with Germany. The former dual empire of Austria-Hungary is dismembered; Austria is constituted a separate state, greatly reduced in area, certain sections being ceded to Italy and Jugoslavia. The Czecho-Slovak State is recognized, as is also Jugoslavia. Austria's army is not to exceed 30,000 men; conscription is abolished; all Austrian warships to be surrendered. A Reparation Commission is to determine the amount Austria must pay. The Austrian treaty was signed at St. Germain, September 10, 1919, Dr. Karl Renner acting for the Austrians.

## Treaty of Peace with Bulgaria.

As in all the treaties of 1919, the Covenant of the League of Nations (see *Treaty with Germany*), is included in the Bulgaria treaty. Bulgaria loses portions of its territory including the important section bordering on the Aegean Sea, but the allies agree to secure to Bulgaria an economic outlet to the Aegean. The Bulgarian army is reduced to 20,000 men; no conscription. She must pay an indemnity of 2,250,000,000 francs in gold in a series of semi-annual payments beginning July 1, 1920. The treaty was signed at the Neuilly Town Hall, November 27, 1919.

**Treaty with France.** Two additional treaties, one between the United States and France and the other between Great Britain and France, were concluded at Versailles on June 28, 1919, and were signed at the same time as the German treaty. These constituted what the French called 'The Guarantee Pact,' and obligated the United States and Great Britain to come immediately to the aid of France if any unprovoked act of aggression is made against her by Germany.

**Trebbia** (treb'bā), a river of North Italy, which rises in the Apennines, and flows into the Po near Piacenza after a course of 55 miles. Here Hannibal defeated the Romans in 218 B. C., and in the vicinity the Austrians and Russians under Suvaroff defeated the French under Macdonald in 1799.

**Trebizond** (treb'i-zond; anciently *Traperus*), a seaport in

Asiatic Turkey, capital of a pashalik of the same name, on the Black Sea. It has an extensive trade, exporting silk, wool, tobacco, wax, oil, etc., from Asiatic Turkey; and silk fabrics, shawls, carpets, etc., from Persia. Pop. estimated at 40,000.

**Treble** (treb'l), in music, the highest vocal or instrumental part in a concerted piece, such as is sung by women or boys, or played by instruments of acute tone, as the violin, flute, oboe, clarinet, etc., or on the higher keys of the piano, organ, etc.: so called because it was originally a third part added to the ancient *canto fermo* and the counterpoint.

**Tredegar** (tred'e-gär), a town of England, in the county of Monmouth, 12 miles west by south of Abergavenny, on the Sirhowy. Near it are valuable mines of coal and ironstone, with extensive blast-furnaces and steel works. Pop. 18,497.

**Tree** (trē), a perennial plant having a woody trunk of varying size, from which spring a number of branches, having a structure similar to the trunk. Trees are thus distinguished from shrubs, which have perennial stems but have no trunk properly so-called; and from herbs, whose stems live only a single year. It is difficult, however, to fix the exact limit between trees and shrubs. Trees are both *endogenous* and *exogenous*, by far the greater number both of individuals and of varieties belonging to the latter class. Those of which the whole foliage falls off periodically, leaving them bare in winter, are called *deciduous*; those of which the foliage falls only partially, a fresh crop of leaves being always supplied before the mature leaves are exhausted, are called *evergreen*. Trees are the longest lived organisms of the vegetable kingdom, and attain a great and indefinite age, far exceeding that of animals. See *Arboriculture*, *Botany*, *Timber*, etc.

**Tree-crab**, a crab of the genus *Birgus*, included among the land-crabs. It breaks open the shell of the cocoa-nut, etc., by repeated blows of its great claws, in order to feed upon the soft pulp of the nut. Tree-crabs can live for long periods out of water, but deposit their eggs in the sea.

**Tree-ferns**, the name given to several species of ferns which attain to the size of trees, as the *Alsophila vestita*, *Cibotium*, *Billardieri*, etc. They are found in tropical countries. A handsome species, *Oyathia medullaris*, contains in its trunk a mucilaginous pulp comparable to sago, which is used ex-

tensively for food in Polynesia and New Zealand.

**Tree-frog**, a name of frogs differing from proper frogs in the extremities of their toes, each of which is expanded into a rounded viscous pellet that enables the animals to adhere to the surface of bodies and to climb trees, where they remain during the summer feeding upon insects. *Hyla versicolor*, of the Northern and Middle United States, is very noisy towards evening.

**Trefoil** (tré'foil), a distinctive title applied to plants of various kinds on account of a peculiarity of the form of the leaf, which consists of three leaflets; examples, buckbean, clover, and medick. The same term is also applied to an ornamental foliage in Gothic architecture, used in the heads of window lights, tracery, paneling, etc.

**Trematoda** (trem-a-tô'da), a division of Scolecida, belonging to the group of Platyelmia or flat-worms, and represented by such forms as the flukes or Distomæ (see *Distoma*) and their allies. They are parasitic worms, usually of a flattened or rounded form, and are furnished with one or more suckorial pores, like minute cupping-glasses, for adhesion to the tissues of their hosts.

**Tremolite** (trem'u-lit), a mineral, a variety of hornblende. It is a silicate of calcium and magnesium, is white or colorless, and usually occurs in long, prismatic crystals.

**Trench**, **RICHARD CHENEVIX**, ecclesiastic and philologist, was born at Dublin, in 1807, and was graduated at Cambridge in 1829. He entered the church, and eventually became dean of Westminster (1856-63), and archbishop of Dublin, 1864. He was the author of a collection of poems, and a popular writer on philological and theological subjects. His works include *Notes on the Parables* (1841), *Notes on the Miracles* (1846), *On the Study of Words* (1851), *Proverbs and their Lessons* (1853), *Synonyms of the New Testament* (1854), *English Past and Present* (1855), *On Plutarch* (1874), *Lectures on Mediæval Church History* (1878), and many others. He died March 28, 1886.

**Trenches**, the name given in general to all those works which are used in attacking a fortress. See *Siege, Sap, Fortification*.

**Trent**, a river of England which rises in Staffordshire, 4 miles north of Burslem. It flows through the counties of Stafford, Derby, Nottingham, and Lincoln, and falls into the Humber after a course of 144 miles. It is navigable

as far as Gainsborough, 25 miles, by vessels of 200 tons, and more than 100 miles by barges.

**Trent** (German, *Trient*, Latin, *Tridentum*), a town in the Tyrol, formerly in the Austro-Hungarian empire, picturesquely situated on the left bank of the Adige. It has a Romanesque cathedral dating from 1212 and many other interesting buildings, including the church of Santa Maria Maggiore, where the Council of Trent (see next article) convened. It is a place of great antiquity, once a Roman colony, called Tridentum; was made a bishopric before 380; passed under Austrian control in 1803; ceded to Italy in 1919 (see *Treaty*). Pop. 30,000.

**Trent**, **COUNCIL OF**, a celebrated œcumenical council of the Roman Catholic Church, convened to settle various controversies that were agitating the church during the Reformation period, and for the reform of abuses. It met during the pontificate of Paul III at Trent in 1545, but the wars in Germany caused its transference to Bologna in 1546, when it dispersed. Pope Julius III again convoked it at Trent in 1551, but it dispersed a year later on the approach of the Lutherans. Eight years afterwards it was again called together by Pius IV, and it finished its labors in 1563. This council definitively settled the doctrines of the Roman Catholic Church.

**Trent Affair**. In October, 1861, Capt. Charles Wilkes, United States Navy, intercepted at sea the British mail steamer *Trent* bound from Havana to St. Thomas, and took off two Confederate commissioners, accredited to France, Messrs. Mason and Sildell, who were among her passengers. They were taken to Boston, and imprisoned at Fort Warren, but were released on Jan. 1, 1862, on the demand of the British government, and permitted to proceed to Europe. The affair created intense excitement at the time, but Secretary Seward accepted England's demand as an adoption of the American doctrine which denied the right to search, and on that basis gave up the captives. The demand, however, gave rise to much irritation.

**Trenton** (tren'tun), a city, capital of Grundy Co., Missouri, is on a branch of the Grand River, 102 miles N. E. of Leavenworth, Kansas. It is the seat of Ruskin College and has railroad shops and flour mills. Pop. 5656.

**Trenton**, a city, the capital of New Jersey, on the Delaware at the head of tide-water and steamboat navigation, 29 miles N. E. of Philadelphia.

It is laid out with great regularity, and has a state-house, court-house, state-prison, state hospital for insane, armory, reform home for girls, normal and model schools, and a Roman Catholic college. The manufactures are large and numerous, including extensive pottery works, wire-cable and other iron works, steam turbines, and various others. Pop. 108,000. The battle of Trenton, perhaps more than any other, decided the success of the Revolution, by giving new courage and confidence to the people. On the morning of December 25, 1776, Washington, with about 2500 men, crossed the Delaware River from the Pennsylvania side, eight miles above Trenton. After a forced march, he surprised Col. Rall, the Hessian general, and captured his entire force.

**Trepang** (tre-pang'), the sea-slug, a marine animal of the genus *Holothuria*, belonging to the class Echinodermata, order Holothuridae, popularly known as 'sea-cucumbers,' or bêche-de-mer.

**Trepanning** (tre-pan'ing), the operation of cutting a circular opening into the skull by means of a surgical instrument called a *trepan* or *trepine*. This consists of a handle, to which is fixed a small hollow steel cylinder, of about  $\frac{1}{2}$  to 1 inch in diameter, having teeth cut on its lower edge so as to form a circular saw. Trepanning is especially resorted to for the purpose of relieving the brain from pressure, as in fracture of the skull or in cerebral abscess.

**Trespass** (tres'pas), in law, a term which is applied generally to any offense against the person or property of another, but is more especially applied to a peaceable but unlawful entry upon the property of another, the remedy for which is by action of damages. Any injuries committed against land or buildings are in the most ordinary sense of the word trespasses, as entering another's house without permission, walking over the ground of another, or suffering any cattle to stray upon it, or any act or practice which damages the property, or interferes with the owner's or occupier's rights of possession. A creditor or customer can be ordered away by a householder or shopkeeper, and even the civil courts have no power to give a right of entry to officers intrusted with the execution of legal processes, though

such officers may maintain possession if once they gain entrance. Malicious trespass is a willful, or malicious, or mischievous injury of property, real or personal.

**Trevelyan** (tre-vel'yan), Sir GEORGE OTTO, nephew of Lord Macaulay, born in 1838. He was educated at Harrow, was graduated at Trinity College, Cambridge, and entered the Indian civil service by competition. He was elected to parliament in 1865, and with the exception of a short interval always followed Gladstone's lead, holding several cabinet positions. He is the author of the *Life and Letters of Lord Macaulay*, *Early History of Charles James Fox*, *History of the American Revolution*, etc.

**Treves** (trévs; German *Trier*, Lat. *Augusta Trevirorum*), a town in the province of Rheinland, Prussia, on the right bank of the Moselle. It is considered the oldest city in Germany, and contains many Roman remains. It is surrounded by walls, and is indifferently built. The chief buildings are the cathedral, built at various times from the sixth century downwards, and containing the Holy Coat (see *Holy Coat of Treves*); the Liebfrauenkirche, or Church of our Lady, an elegant Gothic structure; and the old archiepiscopal palace, now used as a barracks. The Roman remains include an amphitheater, the Porta Nigra (Black Gate), baths, etc. Treves became a Roman colony under Augustus, and subsequently it was the residence of several emperors. It rose to great splendor under the archbishop-electors, who exercised great political influence in Germany. From 1473 to 1797 it had a university. Pop. 43,324.

**Treviso** (trá-vé'só), a town of Italy, capital of the province of Treviso, 15 miles N. N. W. of Venice, on the Sile. It is a walled town with spacious streets and large squares, and has a great number of handsome buildings. The manufactures consist chiefly of silk and cotton goods, machinery, and cutlery. Pop. 16,933.

**Trevithick** (trav'i-thik), RICHARD, engineer and inventor, born in Cornwall in 1771; died in 1833. In 1797 he succeeded his father as a leading engineer in Cornish mining. Among his most inventions was an improved pump, which soon came into universal use in deep mining. He next perfected a high-pressure steam-engine, and began to experiment in the construction of locomotive engines. Passengers were first conveyed by steam by



Trepang  
(*Holothuria edulis*).

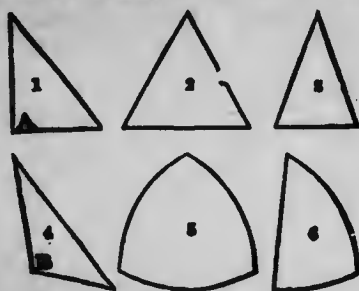


means of his road locomotive in 1801, and he soon after successfully worked a tramroad locomotive. His ideas were afterwards taken up and developed by Stephenson. He was the first to recognize the value of iron in shipbuilding, and the application of steam to agriculture. His request for recognition and reward for his numerous inventions was disregarded by the government, and he died in poverty.

**Triad** (tri'ad), a trinity, a unity of three. In Welsh literature, the name is given to a class of ancient compositions—moral and historical—comprising enumerations of particulars bound together in knots of three. The *Hindu Triad*, *Trimurti*, or trinity, consists of the three deities *Brahma*, *Vishnu*, and *Siva*, considered as an inseparable unity.

**Trial**. See *Jury and Procedure, Civil*.

**Triangle** (tri'ang-gl), in geometry, a figure bounded by three lines and containing three angles. The three angles of a plane triangle are equal to two right angles or  $180^\circ$ , and its area is equal to half that of a rectangle or parallelogram of the same base and altitude. The triangle is the most important figure in geometry, and may be considered the element of all other figures. If the three lines or sides of a triangle are all straight, it is a *plane* or *rectilinear triangle*, as in figs. 1, 2, 3, 4. If all the three sides are equal, it is an *equilateral triangle*, as in fig. 2. If two of the sides only are equal, it is an *isosceles triangle*, fig. 3. If all the



Triangles.

three sides are unequal, it is a *scalene triangle*, fig. 4. If one of the angles is a right angle, the triangle is *right-angled*, as fig. 1, having the right angle at A. If one of the angles is obtuse, the triangle is called *obtuse-angled*, as fig. 4, having the obtuse angle B. If all the angles are acute, the triangle is *acute-angled*, as figs. 2, 3. If the three

lines of a triangle are all curves, the triangle is said to be *curvilinear*, as fig. 5. If one or two of the sides are straight and others or other curve, the triangle is said to be *mixtilinear*, fig. 6. If the sides are all arcs of great circles of the sphere, or arcs of the same circle, the triangle is said to be *spherical*.

**Triangulation**, a method used in surveying. See *Trigonometrical Survey*.

**Trias**, TRIASSIC SYSTEM. See *Geology*.

**Tribune** (trib'un; trib'unus), in Roman antiquity, originally an officer connected with a tribe, or who represented a tribe for certain purposes; especially, an officer or magistrate chosen by the people to protect them from the oppression of the patricians or nobles, and to defend their liberties against any attempts that might be made upon them by the senate and consuls. These magistrates were at first two, but their number was increased to five and ultimately to ten. This last number appears to have remained unaltered down to the end of the empire. There were also military tribunes, officers of the army, each of whom commanded a division or legion, and also other officers called tribunes; as, *tribunes of the treasury*, of the horse, etc. See *Rome (History)*.

**Trichina** (tri-ki'na), a minute nematoid worm, the larva of which was discovered in 1835 in the tissue of the voluntary muscles of man, giving rise to a disease since known as *trichiniasis* or *trichinosis*. The worm is common also to several other mammals, especially to the pig, and it is generally from it that man receives the disease. When a portion of flesh, say of the pig, containing larvae is taken into the stomach the larvae in a few days become developed into procreative adult worms, having in the meantime passed into the intestines. The male worm is about  $\frac{1}{16}$ th of an inch long, the female about a half more. The female produces embryos in extraordinary numbers, which gain entrance into the muscles by penetrating the mucous coat of the intestine and entering the capillaries, whence they are carried to their habitat by the circulation. There they disorganize the surrounding tissue, setting up at the same time morbid action in the system, manifested by swelling of the face, body, and limbs, fever, pains, etc., and resulting sometimes in death. In the muscles they become quiescent, are encased in a cyst covered with calcareous matter, and may give no more trouble. Thorough

cooking kills the trichinae, and thus prevents infection.

**Trichiniasis**, *TRICHINOSIS* (trik-i-ni'a-sis, trik-i-nō'sis), a painful and sometimes fatal disease produced in man by eating meat, especially the flesh of pigs, either raw or insufficiently cooked, infested with *trichinae*. See *Trichina*.

**Trichinopoly** (trich-in-op'ō-ii), a town of British India, capital of district of same name, in the presidency of Madras, on the right bank of the Cavery. It is a military station, and contains a citadel on a granite peak 500 feet high, which commands the surrounding country. The native town lies at the foot of the rock, and beyond it are the European quarters, barracks, hospitals, St. John's Church, with the tomb of Bishop Heber, a Roman Catholic chapel, etc. Pop. 122,028.

**Triclinium** (tri-klin'i-um), among the Romans the dining-room where guests were received, furnished with three couches, which occupied three sides of the dinner table, the fourth side being left open for the free ingress and egress of servants. On these couches, which also received the name of triclinium, the guests reclined at dinner or supper. Each couch usually accommodated three persons.

**Tricolor** (tri'kni-ur), the French national flag, or one formed after the model of it. The French tricolor is blue, white, and red in equal vertical sections, the blue being next the flag-staff.

**Tricoupis, Trikupis** (tri-kō'pis), *CHARILAOS*, a Greek statesman, born at Nauplia in 1832; died in 1896. He became minister of foreign affairs in 1866, and premier in 1875 and on several later occasions, and was active in efforts for the development of Greece. Failing in his efforts to relieve the country from its financial difficulties, he was crushingly defeated in the election of 1896.

**Tricycle** (tri'si-ki), a three-wheeled variety of velocipede, introduced about 1878, and therefore subsequently to the bicycle. The earliest patterns were rear-steering, but were soon superseded by front-steering machines, the latter being steadier. Tricycles were first worked by pedaled levers, but this form soon gave way to the rotary action, which is produced by a cranked axle to which the pedals are fixed. This axle is connected by chains running on toothed wheels with the driving axle. The positions and sizes of the wheels, and the steering gear, vary nearly in every make.

**Tridacna**. See *Clam*.

**Tridentine Council**, the Council of Trent. See *Trent* and *Trent, Council of*.

**Trieste** (tri-es'te), an important seaport of Italy, on a gulf of the same name at the northeastern extremity of the Adriatic, formerly comprising with surrounding territory a crownland of Austria. The old town, on an acclivity crowned by a castle, has steep and narrow streets, but in the new town the streets are spacious and well paved, and there are handsome thoroughfares and squares. The chief buildings are an ancient cathedral in the Byzantine style, and the exchange block. Until the disruption of the Austro-Hungarian monarchy in 1918, Trieste was the chief Austrian port and the most important trading place in the Adriatic and has now very extensive harbor accommodation. It was the storehouse for the Austrian navy. The Austrian Lloyd's shipbuilding company constructed vast wharves, and many ships have been built here. The Latin name of Trieste was *Tergeste*. It became a part of Austria in 1382. Ceded to Italy in 1919, following the European war. Pop. of city 161,000.

**Trifolium** (trā-fō'lli-um), the Trefol or Clover, a genus of low herbs, with the leaves, as a rule, digitately trifoliate and with red, purple, white, or yellow flowers, rarely solitary. There are about 150 species, chiefly found in the northern hemisphere, abounding in Europe and many of them natives of the United States. Several of the species are very useful in agriculture, both as pasture plants and from their power of enriching the soil. This arises from their roots being infected by certain nitrogen-fixing germs, through the action of which the clovers add to the nitrogenous contents of the soil. The true clovers have herbaceous, not twining stems, roundish heads or oblong spikes of small flowers, the corolla remaining in a withered state until the ripening of the seed. The most important to the farmer is the common Red Clover (*T. pratense*), a native of Europe, but naturalized in all parts of the United States, widely cultivated and growing freely in meadows and pastures. The White or Dutch Clover, Creeping Trefol, or Shamrock (*T. repens*) is found in most parts of North America and Europe, nearly always springing up where a barren heath is turned with the spade or plough. It is a valuable feeding plant in dry and thin soils, and its spontaneous growth in a meadow is hailed as a sign of improving conditions. In laying down permanent pastures, except in strong land, it should be somewhat

## Triforium

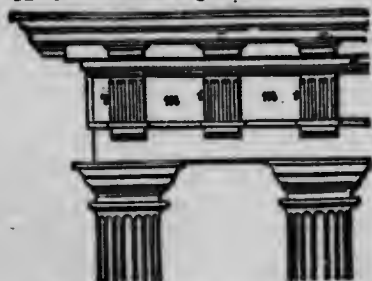
freely employed. A four-leaved clover is hailed by the superstitious as a sign of good luck, though clovers with four or even more leaves are not very rare. Yellow Clover (*T. agrarium*) is also very common in parts of the United States and Enrope. See *Clover*.

**Triforium** (tri-för'i-um), in Gothic churches, a gallery or open space between the arches of the nave and the roof of the aisles below the clerestory, lighted by windows opening into the interior of the building. See *Clerestory*.

**Trigger-fishes** (*Balistes*), a genus of teleostean fishes, so-named from the peculiar structure of the dorsal fin, the first ray or spine of which can only be depressed by the movement of the second ray—the mechanism being thus like that of a gun-trigger.

**Triglidae** (trig'li-dē), a family of very peculiar sea-fishes, mostly known as gurnards, sea-robins, etc. Their angular heads, 'malled cheeks' and many curious and ugly knobs and appendages make them well marked and much disliked, though they are harmless and many of the species fit for food. The most peculiar appendages are those of the pectoral fins, by which the fish actually walks along the bottom and which it uses in its search for food, these fin-appendages having special nerves which make them highly sensitive organs of touch. The triglidae are distributed over all the warmer parts of the ocean, dwelling always near shore. The species number more than forty.

**Triglyph** (tri'gliif, trig'lif), in architecture, is an ornament in the frieze of the Doric order, repeated at equal intervals. Each triglyph consists of two entire gutters or channels



Frieze of Roman Doric Order.

t t t, Triglyphs.

m m, Metopes.

cut to a right angle, called *glyphs*, and separated by three interstices, called *femora*.

**Trigonometrical Survey** (trig-u-no-met'ri-kal), the survey of a

## Trigonometry

country which is carried on from a single measured base-line, by trigonometrical computation made from observed angular distances. The most minute accuracy and the most perfect instruments are required in all the practical parts of such operations; and it becomes necessary to have regard to the curvature of the earth's surface, the effects of temperature, refraction, altitude above the level of the sea, and a multitude of circumstances which are not taken into account in ordinary surveying. In conducting trigonometrical survey of a country, signals, such as spires, towers, poles erected on elevated situations, or other objects, are assumed at as great a distance as will admit of distinct and accurate observations by means of telescopes of considerable power attached to the instruments used in measuring the angles. In this way, starting from a measured base-line, the country will be divided into a series of connected triangles called *primary triangles*; and any side of any one of these being known, the remaining sides of all of them may be computed by trigonometry. By means exactly similar, each of these triangles is resolved into a number of others called *secondary triangles*; and thus the positions of towns, villages, and other objects are determined. The length of the base or line measured, which is an arc of a great circle, must be determined with extreme accuracy, as an error in measuring it would affect the entire survey.

**Trigonometry** (trig-u-nom'e-tri), the science of the measurement of triangles. Trigonometry, originally confined to plane triangles, now embraces two sections, *plane* and *spherical*, the former treating of triangles described on a plane, and the latter of those described on the surface of a sphere. In every triangle there are six things which may be considered, viz., the three sides and the three angles, and the main object of the theoretical part of trigonometry is to deduce rules by which, when some of these are given, the others may be found by computation. In plane trigonometry any three of the six parts of a triangle being given (except the three angles), the other parts may be determined; but in spherical trigonometry, this exception has no place, for any three of the six parts being given, the rest may thence be determined, the sides being measured or estimated by degrees, minutes, etc., as well as the angles. The mode in which trigonometrical definitions are given is as follows:—Let ABC be a right-angled triangle, then

## Trikkala

## Trinidad

$\frac{CB}{AB} = \text{sine of } A; \frac{AB}{AC} = \text{cosine of } A; \frac{BC}{AB} = \text{tangent of } A; \frac{AB}{CB} = \text{cotangent of } A; \frac{AC}{CB} = \text{secant of } A; \frac{CB}{AC} = \text{cosecant of } A; 1 - \text{cosine of } A = \text{versed sine of } A; 1 - \text{sine of } A = \text{covered sine of } A. \text{ Both plane and spherical trigonometry is divided into right-angled and oblique-angled. Solutions of triangles are worked by means of tables of the values of the trigonometrical functions, and the processes are much facilitated by the use of logarithms. See } \textit{Logarithm}.$

## Trikkala

(trăk'kă-lă), chief town of a Greek monarchy in North-west Thessaly, on the Trikkalinos River. It is the seat of an active trade. Pop. 17,809.

**Trilobites** (tril'lu-bits), an extinct and widely distributed family of paleozoic crustacea, nearly allied to the Phyllopora. Trilobites are especially characteristic of the Silurian strata; about a dozen genera appear in the Devonian, three or four in the Carboniferous, and none higher. They comprehended those species in which



Silurian Trilobite  
(*Acephus tyrannus*).



Devonian Trilobite  
(*Bronteus nobilifer*).

the body was divided into three lobes, which ran parallel to its axis. They probably fed on worms and other soft marine animals, and inhabited the bottom of the sea. When attacked they could roll themselves into a ball. No antennae or limbs have yet been detected; 'still,' says Owen, 'there can be no doubt they enjoyed such locomotive powers as even the limpet and chiton exhibit.' The lenses of the eye are frequently beautifully preserved so as to be perceptible by the naked eye. In

a few species the eyes remain undeveloped or are entirely absent. The species vary greatly in size, some species of *Paradosides* being found of a length of two feet. Probably some so-called species were only larval or transition forms of others.

**Trilogy** (tril'-u-gi), a series of three dramas, each of them in a certain sense complete in itself, yet

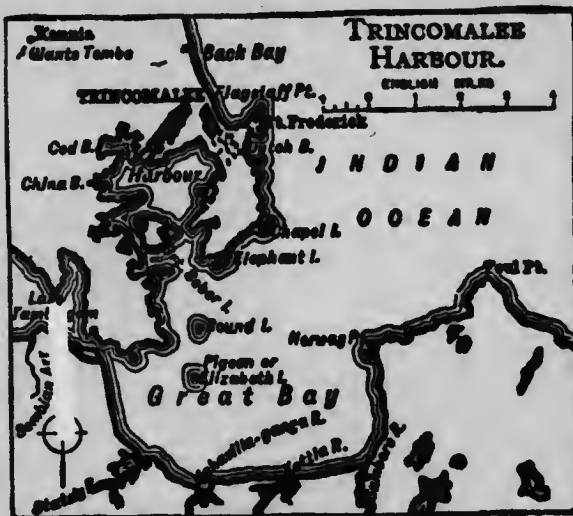
bearing a mutual relation to one another, and forming but parts of one historical and poetic picture. The term belongs more particularly to the Greek drama, where three tragedies, connected in subject, together with a humorous piece, were performed in immediate succession.

**Trimurti.** See *Triad*.

**Trincomalee** (trin-kô-ma-lé'), a maritime fortified town of Ceylon, on the east coast. It is an insignificant town, but it has a noble harbor. It was formerly the headquarters of the admiral commanding on the East Indian station with a garrison of infantry and British artillery. The town successively belonged to the Portuguese and the Dutch, and was taken by the British from the latter in 1795. Pop. 11,205.

**Tringa.** See *Sandpiper*.

**Trinidad** (trin-i-dad'), a city, county seat of Las Animas Co., Colorado, on the Purgatory River, 90 miles s. of Pueblo. Is in a coal and





## Trinidad

stock raising region. Has railway shops, foundry and machine shops and other industries. Pop. 10,204.

**Trinidad**, one of the British West Indies, India Islands, and, excepting Jamaica, the largest and most valuable. It is the most southerly of the Windward group, lies immediately off the northeast coast of Venezuela, and is about 55 miles long by 40 miles broad; area, 1755 square miles. There is a lake of mineral pitch, 104 acres in extent, containing an almost inexhaustible supply. The chief products are sugar, cocoa, molasses, rum, coconuts, pitch, timber and fruits. The climate is healthy, and, though hot, is well suited to Europeans. Trinidad is a crown colony, the public affairs being administered by a lieutenant-governor, assisted by an executive and a legislative committee. It was discovered by Columbus in July, 1491, and taken from Spain by the British in 1797. The capital, Port of Spain, on the northwest side of the island, is one of the finest towns in the West Indies. Pop. (1912) 840,000.

**Trinitrotoluol** (trin-i'tro-to'l'u-ol), popularly known as 'T.N.T.', a high explosive used for bursting charges of projectiles which has superseded wet gun-cotton. It is a compound produced by the substitution of nitro groups for hydrogen atoms in methyl benzene. It was the most powerful explosive used in the European war, 1914-18. In the preparation of T.N.T. many cases of poisoning were reported, caused by the heavy fumes emitted in the filling of shells with the heated and liquefied substances.

**Trinity** (trin-i-ti), a theological name given to the Deity as expressive of the Christian doctrine of the Triune nature of God, the union of the Father, the Son, and the Holy Spirit as Three Persons, and One God. The doctrine of the Trinity is nowhere expressly taught in the Old Testament, but in the New Testament it is clearly taught, though the word Trinity does not occur. A comprehensive statement of the doctrine of the Trinity is found in the Athanasian Creed, which asserts that 'the Catholic faith is this: That we worship one God as Trinity, and Trinity in Unity—neither confounding the persons nor dividing the substances—for there is one person of the Father, another of the Son, and another of the Holy Ghost. But the Godhead of the Father and of the Son, and of the Holy Ghost is all one; the glory Equal; the majesty co-eternal.' Difference in interpretation of the doctrine of the Trinity led to the division of the Church into the Eastern and Western.

## Tripoli

**Trio** (trē'ō, trī'ō), a musical composition for three voices or for three instruments. Also a record or subordinate division of certain musical compositions.

**Triple Alliance.** Several treaties in European politics are known by this name. The first was formed in 1668 by Great Britain, Sweden, and the Netherlands against Louis XIV; the second in 1717 by Great Britain, France, and Holland against Spain. In 1882 was formed that of Austria, Germany and Italy. From this Italy withdrew during the European war.

**Triple Entente** (on-tent'), an alliance between Great Britain, France and Russia. Great Britain remained for long outside of alliances, but at the opening of the twentieth century, owing chiefly to the efforts of Edward VII, began to enter into formal ententes, first with France and then with Russia. The Triple Entente—or Understanding—arose from a Dual Alliance between Russia formed in 1887, an informal understanding between Britain and France in 1904, and a similar understanding between Britain and Russia in 1907.

**Triplet** (trip'let), in music, a combination of three notes to be played in the time of two. They are joined by a slur and distinguished by having the figure 3 above them.

**Tripod** (tri'pod), anciently a bronze altar consisting of a caldron raised on a three-legged stand of bronze. Such was the altar of Apollo at Delphi. Tripods of fine workmanship in precious metals were placed in Apollo's temple.

**Tripoli** (trip'o-li), a country in the north of Africa, largely desert; is bounded on the north by the Mediterranean, west by Tunisia, south by Fezzan and the Libyan Desert, and east by the Libyan Desert and Barca; area, about 410,000 square miles. Its boundaries are somewhat uncertain, but it extends inland for about 800 miles. The coast-line, which is 700 or 800 miles in length, including the Gulf of Sidra, or Greater Syrtis, has only one harbor, that of the capital, Tripoli. The eastern part of the interior is mostly barren sand, but in the south and west it is diversified by mountain ranges, attaining a height of about 4000 feet. The richest tract of



Antique Tripod.

## Tripoli

Tripoli is that which stretches about 15 miles along the coast, and includes the capital. It is productive of wheat, barley, millet, and Indian-corn; oranges, pomegranates, lemons, figs, apricots, plums, and other fruits. Abundant rains fall from November to March, while from May to September the heat is intense, the sirocco often blows, and the thermometer rises at times to a high figure. The population, which in the outlying districts consists of Berbers and Bedouins, and in the town chiefly Moors, is estimated at about 1,000,000.—TRIPOLI, the capital, stands on a tongue of land projecting into the sea, has a moderately good harbor, and consists of a great number of narrow and uneven lanes, the chief buildings being the governor's castle, the great mosque, a handsome structure, synagogues, bazaars, public baths, etc. The trade across the desert extends as far as Timbuctoo and Bornou. The chief manufactures are carpets, long celebrated, other woollen goods, and leather. Tripoli, originally held by the Phœnicians, became in time part of the Roman province of Africa, and in the 8th century was conquered by the Arabs. It was taken by Spain in 1510, and assigned to the Knights of St. John, who had been driven from Rhodes by the Turks. The Knights surrendered to the Turks in 1551 and it remained a province of Turkey until 1711, when its bey became largely independent. Turkey subdued it again in 1835, and it remained a vilayet of the Ottoman empire until 1911, when Italy, which had long sought to extend its interests in Africa, invaded it and after a war continuing until October, 1912, obtained possession. The annexation of Tripoli by Italy was proclaimed in 1911 and agreed to by Turkey in 1912. Tripoli and Cyrenaica comprise the Italian possession of Libya. Pop. of capital, 30,000.

**Tripoli**, TARABOLUS, or TRIPOLIS, a seaport of Syria, capital of a pashalic of the same name, situated on the Mediterranean, 48 miles northeast of Beyrout. There is a trade in silk, wool, cotton, tobacco, galls, etc. Pop. about 30,000.

**Tripoli**, a mineral originally brought from Tripoli and used in polishing metals, marbles, glass, etc. It is a kind of siliceous rottenstone, of a yellowish-gray or white color, rough to the touch, hard in grain but not compact, and readily imbibes water. It is also found in France, Italy and Germany.

**Tripolitza** (trip-u-lit'sa), a town of Southern Greece, province of Arcadia. Previous to the revolution

## Triticum

it was the capital of Morea, but Ibrahim Pasha took possession of it in 1828 and razed it to the ground. It has been partially rebuilt. Pop. 10,465.

**Tripes**. See *Cambridge, University of*.

**Triptych** (trip'tik), a picture, carving, or other representation in three compartments side by side; most frequently such as is used for an altar-piece. The central picture is



Triptych.—Painting by Albrecht Dürer, 1465.

usually complete in itself. The subsidiary designs on either side are smaller, and frequently correspond in size and shape to one-half of the principal picture.

**Trireme** (tri'rēm), a galley or vessel with three benches or ranks of oars on each side, a common class of war-ship among the ancient Greeks, Romans, Carthaginians, etc. The trireme was also provided with a large square sail, which could be raised during a fair wind to relieve the rowers, but was never employed in action.

**Trismegistus**. See *Hermes Trismegistus*.

**Trismus** (triz'mus), a species of tetanus affecting the under jaw with spastic rigidity; locked-jaw. There are two kinds of trismus, one attacking infants during the two first weeks from their birth, and the other attacking persons of all ages, and arising from colds or a wound. See *Tetanus*.

**Tristan D'Acunha** (dā-kun'yā), the largest of three islands in the South Atlantic (the others being Nightingale and Inaccessible Island), about 1300 miles s. w. of St. Helena. It is mountainous, and one peak rises to the height of 7640 feet. The island was taken possession of by Great Britain in 1817. Pop. less than 100.

**Triticum** (trit'i-kum), the genus of grasses including wheat.

## Triton

## Troglodyte

**Triton.** See *Newt*.

**Tritonidae** (trī-ton'i-dē), a family of marine nudibranchiate, gastropodous molluscs, many of which are found on the coast of England, France, and other European countries.

**Tritons** (trī'tons), in Greek mythology, the name of certain sea-gods.

They are variously described, but their body is always a compound of the human figure above with that of a fish below. They carry a trumpet composed of a shell, which they blow at the command of Poseidon to soothe the waves.

**Triumph** (trī'umf), in Roman antiquity, a magnificent procession in honor of a victorious general, and the highest military honor which he could obtain. It was granted by the senate only to one who had held the office of dictator, of consul, or of prætor, and after a decisive victory or the complete subjugation of a province. In a Roman triumph the general to whom this honor was awarded entered the city of Rome in a chariot drawn by four horses, crowned with laurel, and having a scepter in one hand and a branch of laurel in the other. He was preceded by the senate and the magistrates, musicians, the spoils, the captives in fetters, etc., and followed by his army on foot, in marching order. The procession advanced in this order along the *Via Sacra* to the Capitol, where a bull was sacrificed to Jupiter, and the laurel wreath deposited in the lap of the god. Banquets and other entertainments concluded the solemnity. A naval triumph differed in no respect from an ordinary triumph, except that it was upon a smaller scale, and was characterized by the beaks of ships and other nautical trophies.

**Triumphal Arch.** See *Arch*.

**Triumvir** (trī-nm'vir), one of three men united in office. The triumvirs (*L. triumviri*) of Rome were either ordinary magistrates or officials, or else extraordinary commissioners who were frequently appointed to execute jointly any public office. But the men best known in Roman history as triumvirs were rather usurpers of power than properly constituted authorities. The term *triumvirate* is particularly applied in Roman history to two famous coalitions, the first in 59 B.C. between Cæsar, Pompey, and Crassus; the second in 43 B.C. between Antony, Octavian, and Lepidus. See *Rome (History)*.

**Trivandrum** (trē-vān'drūm), a town of India, the capital of

Travancore state, Madras presidency, situated about two miles from the sea. The town is of considerable importance, has a fort containing the rajah's palace and other buildings, an ancient temple, college with European instructors, medical school, hospitals, Napier museum, various handsome buildings, and a military cantonment. Pop. 57,882.

**Trivium** (triv'i-um), the name given in the middle ages to the first three of the seven liberal arts—grammar, rhetoric, and logic. The other four, consisting of arithmetic, music, geometry, and astronomy, were called the *quadrivium*. See *Arts*.

**Troad.** See *Troy*.

**Trocha** (trō'ka), derived from the Greek and meaning a circle. As known in Cuba, during the insurrection of 1895-98, it was a barrier, extending across the island, built of posts, at times three and even five deep, to which barbed wire was strung. Behind this stockade the Spanish soldiers fought. United States officers speak of its dire effectiveness.

**Trochee** (trō'kē), in prosody, a foot of two syllables, the first long and the second short, as Lat. *fāma*, or Eng. *nation*.

**Trochilidae.** See *Humming-bird*.

**Trochu** (tro-shū), LOUIS JULES, a French general, born in Brittany in 1815; educated at St. Cyr; engaged in the Algerian, Crimean, and Italian campaigns; published a pamphlet entitled *L'Armée Française en 1867*, and showed the weakness of the French army, by which he forfeited the favor of Napoleon. At the outbreak of the Franco-German war (1870), however, he was made governor of Paris, and when the republic was proclaimed he was intrusted with the defense of the city, a position which he held until the capitulation. He wrote *Pour la Vérité et pour la Justice*, and *L'Armée Française en 1879*. He died in 1896.

**Troglodyte** (trōg'lu-dit), a cave-dweller; one dwelling in a cave or underground habitation. The ancient Greeks gave the name troglodyte to various races of savages inhabiting caves, especially to the cave-dwellers on the coast of the Red Sea and along the banks of the Upper Nile in Nubia and Abyssinia, the whole of this district being known by the name Troglodytikē. It is shown by archaeological investigations that cave-dwellers in all localities probably preceded house-builders.

**Troglodytes** (-tēs), the generic name of the wrens; also that of the gorilla and chimpanzee.

**Trogon** (trō'gon), a genus of birds, the type of the family Trogonidae. The trogons inhabit the forests of the intertropical regions.

**Trois Rivières** (trwā-ri-vyār; 'three rivers'), an old city of Quebec, Canada, situated at the junction of the St. Lawrence and St. Maurice rivers. It has various thriving industries. Pop. (1913) 18,000.

**Trolley** (trol'li; electric railway). A truck which travels along overhead wires conveying an electric current, and forms a means of connection between them and a railway car. Cars moved by this system have come very widely into use and are commonly known as trolley cars. See *Electric Railway*.

**Trollope** (trol'op), ANTHONY, an English novelist, a younger son of Frances M. Trollope, was born in London in 1815; died in 1882. In 1841 he was appointed clerk to a post-office surveyor in Ireland, where his experiences gave him material for his first novels, *The Macdermots of Ballycloran* (1847), and *The Kellys and the O'Kellys* (1848), neither of which was successful. Meanwhile he was appointed inspector of rural post-offices in Ireland and parts of England, and continuing his novel-writing his first success was *The Warden* (1855), followed by *Barchester Towers* (1857), *Dr. Thorne* (1858), and numerous others. He also published accounts of his travels, including *The West Indies and the Spanish Main* (1859), *Australia and New Zealand* (1873), *South Africa* (1878), besides a *Life of Cicero* (1881), etc.—THOMAS ADOLPHUS TROLLOPE, eldest brother of the above, was born in 1810; resided chiefly in Florence; and was the author of *Impressions of a Wanderer in Italy* (1852), *Tuscany in 1849-59* (1859), *History of Florence* (1865), etc. He died in 1892.—FRANCES MILTON TROLLOPE, mother of the above, was born about 1790, and died in 1863. She was the author of *Domestic Manners of the Americans* (1831), *The Refugee in America* (1832), books which were very severe upon American life and customs.

**Trolls** (trōls), in Northern mythology, a name of certain supernatural beings, in old Icelandic literature represented as a kind of giants, but in modern Scandinavia regarded as of diminutive size, and represented as a kind of mischievous imps or goblins.

**Trombone** (trom'bōn), a deep-toned brass instrument of the

trumpet kind, consisting of three tubes; the first, to which the mouthpiece is attached, and the third, which terminates in a bell-shaped orifice, are placed side by side; the middle tube is doubled, and slides into the other two like the tube of a telescope. By the manipulation of the slide the tube of air is altered in



1, Valve Trombone. 2, Slide Trombone.

length, and the pitch accordingly varied. The trombone is of three kinds, the alto, the tenor, and the bass; and some instruments are fitted with pistons, when they are known as valve trombones.

**Tromp**, MARTIN HARPERTZON, the son of a Dutch naval officer, was born at Briel in 1597. He went to sea with his father in 1607; received the appointment of lieutenant-admiral; gained a decisive victory over the Spanish and Portuguese fleet near Dunkirk in 1639; encountered Blake and Monk in 1653, and in the same year he again encountered Monk and was killed in the battle.—His son, CORNELIUS, born at Rotterdam in 1629, was also distinguished in the naval service of his country. He died in 1691.

**Tromsø** (trom'seu), a seaport of Norway, capital of the province of Tromsø, situated on a small island of the same name off the west coast. It has an extensive trade in fish, train-oil, etc. Pop. 6955.

**Trondhjem** (trond'hyem), a seaport on the west coast of Norway, the ancient capital of the country, situated on a bay at the mouth of the Nid, on the south side of the Trondhjem-fiord. It possesses strong fortifications on the mainland and on the small rocky island of Munkholm. The chief buildings are the cathedral, which in some parts is as old as 1033; the Kongsgaard, or palace of the old Norwegian kings; and a museum, including a picture-gallery, and a library with some rare MSS. The trade consists chiefly in exports of timber, dried and salted fish, tar, and copper. Pop. (1910) 45,335.

**Troop** (trōp), a body of cavalry, usually consisting of sixty troopers, under the command of a captain and two lieutenants.



## Troopial

**Troopial** (trōp'i-al), the name common to a group of passerine birds, akin to the orioles and starlings. They mostly inhabit the Southern United States, but several of them appear as birds of passage in the Northern States in early spring. The cow-troopial, cow-bird, or cow-bunting, the blue-bird, and the bobolink or rice-bunting, belong to this group. See these articles.

**Tropæolum** (tro-pē'u-lum), a genus of handsome trailing or climbing plants, nat. order Geraniaceæ. The species are all inhabitants of South America. Some of them have pungent fruits, which are used as condiments, and others are prized for their handsome and various-colored flowers. The principal species are *T. minus*, small Indian cress, the fruit of which is pickled and eaten as capers, and *T. majus*, great Indian cress, the fruit of which is also made into a pickle. See *Nasturtium*.

**Trophy** (trō'fī), in antiquity, a monument or memorial in commemoration of some victory. It consisted of some of the arms and other spoils of the vanquished enemy, hung upon the trunk of a tree or a stone pillar by the victorious army. The custom of erecting trophies was most generally among the Greeks, but it passed at length to the Romans. It was the practice also to have representations of trophies carved in stone, in bronze, or similar lasting substance. In modern times trophies have been erected in churches and other public buildings to commemorate victories, or heroic action in war.

**Tropic-bird**, the common name of the birds belonging to the genus *Phaeton* and to the pelican family, peculiar to tropical regions. There are only two species, the *P. ætheræus* and *P. phænicūrus*. They are distinguished by two very long, slender tail-feathers. They are wonderfully powerful on the wing, being able to pass whole days in the air without needing to settle.

**Tropics** (trōp'ikz), in astronomy, two circles on the celestial sphere, whose distances from the equator are each equal to the obliquity of the ecliptic, or 23½° nearly. The northern one touches the ecliptic at the sign Cancer, and is thence called the *tropic of Cancer*, the southern one being for a similar reason called the *tropic of Capricorn*. The sun's annual path in the heavens is bounded by these two circles, and they are called *tropics*, because when the sun, in his journey northward or southward, reaches either of them, he, as it were,

turns back, and travels in an opposite direction in regard to north and south. Geographically the tropics are two parallels of latitude, each at the same distance from the terrestrial equator as the celestial tropics are from the celestial equator. The one north of the equator is called the *tropic of Cancer*, and that



Tropic-bird (*Phaeton phænicūrus*).

south of the equator the *tropic of Capricorn*. Over these circles the sun is vertical when farthest north or farthest south, that is, at the solstices, and they include between them that portion of the globe called the torrid zone, a zone 47° wide, having the equator for its central line.

**Troppau** (trōp'pau), a town, capital of the Duchy of Silesia, Austria, on the right bank of the Oppa. 78 miles northeast of Brünn. It contains a castle of the Liechtenstein family, a town house, government offices, a gymnasium, etc. The manufactures consist chiefly of woollen and linen cloth, beet-root sugar, beer, liquors, etc. Pop. 28,725.

**Troppo** (trōp'pō), in music, an Italian term for too much.

**Trossachs** (trōs'aks), a beautifully wooded mountain pass in Perthshire, extending for one mile w. from Loch Achray to Loch Katrine, and situated 8 miles w. of Callander. It was made famous by Scott in his *Lady of the Lake*.

**Trotter** (trōt'er), NEWBOLD HOUGH, artist, born at Philadelphia in 1827. He painted numerous animal subjects and three historical works representing the progress of travel in Pennsylvania. He died Feb. 21, 1898.

**Trotting Horse**, a horse trained to trot at high speed without breaking into a gallop. Trotting

horses are of two distinct races: (1) The Russian, which is Arabian on a Flemish stock, attaining high speed, but with bad knee action; (2) the American, probably both Barb and Arabian on an English stock, and the finest trotter in the world. Some of the fastest American trotters have done a mile in a few seconds under two minutes. See *Horse Racing*.

**Trotzky** (trots-ke), LEON (1878- ), Russian radical Socialist and, with Nikolai Lenine, leader of the Bolshevik group which took control of affairs in Russia following the overthrow of the Czar in 1917, and concluded a separate peace with Germany in 1918. (See *European War*, *Russia*, etc.) Trotzky was

lake trout (*S. ferox*). The common trout abounds in all the rivers and lakes of Northern Europe, and is found even in the smallest streams. A trout of 1 lb. weight is reckoned a good fish, and though a weight far in excess of that is frequent, many streams produce none nearly so large. The Lochleven trout, found in the loch of that name, is a distinct species (*S. levenensis*). The brook-trout of America is *S. fontinalis*, and the common American lake-trout *S. conifinis*. There are, however, several species of lake-trout in America, among the finest and largest of which is the Mackinaw trout or namaycush (which see). The great gray or lake trout of



Rainbow Trout (*Salmo trideus*).

sent to Siberia for participation in revolutionary plots, and later lived in Berlin. At the outbreak of the war in 1914 he went to Switzerland and later to the United States, becoming editor of the *Novi Mir* (*New World*), a Russian paper published in New York. After the abdication of Czar Nicholas Trotzky returned to Russia, joined Lenine and became foreign minister in the Bolshevik cabinet.

**Troubadour** (trō'ba-dör), a name given to a class of early poets who first appeared in Provence, in France. The troubadours were considered the inventors of a species of lyrical poetry, characterized by an almost entire devotion to the subject of romantic gallantry, and generally very complicated in regard to its meter and rhymes. As a rule its poetical merit is not high. Sometimes the martial strain is sounded. See *Trouvère* and *Provençal*.

**Trout**, the common name of various species of the genus *Salmo*, or salmon, as the bull-trout (*S. eriox*), the salmon-trout (*S. trutta*), the common trout (*S. fario*), and the great gray or

Britain weighs sometimes 30 lbs., while the North American lake-trout attains a weight of upwards of 60 lbs. The brook-trout is one of the most favorite fish of the skilled angler, from its active play after taking the hook. It is also esteemed for the table.

**Trouvère** (trō'vâr), a name given to the ancient poets of Northern France, corresponding to the *Troubadour* of Provence. Their productions partake of a narrative or epic character, and thus contrast broadly with the lyrical, amatory, and more polished effusions of the southern rivals. See *France* (*Literature*), and *Troubadour*.

**Trouville** (trō-vêl), a seaport and favorite French bathing place, department of Calvados (Normandy), at the mouth of the Touques. Pop. 5684.

**Trowbridge** (trō'brij), a market town of England, county of Wilts, on the river Biss, 25 miles northwest of Salisbury. In the parish church, which was built in the fourteenth century, there is a monument to the poet

## Trowbridge

Crabbe, who was rector here from 1814 to 1832. The manufactures are woolen cloths, kerseymeres, bedding, etc. Pop. (1911) 11,822.

**Trowbridge**, JOHN TOWNSEND, author, born in Monroe County, N. Y., in 1827. His best known works are *Neighbor Jackwood*, *The Vagabonds*, *Oudjo's Care*, and *Coupon Bonds*. Died Feb. 12, 1916.

**Troy** (troi), or **ILIUM** (Greek, *Troia* or *Ilion*), an ancient city in the Troad, a territory in the northwest of Asia Minor, south of the western extremity of the Hellespont, rendered famous by Homer's epic of the *Iliad*. The region is for the most part mountainous, being intersected by Mount Ida and its branches. There have been various opinions regarding the site of the Homeric city, the most probable of which places ancient Troy at the head of the plain bounded by the modern river Mendereh, supposed to be the Scamander of Homer, and the Dombrek, probably the Homeric Simois. The Ilium of history was founded about 700 B.C. by Æolic Greeks, and was regarded as occupying the site of the ancient city, but this is doubtful; it never became a place of much importance. The ancient and legendary city, according to the Homeric story, reached its highest splendor when Priam was king; but the abduction of Helen, wife of Menelaus, king of Sparta, by Paris, one of Priam's sons, brought about its destruction. To revenge this outrage all the Greek chiefs afterwards famous in history handed themselves against the Trojans and their allies, and went against Troy with a great fleet. The first nine years of the war were spent by the Greeks in driving the Trojans and their allies within the walls of the capital. The tenth year brought about a quarrel between Achilles, the bravest of the Greeks, and Agamemnon, the Greek commander-in-chief, which proved for a time disastrous to their party, and which forms the subject of the *Iliad*. In the end the city was taken by means of a large hollow wooden horse, in which a number of the bravest of the Greek heroes concealed themselves, while the rest retired to their ships. Thinking that the Greeks had given up the siege, the Trojans incautiously drew the horse within the city, and gave themselves up to revelry. The Greeks within the horse issued from their concealment, and being joined by their companions without the walls, Troy was taken and utterly destroyed. This is said to have occurred about 1184 B.C. Not only has the site of the ancient city been disputed, but the

legends connected with it are held by some scholars to have no historical foundation; nor has this view been altered by the excavations of Schliemann, and his discovery of the remains of a prehistoric city or cities at Hisarlik, the site of the historic Ilium.

**Troy**, a city, capital of Rensselaer Co., New York, on the left bank of the Hudson River, 6 miles above Albany and at the head of steamboat navigation. On the opposite side of the Hudson is Watervliet, or West Troy. The city has a well-equipped polytechnic institution. It has a fine court-house, a lyceum, a celebrated seminary for women, a public library, a government arsenal, etc. It is a leading center for the manufacture of shirts, collars and cuffs, and has important iron industries, horse-shoes being extensively produced. Mathematical instruments are very largely made, and there are various other manufactures. The river trade is important. Pop. 76,813.

**Troy**, a city, capital of Miami Co., Ohio, on the Great Miami River, 8 miles s. of Piqua. It has manufactures of foundry and machine-shop products, wagons, malted and distilled liquors, tobacco, etc. Pop. 6122.

**Troyes** (tro-á), a town of France, capital of the department of Aube, on the Seine, 100 miles E. S. E. of



Facade of Cathedral, Troyes.

Paris. The principal edifices are the cathedral, a fine Gothic building, the churches of St. Urbain and St. Made-

leine; the town-house, the prefecture, etc. The manufactures chiefly consist of cottons, woolens, hosiery, soap, artificial flowers, paper, gloves, etc. Pop. 51,228.

**Troy Weight**, a weight chiefly used in weighing gold, silver, and articles of jewelry. The pound troy contains 12 ounces; each ounce is divided into 20 pennyweights, and each pennyweight into 24 grains. Hence the pound contains 5760 grains, and the ounce 480 grains. As the avoirdupois pound (the weight in general commercial use) contains 7000 grains, and the ounce 437½ grains, the troy pound is to the avoirdupois as 144 to 175, and the troy ounce to the avoirdupois as 192 to 175.

**Truce** (trūs), a suspension of arms by agreement of the commanders of opposing armies; a temporary cessation of hostilities, either for negotiation or other purpose. The *truce of God* was a suspension of arms which occasionally took place in the middle ages, and was introduced by the church in order to mitigate the evils of private war. This truce provided that private feuds should cease at least on the holidays from Thursday evening to Sunday evening each week, during the season of Advent and Lent, and on the octaves of the great festivals.

**Truck System** (Fr. *troquer*, to exchange, to barter), the practice of paying the wages of workmen in goods instead of money. This practice formerly prevailed in the mining and manufacturing districts of the United States and Britain, and the workmen had often to pay exorbitant prices for their goods. The latter country abolished it in 1831 and most of the United States have done the same.

**Truffle** (truf'l), a genus (*Tuber*) of fungi of the section *Gasteromycetes*, growing underground. The common truffle (*T. cibarium*) is of a fleshy fungous structure and roundish figure, without any visible root; of a dark color, approaching to black, and studded over with tubercles, and varies in size from that of a large plum to that of a large potato. It grows abundantly in some parts of England, Italy, and the south of France. It is much sought after as an ingredient in certain high-seasoned dishes. There being no appearance above-ground to indicate the existence of the truffle, dogs are trained to find this fungus by the scent and scratch it up.

**Trujillo** (try-hel'yō). See *Truzillo*.

**Trullan Councils**, two ecclesiastical conventions,

the first held by the Emperor Constantinus Pogonatus (680), the second by Justinianus II (692), which take their name from the great hall in the imperial palace of Byzantium where they met.

**Trumbull** (trum'bul), JOHN, artist, born at Lebanon, Connecticut, in 1756; died in 1843. He served in the Revolutionary war under Washington and Gates, studied art under Benjamin West, and in 1783 produced *The Battle of Bunker Hill*, his first historical piece. He painted four historical pieces for the rotunda of the Capitol at Washington.

**Trumbull**, JOHN, poet, was born at Westbury, Connecticut, in 1750; died in 1831. His fame rests on his *McKings*, a satirical poem in the style of Butler's *Hudibras*.

**Trumpet** (trum'pet), a wind instrument of music of the highest antiquity, having a clear ringing and penetrating tone. In its modern form it consists of a metal tube (usually brass, sometimes silver), about 8 feet long, doubled up in the form of a parabola, becoming conoid in the last fold, and expanding into a bell-shaped end, the other end being fitted with a mouthpiece by which the instrument is sounded. The trumpet tuned on C produces with great power and brilliancy the following series of tones in an ascending scale: C in the second space of the bass clef, G, C, E, G, Bb, C, D, E, and G. By means of crooks and slides the length of the tube can be increased, and the pitch correspondingly lowered. Trumpets are also sometimes fitted with pistons, valves, or keys, by which the intermediate tones and semi-tones can be produced.

**Trumpet**, HEARING. See *Ear-trumpets*.

**Trumpet**, SPEAKING. See *Speaking-trumpet*.

**Trumpeter** (*Poophia*), a genus of gallinatorial or wading birds, found in South America, and so named from their hollow cry. The most familiar species is the Agami or golden-breasted trumpeter (*P. crepitans*), a bird of the size of a pheasant, which is readily tamed, and becomes a favorite inmate of the house.

**Trumpet-fish**. See *Bellows-fish*.

**Trumpet-flower**, a name applied to various large tubular flowers, as those of the *Bignonia*.

**Trumpets**, FEAST OF, a feast among the Jews, held on the first and second days of the month Tisri, which was the commencement of the Jewish civil year. It derived its name



## Trumpet-shell

from the blowing of trumpets in the temple with more than usual solemnity.

**Trumpet-shell.** See *Conch*.

**Trumpet-weed,** a large South African sea-weed, *Ecklonia buccinella*, the stem of which being hollow is used as a siphon, and also as a trumpet.

**Trumpet-wood.** See *Cocropia*.

**Trunk-fish.** See *Ostracion*.

**Trunk-hose,** a kind of short wide breeches gathered in above the knees, or immediately under them, and distinguished according to their



Trunk-hose.

1, Charles IX of France, 1550-1574.

2, Robert Carr, Earl of Somerset, died 1645.

peculiar cut as French, Gallic, or Venetian. This garment prevailed during the time of Henry VIII, Elizabeth, and James I.

**Truro** (tru'rō), an episcopal city, seaport, and municipal borough of England, county of Cornwall, at the confluence of the Kenwyn and St. Allen, 8½ miles N. of Falmouth. The principal edifice is the new cathedral (the first Protestant cathedral, except St. Paul's, built in England), consecrated in 1887, when Truro was established as a bishopric. The smelting of tin is carried on to a great extent. Pop. 11,325.

**Truro,** Nova Scotia, on the Intercolonial Railway. It has manufactures of foundry materials, lasts and pegs, hats and caps, knit goods, etc. Pop. 6107. (See *Truro*.)

**Truss,** in surgery, a bandage or apparatus used in cases of hernia to keep up the reduced parts and hinder further protrusion, and for other pur-

poses.—In building, a combination of timbers, or of iron-work, or of both together, so arranged as to constitute an unyielding frame. The simplest example of a truss is the principal or main couple of a roof, in which the tie-beam is suspended in the middle by the king-post to the apex of the angle formed by the meeting of the rafters. See *Roof*.

**Trust.** In law, a trust is a peculiar species of ownership, in which property, real or personal, is invested in one or more persons for the benefit of others. The person who holds the property is a *trustee*; the person for whose benefit it is held is called *cestui que trust* (he that has the benefit of the trust). Trusts, as originally employed in England, applied to real estate only, but in recent times have been extended to personal property, and before the middle of the nineteenth century the latter form developed into what are known as commercial trusts, great trade combinations ostensibly intended to cheapen expenses, regulate production, and remove competition, but practically going beyond those ostensible purposes. Trusts of this kind quickly made their way to the United States, where they have developed more rapidly and greatly than in England, some of them having become immense in the amount of capital involved, so much as to be regarded by the community at large with hostility as threatening the foundations of honorable industry. As so regarded, the term trust is applied to cases foreign to its original application, being employed to designate trade combinations in general, irrespective of their form and mode of creation. As such the term corporation is also commonly applied. The combinations now in existence have ceased to be normal trusts from the fact that the trustees have come to control, not the real and personal property of the corporations involved, but the shares of their stockholders. This gives the trustees the power of managing, though not the legal ownership of, the property concerned. Against these great combinations of financial and commercial property a vigorous enmity has arisen, and the governing powers have proceeded against them in various instances as law-breakers and foes of the community. Thus suits were brought against the Sugar Trust in New York, the Standard Oil Company in Ohio, and the Chicago Gas Company in Illinois, and the illegality of these combinations was proved. The forfeiture of one charter in each case, with the liability to a similar forfeiture in the case of the other

corporations concerned, operated effectually to dissolve these trusts in their earlier forms. This preliminary battle against the trusts simply changed, without destroying them. They were quickly reorganized in new and different forms and continued in operation. They disappeared as corporate trusts, but continued to exist as combinations held together by contract. And their old methods of injurious procedure were continued: the stifling of competition of minor concerns, the procuring of special rates and privileges in railroad transportation, the issue of watered stock, increasing the sum of floating capital far beyond the value of the property; all these tending to keep alive the enmity of the community at large. There have been many new suits at law brought against the trusts, and legislative investigations by the House of Representatives, the New York Senate, and the Canadian Parliament. Anti-trust laws have been passed in a number of the states, and in 1890 Congress passed a National Anti-trust Act. It cannot be said that these had much beneficial effect. Most important of all has been the creation of the Interstate Commerce Commission, for the purpose of dealing with all illegal practices of the trusts. Unfortunately this Commission was long hampered by lack of full powers of action, a weakness only recently removed by new legislation. Of late years it has proceeded actively against the trusts and won some notable victories. A spectacular one of these was the decision given by a Federal court in 1907, fining the Standard Oil Company the immense sum of \$20,240,000 for accepting illegal rebates in railroad freights. This decision was afterwards reversed by a United States Circuit Court of Appeals, but it went far to do away with the evil of rebating, which is now strictly forbidden by law. Another notable suit was against the Sugar Trust, in the operation of which fraudulent methods of weighing imported sugar had been discovered. In a decision rendered March 5, 1909, the trust was fined \$134,116 for these practices, and in 1910 it was compelled to disgorge over \$2,000,000 for fraudulent weighing. The two most important suits were those brought against the Standard Oil and the American Tobacco corporations in 1911. These were both decided adversely to the trusts, which were found guilty of stifling competition and ordered to dissolve. Steps have been taken by the companies to obey the orders of the court, but how effective their breaking up into

their elements will prove remains to be seen. Various devices have been proposed for the more effective control of trusts by the Federal Government, and a Corporation Tax has been imposed since 1909. The Clayton Anti-Trust Bill, passed by Congress in 1914 supplements the Sherman Law and makes it more rigid; and the Trade Commission Bill, likewise passed in 1914, provides for a commission with full inquisitional powers into the operation and organization of corporations and authority to condemn unfair methods of competition.

**Trustee** (trus-tē) In law, a person so committed in trust for the benefit of some other party or parties, or for some special purpose. See **Trust**. No one is compelled to undertake a trust, but if he once accepts, he cannot renounce it unless the trust deed contains a provision enabling him to do so. A competent court grants him a discharge, or by the consent of all those beneficially interested in the estate. Trustees are liable for the consequences of any breach of trust however innocent, and the estate of a trustee deceased, who has misapplied the trust fund, is liable for the deficiency; but generally speaking, the law only requires of a trustee the same amount of care and prudence he would be expected to display in managing his own affairs. Where there are several trustees each is liable for his own acts and receipts only, unless there is common agreement. Trusts are generally to protect the interests of married women and children, by placing in the hands of trustees for them the legal rights which they would be incapable of exercising. Frequently trusts involve the sale or purchase of lands, or investment of funds, in which cases the trustee has to exercise due caution, as he may be rendered liable for any loss.

**Truxillo**, or **TRUJILLO** (bo' tru-hel'-yō), (1) a town in Western Spain, prov. of Cáceres, the birthplace of Pizarro. Pop. 12,512. (2) A town (also called *Chimá*) in the north of Peru, near the coast, and having as its port Salaverry. It was founded by Pizarro, has a university, and a good trade. Pop. about 8000. (3) The capital of the state of Truxillo, Venezuela, 90 miles s. w. of Barquisimeto. Extensive coal deposits exist in the vicinity. Pop. 10,000.

**Truxton** (truks'tun), THOMAS, naval officer, born on Long Island in 1755; died in 1822. He commanded a privateer and took valuable prizes in the Revolution. In 1794 he was made captain in the navy and in the naval

war with France (1799-1800) captured the French frigates *L' Insurgente* and *La Vengeance*. The latter victory brought him a gold medal from Congress.

**Trygonidae** (tri-gon'i-dē), the family name of the stingrays (which see).

**Tsaritsyn**, a Russian city in Saratov province, on the Volga. Pop. (1910) 100,847.

**Tsarskoye-selo** (tsär'skō-yē sye-lō), ZARSKOYE-SELO ('Czar's Town'), a town of Russia, government of Petrograd. Here Nicholas II was imprisoned following the revolution of 1917. Pop. 30,880.

**Tschaikovsky** (chi-kof'ski), PETER ILITCH, a noted Russian composer, born in 1840; died in 1893. In 1862, when the Conservatory of Music was founded at St. Petersburg, he gave up an official position to devote himself to music, studying under Anton Rubinstein and Zaremba. From 1866 to 1878 he taught in the conservatory; then retired to devote himself to composition. He is best known by his symphonies.

**Tsetse-fly** (tset'se), a South African dipterous (two-winged) insect (*Glossina morsitans*), akin to the gad-fly, whose bite is often fatal to horses, dogs, and cows, but was long considered innocuous to man and wild beasts. It has been discovered that the same insect carries the germs of the deadly sleeping sickness, which has long been known in parts of Africa and of late years has proved especially fatal to the natives of Uganda. Active efforts are now being made to check the ravages of this disease by preventive methods, the habits of the fly being studied and its haunts broken up.

**Tsi-nan**, TSINANFU, a Chinese city on the Ta-tsin River. Glass and silk wares made. Pop. 300,000.

**Tsze Hsi An**, the late dowager empress of China, born in Manchuria. She became one of the wives of the emperor Hsien Fung, who ascended the throne in 1850. A woman of remarkable political acumen, she raised herself to the position of co-empress. On the emperor's death she put her son, Tung Chi, on the throne, acting as regent during his minority. From that time forward she was the practical ruler of China. On the death of Tung Chi, in 1875, she placed her nephew, Kwang Seu, an infant, on the throne, she again becoming regent. When he grew up and assumed control, his attempted reform movements led to his being deprived of authority by his despotic aunt, backed by the conservative party, and from that time to her death the gov-

ernment remained in her hands, the emperor being kept in a virtual captivity. She opposed reform, encouraged the Boxer movement, but a few years later, after the Russo-Japan war, became herself a reformer and took active steps to modernize Chinese administration and methods of education. In many respects a woman of unusual powers, the tendency of historians is to class her among the great women rulers of the world. From the death of her husband in 1861 to the time of her death, a period of nearly half a century, she was practically the ruler of China. She died November 15, 1908.

**Tuam** (tū'am), a town of Ireland, county of Galway, 120 miles northwest from Duhlin. It is the seat of the Bishop of Tuam, and also of the Roman Catholic archbishop. Its principal edifices are the Protestant and Roman Catholic cathedrals, the bishops' palaces, and the college of St. Jarlath. Pop. 3012.

**Tuamotu Islands** (tū-a-mō'tū), PAUMOTU, or Low ARCHIPELAGO, an extensive group of islands in the Pacific, lying eastwards from the Society Islands and south of the Marquesas. They are mostly under French protection, and have a population of 7000. They export pearls, mother-of-pearl, trepang, etc.

**Tuaricks** (tū'a-rikz), TUAREGS, or TAWARIKS, a race of nomads supposed to be connected with the Berbers in their origin, and inhabiting a great part of the Sahara desert between 5° w. lon. and 13° e. lon. They are of a handsome and muscular physique, of war-like habits, fierce and cruel disposition, and Mohammedans in religion. Their numbers are estimated at 200,000.

**Tuber** (tū'ber), in botany, an underground fleshy stem or appendage to the root, being usually an oblong



Tuberous Roots.

1, Palmate (*Orchis maculata*). 2, Didymous (*Orchis mascula*). 3, Fasciculate (*Picaria ranunculoides*).

or roundish body, of annual duration, composed chiefly of cellular tissue with a great quantity of amylaceous matter,

## Tubercle

intended for the development of the stems or branches which are to spring from it, and of which the rudiments, in the form of buds, are irregularly distributed over its surface. Examples are seen in the potato, the Jerusalem artichoke, and arrow-root. Tubers are distinguished, according to their forms, into *didymous* (in pairs), *palmate* (hand-like), *fasciculate*, *globular*, *oblong*, etc.

**Tubercle** (tū'bér-kl); a small aggregation of round cells and tubercle bacilli which tend to spread and invade surrounding tissues. In doing so it breaks down in the center into an opaque, yellowish or cheesy material, carrying the normal tissue with it in its destructive change. Tubercles may be developed in different parts of the body, but are most frequent in the lungs and mesentery. The tubercle bacillus in the lungs is the cause of the well-known fatal disease, pulmonary consumption.

**Tuberculin**, a sterile liquid containing the growth products of the tubercle bacillus, put forth as a cure for tuberculosis by Dr. Koch in 1890. It failed as a cure, but is used in diagnosing tuberculosis of cattle.

**Tuberculosis** (tū-bér-kū-īō'sis) is the name applied to an infectious, contagious disease due to inoculation by a rod-shaped, microscopical germ, the *Bacillus tuberculosis*, measuring in diameter 0.25 and in length 1.5 to 3.5 micromillimeters. There are two varieties, the human and the bovine, the former being the longer. The tubercle bacillus attacks chiefly the warm-blooded animals, being common among the domestic creatures—fowls, cows, pigs, etc.; the horse is only slightly susceptible to infection. The guinea-pig, while comparatively immune to infection, is very susceptible to inoculation.

The bacillus gains entrance into the body through wounds, the air inhaled, or food ingested. It reaches the blood stream, where the bacilli multiply and are carried throughout the body, no organ or tissue being exempt from their ravages. The bacilli produce a toxin, which is disseminated throughout the system by the blood. In the various tissues the bacilli lodge and multiply and around them is formed the characteristic tubercle, which gives the name to the bacillus and the disease. The tubercle is a small nodule, which may be white, gray, or yellow in color. The smallest tubercles are called millary. These may be many or few in any particular area. The tubercle is a mass of epithelioid cells with large, oval nuclei and glistening,

## Tuberculosis

nuclear bodies. In the center are so-called 'giant cells,' which are round or oval, with prolongations, and containing from 20 to 100 round or oval nuclei, which in old giant cells are arranged in a chain around the periphery. Outside the epithelioid cells is a zone of lymph cells from the blood. In old tubercles the center undergoes a cheesy degeneration, due to lack of blood supply in the center. Sometimes a fibrous capsule surrounds and imprisons the tubercle. The severity of any case of tuberculosis is proportionate to the number of tubercles present.

Any injury may provide an entrance for the germs, as they may be floating in the air at the time. A person may inhale them at any moment, since a tuberculous person may be exhaling them in the vicinity or they may be wafted by the breeze from a distance. Or a tuberculous person may expectorate them and after the sputum has been desiccated they may then be blown about. The mere inhalation of the germs, however, will not produce the disease, as the tissues of the body may be able to destroy or cast off the bacilli. Attendants in tuberculosis hospitals, exercising proper care, do not become infected. But should a sickly person inhale them, his likelihood of escaping the disease is not so good, and if a well person harboring the germs becomes ill of some acute inflammatory disease—cold, pneumonia, influenza, etc.—tuberculosis may then start up. Prolonged exposure to the exhalations from tuberculous persons in poorly ventilated apartments, as in crowded tenements; the faulty disposal of tuberculous sputum; the coughing by the tuberculous into non-tuberculars' faces; infecting the pockets by placing spitcloths therein, are modes of infection. Foul air, overcrowding, lack of sunshine, dark houses, dampness, combined with low altitude and insanitary conditions generally are all potent factors in the propagation of the disease. Direct contagion by kissing is possible and also may occur by using eating and drinking utensils after a tuberculous person that have not been sterilized. Infection by tuberculous meat eaten in a partially raw condition has been frequently demonstrated, as well as by contaminated milk. The latter is thought to be the source of intestinal tuberculosis in children. The eating of tuberculous meat has probably been pretty well eradicated by careful inspection of abattoirs and veterinary bacteriological inspection, but vigilance in this direction must not be relaxed. All meat should be thoroughly



cooked to kill all germs that may have found a lodgment therein. The disease is not hereditary, but a predisposition is transmitted to offspring.

Tuberculosis is to be prevented by strict attention to hygienic rules. Tuberculous persons should not swallow their sputum nor expectorate it on the ground or pavement or into cuspidors, but carefully eject it into impermeable receptacles, without soiling their hands, clothes, or the receptacle. All the sputum receptacles should be destroyed by fire. All eating utensils of the tuberculous should be sterilized by thorough boiling, as also should all their clothes, though the latter may be fully sterilized by exposure to formaldehyde gas for twenty-four hours. All meat and milk should be freed from tubercle by veterinary inspection of herds. All excreta from the tuberculous should be sterilized by fire, 5 per cent. carbolic acid solution, or 4 per cent. chlorinated lime solution. Much fresh air should be admitted to rooms which human beings and animals inhabit. The tuberculous should avoid kissing and fondling others. Bedrooms should be cleansed with moist cloths and not have the dust swept into the air. Sunlight and fresh air are the enemies of germs.

Tuberculosis is the most widespread and fatal disease to which man is heir, about 40 per cent. of deaths in cities being due to it. Longitude and latitude have but slight influence upon its prevalence, though altitude appears to exert a more or less controlling influence upon the life of the tubercle bacillus.

Tuberculosis of the skin is called lupus and contains tubercles. Eventually large areas of skin are transformed into reddish, ulcerated patches, more or less deep, with pockets of yellowish, purulent matter. It is treated by X-ray, Finnsen's phototherapy, radium, surgical removal, and caustics. The lymph glands are attacked and enlarge and finally degenerate, surgical removal being required. The mucous membrane of the alimentary canal may become affected, tubercles, ulcerations, hemorrhages and weakness resulting. If the ulceration is sufficiently deep to produce perforation, peritonitis or fistula may result, which latter is frequent in and around the rectum. The liver, pancreas, spleen, kidneys, and other viscera may be affected similarly.

The great tuberculous disease, however, is tuberculosis of the lung. There are two varieties of the disease—acute and chronic—and three successive stages. In this disease small nodules are scattered more or less profusely throughout

the diseased areas. As the affection progresses the nodules enlarge and become more numerous, finally coalescing to form large masses of consolidated matter. When this liquefies, cavities are formed. If, with this infection, there is added some of the pus-forming bacteria, a more rapid variety is the consequence, and an irregular fever results. In the acute disease there is a sudden chill, fever, pain in the side, cough, and bloody sputum. In a fortnight a mucopurulent expectoration occurs, which may contain the bacilli. Then are found chills, fever, and drenching sweats; the fever is higher in the evening than in the morning; the heart is weak and rapid, breathing is difficult, and the tubercular gradually sinks. The chronic disease begins usually as a bronchitis, though it may come on stealthily with no prodromal signs. People usually describe it as a severe cold that settles on the chest and cannot be gotten rid of. There is some cough, dry at first, but later profuse expectoration, fever, and emaciation occur. There are gradual loss of strength and appetite, anemia, profuse or slight hemorrhage. This may continue for a long period of time or suddenly get worse.

It is treated by cold, dry air at an elevation of 2000 or 3000 feet above sea level, which is stimulating to the tissues, arousing Nature's forces to repel the bacteria and excrete the toxins. They should remain outdoors the entire time, summer and winter, if possible, only protected from storms. Buildings with removable sides, or large sashes, constructed of a material to withstand strong chemical disinfectants, should be occupied, and the body will adapt itself to the environment, provided warm clothing is worn. At a lower altitude in damp weather ventilation is secured by having open the windows in an adjoining apartment and an open fireplace in the room occupied. Personal hygiene is imperative, as are the preventive measures already given. An impermeable sputum flask should receive the expectoration. The tubercular requires good nourishment. Milk, cream, meat, eggs, butter, vegetables, and game should be liberally provided. Tuberculin is administered sometimes by hypodermic injection until the person no longer reacts to it.

**Tuberosa** (tū'be-rōs; *Polyanthes tuberosa*), a plant of the nat. order Liliaceae, originally brought from the East, and now largely cultivated in American gardens both for its perfume and for its beautiful white flowers. It has a bulbous root, and an upright branchless stem growing to the height

of 3 or 4 feet. It is cultivated for the perfumers in France and Italy.

**Tubicolæ** (tū-bik'ū-iſ; 'tube-dwell-ers'), an order of annelids, comprehending those which live in calcareous tubes, composed of secretions from the animal itself, as in *serpula* (which see); in tubes composed of sand and fragments of shell connected together by a glutinous secretion, as in *tereberlia*; or in a tube composed of granules of sand and mud, as in *sabella*.

**Tübingen** (tū'bing-in), a town of Würtemberg, in the circle of the Schwarzwald (Black Forest), on the Neckar, 18 miles southwest of Stuttgart. It is irregularly built, and the streets are for the most part steep and narrow, but the environs are picturesque. There are various manufactures, but the town is supported chiefly by the university, which was founded in 1477. It has a library of 300,000 vols., a botanic garden, chemical laboratories, collections of zoölogy and comparative anatomy, of minerals, of coins and medals, etc. The number of teachers is nearly 100, of students over 1200. Reuchlin and Melancthon were professors here, as was also F. C. Baur, who founded the Tübingen school of theology, a school which has been distinguished by its critical method, and its tendency to the rejection of the supernatural element in Christianity. Pop. 16,809.

**Tubipora** (tu-hip'o-ra), a genus of corals belonging to the order Alcyonaria, and represented by the familiar organ-pipe coral (*T. musica*), and by other species.

**Tubuai Islands** (tū-bū-i'), a group in the Pacific Ocean, south of the Society Islands, and, like them, under France.

**Tubular Bridge.** See *Bridge*.

**Tuckahoe** (tuk-a-hō'), a singular vegetable found in the southern seaboard section of the United States, growing underground, like the European truffle. It is also called *Indian bread* and *Indian loaf*. It is referred to a genus, *Pachyma*, of spurious fungi, but in all probability it is a peculiar condition of some root, though of what plant has not been properly ascertained.

**Tucker** (tuk'er), ABRAHAM, an English miscellaneous and philosophical writer, born in 1705; died in 1774. He was educated at Oxford, lived the life of a private country gentleman, and published his chief work, *The Light of Nature*, under the pseudonym of Edward Search. It has been frequently republished.

**Tucker**, ST. GEORGE, jurist, was born in Bermuda in 1752; died in 1827. While he was still a boy his father removed to Virginia and he entered the William and Mary College, where he was graduated in 1772. He studied law, and during the Revolutionary war served in the patriot army. In 1778 he married Mrs. Randolph, mother of the celebrated John Randolph of Roanoke. After the war he became a judge and also professor of law in William and Mary College, was made judge of the State Court of Appeals in 1803, and of the United States Court for the eastern district of Virginia in 1813. He published numerous works in prose and verse, and was especially happy in *vers de société*.—HENRY ST. GEORGE TUCKER, his son, was born in Virginia in 1781; died in 1848; studied law under his father, and like him became eminent in the profession. He was professor of law in the University of Virginia, chancellor of the fourth judicial district, president of the State Court of Appeals, and a member of Congress 1815-19. He wrote *Lectures on Constitutional Law* and other legal works.—BEVERLEY TUCKER, another son, born in 1784; died in 1851. He also became a lawyer, and served as a judge in Missouri from 1815 to 1830. From 1834 to his death he was professor of law in William and Mary College. He wrote legal works and several novels, one of which, *The Partisan Leader*, published in 1836, in a measure foreshadowed the secession movement of 1861. In the convention at Nashville in 1850, he vigorous invectives against the North recalled the speeches of his half-brother, John Randolph of Roanoke.—GEORGE TUCKER, a nephew of St. George Tucker, was born in Bermuda in 1775; died in 1861. He came to Virginia in 1787, studied law under his uncle at William and Mary College, and was a member of Congress from 1819 to 1825, when he became professor of ethics and political economy in the University of Virginia, holding this position for twenty years. He wrote a standard *Life of Thomas Jefferson*; a *History of the United States*, down to 1840; *The Valley of the Shenandoah*, a novel, and *A Voyage to the Moon*, a satirical romance. Most of his later life was spent in Philadelphia.

**Tuckerman** (tuk'er-man), HENRY THEODORE, an American man of letters, born at Boston in 1813; died in 1871. His writings are very numerous, and consist mainly of monographs relating to biography, literature, and art. Among the best known are

*Italian Sketch Book; Artist Life: The Optimist; Characteristics of Literature; Essays, Biographical and Critical, etc.*

**Tucson** (tuk'sun), a city, the capital of Pima county, Arizona, 130 miles S. E. of Phoenix. It is the seat of the University of Arizona and of St. Joseph's Academy. The chief industries have to do with mining and stock-raising. Hides, wool, and metals are dealt in. Pop. 13,193.

**Tucum** (tö'kum), a species of palm (*Astrocaryum vulgäre*) of great importance to the Brazilian Indians, who make cordage, bow-strings, fishing-nets, etc., from the fine durable fiber consisting of the epidermis of its unexpanded leaves. The name is also given to the fiber or thread, and to an oil obtained from the plant.

**Tucuman** (tö-ku-man'), or SAN MIGUEL DE TUCUMAN, a town of the Argentine Republic, capital of the province of the same name, in the northwest of the country, near the foot of a mountain range on the Upper Rio Dulce. It is a rising place, connected by railway with Buenos Ayres. Pop. about 55,000. The province is fertile, and has a fine climate; area, 8950 sq. miles. Pop. 263,079.

**Tudela** (tö-thä'lä), a city of Spain, province of Navarre, on the right bank of the Ebro, 156 miles north-east of Madrid. It has an ancient cathedral and other churches, a medical college, etc. Pop. 9499.

**Tudor** (tü'dur), the family name of an English royal line founded by

Owen Tudor of Wales, who married the widowed queen of Henry V. The first of the Tudor sovereigns was Henry VII; the last, Elizabeth. See *England*.

**Tudor-flower**, a trefoil ornament much used in Tudor architecture. It is placed upright on a stalk, and is employed in long rows as a crest or ornamental finishing on cornices, ridges, etc.

**Tudor Style**, in architecture, a name frequently applied to the latest Gothic style in England, being the last phase of the perpendicular, and sometimes known as *Florid Gothic*. The period of this style is from 1400 to 1537; but the term is sometimes extended so as to include the Elizabethan period also, which brings it down to 1603. It is the result of a combination of the Italian style with the Gothic. It is characterized by a flat arch, shallow moldings, and a profusion of paneling on the walls.

**Tuesday** (tüz'dä), the third day of our week, so called from the

Anglo-Saxon god of war, *Tiu*. See *Tyr*.

**Tufa** (tü'fa), or *TUFF*, the name originally given to a kind of volcanic rock, consisting of accumulations of scoria and ashes about the crater of a volcano. The name is now applied to any porous vesicular rock; thus rounded fragments of greenstone, basalt, and other trap-rocks, cemented into a solid mass, are termed *trap-tuff*, while a vesicular carbonate of lime, incrusting and incorporating twigs, moss, shells, and other objects that lie in its way, is called *calc-tuff*.

**Tuileries** (tüw'le-ris; from Fr. *tuile*, a tile, because the spot on which it is built was formerly used for the manufacture of tiles), the residence of the French monarchs, on the right bank of the Seine, in Paris. Catherine de' Medici, wife of Henry II, began the building (1564); Henry IV extended it, and founded the old gallery (1600); and Louis XIV enlarged it (1654), and completed that gallery. The side towards the Louvre consisted of five pavilions and four ranges of buildings; the other side had only three pavilions. During the revolution of 1830 the palace was sacked. It was restored by Louis Philippe to its former splendor, but in 1848 it was again pillaged. The Tuileries then became successively a hospital for wounded, a picture gallery, and the home of Louis Napoleon in 1851. On May 23, 1871, it was almost totally destroyed by fire (the work of the communists), and the remaining portions were removed in the year 1883.



Tudor Architecture, Hengrave Hall, Essex, 1536.

**Tula** (tū'la), a government of Central Russia; area, 11,954 square miles. The surface is generally flat, and the principal rivers are the Oka, the Upa, and the Don. By canal there is communication with the Baltic, the Black Sea, and the Caspian. Much grain is produced, and vast numbers of horses, cattle, and sheep are reared. Iron is smelted and manufactured to a large extent. Pop. 1,662,600.—**TULA**, the capital, is situated on the Upa, 107 miles south of Moscow. It is the residence both of a civil and a military governor, the see of a bishop, and has extensive manufactures of firearms, as also cutlery, ornamental steelworks, platina snuff-boxes, silks, hats, soap, candles, corsetage and leather. Pop. 136,530.

**Tula-metal**, an alloy of silver, with small proportions of lead and copper, forming the base of the celebrated Russian snuff-boxes popularly called platinum boxes.

**Tule** (tū'le), a large species of rush or sedge, *Scirpus validus*, nat. order Cyperaceæ, which grows to a great height, and covers large tracts of marshy land in parts of California, being also found generally throughout the United States.

**Tulip** (tū'lip), a genus of plants (*Tulipa*), nat. order Liliaceæ. The species are bulbous herbaceous plants, inhabiting the warmer parts of Europe and Asia Minor, and are now extensively cultivated in gardens. About forty species have been described, of which the most noted is the common garden tulip (*T. gesneriana*), a native of the Levant, now an ornament in American gardens. Upwards of 1000 varieties of this plant have been enumerated. The wild tulip (*T. sylvestris*) has yellow flowers, and blooms in April and May. The sweet-scented tulip (*T. suaveolens*), prized for its fragrance, is grown in the United States. About the middle of the seventeenth century an extraordinary tulip mania prevailed in Holland. Enormous sums were given for bulbs, the ownership of a bulb being often divided into shares, in which men speculated as they do in ordinary stocks or shares. The close of this mania led to great losses.

**Tulip-tree**, an American tree bearing tulip, the *Liriodendron tulipifera*, nat. order Magnoliaceæ. It is one of the most magnificent of the forest trees in the temperate parts of North America. Throughout the States it is generally known by the name of tulip poplar, white wood, or canoe-wood. The wood is light,

compact, and fine-grained, and is employed for various useful purposes. The bark, especially of the roots, has an aromatic smell and bitter taste, and has been used in medicine as a tonic and febrifuge.

**Tulle** (tui), a town of France, capital of the department of Corrèze, situated on the Corrèze, 115 miles N. N. E. of Bordeaux. It has a cathedral and episcopal palace, a communal college, a diocesan seminary, courthouse, etc., and manufactures of firearms, wax-candles, playing-cards, leather, and the famous Point de Tulle lace. Pop. 12,741.

**Tulle**, a kind of silk open lace manufactured at Tulle in France in narrow strips, and much used on ladies' caps, etc.

**Tulloch** (tul'uk), JOHN, theologian, born in 1823 at Bridge of Earn, Perthshire; died in 1886. He was an influential leader in the councils of the Scotch Church, was for many years principal of St. Mary's College, St. Andrews, and was the author of the Burnet prize essay on *Theism* (1855), *Leaders of the Reformation* (1859), *English Puritanism and its Leaders* (1861), *Rational Theology and Christian Philosophy in England in the Seventeenth century* (1872), *Pascal* (1878), *Facts of Religious Life* (1877), etc.

**Tullus Hostilius** (tul'us hos-til'i-us), according to the legend, third king of Rome and successor to Numa Pompilius (B.C. 670-638), a warlike monarch, in whose reign took place the combat of the Horatii and Curiatii.

**Tultcha** (tult'cha), a town of Roumania, on the Danube, which near it divides into its three chief mouths. It has a good trade. Pop. 18,880.

**Tulsa**, a city in Tulsa Co., Oklahoma, 14 miles N. N. E. of Sapulpa. It is the center of a vast oil-producing region. Among the industries are: oil refining, coal mining, wheat milling, etc. Pop. 28,240.

**Tumbrel** (tum'brcl), a covered cart or carriage with two wheels, which accompanies troops or artillery, for conveying the tools of pioneers, cartridges, and the like.

**Tumor** (tū'mur), in surgery, in its widest sense, a morbid enlargement or swelling of any part of the body or of any kind; more strictly, however, it implies a permanent swelling occasioned by a new growth, and not a mere enlargement of a natural part, which is called hypertrophy. Tumors may be divided into two well-defined classes: (a) *Simple, benign, or innocent*



**tumors**, the substance of which has anatomical resemblance to some tissues of the body; they gradually increase in size, and generally only produce inconvenience from the great bulk they sometimes attain; a complete cure may be effected by simple excision. (b) **Malignant tumors**, which bear no resemblance in substance to normal tissue; they are exceedingly liable to ulceration, they invade all the textures of the part in which they occur, affecting the mass of the blood, and terminate fatally; when excised they are apt to recur not only in the immediate neighborhood of the previous site, but also in remote parts of the body. This recurrence in remote parts is due to transference of some of the elements of the tumor by means of lymphatic or blood vessels. Hence if a malignant tumor is to be excised it must be done early to avoid such secondary infection if possible. Innocent tumors are often named from the tissues in which they occur, as *adipose* or *fatty tumors*, *fibrous tumors*, *cartilaginous tumors*, *bony tumors*, and the like. Of the malignant class cancer is a well-known example. See *Cancer*.

**Tumuli** (tū'mū-l), artificial mounds of earth or stone raised to mark the resting-places of the dead. They are very abundant in parts of the United States, the work of prehistoric Indians. See *Barrows*.

**Tun**, an old measure of capacity. The English *tun* of wine contained four hogsheads, or 24 gallons, but in English-speaking countries the gallon is now the higher legal measure of capacity.

**Tunbridge Wells**, a market town and watering-place of England, partly in Kent, partly in Sussex, 32 miles s. s. e. of London, 4 miles s. of Tunbridge. It has a spacious parade, a town hall, corn exchange, public halls, Pump Room for visitors taking the waters, Convalescent Home for Children, and manufactories of toys and fancy articles. The spring to which the place owes its origin and prosperity is chalybeate, and is considered very efficacious in cases of weak digestion. Pop. 35,703.

**Tundras** (tun'dras), a term applied to the immense stretches of flat, boggy country, extending through the northern part of Siberia and part of Russia, where vegetation takes an Arctic character. They are frozen the greater part of the year, and are very difficult to cross when not frozen.

**Tungsten** (tung'sten), a metal discovered in 1781; atomic weight 184; symbol W (from its other

name *wolfram*). It has a grayish-white color and considerable luster. It is brittle, nearly as hard as steel, and less fusible than manganese. The ores of this metal are the native tungstate of lime and the tungstate of iron and manganese, which latter is also known by the name *wolfram*.

**Tungûs** (tun'gus), a term applied to certain Mongolian tribes in the northeast of Asia, consisting of nomadic and hunting peoples, spread over Eastern Siberia. In a wider sense the term Tungusians is used to include the Manchus, who conquered China in 1644.

**Tunic** (tū'nik), an ancient form of garment in constant use among the Greeks. Among the Romans the tunic was an under garment worn by both sexes (under the *toga* and the *palla*), and was fastened by a girdle or belt about the waist. The term is also used ecclesiastically to denote a dress worn by the sub-deacon, made originally of linen, reaching to the feet, and then of an inferior silk, and narrower than the dalmatic of the deacon, with shorter and tighter sleeves.

**Tunicata** (tū-nī-kā'ta), an order of Molluscoidea or lower mollusca, which are enveloped in a coriaceous tunic or mantle, provided with two orifices, the one branchial and the other anal, and covering beneath it a second tunic, which adheres to the outer one at the orifices. These animals are popularly named *sea-squirrels*, and are found either solitary or in groups, fixed or floating, and sometimes joined together in a common mass. See *Ascidia*.

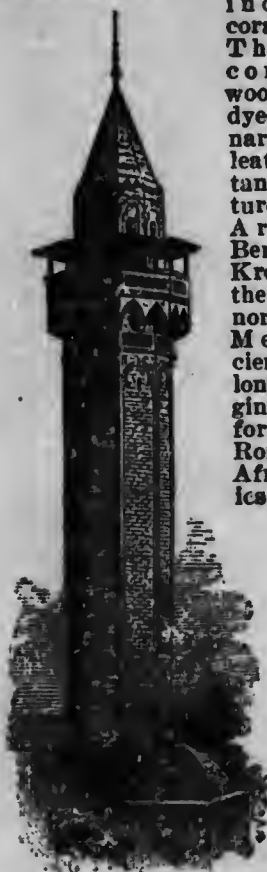
**Tuning-fork**, a steel instrument with two prongs, designed when set in vibration to give a musical sound of a certain fixed pitch. The ordinary tuning-fork sounds only one note—usually the middle or tenor C in America, and A in Germany; but some are made with a slider on each prong, which, according as it is moved up or down, regulates the pitch of the note produced.

**Tunis** (tū'nīs), a country of North Africa, now a French protectorate, is bounded on the north and northeast by the Mediterranean, on the southeast by Tripoli, and on the west and southwest by Algeria; area, estimated about 51,000 square miles. The coastline presents three indentations, forming the Bay of Tunis on the north and those of Hammamet and Gabes or the Lesser Syrte on the east. The northwest portion of the country is traversed by the Atlas Mountains, which on their lower slopes have many fertile tracts, partly

under culture. Between these mountains and the Gulf of Hammamet on the east stretches the extensive plain or plateau of Kairwan. The only river of any consequence is the Mejerdah. Agriculture is very much neglected; the principal crops are wheat, barley, and maize; olive plantations are numerous, while tobacco is largely, and cotton, indigo, saffron, and opium partially, grown. On several parts of the coast the fisheries,

including that of coral, are valuable. The manufactures consist chiefly of woolen fabrics, soap, dyed skins, and ordinary and morocco leather. The inhabitants consist of a mixture of Moors and Arabs, along with Berbers, here called Kroumirs, occupying the elevated tract north of the valley of Mejerdah. In ancient times Tunis belonged to the Carthaginians, afterwards formed part of the Roman province of Africa, and many relics of Roman architecture remain.

It was subdued about 675 by the Arabs, became a powerful state under independent rulers in the thirteenth century, and in 1575 was incorporated with the Ottoman Empire. In the spring of 1881 the French invaded Tunis, in order to punish the turbulence of the Kroumirs,



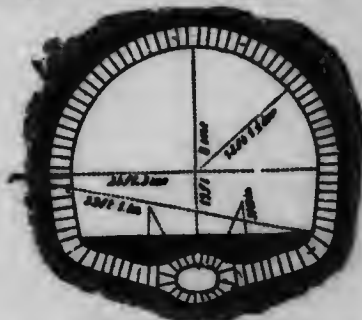
Minaret at Tunis.

and the French minister resident is now the virtual ruler of the country. Under French administration the Tunisian debt has been consolidated, commerce has increased, the means of transit have been improved, and a number of primary schools established. The resident army of occupation numbers 10,000 men. Pop. estimated at nearly 2,000,000.—Tunis, the capital city, is situated on a salt lagoon connected with the Bay of Tunis by a narrow channel, where is

the port of Goletta, there being another salt lake on the other side of the city. Both Tunis and Goletta are built of the materials of ancient Carthage. Almost the only building of importance is the palace of the bey in the Moorish style; the bazaars are also interesting, and under French direction a cathedral and other buildings have been erected, and schools, etc., established. Pop. about 250,000, nearly half being Christians and Jews.

**Tunkers.** See *Dunkers*.

**Tunnel** (tun'el), a subterranean passage cut through a hill, a rock, or any eminence, or under a river, a town, etc., to carry a canal, a road, or a railway in an advantageous course. In the construction of canals and railways



St. Gothard Tunnel. Section showing construction in soft strata.

tunnels are frequently had recourse to in order to preserve the desired level and for various other local causes. Tunnels, when not pierced through solid rock,



St. Gothard Tunnel. Section near entrance on Italian side.

have usually an arched roof and are lined with brick-work or masonry. The sectional form of the passage is various. Among the greatest works of this kind are the tunnels of St. Gothard, Mont

Oenls, the Arlberg, the Simplon, and the recently constructed Loetschberg, in the Alps. In Britain the Severn and Mersey tunnels are noteworthy, while in America the Hoosac tunnel and that through the Cascade range in the State of Washington are of much interest. (See the various headings.) Many important tunnels under rivers have been recently constructed, the most interesting being those under the Hudson and East rivers at New York, especially the great Pennsylvania Railroad tunnel, which passes under both rivers and under the city of New York. Another of interest is the tunnel under the Elbe, Germany, at Hamburg. Two great tunnels, through the Pyrenees from France to Spain, were completed in 1913.

**Tunny** (tun'i), a fish of the genus *Thynnus* and family Scombridae, the *T. vulgaris*, closely allied to the mackerel. These fish live in shoals in almost all the seas of the warmer and temperate parts of the earth. They are taken in immense quantities on the Mediterranean coasts, where the fishing is chiefly carried on. The flesh is delicate and somewhat resembles veal. The common tunny attains a length of from 4 feet to even 20 feet, and sometimes exceeds half a ton in weight. Its color is a dark blue on the upper parts, and silvery white below. The American tunny (*T. secundo-dorsalis*) is found on the American coast from New York to Nova Scotia. The albacore (*T. pacificus*) and the bonito are allied species.

**Tunstall** (tun'stal), a town of England, in Staffordshire, 2½ miles N. E. of Newcastle-under-Lyme. It has rapidly risen from a hamlet to a considerable town, with manufactures of china and earthenware, bricks and tiles, etc. The district is rich in coal and ironstone. Pop. of district 39,292.

**Tupaia** (tū-pē'ya), a genus of remarkable mammals. See *Banring*.

**Tupelo** (tū-pe-lō), a North American forest tree of the genus *Nyssa*, the *N. denticulata*, nat. order Santalaceæ. It is a lofty tree of great beauty. The same name is given to other species of the genus, some of which are also called *black gum*, *sour gum*, *gum tree*, *piperidge*, etc.

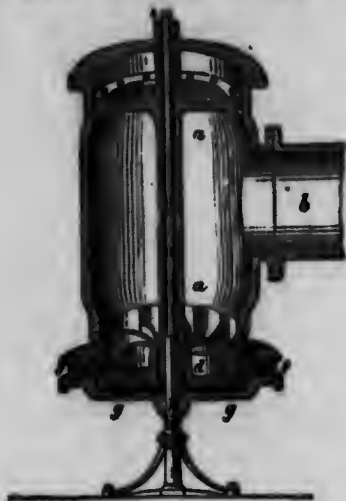
**Tupper**, SIR CHARLES (1821-1915), Canadian statesman. He was born at Amherst, Nova Scotia, and graduated in medicine at Edinburgh University in 1843. After practicing medicine for 12 years he entered politics, being elected a member of the Legislative Assembly. He was made Provincial Secretary in 1856 and Premier in 1864-67. A strong supporter of Canadian Confedera-

tion, he was a delegate to the conferences at Charlottetown and Quebec in 1864, afterward joining the conference of delegates with the British government in London, resulting in the Confederation in 1867. In the first Dominion administration of Sir John A. Macdonald he was successively President of the Council (1870), Minister of Inland Revenue, 1872, and Minister of Customs, 1873. He was the first Canadian Minister of Railways; he gave important aid in the construction of the Canadian Pacific Railway until 1884, when he was appointed Canadian High Commissioner in London. Returning for a short period he was Minister of Finance 1887-1888, but resumed his post as High Commissioner in London, 1888-1896. Returning to Canada he succeeded Sir Mackenzie Bowell as Premier in 1896 and made strong but unsuccessful efforts to retrieve the Conservative party from the difficulties into which it had fallen over the educational question, which led to his defeat in 1896. After four years' service as leader of the opposition he retired from public life, going to live in England, where he died in 1915, his body being brought to Halifax for burial. He was an able executive and a brilliant debater. During his legislative career he procured the enactment of many important laws. He was made K. C. M. G. (1870), G. C. M. G. (1896), a Baronet in 1888 and a member of the Privy Council in 1908.

**Tupper**, SIR CHARLES HIBBERT (1855- ), Canadian statesman, son of Sir Charles Tupper (q. v.). He was Minister of Marine (1888-1895), Minister of Justice and Attorney-General (1895-1896). In 1893 he served as agent for the British government in the Bering Sea question at the Paris tribunal.

**Turbine** (tur'bin), a kind of horizontal water-wheel, made to revolve by the escape of water through orifices, under the influence of pressure derived from a fall. Turbines are now made after a large variety of patterns. The oldest and simplest is the Scotch turbine, or Barker's mill (which see). In another common form the water passes vertically down through the wheel between the fixed screw blades, which gives it a spiral motion, and then strikes similar blades attached to a movable spindle, but placed in the opposite direction, so that the impact of the water communicates a rotary motion to the blades and spindles. Or the water may be passed from the center horizontally outwards through fixed curved blades, so as to give it a tangential motion, and thereby cause it to act on the blades of

the wheel which revolves outside. In the annexed cut the water is introduced into a close cast-iron vessel *a* by the pipe *b*, connecting it with the reservoir. Here, by virtue of its pressure, it tends to escape by any aperture which may be presented; but the only apertures consist of those between a series of curved float-boards, *ff*, fixed to a horizontal plate *g*, mounted upon a central axis *h*, which passes upwards through a tube



Section of Turbine.

connecting the upper and lower covers, *o* and *d*, of the vessel *a*. Another series of curved plates *ee*, is fixed to the upper surface of the disk *d*, to give a determinate direction to the water before flowing out at the float-boards, and the curves of these various parts are so adjusted as to render the reactive force of the water available to the utmost extent in producing a circular motion in the disk and the axis *h* with which the machinery is connected. The turbine has, to a considerable extent, replaced the old-style water wheel, and has been adapted to steam engine purposes by substituting steam for water as the moving agent. See *Steam Turbine, Gas Turbine*.

**Turbot** (tur-bot), a well-known and highly esteemed fish of the genus *Rhombus* or *Pleuronectes* (*R.* or *P. maximus*). family *Pleuronectidae* or flat-fishes. Next to the halibut, the turbot is the largest of the *Pleuronectidae* found on the European coasts, and is the most highly esteemed for the table. It is of a short and broad form, brown on the upper side, which is usually the left side, and attains a large size, sometimes weighing from 70 to 90 lbs. The

American or spotted turbot (*Rhombus maculatus*), common on the coasts of New England and New York, attains a weight of 20 lbs.

**Turdus** (tur'dus), the genus of birds to which the thrush belongs.

**Turenne** (tu-ren), HENRI DE LA TOUR D'AUVERGNE, VICOMTE DE, Marshal of France, born in 1611 at Sedan, was the second son of Henri de la Tour d'Auvergne, duke of Bouillon, and of Elizabeth, princess of Nassau-Orange. He learned the art of war under his uncles Maurice and Henry of Nassau in the Dutch service, entered the service of France in 1630, served with distinction in Germany and North Italy, and in 1643 received the command of the army of the Rhine in the Thirty Years' war, and was made a marshal. His successes in this post, as in the battle of Nördlingen (1645), greatly contributed to the close of the war. During the disturbances of the Fronde the victories of Turenne led to the termination of the civil war. In the war against Spain he also distinguished himself, and after its close in 1659 he was named marshal-general of France. When war was renewed with Spain in 1667 he conquered Flanders in three months. In the Dutch war of 1672 Turenne had the chief command. He first marched against the Elector of Brandenburg, and having driven him back as far as the Elbe forced him to sign the Treaty of Vossem in 1673; while in the brilliant campaign of 1674-75 he destroyed two Austrian armies by the battles of Mühlhausen and Türkheim, and conquered and devastated the Palatinate. In 1675 he was killed while making preparations to engage Montecuculi.

**Turgot** (tur-gô), ANNE ROBERT JACQUES, was born at Paris in 1727, and died in 1781. He was educated for the church, but renouncing this purpose he studied law, and in 1671 was appointed intendant of Limoges, which post he occupied for twelve years. Shortly after the accession of Louis XVI, in 1774, Turgot was appointed comptroller-general of France, and in order to reform the political and financial condition of the country he moderated the duties on articles of the first necessity, freed commerce from many fetters, and encouraged industry by enlarging the rights of individuals, and abolishing the exclusive privileges of companies and corporations. Such, however, was the opposition of the clergy and nobility to his reforms that he was dismissed from office in 1776, and retired into private life.



**Turgueneff.** See *Tourguenieff*.

**Turin** (tŭ'rin; Italian, *Torino*), a city of North Italy, capital of province of same name, at the confluence of the Dora Riparia with the Po, and between those two rivers. The city is essentially modern, the streets being broad and regular, and many of them lined with arcades, while there are numerous wide squares and gardens. The chief buildings are the cathedral, a renaissance building, completed in the beginning of the sixteenth century, and remarkable for its marble façade; the royal palace, a plain brick building, which contains the king's private library, with valuable MSS., and the royal armory; the university, a fine edifice recently constructed, in which there is a large library; the Palazzo dell' Accademia delle Scienze, with a picture gallery and museums of natural history and antiquities; the Palazzo Carignano, used at one time by the Sardinian and Italian parliaments when they met here (1848-66), and now given up to a collection of natural history; the Madama Palace, an old and interesting building, and several theaters. The environs of the city are beautiful, and offer many objects of interest. Among the educational establishments, in addition to the university, which is attended by about 2700 students, are an episcopal seminary, a royal military academy, a polytechnic school, and various other colleges and schools. The manufactures consist, besides the staple of silk, chiefly of woolens, cottons, linen, paper, ironmongery, earthenware, and porcelain. Turin was anciently the capital of a tribe called the Taurini, and under the Roman Empire was called Augusta Taurinorum. It was long the capital of Savoy, then of the Sardinian kingdom, and from 1861 to 1865 of United Italy. Pop. 427,106.

**Turkestan** (tŭr-kes-tān'), a wide region of Central Asia, roughly divided into two portions, Eastern Turkestan and Western Turkestan. Eastern or Chinese Turkestan is inclosed on three sides by lofty mountain ranges (Thian-Shan, Karakorum, Kuen-lun), and on the east has the desert of Gobi. Near the center is the basin of the Lob-nor, a lake fed from the west by the Tarim and its tributaries. The greater part of this area is uncultivated steppe, but there are fertile portions watered by the rivers Kashgar, Yarkand, and Karakash. The products include cereals, root-crops, and cotton in large quantities, partly manufactured in the country. Carpets and felt cloths, along

with silk, which the country produces abundantly, are exported to India, Kashmere, and Tibet; while opium, tea, linens, and woolens are imported. The inhabitants, who are mostly Mohammedans, are very mixed. In 1863 a rebellion broke out, and after a war of several years Eastern Turkestan succeeded, under Yakoob Beg, in effecting its separation from the Chinese Empire, but after his assassination, in 1877, it was again brought under Chinese sway. The chief towns are Kashgar and Yarkand, and the pop. is estimated at about 2,000,000. — **WESTERN TURKESTAN** comprises the Trans-Caspian districts, the Turkoman steppes, the khanates of Bokhara and Khiva, and the oasis of Merv. This immense region, under the government or protection of Russia, is watered by the Oxus or Amu Darya, and the Jaxartes or Syr Darya. Maize, millet, rice, and cotton are cultivated in the oases along the rivers and on the slopes of the hills, and trade has greatly increased since the Russian occupation. Pop. estimated at between 5,000,000 and 6,000,000.

**Turkestan**, a town of Asiatic Russia, in Syr Darya province, 145 miles N.W. of Tashkend. It was formerly an important place of pilgrimage, and its mosque, built by Tamerlane, is one of the most striking edifices in Central Asia. Pop. 11,592.

**Turkey** (tur'ki), a Mohammedan empire of Southeastern Europe and Western Asia, under the rule of a sultan. In Europe it now occupies a small portion of the Balkan peninsula, and in this portion is situated the capital, Constantinople, but the larger part of Turkey is in Asia. The immediate possessions of Turkey in Europe, or those directly under the sultan's rule, until the Balkan war extended from Montenegro, Bosnia, Serbia, and Bulgaria on the north to the Aegean and Greece on the south, and from the Black Sea to the Adriatic, the Straits of Otranto, and the Ionic Sea. The Treaty of Berlin in 1878 greatly reduced the area under direct Turkish rule, besides confirming the independence and extending the limits of several of the formerly tributary states; and the Treaty of Bukharest in 1913, still further reduced the limits and power of Turkey. (See *Ottoman Empire* and *Balkan War*). The immediate possessions in Europe have an area of 11,100 sq. miles, pop. about 2,000,000; in Asia, 682,960 sq. miles, pop. 17,000,000; in Africa, 400,000 sq. miles, pop. 9,821,100. Egypt, however, has ceased for the present to be part of Turkey and Tripoli has come under Italian rule. The island of Crete or Candia, in the

**Ægean Sea**, formerly possessed by Turkey, was at the close of the Balkan War left autonomous, its annexation by Greece being foreseen.

**European Turkey.**—European Turkey was by the Treaty of Bukharest at the conclusion of the Balkan War (1913) reduced to a very small area, including, however, the great strongholds of Constantinople and Adrianople. It stretches from the new eastern limits of Bulgaria and the Black Sea on the west and north to the Ægean and the Sea of Marmora on the east and south. Until 1913 Turkey included the provinces of Adrianople, Macedonia and Albania. (See *Balkan War*.) In 1908 the Turkish provinces of Bosnia and Herzegovina, which had been administered by Austria since the Congress of Berlin, in 1878, were formally annexed by the latter country. Turkey protested, but eventually accepted a payment of \$12,500,000 from Austria as compensation for the provinces. In 1909 the independence of Bulgaria was also recognized by Turkey, on the assumption by Russia of \$9,000,000 of the Ottoman national debt. The climate of European Turkey is Mediterranean, with sub-tropical rains and summer droughts. The temperature is variable, and owing to the cold north-east winds is much colder than that of other Mediterranean countries in the same latitude. There are few manufactures except in Constantinople and Adrianople. The special industries are tanning (recently established) and manufactures of fine muslins, velvets, silks, carpets and ornamental weapons. Until the outbreak of the Balkan War, Turkey was making substantial advance in agriculture.

**Turkey in Asia** comprises the peninsula of Asia Minor, the country intersected by the Euphrates and the Tigris, the mountainous region of Armenia between their upper courses and the Black Sea, the ancient lands of Syria and Palestine, and the coast strips of Arabia along the Red Sea and Persian Gulf. Omitting Arabia, the country consists mainly of (1) a high plateau traversed by the mountains of Taurus and Anti-Taurus, and stretching from the Archipelago to the borders of Persia; (2) a plateau of less elevation and extent (Syria and Palestine) traversed by the double range of Lebanon; and (3) the extensive plain of Mesopotamia on the Lower Tigris and Euphrates. (See *Asia Minor*, *Armenia*, *Kurdistan*, *Mesopotamia*, *Syria*, and *Palestine*.) The islands Chios, Lesbos, Rhodes, etc., belong to Turkey in Asia, while the island of Samos is a tributary principality, and Cyprus is held by Britain. The chief

towns in Asiatic Turkey are Smyrna, Damascus, Bagdad, Aleppo, and Beyrout.

**Commerce, Communications, etc.**—The chief exports are raisins, figs, and dates, silk, cotton, wool, and mohair, opium, coffee, wheat, wine, valonia, olive-oil, and tobacco; while the imports are cotton, woolen, and silk goods, metals, iron, steel, glass wares, etc. Accounts are usually kept in *grush* or piastres, the value of which is something less than 4½ cents; a hundred piastres make a Turkish *lira* or gold *medjidis* (value about 30 cents), and 500 make a 'purse.' The unit of weight is the *oke*, equal to about 2½ lbs. avoirdupois. The usual linear measure is the *arashin*, equal to 30 inches.

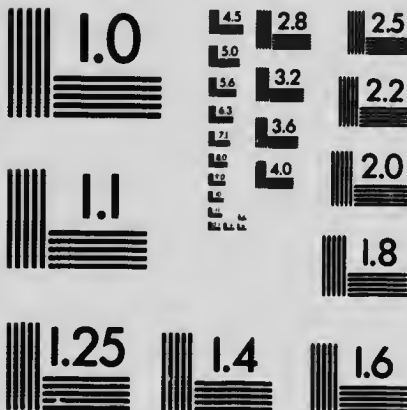
**People.**—The inhabitants of the Ottoman Empire are of very diverse races. First in order are the Osmanli Turks, who, as the dominant race, are diffused over the country. They are proprietors of the greater part of the soil, fill all the civil and military offices, live generally in towns employed in various trades, and are seldom agriculturists. The Greeks form the bulk of the population over great part of the Ægean coasts and islands, and constitute to a very considerable extent the mercantile and trading community of Turkey. Arnauts, or Albanians, are found in the west throughout Albania; the northwest is occupied by Servians; and Bulgarians inhabit the district south of the Danube and east of Servia and Albania. In Asiatic Turkey the Turks are an important element, but there are also numbers of Armenians, Arabs, Kurds, Jews, Greeks, Circassians, etc. The Turkish language belongs to the Turanian family of languages, and is allied to the Hungarian and the Finnish. The literature is considerable in bulk, but not very original, consisting in great part of translations from the Persian and the Arabic, and in recent times from European literature.

**Government.**—The head of the government of Turkey is a monarch, usually designated the sultan, regarded by the Turks as the caliph or head of Islam. His edicts bear the name of Hatti-sherif, and his government is often designated as the Sublime Porte. The public officers who conduct the administration under the sultan are divided into three classes. The first class is that of law and religion, and at their head is the Sheikh-ul-Islam, who governs a judicial and ecclesiastical body called the Ulema. The second class consists of the 'officials of the pen,' or the members of administration, and at their head is the grand-vizier or



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## Turkey

**Sadrasm.** The third class includes the 'officials of the sword,' at their head being the Seraskler or minister of war, and the Capudan Pasha or minister of marine. The supreme deliberative body is the divan or privy-council, with the grand-vizier at its head, other members being the Sheikh-ul-Islam and the ministers of war, marine, finance, justice, education, commerce, etc. The immediate possessions of the Turkish Empire are divided into general governments or vilayets, at the head of each of which is a governor bearing the title of vali. The vilayets are themselves subdivided into sanjaks, administered by mutessarifs; and these again into kazas administered by kaimakans. Military service is obligatory on all Mohammedans. The service lasts twenty years: six with the Nizam and first reserve, eight years in the Redif, and six in the Mustafiz (equivalent to the German Landsturm). The army on a peace footing comprises about 375,000 of all arms and ranks; if put on a war footing it might contain 500,000 more. It is organized on a new system dating from 1887.

**Finances.**—The financial condition of Turkey is thoroughly unsound. From 1854 the state had contracted a series of foreign loans, the total nominal capital of which amounted to about \$1,140,000,000 in 1877. In 1875 the government announced that they would pay half the interest on the debt, but in 1876 they declared themselves unable to pay anything. In 1881 an arrangement was effected by delegates of the bondholders who met at Constantinople. The capital of the debt was reduced to \$532,185,000, and the Turkish government agreed to hand over the excise revenues to a commission representing the bondholders, so that interest to the extent of 1 per cent. has been paid since 1882. In addition to the foreign debt the country is huddled with an internal and floating debt. At the end of 1910 the debt remained about as above stated, with no immediate prospect of liquidation.

**Religion and Education.**—The established religion of Turkey is Mohammedanism, but Christianity under the Greek form is professed by a large majority of the Greeks and Bulgarians, while part of the Albanians are Roman Catholics. The educational system of Turkey, in accordance with the law of 1869, provides for the erection of elementary schools in every commune, and of secondary schools in the larger towns. The University of Constantinople, officially founded in 1900, has not yet been opened. There are law, military, and medical

## Turkey-stone

schools in that city. Roberts College, in the Christian section of the capital, is an important institution, of American origin.

**History.**—See *Ottoman Empire*.

**Turkey**, a large gallinaceous bird (*Meleagris gallo pavo*), well known as an inmate of the poultry yard. It is a native of North America, and was introduced into Europe in the sixteenth century. Wild turkeys abound in some of the forests of the United States, where they feed on berries, fruits, insects, reptiles, etc., their plumage being a golden bronze, shot with violet and green, and banded with black. On account of its size and the excellence of its flesh and eggs the turkey is one of the most valued kinds of poultry. There is another species, the Honduras or West Indian turkey (*Meleagris ocellata*), which derives its specific name from the presence of bright eye-like spots on the tail-coverts. It is not so large as the common turkey, but its plumage is more brilliant.

**Turkey-buzzard**, or **TURKEY VULTURE**, a rapacious bird belonging to the vulture family (Vulturidae) and the genus *Cathartes* (*C. aura*); so named from its bearing a distant resemblance to a turkey. It is about 2½ feet long, and with wings extended about 6 feet in breadth, general color black or brownish. It inhabits a vast range of territory in the warmer parts of America. It is of importance in the cities of the southern United States as a destroyer of carrion, and is protected on account of its useful services in this direction.

**Turkey-carpet**, a carpet made entirely of wool, the loops being larger than those of Brussels carpeting and always cut. The cutting of the yarn gives it the appearance of velvet.

**Turkey-red**, a brilliant and durable red color produced by madder upon cotton cloth, and introduced from the East about the end of the eighteenth century. The processes which a fabric undergoes in receiving this dye are numerous, and vary in different establishments, but the most essential is the preliminary treatment of the fabric with oils or fats, combined with certain other substances, such as carbonate of potash or soda.

**Turkey-stone**, a very fine-grained siliceous slate, commonly of a greenish-gray, sometimes of a yellowish- or brownish-gray color. When cut and polished it is used for sharpening small cutting instruments.

**Turkomans** (tur'kō-manz), a nomadic Tartar people occupying a territory stretching between the Caspian Sea and the Sea of Aral, the khanates of Khiva and Bokhara, Afghanistan, and Persia. They do not form a single nation, but are divided into numerous tribes or clans.

**Turks**, a widely spread race, supposed to have had its original seat in Turkestan or Siberia, but now extending from European Turkey through Asia to the shores of the Northern Ocean. Besides the Ottoman Turks or Osmanli of Turkey, the Turkomans, Kirghiz, Usbecks, Yakuts, etc., all belong to the Turkish race. See *Turkey, Ottoman Empire*, etc.

**Turks Islands** constitute the S. E. portion of the Bahama chain, and along with the Caicos Islands are a dependency of Jamaica, having a government of their own. The chief island is Grand Turk, about 7 miles long and 2 broad. Their chief export is salt. See *Caicos Islands*.

**Turmeric** (tur'me-rik), the dried tubers or rhizomes of *Cureuma longa*, nat. order Zingiberaceæ (ginger). It is largely employed in India and China as an important ingredient in curry powder. Unsized white paper, steeped in an alcoholic solution of turmeric, when dried, is employed as a test to detect alkalies, which change its color from yellow to reddish brown. Turmeric yields a yellow color, which has great brightness but little durability. It is also used medicinally in the East as a carminative.

**Turner**, CHARLES TENNYSON. See under *Tennyson*.

**Turner** WILLIAM, a great English landscape-painter, was born in London in 1775; died in 1851. His father, who was a hair-dresser, proposed to teach the boy that trade, but afterwards allowed him to follow his inclination, and in 1789 he entered the Royal Academy as a student. After remaining there for five years, and working actively at his profession for another five, during which period he sent to the exhibition no less than fifty-nine pictures, he was elected in 1799 an associate of the Royal Academy. In the two following years he exhibited fourteen pictures, and in 1802 was elected an academician. Till this date he had chiefly been known as a landscape-painter in water-colors, but thenceforth he turned his attention to oil-painting, and in the ensuing half-century produced at the Academy exhibitions upwards of 200 pictures. In

1807 he was elected professor of perspective in the Royal Academy, and the following year appeared his *Liber Studiorum*, or *Book of Studies*, which Charles Turner, Mr. Lupton, and others engraved. Other works by him which were engraved are his illustrations of Lord Byron's and Sir Walter Scott's poems; Roger's *Italy* and *Poems*; *The Rivers of England*; *The Rivers of France*; and *Scenery of the Southern Coast*. 'The reputation of Turner,' says Mr. R. N. Wornum, 'among landscape-painters stands alone, solitary, colossal; no man has displayed at the same time such great powers of generalizing and concentrating the beauties of nature. For half a century Turner produced a succession of great works, from 1790 to 1840. After this period, he fell, for the most part, into that vague trifling with mere effects of light and shade and color which has done so much for a time to almost destroy the great reputation he had justly acquired by his previously unrivaled works. He worked in three styles: the best of his early works resemble Wilson and the Poussins; in his second style Claude was his model; and in his third he competed with nature only. . . . As examples of his three styles may be mentioned the *Garden of the Hesperides*, the *Shipwreck*, and the *Sun Rising in Mist*, illustrating the first; *Crossing the Brook*, the *Morning of the Chase*, and *Apuleia in Search of Apuleius*, his second or Claude style; the *Rise*, and the *Fall of Carthage*, 1815 and 1817, showing his transition from this second style to his third and greatest, of which the *Bay of Baia*, *Caligula's Bridge*, and *Childe Harold's Pilgrimage*, painted between 1823 and 1832, are grand examples; and lastly, the *Fighting Temeraire*, painted in 1839, may be instanced as the indication of the point of final transition from the sublime to what we must call the ridiculous in some of those strange productions which occupied the last years of his prolonged life.'

**Turner** SIR RICHARD ERNEST WILLIAM (1871- ), a Canadian army officer who served in South Africa in 1900, and commanded one of the Canadian divisions in the European war, 1914-18.

**Turner**, SHARON, historian, was born in London in 1768; died in 1847. Educated at a private school in Clerkenwell, he was articled to and became an attorney in the Temple, but subsequently devoted his time to historical and philological researches. His chief works are: *History of the Anglo-Saxons* (three vols., 1799-1805); *History of*

## Turnhout

England (nine vols., 1799-1829); *Sacred History of the World* (three vols., 1832); and *Richard Third*, a poem (1845).

**Turnhout** (turn'-hout'), a town of Belgium, province of Antwerp, 26 miles E.N.E. of the town of Antwerp. It has manufactures of linen, woollen, and cotton fabrics, colored paper, playing-cards, and various other industries. Pop. (1904) 22,162.

**Turning** (turn'ing), the art of giving circular and other forms to articles of wood, metal, bone, ivory, etc., by making them revolve in various manners in a machine called a *lathe*, and applying cutting instruments so as to produce the form required; or by making the cutting instrument revolve when the substance to be operated upon is fixed. See *Lathe*.

**Turnip** (tur'nip), the common name of the *Brassica Rapa*, a cruciferous, biennial plant, much cultivated on account of its esculent root, and of the same genus as the cabbage, cauliflower, and broccoli. The turnip, as a culinary vegetable and as a cattle food, was well known to the Greeks and Romans. The root is generally used as a



Turnip.

culinary vegetable in all temperate climates, and in some countries the vegetable is cultivated on a large scale for feeding stock, the root being invaluable for this purpose. In the field culture of the larger-rooted varieties the most advantageous mode is by drills. The roots of the turnip have often a tendency to divide and become hard and worthless—a condition known as *finger-and-toe*, or *dactylorhiza*. The plant thrives best on a rich and free soil and in moist cloudy weather. There are several varieties, all apparently the result of cultivation. The Swedish turnip, which forms a valuable field crop, is probably a hybrid between *B. campestris* and *B. Rapa* or *Napus*, rape. *B. Napus* yields rape, cole, or colza seeds, from which a well-known fixed oil is expressed.

**Turnip-fly**, **TURNIP-FLEA**, the *Haltica nembrum*, a small coleopterous insect, very destructive to young

turnips. It is common in British meadows from April to October, and may be recognized by two yellow stripes on its wing-cases. The name *turnip-fly* is also given to a hymenopter, the *Athalia centifolia*. The larvae of this fly, popu-



Striped Turnip-fly (*Haltica nembrum*). a a, Natural size. b b, Magnified. c, Larva, natural size.

larly known as *niggers*, are very destructive to the leaves of the turnip.

**Turnpike** (turn'pik), a gate that may be set across a road, and is watched by a person appointed for the purpose, in order to stop carriages, carts, wagons, etc., and sometimes travelers, till toll is paid, for the cost and upkeep of the road. Such roads are called *turnpike-roads*, or simply *turnpikes*, and formerly were common in the Atlantic States, but recently tolls on roads have been very largely abolished. See *Roads*.

**Turnspit** (turn'spit), a name given to a variety of terrier dogs, from their being trained to turn the spits or roasting-jacks in mansions. The breed is now practically extinct.

**Turnstone**, a gallinaceous bird of the plover family (*Streptopelia collaris*). The length of the bird is about 9 inches. It takes its name from its practice of turning up small stones in



Turnstone (*Streptopelia collaris*).

search of the marine worms, minute crustaceans, etc., on which it feeds. It appears in most parts of the globe, and is found throughout North America, on the Atlantic and Pacific coasts.

**Turn-table**, in railways, a circular platform of iron and wood, supported on rollers, and turning upon a center without much friction, even

when loaded with a considerable weight. It is used for removing single carriages from one line of rails to another, and also for reversing engines on the same line of rails.

**Turpentine** (tur'pen-tin), an oleo-resinous substance flowing naturally or by incision from several species of trees, as from the pine, larch, fir, pistacia, etc. Common turpentine is obtained from the *Pinus sylvestris* or Scotch fir, and some other species of pine. Venice turpentine is yielded by the larch, *Larix Europæa*; Strasburg turpentine by *Abies picea* or silver fir; Bordeaux turpentine by *Pinus maritima* or maritime pine; Canadian turpentine, or Canada balsam, by *Abies balsamifera* or balm of Gilead fir; and Chian turpentine by *Pistacia Terebinthus*. All the turpentines dissolve in pure alcohol, and by distillation yield oils which are termed *spirits of turpentine*. Oil or spirits of turpentine is used in medicine externally as an excellent rubefacient and counter-irritant, and internally as a vermifuge, stimulant, and diuretic. It is also much used in the arts for dissolving resins and oils in making varnishes. Large quantities of it are obtained from the pine forests of the South Atlantic States.

**Turpentine-tree**, the name given to some species of trees of the genus *Pistacia*, nat. order Anacardiaceæ, which yield turpentine, as the *P. Terebinthus*, the Chian or Cyprus turpentine tree, *P. lentiscus*, the Mount Atlas mastic or turpentine-tree, etc. See *Pistachio*.

**Turpeth** (tur'peth), the root of *Convolvulus Turpethum* or *Ipomœa Turpethum*, a plant of Ceylon, Malabar, and Australia, which has a cathartic property. It is sometimes called *vegetable turpeth*, to distinguish it from *mineral turpeth*. See next article.

**Turpeth-mineral** (Hg SO, 2 Hg O), a name given to the yellow basic sulphate of mercury. It acts as a powerful emetic, but it is not now used internally. It is a very useful errhine in cases of headache, amanosis, etc.

**Turquoise** (tur'koiz, tur'kwaz), a greenish-blue opaque precious stone, consisting essentially of a phosphate of alumina, containing a little oxide of iron and oxide of copper. The true or oriental turquoise, a favorite ornamental stone in rings and other articles of jewelry, is found only in a mountain region of Persia, and was originally brought into Western Europe by way of Turkey (hence the name).

**Turret** (tur'et), in architecture, a kind of small tower. Turrets are chiefly of two kinds, such as rise immediately from the ground, as staircase turrets, and such as are formed on the upper part of a building by being carried up higher than the rest.

**Turret-ship.** See *Ironclad Vessels*.

**Turtle** (tur'tl), the name given to the marine members of the order Chelonia, being reptiles which differ but little from tortoises, the name turtle or tortoise being in some cases applied indifferently. They are found in all the seas of warm climates, and feed chiefly on marine plants. The most important species is the green turtle (*Chelonia mydas*), which is from 6 to 7 feet long, and weighs from 700 to 800 pounds. Its flesh is highly esteemed as a table luxury.



Hawk's-bill Turtle (*Chelone imbricata*).

It is a native of the tropical parts of the Atlantic as well as of the Indian Ocean, being especially abundant near Ascension Island. The logger-head turtle (*Chelone* or *Chelonia caretta*) yields an oil which is used for lamps and for dressing leather. The hawk's-bill turtle (*C. imbricata*) is remarkable for the beautiful imbricated horny plates covering the carapace, and constituting the tortoise-shell of commerce. See *Tortoise*.

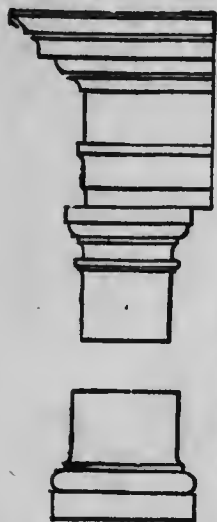
**Turtle-dove** (*Turtur communis*), a small variety of pigeon, about 11 inches in length, color pale brown marked with a darker hue above, a purple tinge pervading the feathers of the breast. They are in general smaller and more slender than the domesticated pigeons, and their cooing note is plaintive and tender.

**Tuscaloosa** (tus-ká-ló'sá), a city, capital of the county of that name, Alabama. It was once the capital of the state. It is situated on the Black Warrior River, 56 miles s.w. of Birmingham. Here is the University



of Alabama and various other educational institutions. It is engaged in the coal and iron industries, has cotton manufactures, and is an important cotton shipping center. Pop. 8407.

## Tuscan Order of Architecture,



Tuscan Order.

one of the five orders of architecture, according to Vitruvius and Palladio. It admits of no ornaments, and the columns are never fluted. Otherwise it differs so little, however, from the Doric, that it is generally regarded as being only a variety of the latter. See *Doric*.

**Tuscany** (tus'kă-ni; Italian, *Toscana*), formerly a grand-duchy, now a department of Italy; area, 9289 square miles. Pop. about 2,500,000. The chain of the Northern Apennines forms a considerable portion of its northern

boundary, the sea being its boundary on the west. The principal river is the Arno. Cereals cover a large area, and vineyards, oliveyards, and orchards are numerous. The manufacture of silk is considerable. The marble of Tuscany, especially that of Siena, is well known. Tuscany corresponds to the ancient Etruria, which was, however, of wider extent. (See *Etruria*.) After the fall of the Western Empire (476) it passed successively into the hands of the Ostrogoths, Byzantine Greeks, and Lombards. Charlemagne made it a French province, and it was governed by marquises or dukes until the twelfth and thirteenth centuries, when it became broken up into a number of small republics, four of which were Florence, Pisa, Siena, and Lucca. From the first Florence occupied the leading place, and it gradually extended its territory. In 1569 Pope Pius I granted to Cosmo I the title of Grand-duke of Tuscany, and this position was retained, with interruptions, by the Medici family (which see) until 1737, when it passed to Francis Stephen, duke of Lorraine. In 1859, when under his descendant, the grand-duke Leopold, it was annexed to Sardinia by a popular vote, and in 1861 became, with Sardinia, part of the kingdom of Italy.

**Tusculum** (tus'kô-lum), an ancient Latin city, now in ruins, near the site of the modern Frascati, 15 miles s. e. of Rome. It was the birthplace of the elder Cato, and a favorite residence of Cicero. Many fine remains have been dug up in recent times, among them being the so-called Villa of Cicero, the Forum, theater, amphitheater, and ancient castle or citadel.

**Tuskegee Institute** (tus'kê'gê), a co-educational, non-sectarian institution at Tuskegee, Alabama, founded by Booker Washington in 1881 for the instruction of colored students in industrial pursuits. Aided by charitably disposed persons and managed with remarkable ability, it has played an important part in the development in industry of the negroes of the South. It has now 167 instructors and over 1600 students, with an endowment of nearly \$2,000,000.

**Tussar-silk** (tus'ar), or **TUSSEH-SILK**, a coarse silk obtained from the cocoons of a wild native Bengai silk-worm. See *Silk*.

**Tussilago** (tus-si-lă'gô), colt's-foot, a genus of broad-leaved plants, nat. order Compositæ, sub-order Corymbiferae. The species are natives of Europe and America. *T. Farfara* (common colt's-foot) is found in the Northern and Middle States. See *Colt's-foot*.

**Tussock-grass** (tus'uk; *Dactylis cæspitosa*), a large grass, of the same genus as the cock's-foot grass of the United States, a native of the Falkland Islands, Fuegia, and South Patagonia. It grows in great tufts or tussocks sometimes 5 to 6 feet in height, the long tapering leaves hanging over in graceful curves. The plant is a useful food for cattle, and several attempts have been made to establish it for that purpose.

**Tussock-moth**, a grayish-white moth about an inch long, the caterpillars of which do great mischief in hop grounds, and are known as hop dogs. The caterpillar is delicate green in color, with brush-like tufts of yellow hairs on several of the segments. It feeds on leaves throughout the summer, becomes a hairy chrysalis about September, and emerges as a moth in the following spring.

**Tutenag** (tû'te-nag), Chinese white copper, an alloy of copper 50, nickel 19, and zinc 31, used for table ware, etc. A small quantity of lead or iron is added in some formulas. It much resembles packfong, which is also called Chinese white copper.

**Tuticorin** (tū-tā-kor'in), a seaport of India, a terminus of the South Indian Railway, 33 miles east of Tinnevely, Madras. The roadstead is good, and the trade considerable. Pop. 28,048.

**Tutor** (tū'tur), (1) in many universities, the name given to scholars attached to the various colleges, by whom, assisted by private tutors, the education of the students is chiefly conducted. They are selected from the college. (2) In Scots law, the guardian of a boy or girl in pupilarity. By common law a father is tutor to his children. Failing him there may be three kinds of tutor, a *tutor-nominate*, a *tutor-at-law*, or a *tutor-dative*.

**Tutlingen** (tūt'ling-en), a town of Württemberg, on the Danube, near the Baden frontier. Pop. (1905) 14,627.

**Tutuila** (tū-tū-g'la), one of the largest of the Samoan or Navigators' Islands. It rises about 2000 feet above the sea, is covered with vegetation, and has the excellent harbor of Pango Pango, or Pago Pago. It was annexed to the United States in 1899. Pop. about 4000.

**Tuyere** (tū-yēr, or twē'yār). See *Blast-furnace*.

**Tver** (tyār), a town of Russia, capital of the government of the same name, situated in a plain on the Volga, 96 miles northwest of Moscow. It consists of the Kremlin or fortress, surrounded by an earthen wall, and the town proper. The manufactures are numerous and varied. Pop. 45,644.—The government of Tver has an area of 25,225 square miles, and a population of 2,053,000. Rye, barley, hemp, and flax are largely cultivated, and the forests are extensive.

**Twain**, MARK. See *Clemens*.

**Twat**, an oasis group in the Sahara, southeast of Morocco, to which it is considered as belonging. The inhabitants are about 300,000 in number, partly Arabs, partly Berbers, and are fanatical Mohammedans.

**Tweed** (twēd), a river of Scotland, which rises in the south part of Peeblesshire, forms the boundary line between England and Scotland for 16 miles, runs through England for a short distance, and then enters the North Sea at Berwick; total length, 97 miles. Its waters abound with salmon and trout, and its name is celebrated in connection with some of the best literature of Scotland.

**Tweed Ring**, a political combination in New York City

which, about 1868-71, secured control of the municipal elections and revenues, the latter of which were plundered of many millions of dollars. Its ruling spirit was William M. Tweed, who became the head of the Tammany organization. He was brought to trial in 1873 and sentenced to prison for 12 years. He escaped in 1875, but was captured and brought back, and died April 12, 1878.

**Twelfth-day**, the twelfth day after Christmas, upon which is held the festival of Epiphany (which see). On the evening of this day, called Twelfth-night, various social rites and ceremonies are observed in different countries. One of these is the baking of a cake, into which a bean is introduced, the person who receives the bean being made king for the occasion.

**Twickenham** (twik'en-am), a town in Middlesex, England, on the Thames, nearly 11 miles s. w. of London. In the 18th century it was a fashionable resort. Pop. 29,374.

**Twilight** (twi'lit), daylight which continues after sunset, occasioned by the reflection of sunlight from the higher parts of the atmosphere which are still illuminated after the sun has become invisible from ordinary heights, and which contain floating matter which reflects the sun's beams. It is supposed to last till the sun is about 18° below the horizon, but is much influenced by the state of the atmosphere as to clouds, etc. The light preceding sunrise is also given this name. In low altitudes (that is, near the equator) there is little twilight.

**Twilight Sleep**, a method of inducing painless childbirth, worked out in the medical clinic of the University of Baden, and in 1914 reported to have been used successfully in 5000 cases in Freiburg, Germany. The 'twilight sleep' is a borderland condition between sleeping and waking, induced by the hypodermic injection of a small quantity of a combination of two drugs, scopolamine and morphine, which produces an unusual delicately balanced condition of consciousness in which the body loses all sense of pain, but retains the power of muscular contraction.

**Twill**, a textile fabric, in which the weft threads do not pass over and under the warp-threads in regular succession, as in common plain weaving, but pass over one and under two, over one and under three, etc.

**Twin Falls**, a city, county seat of Twin Falls Co., Idaho, near the Snake River, 120 miles s. w. of Pocatello. It is in an agricultural district. Pop. 8000.

**Twin Screw**, a propeller of a steam-vessel, composed of two separate and parallel screws which revolve in opposite directions, thus giving increased power over a single screw propeller. The twin-screw system is now employed in the principal warships of the world, and triple-screws are used on many modern vessels.

**Twiss**, SIR TRAVERS, born in Westminster, England, in 1810. He was educated at Oxford; became a fellow and tutor in his college; was appointed successively professor of political economy at Oxford (1842-49); professor of international law, King's College, London (1852-55); professor of civil law in Oxford (1855-70); and advocate-general of the crown (1867-72). His chief works are: *The Oregon Question Examined* (1846), *View of the Progress of Political Economy in Europe* (1847), *Lectures on the Science of International Law* (1856), *the Law of Nations* (1863), and *Belligerent Right on the High Seas* (1884). He died in 1897.

**Tyburn** (ti'burn), a turnpike at the west end of Oxford Street, London, noted for the public executions of metropolitan malefactors which long took place near it. The turnpike was removed in 1829.

**Tyche** (ti'kē). See *Fortuna*.

**Tyco Brahe**. See *Brahe*.

**Tyler** (ti'ler), a town of Texas, capital of Smith Co., 19 miles N. W. of Troup. It has cotton and oil mills and other industries. Pop. 10,400.

**Tyler**, JOHN, tenth president of the United States, was born in Virginia, March 29, 1790. He studied law, was elected to Congress in 1816, and in 1825 became governor of Virginia and also succeeded John Randolph as United States Senator. He subsequently became identified with the Whig party, and in 1840 was elected Vice-President under the presidency of General Harrison. On Harrison's death in 1841 he succeeded as President, and as such came into collision with his party on the National Bank Bill and other questions. The annexation of Texas was the chief event of his term of office, at the end of which he retired into private life. On the outbreak of the Secession war he espoused the cause of the South, and was a member of the Confederate congress. He died in Richmond in January, 1862.

**Tyler**, MOSES COIT, historian, born at Griswold, Connecticut, in 1835. He graduated at Yale University in 1857,

studied theology, and became a Congregational pastor in 1859. He was professor of English literature in Michigan University, 1867-72 and 1874-81, and literary editor of *The Christian Union*; 1872-74. He became priest in the Protestant Episcopal Church in 1883. He wrote *History of American Literature During the Colonial Period*, *Manual of English Literature*, etc. He died December 28, 1900.

**Tyler**, WAT, an English soldier who served in the French wars, and was one of the leaders in the rebellion of 1381 against the poll-tax (which see). He led the men of Kent upon London, where, after fire and pillage, they were partly dispersed by a promise of the king to grant them charters of freedom and amnesty. Tyler, however, remained with a body of the insurgents, and was met by the king next day at Smithfield, where, for his apparent inscience in the royal presence, he was stabbed by William Walworth, mayor of London.

**Tyler**, EDWARD BURNETT, anthropologist, born at Camberwell, England, in 1832. He devoted himself with much success to researches in the history of man and civilization; became president of the Anthropological Society, keeper of the Oxford University Museum, and reader in anthropology. He was appointed first Gifford lecturer at Aberdeen in 1888. His chief works are: *Researches into the Early History of Mankind*; *Primitive Culture*; and *Anthropology*. He was made professor of anthropology at Oxford in 1895.

**Tympanum** (tim'pa-num), (1) a cavity of an irregular shape situated in the ear. (See *Ear*.) (2) In architecture, the triangular space in a pediment included between the cornices of the inclined sides and the horizontal cornice; also, any similar space, as above a window, or the space included between the lintel of a door and the arch above it. The tympanum is often ornamented with carving or sculpture.

**Tyndale**, WILLIAM. See *Tindall*, William.

**Tyndall** (tin'dal), JOHN, physicist, born in 1820 at Leighlin Bridge, Carlow, Ireland; was educated in a neighboring school; joined the Irish Ordnance Survey in 1839; engaged in railway engineering for several years; was appointed teacher in Queenwood College, Hants; was elected to the chair of natural philosophy in the Royal Institution in 1853; visited Switzerland in 1856 along with Huxley, and made repeated investigations in that country subse-

quently; lectured throughout the United States in 1872; and presided over the British Association in 1874 at Belfast. His chief works are: *The Glaciers of the Alps* (1800); *Heat Considered as a Mode of Motion* (1863); *On Radiation* (1865); *Sound* (1865); *Light* (1870); *The Forms of Water* (1872); *Floating Matter in the Air* (1881), etc. He died December 4, 1893.

**Tyne** (tin), a river of England, formed by the junction near Hexham of the North Tyne, which rises in the Cheviots, and the South Tyne, which rises in the east of Cumberland. The united stream enters the sea at Tynemouth after a course from Hexham of nearly 30 miles. The Tyne has, since 1854, been the subject of large engineering operations, consisting of extensive dredging, the construction of piers at its mouth, the formation of large docks, and the building of a swing-bridge at Newcastle. These improvements have resulted in a great increase in its trade. See *Newcastle-on-Tyne*.

**Tynemouth** (tin'mouth), a borough of England, county of Northumberland, at the mouth of the Tyne on its north bank. There are many handsome buildings, a parade nearly a mile long, the ruins of a picturesque old priory, an aquarium, winter-garden, baths, etc., and the place is much frequented for sea-bathing. The port of North Shields and several villages are included within the borough. Pop. 58,822.

**Type** (tip), a rectangular solid of metal, wood, or other hard material having a raised letter, figure, punctuation mark, or other character on the upper end, which, when inked, is used to make impressions on paper and other smooth surfaces; the term is also used collectively. Types must be all of a uniform height, and perfectly true in their angles, otherwise they could not be locked firmly together to be printed from. The nicks *d d d* shown in figure are notches made on one side of the type to assist the compositor in distinguishing the bottom from the top; the *groove* (*e*) is a channel made in the bottom of the type to make it stand steadily. From the character of the letters types are known as CAPITALS, small or lower-case letters, italics, scripts, etc.



From their size they receive the following names, the titles ranging from *brilliant*, which, however, is rarely used, to *English*, the largest type used in ordinary book work:—

Brilliant.....	William Caxton was the first English Printer
Diamond .....	William Caxton was the first English Printer
Pearl .....	William Caxton was the first English Printer
Ruby .....	William Caxton was the first English Printer
Nonpareil .....	William Caxton was the first English Printer
Minion .....	William Caxton was the first English Printer
Brevier .....	William Caxton was the first English Printer
Bourgeois .....	William Caxton was the first English Printer
Long Primer .....	William Caxton was the first English Printer
Small Pica .....	William Caxton was the first English Printer
Pica .....	William Caxton was the first English Printer
English .....	William Caxton was the first English Printer
Brevier .....	Black Letter or Old English

Late in the nineteenth century the 'point' system was adopted generally by printers. The old names with their nearest equivalent in the point system are as follows:

Brilliant .....	3½	point
Diamond .....	4	"
Pearl .....	4½	"
Ruby .....	5	"
Nonpareil .....	6	"
Minion .....	7	"
Brevier .....	8	"
Bourgeois .....	9	"
Long Primer .....	10	"
Small Pica .....	11	"
Pica .....	12	"
English .....	14	"

Types are made by casting (which is now done by machinery), the letter being first cut upon the end of a steel punch, and the punch then driven into a piece of copper, which forms the *matrix* or bottom of the mold intended to produce the letter. Type-metal is an alloy of lead, antimony, and tin. See *Printing*.

## Type-setting Machine,

a mechanical device for setting type. A machine for this purpose was patented in England as early as 1794, but the first in any way available was the Churd machine of 1822. This cast the types as well as set them. Various other machines were subsequently produced, but it was not until the last quarter of the century that any was invented that competed profitably with hand-setting. Of those now in use that set previously-cast types, there are two which may be named, the Thorne and McMillan machines. The first of these sets and distributes the type, while the second has separate machines for setting and distributing. Of type-casting machines, there are two in common use, the



Merganthaier and the Lanston. The Merganthaier machine, perfected in 1884, is known as the Linotype, from the fact that it casts a line of type instead of single types. It has long been widely used in newspaper offices and is now largely employed in book setting. The Lanston, known as the Monotype, casts single types, a keyboard being used as in the Linotype, each key controlling the casting of a special type-letter, mark, space, etc. This is in considerable use, and there are other single-type machines on the market.

**Typewriter**, a machine intended to be used as a substitute for the pen, and by which the letters are produced by the impression of linked types. The essential elements in such machines are a movement to bring the type into position, an inking device, an impression movement, and means for letter and line spacing. A successful form of the machine has a series of letter keys arranged in rows, to be worked by the fingers of both hands, a letter being imprinted on the paper (which moves automatically) each time a key is struck. In recent years many type-writers have been brought before the public, such as the Remington, Hammond, Bar-Lock, etc., and improvements are made from time to time. In these there are two rows of keys, 23 in all. Each key works a lever to which is attached a capital letter, an ordinary Roman letter, and a figure. The capital letters and the figures are brought into play by means of two small shift stops, and the printing as it is performed is in full view of the operator. In others, as the Calligraph, Yost, and Smith Premier, there is a separate key for every character producible.

**Typhaceæ** (ti-fā'se-ē), a nat. order of monocotyledonous plants, characterized by their calyx being three-sepaled and half-glumaceous, or a mere bundle of long hairs, by their long lax filaments, clavate anthers, solitary pendulous ovules, and peculiar habit. The order includes two genera, *Typha* and *Sparganium*, the species of which are abundant in the northern parts of the world. They are herbaceous reed-like plants, growing in marshes and ditches. See *Reed-mace*.

**Typhline** (ti-f'lin), a curious lizard belonging to a family in which the eyes and ears are hidden under the skin. In the typical species, the common typhline (or blind acontias—*Typhlina Cuvierii*), the limbs are entirely wanting, and the animal looks utterly helpless, having no apparent legs,

feet, eyes, or ears. It is a native of South Africa.

**Typhoid Fever** (ti-foid), called also enteric fever and gastric fever, a disease somewhat resembling typhus, but essentially different. It is characterized by serious disorder of the bowels, and is not infectious in the sense that it can be communicated from one person to another by breath or by the skin, as in scarlet fever and small-pox. The poison seems to consist of living organisms or disease germs which exist in the discharges from typhoid fever patients, may gain admission to the water of wells, and hence to the human stomach, through drinking water or that used to wash milk dishes. When these germs gain access to the alimentary canal of a person whose general health is impaired, the disease is usually set up. It is uncertain what time may elapse between the introduction of the poison and the appearance of the disease, but the period is usually about three weeks. The symptoms of the disease are languor, chills, violent headache, thirst, and pains in the limbs. Soon diarrhoea sets in, accompanied by a distended and tender state of the abdomen. The temperature rises, the skin loses its moisture, the kidneys cease to act freely, and the tongue becomes dry and brown. Then a rose-colored rash appears over the chest and abdomen, which may soon disappear, only, however, to be followed by a new crop of spots. At this stage delirium and other serious symptoms arise, and as the disease advances ulceration or perforation of the bowels may take place. While the symptoms here described are those of a typical case, there are numerous instances where the patient may have no marked looseness of the bowels, no spots on the skin, and no delirium. In the treatment of the disease the most important thing is the dieting. Only soft liquid foods are allowable, such as milk, in abundance, boiled bread and milk, corn-flour, etc. Looseness of the bowels, if excessive, should be checked by catechu and chalk mixture, with the addition of iaudanum, if necessary, to a grown-up person. The disease is serious and often proves fatal. See *Vaccination*.

**Typhon** (ti-fon), the Greek designation of an Egyptian deity called Set or Seth, son of Seb, and brother to Osiris, whom he is said to have destroyed. He seems to have represented the volcanic forces of the earth.

**Typhoon** (ti-fōn'), a violent hurricane, especially one of those which rage on the coasts of China and

Japan and the neighboring archipelago. They occur from May to November, but are most frequent and disastrous during the months of July, August, and September.

**Typhus Fever** (ti'fus), known also as hospital fever, jail fever, etc., is essentially a fever of the poor, ill-fed, and badly-housed inhabitants of large cities. It is infectious, and the infection is believed to be transmitted by germs carried by lice or other vermin. Free ventilation is the least favorable condition for the spread of typhus. Before the symptoms show themselves a period of from five to twelve days may pass after the person is infected. Then there is generally a shivering, followed by a hot, dry skin, a suffused condition of the eyes, a small pupil, thirst, a dull, stupid expression, great prostration, and costive bowels. About the seventh day a rash of irregular spots and of a dusky hue appears over the chest and back, but sometimes this is entirely absent. As the disease advances the patient's strength becomes exhausted, the urinary secretion is scanty, if not entirely suppressed, delirium sets in, and the disease is often complicated by bronchitis, pneumonia, or pleurisy. About the fourteenth day, in favorable cases, the turn of the fever is shown by the patient falling into a sound sleep, from which he awakes with the fever gone. In unfavorable cases the prostration increases, the feverishness is heightened, convulsions may occur, and at length the patient sinks into unconsciousness. The treatment consists in keeping the patient in a well-ventilated room, and preventing exhaustion by a light and wholesome diet. Milk, beef-teen, nourishing soups without vegetables, should be given to the patient in small quantities at short intervals.

**Typography** (ti-pog'ra-fi). See **Printing**.

**Tyr** (tir), in northern mythology, the son of Odin, brother of Balder, and the god of war and victory. He corresponds to the Anglo-Saxon Tiw, from whom Tuesday is named, and the day is similarly named among the Danes and Icelanders.

**Tyrannus** (ti-ran'us), a genus of insectivorous birds. The best-known species is the tyrant fly-catcher (*T. Carolinensis*), which is remarkable for its bold and pugnacious disposition. It is a native of the United States, feeds on insects, and is not afraid to attack birds of prey much larger than itself. It is also called *tyrant-shrike* and *kingbird*.

**Tyrant** (ti'rant), originally, in ancient Greece, one who had usurped the ruling power without the consent of the people or at the expense of the existing government. Such a ruler, although he obtained his power illegally, did not always use it oppressively and violently; on the contrary, it was frequently used humanely and beneficently, and some tyrants were patrons of literature and art. In modern times the word has a different significance, indicating a cruel or oppressive ruler.

**Tyrant Fly-catcher.** See **Tyrannus**.

**Tyre** (tir), one of the most celebrated cities of ancient Phœnicia, and with its elder sister, Sidon, long a great trading mart. It was built partly on an island and partly on the mainland; and the insular fortifications formed its chief strength when besieged and taken by Alexander the Great in B.C. 332. A mole or causeway then constructed to the island was the origin of the isthmus which now connects it with the mainland. Tyre was famous in the tenth century B.C. under Hiram, the friend of Solomon; was besieged in vain by the Assyrians in 725-720 B.C., and by Nebuchadnezzar, 585-572 B.C., and remained an important place till it came into the hands of the Turks. It was famous for a dye (the Tyrian purple) obtained from the shell-fish *Murex* (which see). The modern Tyre or Sur is an insignificant place of 6000 inhabitants, under the government of Beirut. See also *Phœnicia*.

**Tyrol** (tir'ol), or **TIROL**, formerly a province of Austria (most of it ceded to Italy in 1919), bounded north by Bavaria and Lake Constance, west by Switzerland, east by Salzburg and Styria, south, east, and west by Venetia and Lombardy; area, 11,325 square miles. In magnificence of scenery Tyrol is only inferior to Switzerland, of which it is a continuation. The Alps enter it from Switzerland in three chains, of which the central (the Tyrol or Oetzthaler Alps) is the loftiest, and divides the country into North and South Tyrol. The drainage of North Tyrol is mainly carried to the Danube by the Inn, which is the only navigable river; that of South Tyrol is mostly conveyed to the Adriatic by the Adige. About one-third of the surface is practically inaccessible, another third is occupied by forests. The vine and cereals are cultivated, and minerals, especially iron and salt, are extensively worked. Silk, metal wares, wood articles, lace, and embroidery, are

among the manufactures. The capital is Innsbruck. Pop. 850,062.

**Tyrone** (tī-rōn'), a county of Ireland, in the province of Ulster; bounded by Londonderry, Donegal, Armagh, Monaghan, and Fermanagh; area, 1200 sq. miles. The surface is hilly, rising into mountains in the north and south, and declining to a level towards Lough Neagh. The soil in the lower districts is fertile, and the county is watered by numerous branches of the Foyle and Blackwater. Agriculture generally is in a backward state. Coal is mined to a small extent near Dunganon in the eastern portion of the county; linens, woollens, earthenware, whiskey, beer, chemicals, etc., are made. Principal towns, Strabane and Dunganon. Pop. 150,567.

**Tyrone**, a borough of Blair Co., Pennsylvania, on the Little Juniata River, 14 miles N. E. of Altoona. It has extensive coaling interests, railroad shops, lumber and paper mills, etc. Pop. 8200.

**Tyrrhenian Sea** (tī-rē-ni-an), the name given to the part of the Mediterranean Sea adjoining the southwest coast of Italy, and extending to Corsica, Sardinia, and Sicily.

**Tyrtaeus** (tī-rē-us), a Greek lyric poet of the seventh century B.C., a native of Attica, celebrated for his war songs written for the Spartans.

**Tyrwhitt** (ter'it), THOMAS, born in London in 1730; died in 1786. He was educated at Eton and at Queen's College, Oxford; became a fellow of Merton; clerk to the House of Commons (1761-67); and in 1784 was ap-

pointed a curator of the British Museum. Among his writings were: *Observations on some Passages of Shakspeare* (1700); an edition of *Chaucer* (1775); and an edition of the so-called *Rowley's Poems*, in the appendix of which he exposes the fraud of Chatterton.

**Tyssens** (tī-sens), PETER, a distinguished Flemish painter, born at Antwerp in 1625; died in 1692. He excelled both in portraits and historical painting. Among the latter is *The Assumption of the Virgin*.—His sons, NICHOLAS and AUGUSTINE, were also talented artists, the former painting birds and flowers, the latter landscapes of great merit.

**Tytler**, PATRICK FRASER, fourth son of Alexander Fraser Tytler (Lord Woodhouselee), was born at Edinburgh in 1791, and died in 1849. He was educated at the University of Edinburgh, became a lawyer, and finally engaged in literature, writing his chief work, the *History of Scotland*, 1823-43. Among his other works are his biographies of the Admirable Crichton, Wicliff, and Sir Walter Raleigh.—His father, ALEXANDER FRASER TYTLER (Lord Woodhouselee), Scotch judge, was born at Edinburgh in 1747; died in 1813. His chief work is the *Elements of General History*. He also contributed papers to *The Mirror*, *The Lounger*, etc.—Lord Woodhouselee's father, WILLIAM TYTLER, of Woodhouselee, born in 1711; died in 1792, published an *Inquiry into the Evidence Against Mary Queen of Scots*, *Criticisms of Hume's and Robertson's Histories*, the *Poetical Remains of James the First*, etc.

# U

**U**, the twenty-first letter and the fifth vowel in the English alphabet. Its true primary sound was that which it still retains in most of the languages in Europe, that of *oo* in *cool*, *tool*, *good*, *wood*, etc., answering to the French *ou* in *tour*, the sound being sometimes short, sometimes long.

**Ubangi.** See *Mobangi*.

**Ubeda** (ù-bà'da), a city of Spain, province of Jaen, on the right bank of the Guadalquivir. It contains a fine cathedral. Pop. 19,913.

**Uberweg** (ù'bér-vàh), FRIEDRICH, born in Rhenish Prussia in 1826; died in 1871. He studied at Göttingen and Berlin, and in 1862 was appointed professor of philosophy at Königsberg. He wrote *A System and History of Logic* (1875) and *A History of Philosophy*, both translated into English.

**Ubes, St.** See *Setubal*.

**Ucayale** (ù-ka-gù'lè), or UCAYALI, a large river of Peru, one of the headwaters of the Amazon. It begins in the Apurimac, is upwards of 1000 miles in length, and is navigable by large vessels for 100 miles.

**Udaipur** (ù'dè-pur), or OODEYPUR, a town in the northwest of India, capital of a native state of the same name in Rajputana, on a lake 2000 feet above sea-level, contains a notable royal palace, and exports turmeric, cotton, indigo, etc. Pop. 45,595.—The state, which has an area of 12,670 sq. miles, came under the protection of Britain in 1817, and the rajah ranks highest in dignity among the Rajput chiefs. Pop. 1,030,212.

**Udal.** See *Odal Right*, and *Allodium*.

**Udall** (ù'dal), NICHOLAS, the author of *Ralph Roister Doister*, the first regular English comedy, born in 1506; died in 1556. He was master of Eton School from 1534 to 1541, and the play was written for performance by the scholars. Its authorship was not ascer-

tained till 1818. He was in favor of court as a writer of pageants and interludes.

**Uddevalla** (ud-e-và'là), a seaport in the southwest of Sweden, at the inner end of the Byffjord. It has an active trade and textile manufactures. Pop. 9442.

**Udine** (ù'dè-nà), a walled town of North Italy, capital of a province of the same name and see of an archbishop, 60 miles northeast of Venice. It contains a castle (now a barrack), a Romanesque cathedral, bishop's palace, etc., and has manufactures of linen, silk, woollens, etc. Pop. (1914) 48,952.

**Ufa** (ù'fà), a government of Russia, separated in 1865 from Orenburg; area 47,004 square miles. On the east, where it is bordered by the Southern Urala, the country is mountainous, wooded, provided with excellent pastures, and rich in minerals. It is also well watered by the Bieiaya, and has abundance of arable land on which good crops are raised. Pop. 2,620,600.—**UFA**, the capital, stands on the Bieiaya, at the confluence of the Ufa, 735 miles east by north of Moscow. It is the see of a bishop, and has considerable manufactures and trade. Pop. (1910) 103,485.

**Uffizi Gallery** (ùf-féd'zè). See Florence.

**Uganda** (ù-gàn'dà), a country of British East Africa, to the N. W. of the Victoria Nyanza. It is a rich agricultural country with a mild and uniform climate, and the inhabitants are of a comparatively high type. Within it, wholly or in part, are the large lakes Victoria, Albert, Albert Edward, Kiogo and Rudolf. It was first visited by Speke and Grant in 1860, and is the seat of several mission stations. Under King Mtesa, however, and his successor Mwanga, the Christians were persecuted, and Bishop Hannington was put to death by the latter. It is now a British protectorate, the British seat of administration being Entebbe, the native capital Mengo. Pop. estimated at 4,000,000.



## Ugrians

## Ulmaceæ

**Ugrians** (ŭ'gri-anz), a term applied to the Finnic group of Turanian peoples, comprising the Lapps, Finns, and Magyars or Hungarians; their language is termed Ugrian.

**Uhland** (ŭ'lant), JOHANN LUDWIG, poet, born at Tübingen in 1787; died in 1862.

**Uhl**, EDWIN FULLER, statesman, born at Rush, New York, in 1841; died in 1901. He studied law, became mayor of Grand Rapids, Mich., in 1890, and was made assistant Secretary of State in October, 1893; and during the sickness of Secretary Gresham was Acting Secretary of State. While in this office he was entrusted with the arbitration to settle the boundary between Brazil and the Argentine Republic. He was made ambassador to Germany in February, 1896.

**Uhlans** (ŭ'lanz), a species of light cavalry in the armies of the Austrians, Russians and Germans.

**Uhrichsville** (yū'riks-vil), a city of Tuscarawas Co., Ohio, on Stillwater Creek, 9 miles S. E. of New Philadelphia. It has manufactures of fire clay and sewer pipe. Pop. 4751.

**Uintah Mountains** (ū-in'tā), or UINTA, a range of lofty mountains in Utah, which extend E. from the Wahsatch range, and occupy a large area. Some of the peaks reach an altitude of over 13,000 feet.

**Uist** (wist), two islands of the Outer Hebrides, named North and South Uist. The people are principally engaged in fishing. Pop. about 9000.

**Uitlanders** (weet'ian-derz), outlanders or foreigners, the name given by the Boers of the Transvaal to the whites who lived in that country before its annexation to the British empire.

**Ujjain** (ŭ-jān'), a town of India, in Scindia's dominion, 350 miles northwest of Bombay, surrounded by a stone wall with round towers. It was one of the seven ancient holy cities of the Hindus. Pop. 39,892.

**Ukraine** (ū'krān), a region in the south of Russia along the northern shore of the Black Sea; called also Little Russia, to distinguish it from White Russia lying further north along the border of Austria-Hungary, and Great Russia, which centers around Moscow and Petrograd. It formed the Russian governments of Kief, Chernigof, Podolsk, Karkof and Poltava. When Nicholas II was deposed and the communal system of government was inaugurated under the leadership of Lenine (q. v.), the Ukraine peoples declared themselves independent

of Russia and signed a separate peace with Germany in 1918. Pop. about 30,000,000.

**Uians** (ŭ'ianz). See *Uhlans*.

**Ulcer** (ui'ser), a sore in any of the soft parts of the body, either open to the surface or to some natural cavity, and attended with a secretion of pus or some kind of discharge. Ulcers are of various kinds, as *scorbutic*, *cancerous*, *scrofulous*, etc.

**Uleåborg** (ŭ'ie-o-borg), a town of Russia, in the Grand-duchy of Finland, at the mouth of the Uleå, in the gulf of Bothnia. Pop. (1904) 17,737.

**Ulemas** (ū-iē'maz), the hierarchical corporation of learned men in Turkey, composed of the Imams or ministers of religion, the Muftis or doctors of law, and the Cadis or administrators of justice.

**Ulphilas** (ul'fi-las), ULPHILAS, or WULFILA, a bishop of the Goths of Mœsia, was born, it is supposed, in 311; consecrated bishop by Eusebius of Nicomedia, probably at Antioch, in 341; died at Constantinople in 381. He translated most of the Bible into Gothic (Mœso-Gothic), employing the Greek of the Septuagint for the Old Testament, and a Greek text, different from the received text, for the New. Only some fragments of this translation have been preserved, including the greater part of the four gospels, and these are of the highest linguistic value. See *Goths*.

**Ullswater** (ūlz'wā-ter), the largest, after Windermere, of the English lakes, 8 miles N. of Windermere; length, 7½ miles. It is noted for its picturesque scenery.

**Ulm** (ulm), a strongly fortified town of Würtemberg, 45 miles S. S. E. of Stuttgart, on the left bank of the Danube, on both sides of which there are important fortifications. It is an old town, irregularly built, with narrow winding streets, and has a cathedral in the old Gothic style, one of the largest churches in Germany with the tallest spire in the world (530 feet—completed in 1890). Its manufactures include machinery, woollen and linen cloth, leather, paper, brassware, etc. The capitulation of Ulm in 1805, when General Mack surrendered to Napoleon, was the turning-point of the campaign in Austerlitz. Pop. 56,109.

**Ulmaceæ** (ui-mā'se-ē), a nat. order of exogens, of which the genus *Ulmus* or elm is the type. It is nearly related to *Urticaceæ* (the nettles), from which it differs only in having a two-celled fruit and hermaphrodite flowers. It consists of trees and shrubs.

## Ulna

which have scabrous, alternate, simple, deciduous leaves and fugacious stipules.

**Ulna.** See *Arm.*

**Ulphilas.** See *Ulfilas.*

**Ulrici** (ul-rē'tsē), HERMANN, a German philosopher, born in 1806; died in 1884. Having studied at Halle and Berlin, in 1834 he was appointed professor of philosophy at Halle University. His principal works are: *A History of Greek Poetry* (1835), *Shakespeare's Dramatic Art* (1839), *The Fundamental Principle of Philosophy* (1845-46), *Compendium of Logic* (1860), *God and Nature* (1862), *Body and Soul* (1866), *Elements of Practical Philosophy* (1873).

**Ulster** (ul'ster), the most northerly of the four provinces of Ireland, 8613 sq. miles in area. It is mountainous in part, the heights reaching 2800 feet. The coast is bold and rocky. In the north is the famous Giant's Causeway. This province is the chief seat of the Irish linen manufacture, and shipbuilding is actively carried on at Belfast. Pop. 1,581,350.

**Ulster King of Arms**, the principal herald of Ireland, and of the order of St. Patrick. This office was created in 1552.

**Ultima Thule** (Uppermost Thule), a name given in ancient times by the inhabitants of Southern Europe to the remote regions of the unknown North. The Greek navigator Pytheas (who probably lived in the latter part of the fourth century B.C.) made a voyage along the coast of Britain and wrote an account of what he learned about the Shetland and Orkney Islands and possibly the N. mainland calling the region Thule. The name became vague in its application, especially under the form Ultima Thule. Norway, Ireland, etc., bore the title in turn; and many strange superstitions were current regarding the region.

**Ultimatum** (ul-ti-mā'tum), any final proposal or statement of conditions; especially, in diplomatic negotiations, the final terms of the one party, the rejection of which often involves an immediate rupture of diplomatic relations and a declaration of war.

**Ultramarine** (ul-tra-ma-rēn'), a beautiful and durable sky-blue pigment, a color formed of the mineral called lapis lazuli. This substance is much valued by painters, on account of the beauty and permanence of its color, both for oil and water painting. Artificial ultramarine is prepared

by heating sulphide of sodium with a mixture of silicic acid and alumina.

**Ultramontaniam** (ul-tra-mon'tā-nizm), the views of that party in the Church of Rome who place an absolute authority in matters of faith and discipline in the hands of the pope, in opposition to the views of the party who would place the national churches, such as the Gallican, in partial independence of the Roman curia, and make the pope subordinate to the statutes of an oecumenical council. According to ultramontaniam the pope is superior to general councils, independent of their decrees, and considered to be the source of all jurisdiction in the church. The Vatican Council of 1870 virtually established the views of ultramontaniam as dogmas of the church.

**Ulugh Beg, Olug Beg** (o'lög-heg), an eminent Moslem astronomer, born in 1394, grandson of Tamerlane, and king of Transoxiana. He began to reign in 1446 and was killed by his son in 1459.

**Ulverston** (ul'ver-stun, locally pronounced ös'tun), a seaport of England, in Lancashire, about 1½ mile from Morecambe Bay, to which there is a canal. It has a paper-mill, shoe-factory, blast-furnaces, etc., and there is a small amount of shipping. Pop. (1911) 9552.

**Ulysses** (ü-lis'sēz; in Greek, *Odysseus*), king of the island of Ithaca, was one of the Greek heroes who engaged in the war against Troy. In returning to his own country after the siege he visited the country of the Lotophagi in N. Africa, the Cyclopes in Sicily (see *Polyphemus*), the island of Æolus, king of the winds, reached the island Ææa, where Circe changed (temporarily) his companions into pigs; visited the infernal regions, where he consulted the soothsayer Tiresias how to return to his country; passed in safety the coast of the Sirens, and the dangers of Scylla and Charybdis; remained for seven years with the nymph Calypso after losing all his men; and at last, after an absence of twenty years, returned to Ithaca. Here he found his palace occupied and his substance wasted by suitors for the hand of his wife Penelope, but with the aid of his son Telemachus he put them to death. He lived about sixteen years after his return. These adventures of Ulysses are the subject of Homer's *Odyssey*.

**Umballa.** See *Ambala*.

**Umbel** (um'bel), in botany, a variety of inflorescence which consists

## Umbel

of a number of pedicels or flower-stalks, nearly equal in length, springing from a common center, with the blossoms on their summits forming a level or rounded



Umbels of Hemlock.

surface. When a number of such umbels are combined in the same way we have a *compound umbel*, the smaller umbels being called *partial umbels*.

**Umbelliferæ** (um-bel-if'er-æ), an extensive and important nat. order of plants, the flowers of which are almost always in regular compound umbels. The plants of this order are natives chiefly of the northern parts of the northern hemisphere, and nearly all herbs with fistular furrowed stems and divided leaves; the fruit consists of two indehiscent ridged carpels united by a commissure. Some are very poisonous, as hemlock and certain others; others are esculents, as celery, carrots, and parsnips; many yield aromatics, as caraway, coriander, dill, anise; a few secrete a fœtid gum-resin, much used in medicine, as asafetida, galbanum, opopanax and sagapenum.

**Umber** (um'bër), a well-known mineral pigment, of an olive-brown color in its raw state, but much redder when burnt. It occurs either naturally in veins and beds, or is prepared artificially from various admixtures. The commercial varieties are known as Turkey umber, raw and burnt, and English umber, the latter being an artificial ochrey admixture.

**Umbilious** (um-bil'i-kus). See *Navel* and *Placenta*.

**Umbra** (um'bra), in astronomy, a term applied to the total shadow of the earth or moon in an eclipse, or to the dark cone projected from a planet or satellite on the side opposite to the sun. See *Penumbra*, *Eclipse*.

**Umbrella** (um-brei'la), a portable shade, screen, or canopy which opens and folds, carried in the hand for sheltering the person. The umbrella had its origin in the East in very remote times, where it was (and still is) regarded as an emblem of royalty or a mark of distinction; but as a defense from the rain it was not used in the West till early in the eighteenth century.

**Umbrella-bird**, a South American bird (*Cephalopterus ornatus*) allied to the crows, remarkable for the crest of blue-black feathers rising from the head and curving towards the end of the beak, which it nearly reaches. Another long tuft of feathers hangs down from the breast.

**Umbrella-tree**, a name given to two species of *Magnolia*, *M. umbrellata* and *M. tripetala*, from the form and position of the leaves. The same name is given to *Pandanus odoratissimus*, the screw-pine.

**Umbria** (um'bri-a), a division of Italy, on the Adriatic, which derives its appellation from the Umbrians, by whom it was inhabited in ancient times. It now forms the province of Perugia. The Umbrians were an ancient people who spoke a language akin to the Latin. See *Eugubine Tables*.

**Umlaut** (öm'lout), in philology, the change of a vowel in one syllable through the influence of one of the vowels *a*, *i*, *u* in the syllable immediately following—a common feature in several of the Teutonic tongues.

**Umpire** (um'pir), a person to whose sole decision a matter in dispute between two parties is referred. Specifically, in law, a third person to whom the dispute is referred for decision when, in an arbitration, the arbitrators do not agree.

**Umritsir**. See *Amritsir*.

**Unalaska** (ö-nä-läs'ká), one of the largest of the Aleutian Islands (which see), being 75 miles long, and 20 miles at its extreme breadth. On it there are a number of volcanoes.

**Unau** (ö'na), a species of sloth. See *Sloth*.

**Uncaria** (un-kä'ri-a), a genus of plants. See *Gambir*.

**Uncial Letters** (un'shal), letters of a large size, used in ancient Latin and Greek manuscripts. These letters were compounded between the majuscule or capital and minuscule or small character, some of the letters resembling the former, others the latter. Uncial writing is supposed to have been

employed in Latin MSS, as early as the third or fourth century, but was seldom used after the tenth.

**Uncle Sam**, the familiar name of the United States government, used as John Bull is with respect to England. It is an extension of the letters U. S. (United States), printed or stamped on the government property. It was first used in Troy, New York, in 1812, when certain goods purchased for the government and branded U. S., were officially inspected by Samuel Wilson, whose local nickname was Uncle Sam. The coincidence of initials suggested the application of the nickname in full to the government.

**Unconformable** (un-ka-for'ma-bl), in geology, a term applied to strata whose planes do not lie parallel with those of the subjacent



Unconformable Strata.

or superjacent strata but have a different line of direction or inclination. See also *Conformable*.

**Unction**, *EXTREME*. See *Extreme Unction*.

**Underground Railroad**, the name given before the Civil war to a secret arrangement for helping slaves to escape from the South, by passing them from one hiding place to another until they reached Canada or other places of safety. Large numbers gained their freedom in this way, through the aid of antislavery sympathizers.

**Undershot-wheel**, a form of water-wheel having a number of float-boards disposed on its circumference, and turned round by the moving force of a stream of water acting on the float-boards at its lowest part. In this wheel the water acts entirely by its momentum, its weight taking no part in the effect.

**Underwood**, FRANCIS HENRY, author, born at Enfield, Massachusetts, in 1825; died in 1894. He wrote *Handbook of American Literature*, *Handbook of English Literature*, and some novels and biographies.

**Underwood**, LUCIEN MARCUS, botanist, born at New Woodstock, New York, in 1853. He became professor of geology and botany in the Illinois Wesleyan University, and wrote *Our Native Ferns and How to Study Them*, and other botanical works.

**Underwriter**, the name given to insurers. These persons were formerly not permitted to enter into any joint-stock action as a company, but wrote under policies of insurance with the sums for which they severally bound themselves. The system still prevails abroad, but there are also numerous companies whose business it is to grant marine insurances. The underwriters of American cities do not confine their business to marine insurance alone.

**Undine** (un'din), a water-spirit of the female sex, resembling in character the sylphs or spirits of the air, and corresponding somewhat to the naiads of classical mythology. According to Paracelsus, when an undine married a mortal and bore a child she received a soul. One of these spirits is the heroine of a celebrated romance by De la Motte Fouqué.

**Undulatory Theory** (un'dū-lā-tu-ri), in physics, the theory which regards light as a mode of motion generated by molecular vibrations in the luminous source, and propagated by undulations in the subtle medium known as the ether, presumed to pervade all space and to occupy the intervals which separate the molecules or atoms of bodies. When these undulations reach and act on the nerves of our retina they produce in us the sensation of light. The only other theory of light which can be opposed to this, and which is variously called the *corpuscular*, *emission*, or *material theory*, supposes light to consist of material particles, emitted from the source, and projected in straight lines in all directions with a velocity which continues uniform at all distances, and is the same for all intensities. The undulatory theory is, however, now universally adopted by physicists.

**Ungulata** (ung-gū-lā'ta), the ungulate or hoofed quadrupeds, forming the largest and most important order of the mammalia. This order is subdivided into (a) the section *Perissodactyla*, or odd-toed ungulates, which includes the rhinoceros, the tapirs, the horse and all its allies; and (b) the *Artiodactyla*, or even-toed, which comprises the hippotamus, the pigs, and the whole group of ruminants, including



## Unicorn

oxen, sheep, goats, antelopes, camels, deer, etc. In the former section the hind feet are odd-toed (one or three toes) in all the members, and the forefeet in all except the tapirs; in the latter section the toes are always even in number, either two or four.

**Unicorn** (ū'ni-korn), a fabulous animal represented as with one horn growing from its forehead. Such an animal is frequently mentioned by Greek and Roman writers, who generally describe it as a native of India, of the size and form of a horse, the body being white, and a straight horn growing from its forehead. The *reem* of the Hebrews, of which *unicorn* is a mistranslation (Deut. xxxiii, 17, and elsewhere), was probably a urus. It was a two-horned animal. The unicorn is one of the supporters of the royal arms of Great Britain, in that posture termed *salient*. It was taken from the arms of Scotland, which had two unicorns as supporters.

**Unicorn-root**, a popular name of the plant *Aletris farinosa*, a native of North America, which furnishes one of the most intense bitters known, used as a tonic and stomachic.

**Uniform** (ū'ni-form), the distinguishing dress of any body of soldiers, sailors, members of a society or club, etc. Military uniforms seem first to have been adopted in England about the time of Henry VIII, being used for his body-guard and that of succeeding monarchs. Uniforms for the army came in use in 1661, when, on the restoration of the Stuarts, a standing army was first formed. Scarlet became the national color of the British uniform, as blue did of that of the French and German, though the color varied with circumstances, white being used in hot climates. Blue was adopted in the United States, and during the Civil war blue and gray were the distinctive colors worn by the soldiers of the North and South respectively. The head-dress forms a distinctive part of the uniform, and very showy hats and helmets are at times worn, but chiefly for parade purposes. In recent times, owing to the advent of smokeless powder and long range rifles with telescopic sights, showy uniforms of any kind and color have grown dangerous, and there is a growing tendency to adopt the khaki, dust-colored wear, from its indistinctness when at a distance. The idea of display in military dress is being abandoned in favor of that of safety.

**Uniformity**, ACT OF. See Act of Uniformity.

## Union of South Africa

**Union** (ūn'yun), a town of Hudson county, New Jersey, opposite New York, one mile N. of Hoboken. It has silk and other industries. Population 21,023.

**Union**, a town of Union county, South Carolina, 70 miles N. N. W. of Columbia. It has cotton, cotton-seed-oil, and hosiery mills. Pop. 5623.

**Union College**, a non-sectarian college at Schenectady, N. Y., founded in 1795. Eliphalet Nott was president for over 62 years, 1804-66. It was at Union that the college fraternity system had its origin.

**Union College**, an institution under the auspices of the Seventh Day Adventists, at College View, Neb.

**Union Fabrics**, are textile fabrics made of a mixture of different materials, as cotton and wool, cotton and silk, and similar mixtures, in which flax, hemp, jute, etc., are mixed with other fibrous materials.

**Union Jack**, the national ensign of Britain used in small form as a jack—that is, displayed at the end of a bowsprit. The name has come (wrongly) to be applied to the union flag itself. It is formed by the union of the crosses of St. George, St. Andrew and St. Patrick. The jack is not flown on shore.

**Union of South Africa**, a federation of four British colonies of South Africa, including those of the Cape of Good Hope, Natal, Transvaal, and Orange Free State, dating from May 31, 1910. The movement for the union of the South African colonies was launched by a convention in 1908. This convention re-assembled in January, 1909, and proceeded to draft a constitution which, after revision, was adopted. This constitution vests the executive power in the British kings and his representative; the legislative in a Senate and House of Assembly. A Supreme Court is also provided for, of which the several supreme courts of the colonies are to form part. This consists of judges elected by each of the four States. The Senate consists of 40 members, 8 appointed by the governor-general and 8 elected by each of the four states. The House has 121 members, divided among the States according to their respective importance; the Cape colony having 51, Natal 17, Transvaal 36, and Orange Free State 17. The federation was confirmed by Parliament, August 16, 1909. Herbert John Gladstone was appointed as the first governor-general. General Louis Botha, of the late Boer army, being made premier. Each colony

## Union Theological Seminary

retained its own governor and legislature. The area of this new federal union is 472,897 sq. miles, the pop. 5,450,217.

### Union Theological Seminary,

a divinity school in New York City, Presbyterian in origin but now independent of ecclesiastical control. It offers courses leading to the degrees of bachelor of divinity and doctor of divinity. The seminary buildings are on Broadway at 120th Street. There are 130,000 volumes in the library. In 1917 there were 30 instructors and 230 students.

**Uniontown**, capital of Fayette Co., Pennsylvania, 44 miles s. by E. of Pittsburgh. It is in an iron, and coal district, and has coke, iron, steel, glass, and other industries. Pop. 13,344.

**Unit** (ū'nlt), in arithmetic, the least whole number, or one, represented by the figure 1. Every other number is an assemblage of units. This definition is applicable to fractions as well as to whole numbers. In mathematics and physics a unit is any known determinate quantity by the constant repetition of which any other quantity of the same kind is measured. It is not itself one, but is a length, or a surface, or a solid, or a weight, or a time, as the case may be, while 1 is only a numerical symbol. — *Specific gravity unit*: for solids or liquids, 1 cubic foot of distilled water at 62° Fahr. = 1; for air and gases, 1 cubic foot of atmospheric air at 62° Fahr. = 1. The *unit of heat*, or *thermal unit*, in the United States and Britain, the quantity of heat which corresponds to 1° Fahr. in the temperature of 1 lb. of pure water at about 39° Fahr.; in France, the heat required to raise a gramme of pure water at about 3.94° C. 1° C. — In electricity the *unit of quantity* is that quantity of electricity which with an electro-motive force of one volt will flow through a resistance of 1,000,000 ohms in one second, called a *farad*; *unit of current*, a current of one farad per second; *unit of work*, that which will produce a velocity of one meter (39.37 inches) per second in a mass weighing one gramme (15.432 grains) after acting upon it a second of time. — A *dynamic unit* is one expressing the quantity of a force or the amount of work done. One such unit is the *foot-pound* (which see). The system of units recommended by a committee of the British Association for scientific calculations, and known as the *C.G.S. system*, adopts the *centimeter* as the unit of length, the *gramme* as the unit of mass, and the *second* as the unit of time, these words

## United Brethren in Christ

being represented respectively by the above letters. (See *Dynamics*.) In this system the *unit of area* is the square centimeter, the *unit of volume* is the cubic centimeter, and the *unit of velocity* is a velocity of a centimeter per second. The *unit of momentum* is the momentum of a gram moving with a velocity of a centimeter per second.

**Unitarian** (ū-ni-tā'ri-an), a religious sect or congeries of sects, distinguished by the denial of the received doctrine of the Trinity. The Unitarians may be divided into classes: (1) The conservative or orthodox Unitarians, who accept the general articles of the Christian creed (with the exception of the Trinity), such as miracles, the resurrection of Christ, and the plenary inspiration of Scripture. (2) The liberal or progressive Unitarians, whose creed is purely rationalistic. They consider Christ as a mere man, inspired as other great men are, though in a greater degree; they reject the doctrines of original sin, eternal punishment, the belief in miracles, and generally the whole supernatural element in Christianity. The membership is not large, but it has numbered some of the greatest thinkers of America, including Emerson, Lowell, Longfellow, Thomas Jefferson, President Taft, and many others of international fame.

### United American Mechanics,

JUNIOR ORDER OF, a fraternal and beneficial organization, founded in 1853, at Germantown, Pa. It has 290,000 members.

### United Brethren in Christ,

an American religious sect, founded by Philip William Otterhein, a minister of the German Reformed Church, and Martin Boehm, a Pennsylvania Mennonite. The church was organized in 1800; it was at first confined to a membership that was largely German, but it widened its scope and grew rapidly. There are nearly 3600 churches, with about 346,000 members and ministers. Ten colleges and several academies are supported by the church. Bonebrake Theological Seminary, Dayton, Ohio, dates from 1871. The church has an extensive publishing house at Dayton. The theology of the United Brethren in Christ is Arminian. They have two sacraments: baptism and the Lord's Supper. The ceremony of the washing of feet is sometimes used. Home, Foreign Mission and other societies are supported. At the time of the revision of the Confession of Faith in 1889, the conservative element withdrew and established the 'Old Constitution' body, which

## United Greeks

## United States

now has an estimated membership of about 22,000.

**United Greeks** are Christians who originally belonged to the Greek Church, but whom the Roman Church has united with her own members on certain conditions. They retain the ancient rite, the Greek language during service, the strict Greek fasts, and the Lord's supper under both forms, in common with the old Greek Church.

**United Kingdom.** See *Britain*.

### United Presbyterian Church,

the name adopted by that Scottish church which was formed by the union of the Secession Church and the Relief Church in May, 1847. This church adheres to the theological doctrines taught in the Westminster Confession of Faith and the Larger and Shorter Catechisms. The system of church government differs from that of the Established and Free churches only in having no intermediate court between the presbyteries and the supreme court, the latter of which is called a General Synod, and sits once a year. In the United States there are about 1000 churches and over 150,000 members.

### United States (officially *The United States of America*),

a federal republic of North America, one of the largest and most important countries of the world, which occupies nearly one-half the total area of the continent and extends from the Atlantic to the Pacific oceans, and from the Mexican republic and Gulf of Mexico on the south to the Dominion of Canada on the north. Its greatest length, from east to west, is 2800 miles; greatest breadth, north to south, 1600 miles; area, 3,026,789 square miles, equal to more than three-fourths that of all Europe. In addition it possesses the isolated territory of Alaska, 590,884 square miles in area, making its total extent nearly equal to that of Europe. Recent additions to its territory comprise the Philippine and Hawaiian Islands, in the Pacific, and the island of Porto Rico in the Atlantic, with a few smaller islands, adding a further area of 132,310 square miles, the total area under the American flag being 3,749,983 square miles. The boundaries on east and west are the Atlantic and Pacific oceans, on the south the waters of the Gulf of Mexico and the northern border line of Mexico. On the north the boundary west of the 95th meridian of w. longitude is, with slight exception, the 49th parallel of N. latitude. East

of this meridian it is irregular, following the median line of the great lakes and the St. Lawrence River, which it leaves at the 45th parallel of latitude. This parallel forms the northern boundary of New York and Vermont, but Maine projects northward nearly to the parallel of 47° 30'. The population of this country, exclusive of its outlying portions, was in 1910, 91,972,286; inclusive of Alaska, Hawaii, and Porto Rico, 93,402,151. That of the Philippine Islands (census of 1903) was 7,635,423, making a total under the dominion of the great republic of over 100,000,000. This includes a negro population of nearly 10,000,000, and a foreign-born population of over 13,000,000, exclusive of that in the island possessions. The federation consists of 48 states (13 originally); 2 organized territories, Hawaii and Alaska; 1 unorganized, Porto Rico; and the dependencies of the Philippine, Guam and Tutuila islands. There are three cities of over 1,000,000, eight of over 500,000 population, these being New York, 4,766,883; Chicago, 2,185,283; Philadelphia, 1,549,008; St. Louis, 687,029; Boston, 670,585; Cleveland, 560,663; Baltimore, 558,485, and Pittsburgh, 533,905. The cities of over 100,000 number fifty-one. The table on the following page gives the areas and populations of the States and Territories, those marked \* being the original States.

**Physical Characteristics.**—The United States is very diversified in physical aspect, soil and climate, extending, as it does, from 25° to 49° N. latitude, and from east to west over lowlands, plains, plateaus and mountain ranges. It has two broadly marked features, the Mississippi River, with its great valley, crossing it from north to south, and the wide elevation of the Rocky Mountains, with its bordering plains and plateaus, following the same direction farther west. The Mississippi Valley, covering about one-half the area of the United States, comprises in its northern portion a prairie region, largely treeless, in parts quite level, but generally a rolling country. South of the Missouri and the Ohio its surface is more varied, there being numerous hilly tracts, while the level reaches are often swampy near the rivers. Forests formerly covered this southern region somewhat generally, and considerable tracts of woodland remain, but farming and grazing lands now occupy in great part the ancient forest area.

Passing eastward from this vast valley, with its elevation varying from 700 feet

# United States

# United States

States.	Area in Sq. Miles.	Popu- lation, 1900.	Popu- lation, 1910.
Alabama.....	51,998	1,828,697	2,138,093
Arkansas.....	53,335	1,311,564	1,574,449
Arizona.....	113,956	122,931	204,354
California.....	158,297	1,485,053	2,377,549
Colorado.....	103,948	539,700	799,024
*Connecticut.....	4,965	908,355	1,114,756
*Delaware.....	2,370	184,735	202,322
Florida.....	58,666	528,542	751,139
*Georgia.....	59,265	2,216,331	2,609,121
Idaho.....	83,888	161,772	325,594
Illinois.....	56,665	4,821,550	5,638,591
Indiana.....	36,354	2,516,462	2,700,876
Iowa.....	56,147	2,231,853	2,224,721
Kansas.....	82,158	1,470,495	1,690,949
Kentucky.....	40,598	2,147,174	2,289,905
Louisiana.....	48,506	1,381,625	1,656,388
Maine.....	33,040	694,466	742,371
*Maryland.....	12,327	1,190,050	1,295,346
*Massachusetts.....	8,266	2,805,346	3,366,416
Michigan.....	57,980	2,420,982	2,810,173
Minnesota.....	84,682	1,751,304	2,075,708
Mississippi.....	46,865	1,551,270	1,797,114
Missouri.....	69,420	3,106,665	3,293,335
Montana.....	146,997	243,329	376,053
Nebraska.....	77,520	1,068,539	1,192,214
Nevada.....	110,690	42,335	81,875
*New Hampshire.....	9,341	411,588	430,572
*New Jersey.....	8,224	1,883,660	2,537,167
New Mexico.....	122,634	195,310	327,301
*New York.....	49,204	7,268,012	9,113,279
*North Carolina.....	52,426	1,893,810	2,206,287
North Dakota.....	70,837	319,146	577,056
Ohio.....	41,040	4,157,545	4,767,121
Oklahoma.....	70,057	1,000,000	1,657,155
Oregon.....	96,699	413,536	672,765
*Pennsylvania.....	45,126	6,302,115	7,665,111
*Rhode Island.....	1,248	428,556	542,610
*South Carolina.....	30,989	1,340,316	1,515,400
South Dakota.....	77,615	401,570	583,888
Tennessee.....	42,022	2,020,616	2,184,789
Texas.....	265,896	3,048,710	3,896,542
Utah.....	84,990	276,749	373,351
Vermont.....	9,564	343,641	355,956
*Virginia.....	42,627	1,854,184	2,061,612
Washington.....	69,127	518,103	1,141,990
West Virginia.....	24,170	958,800	1,221,119
Wisconsin.....	56,066	2,069,042	2,333,860
Wyoming.....	97,914	92,531	145,965
Territories and Districts.			
D. of Columbia.....	70	278,718	331,069
Alaska.....	500,884	63,441	64,356
Hawaii.....	6,449	154,001	191,909
Porto Rico.....	3,606	953,243	1,118,012

at the head of navigation to sea level in the coast district, an elevated region is reached, the Appalachian uplift, which borders the great valley on the east, as the Rocky Mountain region does on the west. Those mountains extend from northern New England to central Georgia and Alabama, reaching an elevation of 6293 feet in Mount Washington, N. H., and 6710 in Mount Mitchell,

N. C. (See *Appalachian Mountains*.) From the eastern base of this mountain system to the sea extends a coast plain, narrow in Maine, but widening southward, with the exception of a narrow belt at New York, and finally attaining a width of 200 miles in North Carolina. It is hilly in parts of New England, but below New York presents a distinct coast region and a more elevated slope, the latter southward becoming a somewhat abrupt terrace, rising from a few hundred to more than a thousand feet and known as the 'Piedmont Plateau.' The coastal region is seldom more than 100 feet in height, and has a sandy soil, with extensive swamps in many places near the coast. The coastal plain extends from the Atlantic westward along the Gulf border and in its South Atlantic portion extends far southward, forming the peninsular State of Florida. In this are extensive swamps, which have been partly reclaimed. Proceeding westward from the Mississippi River, the land rises in a very gentle slope until it reaches the base of the western plateau, where elevations of 5000 and 6000 feet are attained. This region, known as the Great Plains, has a light rainfall and is not nearly so well adapted for agriculture as the lower eastward region, but it is covered with nutritive grasses and forms extensive regions of pasturage, the great grazing section of the country. Westward still the foot-hills of the mighty Rocky Mountain system appear. (For the characteristics of the latter see *Rocky Mountains*.) Westward from this region of lofty peaks and arid soil stretches to the ocean the Pacific slope, broken by mountain ranges which embrace the Sierra Nevada and the Coast Range, and including the Great Basin, a vast arid plateau, none of the drainage of which reaches the sea. The Great Salt Lake is its most extensive body of water, the relic of a supposed much more extensive lake of past ages, known to geologists as Lake Bonneville. From these mountains and plateaus the land slopes downward to the Pacific coast. In the northeast Puget Sound, a deep open channel of navigable water, extends far into the State of Washington. In southeast California is another great depression, the Mohave Desert, waterless, but sinking in its deepest part to a depth of 260 feet below sea-level.

A splendid system of drainage exists over the greater part of the broad surface of the republic, especially in its great central agricultural plain, which is crossed by the Mississippi through nearly its whole width, while its great lateral affluents, the



Missouri and Ohio, with their numerous branches, gather up the greater parts of the waters of the east and west, and farther south the Arkansas, Red, and other streams pour their waters into the great central artery of drainage. Eastward of the Appalachian extend numerous shorter streams, the Connecticut, Hudson, Delaware, Susquehanna, Potomac, James, Roanoke, Savannah and various others. On the Pacific slope the rivers are of lesser size, the mountains diverting much of the waterflow into interior reservoirs, as in the Great Basin, while the lesser rainfall supplies a smaller quantity of water. The Columbia, with the exception of the Yukon, of Alaska, is the largest river of the continent flowing into the Pacific. There are various smaller streams, the most notable being the Colorado, famous from the grand canyon through which it flows. This, however, renders it unserviceable to mankind except in its lowest section, where it is proving of great value as a source of irrigation. A notable feature of the water system of the United States is the series of great lakes which extend between the States and eastern Canada, sending their waters by the channel of the St. Lawrence to the ocean, and forming an interior commercial waterway nowhere rivaled.

*Climate.*—The great width of the United States from north to south and its diversified topography give it a great variety of climatic conditions, varying from semi-arctic to semi-tropic in temperatures. The icy blasts from the great northwestern level of the continent find their way southward over the wide central plains with little interruption, to the Appalachians, which, in a measure, save the Atlantic States from their Arctic influence. Warm southern winds, entering from the Gulf region, similarly make their way over the valley, bringing summer temperatures, often of tropic heat. This frequent variation of the winds between north and south makes the climate of the east more variable and with greater extremes of temperature than that of the west, where the changes of temperature are much more regular. In the North Atlantic States the temperature frequently falls below zero, and in Minnesota it descends to as low as  $-40^{\circ}$ , but the dryness of the air renders such extremes easily bearable, except when accompanied by strong winds and 'blizzard' snows. In the Middle Atlantic States the temperature at times rises in summer to  $100^{\circ}$  or even above, but such extremes are rarely of long continuance. In this section

the rainfall is abundant, but not excessive, and in the Mississippi valley the rains are sufficient in quantity and regular enough in distribution to aid everywhere in successful agriculture. On the Pacific slope, on the contrary, the rains come periodically, there being wet and dry seasons, while within the Rocky Mountain system the rainfall is in general so deficient that irrigation is necessary to render agriculture remunerative, or even possible, in many sections. On the coast of Washington the annual fall is in places as high as 80 inches, while in the mountain regions it is reduced to 14 inches or even less, and in the California Desert and Death Valley there may be no rain for years at a time. In the arid and semiarid sections of the west, irrigation, long practiced by the people, has been taken in hand by the government, already with the addition of large areas of very productive land to the national resources and the promise of millions of acres of fertile farm lands in the future.

*Flora.*—The territory of the United States, when settlement first began, was covered in great part with dense forests, a region of flourishing woodland unsurpassed in extent and value. But the needs of settlers led to the removal of vast acres of this woodland for agricultural purposes, and the demands for lumber of an increasing population has added immensely to this destructive process, until what forests remain are largely confined to the mountains and are insufficient to supply the growing demand. The government has recently undertaken to conserve what remain of those forests on the public lands. The existing forests cover 550,000,000 acres or about one-fourth the area of the United States. Much the larger part of this woodland belongs to private owners, but there are very extensive national forests, and nearly 200,000,000 acres of these have been withdrawn from settlement and sale to be kept for the benefit of the whole community and utilized for the preservation of the head-waters of streams. A forest service has been organized for the care of these large national forests and vigorous efforts are being made to prevent the decimating fires which have proven so destructive in the past. The forest region of the country embraces a northern belt of pines, in which the white pine, one of the noblest and most valuable to the wood-worker of American trees, occupies a conspicuous place. It has, however, been very largely removed by wasteful and reckless forestry and the less valu-

able pines of the South are in a measure taking its place. Other northern trees of considerable industrial value are the spruce, hemlock, yellow cedar, larch, linden, ash, maple, birch and elm. Somewhat farther south range the hickories and oaks, the chestnut, tulip tree, walnut, poplar, plane, beech, catalpa, cherry and other valuable timber trees, some of these extending as far south as the Gulf coast. The flora of the southern coast regions is especially characterized by several species of pine, the live oak, palmetto, cypress and other species. The Appalachian mountains are generally covered with thick forests and the lower Mississippi valley is richly forested. The prairie region of the northern half of this valley, ranging from western Indiana to eastern Dakota, formerly mainly treeless, now contains much woodland, of recent planting, and the great plains east of the Rocky mountains, where the woodland was of old chiefly confined to the banks of streams, is becoming in a measure forested. The vast mountain region of the west is richly covered with woodland, especially on the coast ranges, where grows one of the densest and loftiest forests on the globe. This Pacific region has a characteristic flora of its own, largely composed of coniferous woods and yielding the tallest masts and finest spars to be anywhere obtained. Noblest among these trees in the north is the great Douglas fir, and in the south the splendid redwood of the California coast range and the giant sequoias of the Sierra Nevada, the most stupendous trees of the earth. The minor flora of the country embraces a large variety of fruit trees and berries, with plants of economic value for various purposes. The pines of the south have a utility separate from that of timber purposes, yielding large quantities of tar, turpentine, rosin, and similar products, known collectively as 'naval stores.' In many rural districts the forests supply the principal fuel used. Peat is locally employed as fuel, and in some of the treeless districts hay, straw, and flax are burned for domestic purposes, ingenious inventions having rendered such materials useful for this purpose.

**Fauna.**—The fauna of the United States, like its flora, is very varied, including many species found in foreign lands, and some which are exclusively American. Among wild animals are the bison or buffalo, now almost extinct in a wild state, the moose or American elk, the caribou, or reindeer, the prong-horned antelope, the big-horn or Rocky Mountain

sheep, the so-called Rocky Mountain goat (a goat-like antelope), the wapiti or American stag, the Virginia deer, the peccary, the cougar or puma, the black and grizzly bear, the panther, the prairie wolf, the raccoon and the beaver. Among the birds are swans, wild turkeys, wild geese, wild ducks, eagles, vultures, mocking and humming birds, etc. Among the reptiles are the rattlesnake and other snakes, turtles and tortoises, alligators, etc. The smaller animals include the lynx, weasel, foxes of several species, muskrat, marten, skunk, otter, prairie-dog, opossum, rabbit, porcupine, numerous species of squirrels and gophers, and a large number of destructive animals of the rat and mouse family. Among water animals there is a great variety of fishes, many of them, as the cod, shad, herring, salmon, mackerel, etc., highly esteemed for table use. Chief among shellfish is the oyster, more abundant on the Atlantic coast than anywhere else in the world and unequalled in quality in any other country. Of crustaceans, the lobster comes first, of a species quite distinct from that of Europe. As for domestic animals there are none of American origin, all the animals of field and household having been brought from Europe. It is the same with the poultry yard, with the exception of the turkey and some species of swimming birds.

**Minerals.**—The mineral resources of the United States are enormous in supply and exceedingly varied in kind, being in some respects beyond rivalry. Very much of this wealth is centered in the Rocky Mountain region and the Pacific coast states, but this does not apply to the highly valuable stores of coal, petroleum, natural gas and iron, which are very largely developed in the Appalachian region and the Middle West. The Appalachian coal fields embrace an area of over 59,000 square miles, including the small but richly productive anthracite region of Pennsylvania. In addition there are about 125,000 square miles in Illinois, Missouri and other Mississippi valley States. Petroleum, at first obtained only in Pennsylvania, has been found abundantly elsewhere, and extends to Texas and the California coast, where it occurs in large quantity. Iron ores abound in many sections, being very rich in Pennsylvania, West Virginia, Tennessee, Alabama, Wisconsin, Minnesota, Missouri and several other States. Copper is unequalled in quantity, the United States supplying over five-eighths of the world's product. Its great fields are in Arizona, Montana, Michigan, Utah and Cali-

fornia, the ores of Michigan being 90-95 per cent. pure metal. Gold and silver are widely distributed, the United States standing second only to South Africa in its production of gold, and to Mexico in that of silver. The leading States in these metals are California, Colorado, Nevada, and the territory of Alaska, in gold; and Montana, Colorado, Nevada, Utah, Idaho and Arizona in silver. Other metals in which this country is rich are lead and zinc. Tin ore is abundant but in unworkable condition, and there are minor yields of nickel, platinum, mercury, antimony, etc. In the Rocky Mountain region are vast deposits of lignitic coal, hitherto little used, but now becoming available, and of late years exceedingly valuable coal deposits have been found in Alaska, not yet worked. Copper is also abundant in this territory. Aside from the minerals mentioned are many others of economic value, including salt, borax, limestone, marble, sulphur, cement, etc. Geologically the United States possesses examples of all the formations, and is rich alike in fossils of the primary and the later periods. It is especially notable for its abundance of vertebrate remains in the geologic strata ranging from the Permian to the Quaternary, including the gigantic dinosaurs of the Jurassic and Cretaceous epochs, the flying reptiles and toothed birds of the Cretaceous, and the greatly varied mammals of the Tertiary age. Among the latter are several types in the life history of the horse, and in later time the horse itself. There are also giant edentates, allied to the more recent ones of South America; and the mammoth and mastodon, relatives of the elephant, all of which appear to have existed in recent geologic times. These are the more notable among a multitude of fossil forms.

*Agriculture.*—It is estimated that the arable lands of the United States exceed a million and a quarter square miles in area, of which over 870,000 square miles were occupied as farms in 1910, about 475,000 square miles consisting of improved lands. Considerable additions have been made to this area within the last decade, irrigation in the west having brought under cultivation large areas once deemed hopelessly arid. The basin of the Mississippi, the Pacific coast lands, and the valley of the Red River of the north vie with each other in fertility, and other highly productive lands are those of the Gulf coast, the region draining into the Great Lakes, and much of that east of the Appalachian mountains. Westward, however, is a

very extensive section in great part unfit for cultivation except under irrigation on account of deficient rainfall. This comprises most of the region between the eastern foot-hills of the Rocky Mountain system westward to the Sierra Nevada and Cascade ranges, an immense area embracing about one-third of the whole country. It includes the States of Arizona, New Mexico, Nevada, Utah, Wyoming, Montana, most of Colorado, and southern California, a large part of Oregon, Idaho and Texas, and parts of the Dakotas, Nebraska and Kansas. A large part of this great region is grass-covered and yields food to immense herds of cattle and sheep. Much of it also may yet be rendered fertile by irrigation, but there is a great extent of absolute desert to which irrigation cannot be applied.

Of American crops the two distinctive ones are cotton and Indian corn, of each of which the United States produces much more than all the rest of the world combined. Most of the cotton goods of the world are woven from American cotton. The corn, however, is very largely consumed at home, especially for the feeding of live stock, the hog-harvest being largely dependent upon it. Wheat is another product of great importance, the crop of the United States having long been the largest in the world. Russia in Europe is now a close rival, but all other countries are far surpassed. There are also large crops of hay and oats, the five named being the leading crops of the country. Other products of great importance are potatoes, tobacco, sugar, and rice. In 1910 the corn crop reached the vast total of over 3,000,000,000 bushels, the wheat crop nearly 700,000,000 bushels, the oat crop 1,100,000,000 bushels, the cotton supply (1911) 12,132,332 bales, the total value of all farm crops increased from \$5,000,000,000 in 1900 to about \$9,000,000,000 in 1911. Other cereals grown are rye, barley, and buckwheat, and common farm products include sweet potatoes, flax, hops and peanuts, each largely grown. No other part of the world is so rich in fruits, alike in quantity and variety. Very important among these are the apple, peach and pear. Plums, apricots, cherries and grapes are produced abundantly, and a considerable variety of berries and nuts are grown. The grape is an important crop in many parts of the east, and especially so in California, and much wine is made. To the temperate products must be added those of the semitropics, the orange, lemon, olive, fig and almond, abundant in California, and the orange and pineapple of Florida.

**Live-stock.**—The abundant corn and hay crops of the United States and the very extensive grazing grounds of the region of prairies and plains give a great opportunity for the raising of live-stock. The leading cattle-breeding State is Texas; sheep-raising is most extensive on the elevated plains east of the Rocky Mountains and on the Pacific slope; horses and mules are bred in great numbers in Missouri, Kentucky and Tennessee, while hogs are raised in all the corn-growing States of the Central and Southern section. Slaughtering and beef and pork-packing are carried on very extensively in Chicago, and various other cities of the Middle West. The dairying industry of the country is very large and immense quantities of butter and several varieties of cheese are made.

**Manufactures.**—The United States has become the foremost manufacturing country in the world, its supplies of coal and iron exceeding those of any other quarter of the globe, while the industry, inventive genius and enterprise of the people and the rapid development of facilities for transportation helped to advance the material interests of the country throughout the nineteenth century, and have given unquestioned industrial supremacy in the twentieth. Among the greatly varied manufacturing industries that of textiles stands high, the cotton and woolen manufacture being very flourishing, while in silk manufacture this country is becoming a rival of France. Knit goods are largely produced, while the production of ready-made clothing is a very active industry. Iron and steel production has reached a very high level, surpassing that of any other country, while the manufacture of iron and steel wares is most varied and abundant. Chief among these industries are the production of building steel, iron bridges, railroad iron and steel, locomotives, armor for steel-clad battleships, fire-arms, steel cars and machine-shop products in general. Other great fields of manufacture are those of electrical appliances, automobiles, agricultural implements, tin-plate, leather, boots and shoes, paper (the pulp for which consumes whole forests), pottery, furniture, flour, beet-sugar, beer, lumber-products and many others. As for the smaller industries, they are innumerable. The value of manufactured goods has grown from \$5,300,000,000 in 1880 to \$20,600,000,000 in 1910.

**Commerce and Transportation.**—The commerce of the United States has vied with its manufactures in development. Transportation has been provided with extraordinary rapidity. For internal

commerce the navigable inland waters of the country have been of immense value, in view of the fact that steam transportation was established upon them early in the history of the republic. Canals were early provided to add to the facilities in this direction, chief among these being the Erie Canal, from Buffalo to Albany, which for the greater part of a century has been a valuable carrier of freight. But railroad development has largely replaced that by water in the inland commerce of the country. This began in 1830 with 23 miles of track. In 1900, seventy years later, it had grown to 104,334 miles. In 1912 it had reached nearly 250,000 miles, far surpassing in length that of any other country, and equaling that of all Europe. The foreign trade of the country has grown to great proportions, though it is much surpassed by the internal commerce. In the last century the great bulk of it consisted of agricultural products and meats, cotton being a leading article of export. Of recent years, however, this country has ceased to feed and clothe Europe to the extent of the past, the home demand having grown so greatly, especially for food stuffs, as to consume the great bulk of them, while several countries are competing largely in that, and to a small extent in cotton. On the other hand the export of manufactured goods has grown until now these form a very considerable part of the goods sent abroad. At the beginning of the twentieth century the commerce of the United States was valued at about \$2,500,000,000. In 1911 it reached a total of about \$3,500,000,000. Of this much the greater part were exports, the balance of trade in its favor being in 1900 about \$500,000,000. It has decreased somewhat since then, but is still a notable amount. About two-thirds of the exports go to Europe, half this amount going to the British Isles. The bulk of the British purchases consist of cotton and food-stuffs. The exports of manufactured goods embrace iron and steel wares, leather, tobacco, oils, agricultural implements, copper manufactures, cotton goods, leather, wood products, etc. The imports include chemicals, cotton goods, fibers, fruits, furs, hides and skins, wool, tin-plate, india rubber, jewelry, silk goods, coffee, sugar, tea, tropical fruits and various other wares.

**Government.**—The government of the United States is a federal republic based on the constitution of 1787, drawn up by delegates from the thirteen original States, and subsequently amended. The constitution and modes of administration



of the individual States bear a close resemblance to each other and to the national government. Each State maintains its independence, and by means of a State legislature and executive (vested in a governor) has complete management of its own affairs. The combined States have one supreme legislature, which takes the name of Congress, and consists of a Senate and a House of Representatives. The Senate consists of two members from each State elected by its citizens for six years, one-third of the whole body being renewable biennially. The House of Representatives consists of members chosen for two years by the people of the several States, in numbers proportioned to their population as ascertained by the decennial census. The head of the executive power of the government is a President, elected by the people and holding his office for a term of four years, with a Vice-President elected at the same time and for the same term. Only persons born in the United States and who have reached the age of 35 years are eligible to the presidency. The President is commander-in-chief of the army and navy and of the militia in the service of the Union. He has the power of a veto on all laws passed by Congress; but, notwithstanding his veto, any bill may become a law on its being afterwards passed by each House of Congress by a two-thirds vote. The Vice-President is *ex officio* President of the Senate. The presidential succession is fixed by Chapter 4 of the acts of the 40th Congress, 1st session. In case of the removal, death, resignation, or inability of both the President and Vice-President, then the Secretary of State shall act as President till the disability of the President or Vice-President is removed or a President is elected. If there be no Secretary of State, then the Secretary of the Treasury will act; and the remainder of the order of succession is; Secretary of War, Attorney-General, Postmaster-General, Secretary of the Navy, Secretary of the Interior (the offices of Secretary of Agriculture, Secretary of Commerce, and Secretary of Labor, were created after the passage of the act). By the 15th amendment to the Constitution neither race nor color affects the rights of citizens, though untaxed Indians and Chinese are excluded from the franchise. The same is the case with women except in ten states in which they have full franchise and a number of others in which they have a partial franchise. There is a third section of the government, the judicial, consisting of a Supreme Court, which deals with

interstate subjects of controversy and has the power of invalidating the enactments of Congress, if it decides that they are not in conformity with the Constitution. (See succeeding article on *United States, Political Development of the*.) The governments of the States are based on a similar principle, each having its Supreme Court, the decisions of which are final on a constitutional question. The Constitution can be amended only by a vote in favor of the proposed amendment of two-thirds of each House, and subsequently by the acceptance of three-fourths of the States; or by the calling of a constitutional convention on the demand of two-thirds of the States, with ratifying conventions in three-fourths of the States. While each State is guaranteed a republican form of government, and in general their governments are based on the same principle as that of the national government, the territories, organized and unorganized, are under the direct control of Congress, the organized ones being represented in Congress by a delegate, who has no vote, and having legislatures elected by their people.

*Finances.*—The public debt of the United States reached its ultimate height in 1866, as a result of the expenditure for the Civil war, its amount on July 1 of that year being \$2,773,236,173. Thirty years before the country had been out of debt and with an excess of funds which it divided among the several States. After the war the reduction of this debt proceeded with marked rapidity, until by 1912 the interest-bearing debt had decreased to \$963,349,390, and the debt bearing no interest to \$383,499,246, making a total of \$1,346,848,636, including \$1,851,810 on which interest had ceased. Against this there was in the treasury a reserve fund and cash balance amounting to \$300,400,000. During this period the expenses of the government had steadily increased until what was called a billion dollar Congress was reached in McKinley's first term, while in 1912 the appropriation for a single session of Congress was over \$660,000,000.

*Army.*—The United States army is based on the principle of that of Great Britain, being recruited by voluntary enlistment only, not by conscription and forced military service of all able-bodied men, as is generally the case in the nations of Europe. The island condition of Great Britain and the strength of her navy has removed the necessity of general military duty, while the oceans which divide the United States from all other powerful nations have rendered a powerful army in this country in times of peace

unnecessary, a strong navy being depended upon for protection. As a result the army has been generally restricted to the numbers requisite for military police duty, the keeping a great multitude of men under arms in times of peace in readiness for possible war being not considered requisite. This policy has always prevailed, no more men being kept in the ranks than are deemed necessary to maintain internal order, the government relying upon the enlistment of volunteers in times of emergency. In 1790 the national army consisted of only 1200 men, under the command of the President. In 1861 its numbers had grown to 14,000. During the Civil war 2,039,748 men were called into the ranks chiefly by voluntary enlistment, in some measure by conscription, or by bounties of from \$300 to \$1000 to each volunteer. After the war the army was disbanded with the exception of the number required for peace service, and by an act of Congress of July 15, 1870, this number was limited to 30,000 men. This number was subsequently increased during the century to about 60,000. The brief war with Spain, in 1898, demanded a sudden enhancement of the army, which was readily accomplished by a call for volunteers. But the lack of careful supervision of this large body of raw soldiers was seriously felt, had management resulting in the death of large numbers of them by disease. After the dishandment of this volunteer force the limit of strength of the regular army was fixed by Secretary of War Root and General Miles at 77,284 men, in accordance with General Miles's proposition of one soldier for every thousand inhabitants. The length of service was fixed at five years. The need of a more scientific management of the military establishment was seriously felt, and by a bill of February 14, 1903, the office of Lieutenant-General commanding was dropped and a staff corps of eminent officers, appointed by the President, was adopted, in accordance with the policy pursued in European army organizations. Under laws passed in 1901, 1907 and 1908 the army now comprises 30 regiments of infantry, 15 of cavalry, 6 of field artillery, and a coast artillery corps, with a Porto Rico regiment of infantry, and a considerable force in the Philippines, 52 companies of which are native scouts. The total strength of the army is about 87,000, and it is provided by law that it shall not exceed 100,000 men. In addition to these are the organized State militia, a drilled and equipped force of over 120,000 men. These, known as the

National Guard, are subject to duty under demand of the government if any national emergency should arise. The militia law of 1903, amended in 1908, provided that 'The militia shall consist of every able-bodied male citizen of the respective States who is more than 18 and less than 45 years of age.' These are to be divided into the organized militia and a reserve militia, subject to duty should necessity demand. The total number of this unorganized reserved militia was stated in 1915 at 20,538,347.

**Navy.**—The United States has the credit of first demonstrating the advantage of an ironclad navy, this being done in the Civil war by both sides engaged. Britain and France had already built ironclads, but the first battle between ships thus protected was the memorable conflict in Hampton Roads, in 1862, between the *Monitor* and *Merrimac*. The wooden ships of the older navy, previously attacked by the *Merrimac*, proved hopelessly feeble before this powerful antagonist and were put out of service with startling suddenness, and only her encounter with the *Monitor* checked the *Merrimac* in her career of destruction. The lesson thus taught was quickly taken advantage of in Europe, where a rivalry in building iron- and steelclad war-vessels begun which has continued without interruption to the present day. But the United States was very slow in putting into practice the lesson it had taught. Resting secure in its thousands of miles of ocean boundary, it let twenty years pass before it awakened to the advisability of preparing for possible naval war. In 1882 there were 140 vessels on the navy list, but of these 25 were mere tugs, while a large number of the others were antiquated and useless. Shortly after this the government aroused to the need of possessing a modern naval establishment, and began the construction of the powerful navy it has since possessed. Its long negligence left to the European nations the task of experimenting in the new system of war-vessel construction, and gave it the important advantage of participating without cost in lessons learned by a long-continued practical study of the new system in Europe. At the period of the Spanish-American war a navy of fair strength for that date existed, one that with remarkable quickness put the weaker Spanish navy out of commission. Since then many war-vessels fitted to compete on equal terms with the strongest of those possessed by other nations have been built, and in 1912 the United States had, built and building, 28 battleships of recent type with 9 of older type, 12 first-

class armored cruisers, and a considerable number of second and third-class cruisers, monitors, gunboats, torpedo boats, destroyers and submarines. In this respect it ranks high among other nations, Great Britain considerably and Germany slightly surpassing it in number and strength of war ships. The United States has a satisfactory number of the powerful Dreadnought and super-Dreadnought class. Of these the *Arkansas* and *Wyoming*, with their 26,000 tons displacement and armament of twelve 12-inch guns; the *New York* and *Texas*, 27,000 tons, and the *Nevada* and *Oklahoma*, 27,500 tons, each with ten 14-inch guns, are much surpassed by the 31,400 *Pennsylvania* and *Arizona* and the 32,000 *California*, *Idaho* and *Mississippi* with twelve 14-in. guns each.

**History.**—The territory now occupied by the United States of America, though it appears to have been visited on its N. E. coast by Norse navigators about the year 1000, continued the sole possession of numerous tribes of Indians till the rediscovery of America by Columbus in 1492. In 1498 an English expedition, under the command of Sebastian Cabot, explored the east coast of America, from Labrador to Virginia, perhaps to Florida. In 1513 Juan Ponce de Leon landed in the Florida peninsula, and explored a portion of that region in a romantic search for the Fountain of Youth. In 1539-1542 Ferdinand de Soto led a Spanish expedition from the coast of Florida across Alabama, and discovered the Mississippi river. In 1584-1585 Sir Walter Raleigh sent two expeditions to the coast of North Carolina and vainly attempted to form settlements on Roanoke Island. A Spanish settlement was made at St. Augustine, Florida, in 1565. The first successful English settlement was that planted at Jamestown, Virginia, in 1607. In 1609 the Dutch explored the Hudson River, and some years later began a settlement on Manhattan Island, New York harbor. Plymouth, Massachusetts, was settled by the Pilgrims, members of a persecuted religious sect, in 1620, and Massachusetts Bay by the Puritans, another sect, in 1628 and 1630. Later settlements were those of Connecticut, in 1633; Maryland, in 1634; Rhode Island, in 1635; Carolina in 1663 and 1670; Pennsylvania in 1682, and Georgia in 1733. Meanwhile the French from Canada, under La Salle and others, had explored the Great Lakes and the Mississippi, and settlements had been made at points in Illinois and along the Mississippi, while Mobile was founded in 1702 and New Orleans in 1718. In 1664 the

British dispossessed the Dutch on Manhattan Island, and named the settlement New York. The first effort at a union of the colonies was in 1643, when the settlements in Massachusetts, Connecticut and New Hampshire formed a confederacy for mutual protection called 'The United Colonies of New England.' The growth of the colonies was attended by occasional warlike relations, not only with the Indians, but between the Europeans of different nations. There was war on several occasions between the English of South Carolina and Georgia and the Spanish of Florida, and three successive wars broke out between the British of the North and the French of Canada, in 1689, 1702 and 1744. These were hostilities between the colonists arising from wars in Europe, but in 1754 a more important war began due to rivalry between the colonists themselves, and which in turn gave rise to an European war. This, known as the French and Indian war, continued until 1763, its origin being an effort of the French to take possession of the Ohio Valley and the determination of the British colonists to prevent this. Its seven years' continuance was attended by varying fortunes of war, the French at first generally successful, the British finally everywhere victorious, Quebec, the capital and military stronghold of Canada, being finally taken. The result was disastrous to France, which was obliged to surrender its possessions in Canada to Great Britain. Its territory west of the Mississippi was transferred to Spain. The close of this war was soon followed by discontent on the part of the colonists with their treatment by the British government. In 1761 the enforcement against smugglers of the oppressive Navigation laws, by the use of general search warrants which gave the customs officials the right to enter and search any domicile, caused a strong excitement against the English government, especially in Boston. Parliament also resolved to increase the revenue by a general stamp-duty through all the American colonies. Accordingly, the Stamp Act of 1765 was passed; but this, after opposition, was repealed next year, Britain still claiming, however, its right to tax. In accordance with this claim a duty, in 1767, was imposed upon tea, paper, glass, etc.; but the colonial opposition was such that three years later the duties were all repealed except the one upon tea. To such a pass had the opposition now come that in 1773, when British ships loaded with tea attempted to effect a landing in the port of Boston,

a number of the inhabitants, disguised as Indians, seized them and threw their cargoes into the sea. In punishment of this, parliament passed the Boston Port Bill, which declared that port closed to all commerce, and transferred the seat of colonial government to Salem. This caused much suffering in Boston and from this time it became to many evident that a conflict was inevitable. This began in April, 1775, when a British force, sent from Boston to destroy the military stores at Concord, fired upon the colonists at Lexington, and was subsequently attacked and forced to retreat. Before the end of April the British governor and army were besieged in Boston by a revolutionary force of 20,000 men; the northern fortresses of Ticonderoga and Crown Point were seized; and a Continental Congress which assembled at Philadelphia took measures to equip an army and navy, with George Washington, who had won fame in the French and Indian war, as commander-in-chief. On June 17 the British attacked the intrenched position of the colonists on Bunker Hill, which commanded Boston harbor, and captured it with great loss to their troops. In the following year they were forced to evacuate the city and retreat to Halifax. This success encouraged the colonists in their resistance, and it was declared by the thirteen States assembled in Congress that 'The United Colonies are, and ought to be, free and independent States; that their political connection with Great Britain is, and ought to be, dissolved.' This resolution was embodied in a declaration of independence, drawn up by Jefferson and adopted July 4, 1776. The British government now sent an army against the colonists under the command of Sir William Howe, and in a battle on Long Island (August, 1776) Washington was defeated and obliged to abandon New York. He retreated through New Jersey and crossed the Delaware, but later in the year won a victory at Trenton, New Jersey, which enabled him to establish himself in that State and threaten New York. In 1777 the British invaded Pennsylvania by way of Chesapeake Bay, defeated Washington on the Brandywine and captured Philadelphia. Fortune, however, favored the Americans in the north, where General Gates at Stillwater defeated General Burgoyne; his whole army being forced to surrender. This event led to a treaty with France in 1778, and subsequently Spain and Holland gave support to the Americans. The British army now left Philadelphia and the conflict was trans-

ferred to the South. Here it was prosecuted with varying fortunes, but in 1781 the surrender of Lord Cornwallis with his army at Yorktown to a combined French and American force under Rochambeau and Washington, virtually terminated the war. On September 3, 1783, Great Britain formally recognized the independence of the United States by a treaty of peace signed at Paris. The new-formed States, however, were very imperfectly united, and in 1787 a convention met at Philadelphia and after four months' deliberation framed a Constitution. This Constitution, which remains the basis of the government, came into operation in March, 1789, and on April 30 Washington became the first president. The Congress appointed by the thirteen States then proceeded to impose duties, establish a federal judiciary, organize the executive administration, fund the debt of the United States, and establish a national bank. In 1792 Washington was unanimously reelected president, but in 1796 he refused to be elected for a third term. During his administration the States of Vermont, Kentucky, and Tennessee were admitted into the Union. John Adams was elected second president, and it was while he held office that the hostile demeanor of France led to a brief naval war in which all the success lay with the United States. In 1800 the seat of government was transferred from Philadelphia, which had been the capital, to Washington, and in 1803, under President Jefferson the territory of the new Union was immensely added to by the purchase from France of Louisiana, the great region between the Mississippi and the Rocky Mountains. A new source of hostility to Great Britain soon arose from her claim to the allegiance of American naturalized subjects and the right to search American vessels for British seamen. In 1807 the British frigate *Leopard* overhauled the United States frigate *Chesapeake*, near the entrance to Chesapeake Bay, compelled her to surrender, and took off four of her men. Reparation was asked in vain; some time later all trade with France and England was prohibited by Act of Congress, and in June, 1812, war was declared against Great Britain. This lasted until the end of 1814, the armies having varying success upon land, but the Americans winning a brilliant series of naval victories. The final event in the war was Jackson's victory over the British at New Orleans, fought after the treaty of peace had been signed. After this the chief historical events were the wars against the southern Indian tribes and the acqui-



tion of Florida from the Spanish in 1819; the annexation of Texas, which led to a war with Mexico in 1846; and the acquisition of a large territory in northern Mexico, consisting of New Mexico and Upper California, which were ceded to the United States on payment of the sum of \$15,000,000 to Mexico. The great question during this and the succeeding period was that of slavery in the South, against which a strong party arose in the North. Texas had been introduced into the Union as a slaveholding state, and the endeavor to act similarly with regard to the territory of Kansas led to local conflicts. The question was still further complicated by an antislavery insurrection (1859) at Harper's Ferry, led by John Brown, which helped to bring the question of the abolition of slavery to a crisis. The presidential election of 1860 turned to a great extent upon this question, and when Abraham Lincoln, the Republican candidate, was elected, the slaveholding States of South Carolina, Mississippi, Florida, Alabama, Georgia, Louisiana, and Texas formally seceded from the Union. These States formed themselves into a separate union on February 4, 1861, which they named 'The Confederate States of America,' with Jefferson Davis as president. They were subsequently joined, after hostilities had begun, by Virginia, North Carolina, Tennessee and Arkansas. The custom-houses, arsenals, and United States buildings in these States were seized and occupied by the Confederates, and every preparation made to organize a separate government. War was inevitable, and the first blow was struck on April 12, 1861, the Confederates proceeding to bombard Fort Sumter, in Charleston harbor, which was forced to surrender. President Lincoln then called out by proclamation 75,000 volunteers, and the first battle on a large scale took place at Bull Run, south of Washington, on July 21, the Federal forces being defeated. During the remainder of 1861 frequent collisions took place between the rival forces at different points. In the spring of 1862 General Grant captured Fort Donelson, on the Cumberland River and obtained a victory over the Confederates at Shiloh, or Pittsburgh Landing, in Tennessee. In April the Federal fleet, under Porter, ran past the forts at the entrance of the Mississippi, and aided in the capture of Vicksburg and Arkansas Post. An attempt was then made, by General McClellan to invest Richmond, the capital of the Confederacy, but this was prevented by the Confederate generals Lee and 'Stonewall'

Jackson, who drove the Federals back to the James River, where they established themselves. General Lee then assumed the offensive and moved with his whole army upon Washington, defeating General Pope with great loss at Bull Run and invading Maryland. Here he was met on the banks of the Antietam by McClellan, and, after an obstinate fight, compelled to recross the Potomac. Soon afterwards McClellan was superseded by Burnside, and in December another advance to Richmond was commenced. This General Lee had anticipated, and intrenched himself behind the town of Fredericksburg, a position from which the Federals endeavored in vain and with severe loss to dislodge him. In the following April General Hooker, superseding Burnside in the command of the army of the Potomac, commenced another movement towards Richmond, but was defeated by General Lee at Chancellorsville. Following up this gain Lee transferred his army to the valley of the Shenandoah, entered Maryland, and crossed into Pennsylvania. At Gettysburg he unexpectedly encountered the Federal forces under Meade, and after three days of desperate fighting and the loss of 28,000 men was defeated and was forced to retreat into Virginia. On the Mississippi the fortune of war was also in favor of the Federals. Aided by the fleet, which dashed past Port Hudson and seized Natchez, General Grant assumed the offensive and captured Vicksburg with its large garrison, while at the end of this year (1863) he inflicted severe defeat upon Bragg at Chattanooga. In 1864 General Grant, as the result of his successes, was appointed commander-in-chief of all the armies, and at once he set himself to reorganize the Federal forces. He took command of the army of the Potomac himself, with which he proposed to meet Lee, while he despatched Sherman to operate against the Confederate forces in Georgia. In May Grant moved his main force across the Rapidan and immediately attacked Lee in The Wilderness, where severe fighting lasted for six consecutive days. Unable to route the Confederates, Grant endeavored by a flank movement to cut them off from Richmond, but Lee anticipated the attempt and foiled it. Severe battles followed and finally Grant crossed the James River and attacked Petersburg, but was repelled, and obliged to begin a regular siege. Meanwhile Sherman, with a large Federal force, defeated Hood (who had superseded Johnston as commander in Georgia), and occupied

Atlanta. From this point he crossed the country by forced marches, seized Savannah, and by February, 1865, occupied Charleston and marched into North Carolina. During this brilliant movement the forces under Lee and Grant had faced each other in the lines round Richmond, but in April, 1865, a general advance was made by the Federals. Lee defended Petersburg and Richmond with great skill and obstinacy, but after three days' sanguinary conflict the Confederate lines were broken, and Richmond lay at the mercy of the Northern armies. Lee retreated to Appomattox Court House, but was so closely followed by Grant that he was obliged to surrender with his whole army. The remaining Confederate armies in the field soon afterwards surrendered, and the four years' war ended in favor of the Federal government. In the course of the war the abolition of slavery had been proclaimed by President Lincoln, and he had just entered (April, 1865) upon his second term of the presidency when he was assassinated in Ford's theater at Washington by John Wilkes Booth.

As the seceded States returned to their allegiance to the Union they were readmitted to their state and national privileges, being obliged to agree to a number of amendments to the Constitution, two of which gave the manumitted slaves the rights of citizenship, including that of the suffrage. The election of General Grant to the presidency in 1868 served, in some measure, to consolidate matters. The government declared its ability to pay the enormous war debt, and an attempt was made to reform the civil service. The question of equal rights, without regard to color or previous condition of servitude, gave rise in 1874 to hostile conditions in the Southern States between the negro and the white population. The difficult suppression of the hostile Indians in the northwestern states formed one of the tasks of the Grant administration. His administration was also able by means of arbitration to bring the claim of damages against Great Britain for the depredations of the *Alabama* and other cruisers huilt there, to a favorable issue for the United States. In 1876 a Centennial Exposition was held in Philadelphia, in celebration of the one hundredth year of American independence. The exhibitors, from all parts of the world, numbered 30,865, and the exposition was the most brilliant which had been held up to that time. After a presidency of two terms General Grant was succeeded by Rutherford B. Hayes,

whose election was strongly contested but was granted by an electoral commission formed by compromise between the parties. At the next election (1880) the Republicans elected General Garfield. Soon after (July 2, 1881) he was shot by Charles J. Guiteau, and died Sept. 19, 1881, Chester A. Arthur, the vice-president, becoming president. In 1885 Grover Cleveland, the first Democrat holding the office since 1861, succeeded as president. The Anti-polygamy bill, virtually disfranchising Mormons, became a law in 1886; also the Interstate Commerce bill, establishing a commission to secure uniformity of railroad rates, nationalize through-route traffic, and break up harmful trade combinations. In 1888 North Dakota, South Dakota, Montana and Washington territories were admitted as States. A bill passed in 1879 prohibiting the immigration of Chinese as laborers, amended in 1882 making the restriction to last for 20 years, was further amended in 1888 by taking away from the Chinese now or heretofore in the country the privilege of return unless they had previously procured certificates. President Cleveland retired to private life after a cautious and prudent administration, signalized by patient attention to details and strong assertion of official prerogative. In 1889 Benjamin Harrison, elected by the Republicans, became president, the issue of the campaign being Free-trade vs. Protection. One result was the enactment of a strongly protective tariff bill. Acts to admit Wyoming and Idaho as States were passed in 1890. On June 19, 1890, the report of the International American Conference was presented, forming the basis of the policy of reciprocity by which treaties were entered into with Germany, France, Spain, Brazil and the countries of Central and South America. By the end of 1892 these treaties began to bring about an anticipated increase of trade. The Behring Sea question, long a diplomatic stumbling-block between the United States and Great Britain, was, after skillful diplomacy, referred to a board of arbitration. In 1892 Cleveland was re-elected to the Presidency, and during his administration a new tariff bill was passed, under Democratic auspices, reducing the rates but not sufficiently to satisfy the President, who, however, permitted it to become a law without his signature. An interesting event of his administration was a grand exposition of industry held at Chicago in 1893, in honor of the discovery of America by Columbus, four centuries before. Another event of interest, as sustaining the 'Monroe Doc-

trine,' was the intervention of the President in a controversy between Great Britain and Venezuela in regard to boundary questions. Cleveland went so far as to threaten forcible intervention if Venezuela was despoiled of any of its rightful territory, and demanded a settlement by arbitration. This was finally granted and an amiable settlement reached. In 1896 William McKinley, the Republican candidate, was elected to the presidency. Important events marked his administration. An insurrection against Spain had broken out in Cuba, and the war there was attended by acts of barbarity against which the people of the United States vigorously protested. The battleship *Maine*, sent to Havana harbor, was sunk by an explosion, nearly all on board perishing. This untoward event led to a declaration of war and a brief period of hostilities succeeded, in which the United States was uniformly successful. Santiago, Cuba, was taken, after the destruction of the fleet guarding it, and a similar capture and destruction of a Spanish fleet took place at Manila, capital of the Philippine Islands. The result was the freeing of Cuba from Spanish rule, and the cession to the United States of Porto Rico, the Philippine Islands, and the small Pacific island of Guam. Another event of interest was the annexation to the United States of the Hawaiian Islands, in the mid-Pacific. In 1900 the United States took part in the occupation of Peking, China, as a result of the 'Boxer' outbreak against the national embassies to that country. The gratitude of China was subsequently won by the government of this country, which remitted its share of the large indemnity which the offended nations had exacted.

In 1900 President McKinley was re-elected to the presidency, Theodore Roosevelt being elected vice-president. In September, 1901, the President was shot by an anarchist while visiting an exposition at Buffalo, New York, and died of the wound. Vice-President Roosevelt succeeding to the presidency. Important events of his administration were the full establishment of the republic of Cuba, the purchase by the United States of the partly completed Panama Canal and the taking of active steps towards its completion, the settlement by arbitration of the disputed boundary between Alaska and Canada, and the holding of a magnificent World's Fair at St. Louis, in recognition of the centennial anniversary of the purchase of the great Louisiana territory. There was also important legislation, at the instance of

the President, tending to control the operations of railroads and other corporations. In 1904 Roosevelt was elected to the presidency, and during this term instituted a number of reform movements, bills being passed to regulate freight charges on railroads, to prevent the evil of rebates in freight charges, to check unclean methods of meat packing and adulteration of food-stuffs, and to investigate the great business corporations, several of which proved to be nests of fraud and corruption. Among the general events was a Peace Conference held at Portsmouth, N. H., at the instance of President Roosevelt, which brought to an end the terrible war of 1904-1905 between Russia and Japan. In 1906 San Francisco was in great part destroyed by a severe earthquake and subsequent conflagration, causing a loss that elicited large sympathetic contributions from all parts of the country. Oklahoma Territory and the Indian Territory were united in 1906 and admitted to the Union as a State, which was given the name of Oklahoma. Another event, of spectacular character, was a circumnavigation of the globe by a fleet of American battleships, which visited all the leading ports of the Pacific and returned to Hampton Roads, February 22, 1909. In 1908 William H. Taft, late Secretary of War, was nominated as the Republican candidate for the presidency, elected in November, and inaugurated March 4, 1909. The beginning of his term was signalized by a special session of Congress and the enactment of a new tariff bill making considerable reductions in the customs charges. These reductions were not sufficient to give general satisfaction. President Taft was an advocate of several radical measures, one of these being a treaty of reciprocity with Canada, which was passed, but failed to meet the approval of Canada. The formation of a new party, the Progressive, was one of the notable political events of 1912, and another was the election to the presidency of Woodrow Wilson, a Democrat. The chief events of his administration were the passage of a lower tariff bill; the reform of the currency system; measures regulating corporations; the passage of income tax and popular vote for senators' amendments to the Constitution and semi-warlike relations with Mexico.

Wilson was re-elected in 1916. Tension in the Mexican situation was greatly increased by a raid into American territory by Villa, a Mexican bandit, and a primitive expedition was sent into Mexico and the mobilization of practically the entire national guard on the border.

German submarine attacks on shipping led to the breaking off of diplomatic relations with Germany in 1917, and war was threatened. The strength of the army was increased to 208,328 and a bill passed for large increases in the navy. The acquisition of the Danish West Indies was completed in 1917.

When the second term of Woodrow Wilson as President of the United States began, on March 4, 1917, the relations between this country and Germany had grown seriously strained as a result of the relentless U-boat war on the part of Germany. It was growing evident that an overt act on the part of the latter country would precipitate war between the two nations. Diplomatic relations between these countries having already been broken, only open hostilities remained, and an attack on the liner *Lucania* by a submarine was regarded as the overt act awaited. Congress was at once called into extra session and on April 4 and 5 the two Houses decided by heavy majorities that a 'state of war' existed between Germany and the United States. This action threw the nation into a state of intense activities and strenuous preparations, for hostile relations at once began. The navy was immediately mobilized, 90 German vessels in American ports (620,000 tons, \$148,000,000 value) were taken over by the government, together with 14 Austrian ships. Active financial measures were also instituted, consisting in a revenue bill for a bond issue of \$5,000,000,000 and a Liberty Loan for public subscription of \$2,000,000,000. Of the sums raised \$3,000,000,000 were to be loaned to the European allies of the United States. Other steps taken in war preparation were the conscription of the National Guard of volunteer soldiers into the Federal service and the passage of a selective conscription bill, covering all the young men of the nation between 21 and 31 years of age. Registration for this purpose was made on June 5, 1917, the number registered being about 10,000,000. In July a first draft was made, to cover an army of over 600,000, and a force of regulars was subsequently sent to France, under the command of General Pershing, late commander of the Villa punitive expedition to Mexico. This force was attacked on the high seas by German submarines, but reached Europe in safety. Other important steps taken were for the building of a large number of small vessels, fitted to cope with submarines, and for the construction of 20,000 war aeroplanes for field service at the seat of war. Bills were also passed for the regulation of the food and fuel supply of the country,

under the control of Herbert C. Hoover and Harry A. Garfield, and an embargo on commerce between the United States and the neutral nations of Northern Europe which had been supplying Germany with war materials purchased in the United States. In October a second Liberty Loan was negotiated, the large sum of about \$5,000,000,000 being obtained from the people by these loans. Congress adjourned on October 8, after passing a war loan tax estimated to yield \$2,534,870,000 of revenue, chiefly by increased levies upon incomes and taxes on excess war profits. It also included an increase in the postal rates, stamps on checks, on theater tickets, travelers' tickets and various other items of daily use. The second war appropriation of Congress in 1917 covered the large total of \$4,810,779,370, of which \$3,771,927,320 was made available for immediate use. This was the largest appropriation ever made in the United States, exceeding by more than \$2,000,000,000 the first bill passed. The war bond bill passed by Congress on September 6 amounted to \$11,538,945,460.

When Congress came again into session on December 3, its first act was to declare war against Austria, this being carried with only one dissenting vote. During the war a number of munition plants, stores of materials, vessels laden with war supplies, etc., had been destroyed, presumably by spies, and it became necessary to take steps to prevent German and Austrian residents in this country from work of this kind and to pass stringent laws dealing with spies and alien enemies. Aliens were not permitted upon the water fronts of the seaport cities unless with permits, and decisive measures were taken to protect all depots of supplies. The industrial staff of the country was largely employed in the production of war materials, the railroads were requisitioned for the transportation and such materials and all the products of the country held subject to government demands. All this led to a large increase in the prices of food, fuel and other necessities of life, some of these growing very scarce and dear, while the railroad service became so congested that on December 28 the President took possession and assumed control of the railroad lines of the country and the systems of water transportation under their control. William G. McAdoo was appointed Director General. Meanwhile large numbers of the newly organized army were transported to France without loss, the seas in the danger zone being patrolled by swift destroyers. The new recruits were put under intensive training on French soil and before the



year ended many of them were in the trenches, getting their final discipline under the guns of the foe. Their presence on the battlefield and a large increase in their numbers were felt to be absolutely necessary. The coal situation became acute at the end of 1917 and the beginning of 1918, and to relieve it the President ordered cessation of general industries for a period of five days and the Monday of each week for several weeks.

American soldiers at the rate of 200,000 a month crossed the seas in safety, despite the efforts of the German submarines. The most notable tragedy due to the work of the under-sea enemies was the torpedoing of the *Tuscania* in February, 1918, off the coast of Ireland with a loss of 204 men. From the beginning of the war 145 American passenger vessels were lost, through enemy acts. In all 775 American lives were lost at sea.

Among the special government activities which functioned during the war were: the food administration, fuel administration, espionage act, war trade board, shipping board, alien property custodian, agricultural stimulation, housing construction, control of telegraphs, telephones and railroads, export control, war finance corporation, capital issues committee, aircraft board, etc.

The American Expeditionary Force (see *Army of the United States*), under General Pershing, showed its mettle early in 1918, not only holding the Germans in their desperate offensive that threatened Paris, but undertaking counter-offensives that demoralized the enemy at Château-Thierry (q. v.) and at St. Mihiel (q. v.), where the great salient established by the Germans in 1914 and held by them for four years was pinched out by the Americans on September 12. From the first attack of the Americans the German tide turned backwards till in November the Teutons sued for peace. The armistice was signed November 11, 1918 (for terms of armistice, and map, see *European War*). The casualties in the American Expeditionary Force up till the signing of the armistice were: Killed and died of wounds, 36,145; died of disease, 14,811; deaths unclassified, 2204; wounded, 170,625; prisoners, 2163; missing, 1160. The government's plan was to have 5,000,000 men under arms before the summer of 1919. The selective service laws operated as manhood conscription. The first was for men between 21 and 31; the second for men between 18 and 45 not included in first draft; total enrolment in both classes, 23,456,021. The armistice of November 11, 1918, found 2,500,000 men overseas, nearly 4,000,000 men actually under arms,

and an assignment of 250,000 made to the training camps.

Less than a month from the signing of the armistice Woodrow Wilson sailed for France to take part in the peace conference; thus breaking all precedents, he being the first President of the United States to visit Europe while in office. The peace conference opened on January 18, 1919, in the French Foreign Office at Paris, President Wilson making the nominating speech, naming Premier Clemenceau as permanent chairman. The United States was represented by President Wilson, Robert Lansing, Secretary of State; Henry White, former Ambassador to France and Italy; Col. E. M. House, and Gen. Tasker H. Bliss, representative of the American army with the Supreme War Council at Versailles. Almost the first matter considered was the formation of a League of Nations (q. v.), and this formed part one of the treaty of peace (q. v.), which was signed at Versailles, June 28, 1919, by the American, Allied and German representatives. When the treaty was presented to the Senate it aroused much opposition, and President Wilson left Washington on Sept. 3 on a 10,000 mile trip through the West and Middle West, speaking on behalf of the treaty and the League of Nations. He was taken sick on Sept. 25 and compelled to return to Washington. Led by Senator Lodge, an attempt was made to ratify the treaty with reservations, but this failed; similarly an attempt to ratify the treaty without reservations also failed.

Among the strikes that occurred in 1919 were those of the railroad shopmen, the steel workers, the policemen's strike in Boston, the marine workers in the port of New York, and the great coal strike, the latter causing the greatest hardship, coming as it did in November and continuing into December, when coal was in great demand. The policemen's strike in Boston was of national importance, and there was a general feeling of relief when Governor Coolidge of Massachusetts, who had denounced the striking policemen, was re-elected on a platform of no compromise with the strikers. A printers' strike in New York interfered with the publication of many magazines. The *Literary Digest*, unable to secure typesetters, adopted the novel method of making electrotypes from typewritten copy. *Callitypy* is the word used to describe this method, which was also used by other periodicals.

William G. McAdoo, who had done excellent service as Director-General of Railroads and Secretary of the Treasury, resigned both offices. Walker D. Hines

succeeded him as Director-General; and Carter Glass became Secretary of the Treasury, holding office till he became a member of the Senate, on the appointment of Governor Davis of Virginia, to succeed Thomas S. Martin, deceased. Thomas Watt Gregory was succeeded as attorney-general by A. Mitchell Palmer, who had been alien property custodian. Joshua W. Alexander of Missouri succeeded William C. Redfield as Secretary of Commerce.

**Literature.**—The first literary work of any consequence in the United States was a translation of Ovid's *Metamorphoses* by George Sandys, written in Virginia (1620) and published in London (1626), and a Puritan edition of the *Psalms* (1640). The journals and annals of John Winthrop (1588-1649), governor of Massachusetts, Edward Winslow (1595-1655), governor of Plymouth colony, Nathaniel Morton (1613-85), etc., have been valuable to the historian. The most notable of the earlier writers were the theologians, such as Increase and Cotton Mather, Roger Williams, and above all Jonathan Edwards. The only one whose writings are still read to any extent was Benjamin Franklin, whose *Autobiography* and *Poor Richard's Almanac* are the only popular literature remaining from the colonial period. The succeeding or revolutionary era was chiefly remarkable for its political writers, among whom were James Otis (1725-83), Josiah Quincy (1744-75), John Adams (1735-1826), Thomas Jefferson (1743-1826), Alexander Hamilton (1757-1804), John Jay (1745-1829), and James Madison (1751-1836). Of historical writings belonging to this period there were the *History of New England* by Hannah Adams; of the *American Revolution*, by William Gordon and David Ramsay, and the *Annals of America*, by Abiel Holmes. Philology was represented at this time by Lindley Murray (1745-1826), and by Noah Webster (1758-1843), the compiler of a famous dictionary. The list of poets includes Philip Freneau (1752-1832), John Trumbull (1750-1831), and Joel Barlow (1755-1812). The first well-known novelist was Charles Brockden Brown (1771-1810).

It was not, however, until the nineteenth century that the United States produced the higher forms of pure literature. The poets of this epoch may be headed by William Cullen Bryant (1794-1878), and following him come Richard H. Dana (1787-1879), Charles Sprague (1791-1875), James G. Percival (1795-1856), Joseph R. Drake (1795-1820), Washington Allston (1779-1843), Fitz-Greene Halleck (1790-1867), and Mrs.

Sigourney (1791-1865); the song-writers, Francis Scott Key, Samuel Woodworth, John H. Payne (author of 'Home, Sweet Home'), and Stephen C. Foster. The later and in part more famous names are John G. Whittier (1807-92), Henry W. Longfellow (1807-82), Edgar A. Poe (1808-49), James Russell Lowell (1810-91), Ralph Waldo Emerson (1803-82), Oliver W. Holmes (1809-94), Walt Whitman (1819-92), Thomas B. Aldrich (1836-1907), Alice Cary (1820-71), and others of later date. The prominent novelists include James Fenimore Cooper (1789-1851), James Kirke Paulding (1779-1860), John P. Kennedy (1795-1870), William G. Simms (1806-70), Nathaniel Hawthorne (1804-64), Harriet Beecher Stowe (1811-96), and Bayard Taylor (1825-78). Those of more recent date include William Dean Howells, Francis M. Crawford, Frances H. Burnett, Henry James, George W. Cable, Francis Bret Harte, Mary N. Murfree, Frank Stockton, Louisa May Alcott, etc. There are also many writers of the short tale, most famous among them being Edgar Allan Poe, followed by others too numerous to mention. Humorous writers also became numerous, the most famous among them being Washington Irving, James Russell Lowell, Samuel L. Clemens ('Mark Twain') and Charles Farrar Brown ('Artemus Ward').

The United States has been the birthplace of a number of historians of superior merit, chief among whom are George Bancroft (1800-91), John Fiske (1842-1901), William H. Prescott (1796-1859), George Ticknor (1791-1871), John Lothrop Motley (1814-77), Francis Parkman (1823-93), Woodrow Wilson (born 1856), John Bach McMaster (born 1852), and others. Of writers who achieved fame in other fields than those mentioned may be named Washington Irving, Ralph Waldo Emerson, whose *Essays* are of world-wide fame; Henry D. Thoreau, Bayard Taylor, William Ellery Channing and George W. Curtis. The orators of high reputation include such well-known names as Patrick Henry, Daniel Webster, Henry Clay, John C. Calhoun, Edward Everett, Wendell Phillips, Henry Ward Beecher and Charles Sumner. This compilation of names is by no means exhaustive, and there are many writers of recent date that might well have been added, but the list given includes the most famous of American literary artists.

**United States,** POLITICAL DEVELOPMENT OF THE. The description of the United States so far given is confined to its natural conditions and its industrial, historical and

literary progress. To gain a fuller idea of its progress and significance as a whole, it seems desirable to speak of its political development, as exemplified in the several great State papers which have been from time to time issued, and which have few counterparts in the history of any other country. The United States differs from republics in general in the fact that its system is the result of a gradual evolution instead of a revolutionary overthrow, as in the case of France; or of imitation, as in the case of the other American republics, the governments of which were based upon that of the United States. The republic of Switzerland alone resembles that of the United States as being a result of political evolution. But it is on so small a scale that it cannot properly be compared to the giant federal organization of the United States, which ranks in size with the greatest of the world's nations, covering half a continent. The stages by which the organization of this great government was reached are indicated in the Declaration of Independence, the Constitution, and the other great documents which appeared from time to time, each as the outcome of a period of preceding development and each as a stepping stone of a future development in the great problem of political progress. This country has been democratic in sentiment from its origin in the colonies that settled at successive periods, along the Atlantic coast, their people plainly indicating this feeling, and resisting all efforts to subject them to the dominance of king or parliament without due representation. They insisted on having their own legislatures, making their own laws, paying their own officials, and in other ways maintaining a just degree of independence. This spirit is shown in all the American State papers.

At a very early date in the history of the United States, that on which the Pilgrims sought a new home beyond the seas on the bleak New England shore, the immigrants gathered in the cabin of their little ship, the *Mayflower*, and drew up for themselves a compact of government in which they determined to make their own laws and choose their own governors. This brief declaration of intentions, dating from 1620, forms the first chapter in the great volume of documentary American history, and we give it here as the genesis of American political progress.

#### THE MAYFLOWER COMPACT

In the name of God, Amen: We, whose names are underwritten, the

loyall subjects of our dread Sovereigne Lord King James, by ye grace of God of Great Britaine, France, and Ireland, King, defender of ye faith, &c., having undertaken, for ye glorie of God and advancement of ye Christian faith, and honour of our King and countrie, a voyage to plant the first colony in ye Northerne parts of Virginia, doe by these presents solemnly and mutually in ye presence of God and one of another, covenant and combine ourselves together into a civill body polittick, for our better ordering and preservation and furtherance of ye ends aforesaid; and by vertue hereof to enact, constitute, and frame such just and equall lawes, ordinances, acts, constitutions, and offices, from time to time, as shall be thought most meete and convenient for ye generall good of ye colonie, unto which we promise all due submission and obedience. In witness whereof we have hereunto subscribed our names, *Cape Cod* 11 of November, in the yeare of the raigne of our Sovereigne Lord King James of England, France, and Ireland 18 and of Scotland 54. Anno Domini, 1620.

Passing onward down the road of development, it is proper to state that Virginia had already a legislature of its own election, though under a governor appointed by the king. The New England colonies went farther, electing their own legislatures and governors and making their own laws, so that from their origin they were practically republics, their allegiance to the distant king being one rather of formality than of submission. In 1639 the New Haven colony became so liberal as to give all freemen the right to vote, embodying this principle in a written instrument, the first known in history drawn up by a people for their own government. The document made no mention of the English king or company, and was in effect the constitution of a separate republic. In 1643 a step was taken towards the formation of a federal republic, the colonies of Plymouth, Massachusetts, Connecticut and New Haven forming a confederation for defense against the Dutch and Indians. This they called 'The United Colonies of New England.'

The time came when it appeared desirable to combine all the colonies for defensive purposes, and in 1754 a convention was held in Albany in which the question of a general union was brought forward. Of the several plans offered that of Benjamin Franklin was adopted. It provided for a union of the colonies under the following terms:

Franklin suggested that Philadelphia, the most central large city, should be the capital of the united colonies. The government sitting here was to consist of a grand council, elected every third year by the colonies, but holding yearly meetings, with a governor-general appointed by the king with power of veto over all laws. This government was to have the power to make general laws, levy taxes, regulate commerce and perform other governmental duties. This governmental scheme proved in advance of the times and was rejected, the colonies thinking that it took too much power from them to give it to the general government, the king that it gave too much power to the colonies.

The first colonial congress held in America was that known as the 'Stamp Act Congress,' held at New York in 1765, and composed of delegates from nine of the colonies, its purpose being to consider the threatening relations between the Parliament of Britain and the colonies of America. It made an appeal to the king for American rights. In 1774 the idea of colonial union had further advanced and the 'First Continental Congress' met in Philadelphia, all the colonies but Georgia being represented. It also petitioned the king to redress the wrongs of the colonists, and drew up a declaration of rights. It did not ask for American representation in Parliament, but demanded the right to make all laws, except those relating to foreign commerce, and to levy all taxes needed for colonial uses. In 1775 the 'Second Continental Congress' met, with delegates from all the colonies. This issued a 'Declaration of Colonial Rights,' and on July 4, 1776, a 'Declaration of Independence.' This famous paper, with which the history of the United States began, is here given.

## THE DECLARATION OF INDEPENDENCE

IN CONGRESS JULY 4, 1776.

The unanimous declaration of the thirteen United States of America. When in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth the separate and equal station to which the Laws of Nature and of Nature's God entitles them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed. That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object, evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their future security. Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world.

He has refused his Assent to Laws, the most wholesome and necessary for the public good.

He has forbidden his Governors to pass Laws of immediate and pressing importance, unless suspended in their operation till his Assent should be obtained; and when so suspended, he has utterly neglected to attend to them.

He has refused to pass other Laws for the accommodation of large districts of people, unless those people would relinquish the right of Representation in the Legislature, a right inestimable to them and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public Records, for the sole purpose of fatiguing them into compliance with his measures.



He has dissolved Representative Houses repeatedly, for opposing with manly firmness his invasions on the rights of the people.

He has refused for a long time, after such dissolutions, to cause others to be elected; whereby the Legislative powers, incapable of Annihilation, have returned to the People at large for their exercise; the State remaining in the meantime exposed to all the dangers of invasion from without, and convulsions within.

He has endeavored to prevent the population of these States; for that purpose obstructing the Laws for Naturalization of Foreigners, refusing to pass others to encourage their migrations hither, and raising the conditions of new Appropriations of Lands.

He has obstructed the Administration of Justice, by refusing his Assent to Laws for establishing Judiciary Powers.

He has made Judges dependent on his Will alone, for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of New Offices, and sent hither swarms of Officers to harass our people, and eat out their substance.

He has kept among us, in times of peace, Standing Armies without the Consent of our legislature.

He has affected to render the Military independent of and superior to the Civil power.

He has combined with others to subject us to a jurisdiction foreign to our constitution, and unacknowledged by our laws; giving his Assent to their Acts of pretended Legislation:

For quartering large bodies of armed troops among us.

For protecting them, by a mock Trial, from punishment for any Murders which they should commit on the Inhabitants of these States:

For cutting off our Trade with all parts of the world:

For imposing Taxes on us without our Consent:

For depriving us in many cases of the benefits of Trial by jury:

For transporting us beyond Seas to be tried for pretended offences:

For abolishing the free System of English Laws in a neighboring Province, establishing therein an Arbitrary government, and enlarging its Boundaries so as to render it at once an example and fit instrument for introducing the same absolute rule into these Colonies:

For taking away our Charters, abolishing our most valuable Laws, and altering

fundamentally the Forms of our Governments:

For suspending our own Legislatures and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated Government here, by declaring us out of his Protection and waging War against us.

He has plundered our seas, ravaged our Coasts, burnt our towns, and destroyed the lives of our people.

He is at this time transporting large Armies of foreign Mercenaries to complete the works of death, desolation and tyranny, already begun with circumstances of Cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the Head of a civilized nation.

He has constrained our fellow-Citizens taken captive on the high Seas to bear Arms against their Country, to become the executioners of their friends and Brethren, or to fall themselves by their Hands.

He has excited domestic insurrections among us, and has endeavored to bring on the Inhabitants of our frontiers, the merciless Indian Savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes and conditions.

In every stage of these Oppressions We have Petitioned for Redress in the most humble terms. Our repeated Petitions have been answered only by repeated injury. A Prince, whose character is thus Marked by every act which may define a Tyrant, is unfit to be the ruler of a free people.

Nor have We been wanting in attentions to our British brethren. We have warned them from time to time of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations, which would inevitably interrupt our connections and correspondence. They too have been deaf to the voice of justice and of consanguinity. We must therefore, acquiesce in the necessity which denounces our Separation, and hold them, as we hold the rest of mankind, Enemies in War, in Peace Friends.

WE, THEREFORE, the REPRESENTATIVES of the UNITED STATES OF AMERICA, IN GENERAL CONGRESS Assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in

## United States

the Name, and by authority of the good People of these Colonies, solemnly **PUBLISH** and **DECLARE**, That these United Colonies are, and of Right ought to be **FREE AND INDEPENDENT** States; that they are Absolved from all Allegiance to the British Crown, and that all political connection between them and the State of Great Britain, is and ought to be totally dissolved; and that as **FREE AND INDEPENDENT** STATES, they have full Power to levy War, conclude Peace, contract Alliances, establish Commerce, and to do all other Acts and Things which **INDEPENDENT STATES** may of right do. And for the support of this Declaration, with a firm reliance on the protection of Divine Providence, We mutually pledge to each other our Lives, our Fortunes, and our sacred Honor.

In this notable paper the colonies united in declaring their independence from Great Britain, but they were still separate commonwealths, though fighting together for one general object. Something further was needed. In the Declaration they called themselves simply 'Free and Independent States.' If they were to be 'United States,' a great further step in political evolution was needed. To win their independence an actual Union appeared necessary, and on July 11, 1776, the Continental Congress appointed a committee to draw up a form of confederation for the States. This was completed and signed July 9, 1778, but its ratification was made gradually by the several States, Maryland being the last to accept it (January 30, 1781). The first Congress under the confederation met on March 2, 1781. This first form of a United States Constitution is of much importance as a step forward towards a firm and durable Union. It is here appended:

### THE ARTICLES OF CONFEDERATION

ARTICLES OF CONFEDERATION AND PERPETUAL UNION BETWEEN THE STATES OF NEW HAMPSHIRE, MASSACHUSETTS BAY, RHODE ISLAND AND PROVIDENCE PLANTATIONS, CONNECTICUT, NEW YORK, NEW JERSEY, PENNSYLVANIA, DELAWARE, MARYLAND, VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA, AND GEORGIA.

*Article I.* The style of this Confederacy shall be, 'The United States of America.'

*Article II.* Each State retains its

sovereignty, freedom, and independence, and every power, jurisdiction, and right, which is not by this Confederation expressly delegated to the United States in Congress assembled.

*Article III.* The said States hereby severally enter into a firm league of friendship with each other, for their common defence, the security of their liberties, and their mutual and general welfare, binding themselves to assist each other against all force offered to, or attacks made upon them, or any of them, on account of religion, sovereignty, trade, or any other pretence whatever.

*Article IV.* The better to secure and perpetuate mutual friendship and intercourse among the people of the different States in this Union, the free inhabitants of each of these States, paupers, vagabonds, and fugitives from justice excepted, shall be entitled to all privileges and immunities of free citizens in the several States; and the people of each State shall have free ingress and egress to and from any other State, and shall enjoy therein all the privileges of trade and commerce subject to the same duties, impositions, and restrictions as the inhabitants thereof respectively; provided that such restrictions shall not extend so far as to prevent the removal of property imported into any State to any other State of which the owner is an inhabitant; provided also, that no imposition, duties, or restriction shall be laid by any State on the property of the United States or either of them. If any person guilty of, or charged with, treason, felony, or other high misdemeanor in any State shall flee from justice and be found in any of the United States, he shall, upon demand of the governor or executive power of the State from which he fled, be delivered up and removed to the State having jurisdiction of his offence. Full faith and credit shall be given in each of these States to the records, acts, and judicial proceedings of the courts and magistrates of every other State.

*Article V.* For the more convenient management of the general interests of the United States, delegates shall be annually appointed in such manner as the Legislature of each State shall direct, to meet in Congress on the first Monday in November, in every year, with a power reserved to each State to recall its delegates, or any of them, at any time within the year, and to send others in their stead for the remainder of the year. No State shall be represented in Congress by less than two, nor by more than seven members; and no person shall be

capable of being a delegate for more than three years in any term of six years; nor shall any person, being a delegate, be capable of holding any office under the United States for which he, or another for his benefit, receives any salary, fee, or emolument of any kind. Each State shall maintain its own delegates in any meeting of the States and while they act as members of the Committee of the States. In determining questions in the United States in Congress assembled, each State shall have one vote. Freedom of speech and debate in Congress shall not be impeached or questioned in any court or place out of Congress; and the members of Congress shall be protected in their persons from arrests and imprisonments during the time of their going to and from, and attendance on, Congress, except for treason, felony, or breach of the peace.

*Article VI.* No State, without the consent of the United States in Congress assembled, shall send any embassy to, or receive any embassy from, or enter into any conference, agreement, alliance, or treaty with any king, prince, or state; nor shall any person holding any office of profit or trust under the United States, or any of them, accept of any present, emolument, office, or title of any kind whatever from any king, prince, or foreign state; nor shall the United States in Congress assembled, or any of them, grant any title of nobility.

No two or more States shall enter into any treaty, confederation, or alliance whatever between them, without the consent of the United States in Congress assembled, specifying accurately the purposes for which the same is to be entered into, and how long it shall continue.

No State shall lay any imposts or duties which may interfere with any stipulations in treaties entered into by the United States in Congress assembled with any king, prince, or state, in pursuance of any treaties already proposed by Congress to the courts of France and Spain.

No vessel of war shall be kept up in time of peace by any State, except such number only as shall be deemed necessary by the United States in Congress assembled for the defence of such State or its trade, nor shall any body of forces be kept up by any State in time of peace, except such number only as, in the judgment of the United States in Congress assembled shall be deemed requisite to garrison the forts necessary for the defence of such State; but every State shall always keep up a well-regulated

and disciplined militia, sufficiently armed and accoutred, and shall provide and constantly have ready for use in public stores a due number of field-pieces and tents, and a proper quantity of arms, ammunition, and camp equipage.

No State shall engage in any war without the consent of the United States in Congress assembled, unless such State be actually invaded by enemies, or shall have received certain advice of a resolution being formed by some nation of Indians to invade such State, and the danger is so imminent as not to admit of a delay to the United States in Congress assembled can be consulted; nor shall any State grant commissions to any ships or vessels of war, nor letters of marque or reprisal, except it be after a declaration of war by the United States in Congress assembled, and then only against the kingdom or state, and the subjects thereof, against which war has been so declared, and under such regulations as shall be established by the United States in Congress assembled, unless such State be infested by pirates, in which case vessels of war may be fitted out for that occasion, and kept so long as the danger shall continue, or until the United States in Congress assembled shall determine otherwise.

*Article VII.* When land forces are raised by any State for the common defence, all officers of or under the rank of Colonel shall be appointed by the Legislature of each State respectively by whom such forces shall be raised, or in such manner as such State shall direct, and all vacancies shall be filled up by the State which first made the appointment.

*Article VIII.* All charges of war, and all other expenses that shall be incurred for the common defence, or general welfare, and allowed by the United States in Congress assembled, shall be defrayed out of a common treasury, which shall be supplied by the several States in proportion to the value of all land within each State, granted to, or surveyed for, any person, as such land and the buildings and improvements thereon shall be estimated, according to such mode as the United States in Congress assembled shall, from time to time, direct and appoint. The taxes for paying that proportion shall be laid and levied by the authority and direction of the Legislatures of the several States, within the time agreed upon by the United States in Congress assembled.

*Article IX.* The United States in Congress assembled shall have the sole

and exclusive right and power of determining on peace and war, except in the cases mentioned in the sixth Article; of sending and receiving ambassadors; entering into treaties and alliances, provided that no treaty of commerce shall be made, whereby the legislative power of the respective States shall be restrained from imposing such imposts and duties on foreigners as their own people are subjected to, or from prohibiting the exportation or importation of any species of goods or commodities whatever; of establishing rules for deciding, in all cases, what captures on land or water shall be legal, and in what manner prizes taken by land or naval forces in the service of the United States shall be divided or appropriated; of granting letters of marque and reprisal in times of peace; appointing courts for the trial of piracies and felonies committed on the high seas; and establishing courts for receiving and determining finally appeals in all cases of captures; provided that no member of Congress shall be appointed a judge of any of the said courts.

The United States in Congress assembled shall also be the last resort on appeal in all disputes and differences now subsisting, or that hereafter may arise between two or more States concerning boundary, jurisdiction, or any other cause whatever; which authority shall always be exercised in the manner following: Whenever the legislative or executive authority, or lawful agent of any State in controversy with another, shall present a petition to Congress, stating the matter in question, and praying for a hearing, notice thereof shall be given by order of Congress to the legislative or executive authority of the other State in controversy, and a day assigned for the appearance of the parties by their lawful agents, who shall then be directed to appoint, by joint consent, commissioners or judges to constitute a court for hearing and determining the matter in question; but if they cannot agree, Congress shall name three persons out of each of the United States, and from the list of such persons each party shall alternately strike out one, the petitioners beginning, until the number shall be reduced to thirteen; and from that number not less than seven nor more than nine names, as Congress shall direct, shall, in the presence of Congress, be drawn out by lot; and the persons whose names shall be so drawn, or any five of them, shall be commissioners or judges, to hear and finally determine the controversy, so always as a major part of the judges who

shall hear the cause shall agree in the determination; and if either party shall neglect to attend at the day appointed, without showing reasons which Congress shall judge sufficient, or being present, shall refuse to strike, the Congress shall proceed to nominate three persons out of each State, and the secretary of Congress shall strike in behalf of such party absent or refusing; and the judgment and sentence of the court, to be appointed in the manner before prescribed, shall be final and conclusive; and if any of the parties shall refuse to submit to the authority of such court, or to appear or defend their claim or cause, the court shall nevertheless proceed to pronounce sentence or judgment, which shall in like manner be final and decisive; the judgment or sentence and other proceedings being in either case transmitted to Congress, and lodged among the acts of Congress for the security of the parties concerned; provided, that every commissioner, before he sits in judgment, shall take an oath, to be administered by one of the judges of the supreme or superior court of the State where the cause shall be tried, 'well and truly to hear and determine the matter in question, according to the best of his judgment, without favor, affection, or hope of reward.' Provided, also, that no State shall be deprived of territory for the benefit of the United States.

All controversies concerning the private right of soil claimed under different grants of two or more States, whose jurisdictions, as they may respect such lands, and the States which passed such grants are adjusted, the said grants or either of them being at the same time claimed to have originated antecedent to such settlement of jurisdiction, shall, on the petition of either party to the Congress of the United States, be finally determined, as near as may be, in the same manner as is before prescribed for deciding disputes respecting territorial jurisdiction between different States.

The United States in Congress assembled shall also have the sole and exclusive right and power of regulating the alloy and value of coin struck by their own authority, or by that of the respective States; fixing the standard of weights and measures throughout the United States; regulating the trade and managing all affairs with the Indians, not members of any of the States; provided that the legislative right of any State, within its own limits, be not infringed or violated; establishing and regulating post-offices from one State to



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another, throughout all the United States, and exacting such postage on the papers passing through the same as may be requisite to defray the expenses of the said office; appointing all officers of the land forces in the service of the United States, excepting regimental officers; appointing all the officers of the naval forces, and commissioning all officers whatever in the service of the United States; making rules for the government and regulation of the said land and naval forces, and directing their operations.

The United States in Congress assembled shall have authority to appoint a committee, to sit in the recess of Congress, to be denominated 'a Committee of the States,' and to consist of one delegate from each State, and to appoint such other committees and civil officers as may be necessary for managing the general affairs of the United States under their direction; to appoint one of their number to preside; provided that no person be allowed to serve in the office of president more than one year in any term of three years; to ascertain the necessary sums of money to be raised for the service of the United States, and to appropriate and apply the same for defraying the public expenses; to borrow money or emit bills on the credit of the United States, transmitting every half year to the respective States an account of the sums of money so borrowed or emitted; to build and equip a navy; to agree upon the number of land forces, and to make requisitions from each State for its quota, in proportion to the number of white inhabitants in each State, which requisition shall be binding; and thereupon the Legislature of each State shall appoint the regimental officers, raise the men, and clothe, arm, and equip them in a soldier-like manner, at the expense of the United States; and the officers and men so clothed, armed, and equipped shall march to the place appointed, and within the time agreed on by the United States in Congress assembled; but if the United States in Congress assembled shall, on consideration of circumstances, judge proper that any State should not raise men, or should raise a smaller number than its quota, and that any other State should raise a greater number of men than the quota thereof, such extra number shall be raised, officered, clothed, armed, and equipped in the same manner as the quota of such State, unless the Legislature of such State shall judge that such extra number cannot be safely spared out of the same, in which case they shall

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raise, officer, clothe, arm, and equip as many of such extra number as they judge can be safely spared, and the officers and men so clothed, armed, and equipped shall march to the place appointed, and within the time agreed on by the United States in Congress assembled.

The United States in Congress assembled shall never engage in a war, nor grant letters of marque and reprisal in time of peace, nor enter into any treaties or alliances, nor coin money, nor regulate the value thereof, nor ascertain the sums and expenses necessary for the defence and welfare of the United States, or any of them, nor emit bills, nor borrow money on the credit of the United States, nor appropriate money, nor agree upon the number of vessels of war to be built or purchased, or the number of land or sea forces to be raised, nor appoint a commander-in-chief of the army or navy, unless nine States assent to the same, nor shall a question on any other point, except for adjourning from day to day, be determined, unless by the votes of a majority of the United States in Congress assembled.

The Congress of the United States shall have power to adjourn to any time within the year, and to any place within the United States, so that no period of adjournment be for a longer duration than the space of six months, and shall publish the journal of their proceedings monthly, except such parts thereof relating to treaties, alliances, or military operations as in their judgment require secrecy; and the yeas and nays of the delegates of each State, on any question, shall be entered on the journal when it is desired by any delegate; and the delegates of a State, or any of them, at his or their request, shall be furnished with a transcript of the said journal except such parts as are above excepted, to lay before the Legislatures of the several States.

**Article X.** The Committee of the States, or any nine of them, shall be authorized to execute, in the recess of Congress, such of the powers of Congress as the United States in Congress assembled, by the consent of nine States, shall, from time to time, think expedient to vest them with; provided that no power be delegated to the said Committee for the exercise of which, by the Articles of Confederation, the voice of nine States in the Congress of the United States assembled is requisite.

**Article XI.** Canada, acceding to this Confederation, and joining in the measures of the United States, shall be ad-

mitted into, and entitled to all the advantages of this Union; but no other colony shall be admitted into the same, unless such admission be agreed to by nine States.

*Article XII.* All bills of credit emitted, moneys borrowed, and debts contracted by or under the authority of Congress, before the assembling of the United States, in pursuance of the present Confederation, shall be deemed and considered as a charge against the United States, for payment and satisfaction whereof the said United States and the public faith are hereby solemnly pledged.

*Article XIII.* Every State shall abide by the determinations of the United States in Congress assembled on all questions which by this Confederation are submitted to them. And the Articles of this Confederation shall be inviolably observed by every State, and the Union shall be perpetual; nor shall any alteration at any time hereafter be made in any of them, unless such alteration be agreed to in a Congress of the United States, and be afterwards confirmed by the Legislatures of every State.

AND WHEREAS it hath pleased the Great Governor of the world to incline the hearts of the Legislatures we respectively represent in Congress to approve of, and to authorize us to ratify, the said Articles of Confederation and perpetual Union, know ye, that we, the undersigned delegates, by virtue of the power and authority to us given for that purpose, do, by these presents, in the name and in behalf of our respective constituents, fully and entirely ratify and confirm each and every of the said Articles of Confederation and perpetual Union, and all and singular the matters and things therein contained. And we do further solemnly plight and engage the faith of our respective constituents, that they shall abide by the determinations of the United States in Congress assembled on all questions which by the said Confederation are submitted to them; and that the Articles thereof shall be inviolably observed by the States we respectively represent, and that the Union shall be perpetual.

The Articles of Confederation served their purpose while the war for independence continued. The necessity of working together was then imperative. But the war had no sooner ended than their innate weakness became apparent. The States had kept too large a share of

power for themselves and left the Confederation a weak and almost powerless body. They had retained the power of taxation, which proved a fatal defect. No Union could hold together with the purse-strings in the hands of thirteen semi-independent commonwealths. Also there was no President, Congress being at once the legislative and the executive body. The new government could pass laws but could not make the people obey them. It could incur debt but could not tax the people for money to pay its debts. The States were to provide money for this purpose, but they showed little inclination to do so. They were jealous of one another and each was inclined to act as a single nation. Washington thus described the situation: 'We are one nation to-day and thirteen to-morrow.' Evidently the political evolution of the United States was far from complete. It must go farther or go back to dissolution; be one strong nation or thirteen weak ones. The last alternative frightened the States. They were already being pressed and threatened by foreign nations. Feeling that they could not stand alone, and could not keep together under the Articles of Confederation, a convention was called to revise these Articles. It met at Philadelphia in 1787. The Articles of Confederation proved unsuited for revision, no change could make them serve the purpose, and the convention devoted its four months of labor to working out a new Constitution. This Constitution, as afterwards amended, is that under which the United States has since been governed. Gladstone has spoken of it as the greatest document ever produced by the force of human genius. Its full text, with its amendments, follows, with the understanding that the headlines of the several sections as here given, such as 'Preamble,' 'Legislative Powers,' etc., are appended for the convenience of readers, and do not occur in the original document:

## CONSTITUTION OF THE UNITED STATES

*Preamble.*—We, the people of the United States, in order to form a more perfect Union, establish justice, insure domestic tranquillity, provide for the common defence, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this CONSTITUTION for the United States of America.

*Article I. Legislative Powers.*—SECTION 1. 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.

House of Representatives.—SECTION II. 1. The House of Representatives shall be composed of members chosen every second year by the people of the several States, and the electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislature.

Qualifications of Representatives.—2. No person shall be a Representative who shall not have attained to the age of twenty-five years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State in which he shall be chosen.

Apportionment of Representatives.—3. Representatives and direct taxes shall be apportioned among the several States which may be included within this Union according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of Representatives shall not exceed one for every thirty thousand, but each State shall have at least one Representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to choose 3; Massachusetts, 8; Rhode Island and Providence Plantations, 1; Connecticut, 5; New York, 6; New Jersey, 4; Pennsylvania, 8; Delaware, 1; Maryland, 6; Virginia, 10; North Carolina, 5; South Carolina, 5, and Georgia, 3.\*

Vacancies, How Filled.—4. When vacancies happen in the representation from any State, the Executive Authority thereof shall issue writs of election to fill such vacancies.

Officers, How Appointed.—5. The House of Representatives shall choose their Speaker and other officers, and shall have the sole power of impeachment.

Senate.—SECTION III. 1. 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.

Classification of Senators.—2 Im-

mediately after they shall be assembled in consequence of the first election, they shall be divided as equally as may be into three classes. The seats of the Senators of the first class shall be vacated at the expiration of the second year, of the second class at the expiration of the fourth year, and of the third class at the expiration of the sixth year, so that one-third may be chosen every second year; and 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.

Qualifications of Senators.—3. 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 not, when elected, be an inhabitant of that State for which he shall be chosen.

President of the Senate.—4. The Vice-President of the United States shall be President of the Senate, but shall have no vote unless they be equally divided.

5. The Senate shall choose their 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.

Senate a Court for Trial of Impeachments.—6. The Senate shall have the sole power to try all impeachments. When sitting for that purpose, they shall be on oath or affirmation. When the President of the United States is tried, the Chief Justice shall preside; and no person shall be convicted without the concurrence of two-thirds of the members present.

Judgment in Case of Conviction.—7. Judgment in cases of impeachment shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust, or profit under the United States; but the party convicted shall nevertheless be liable and subject to indictment, trial, judgment, and punishment, according to law.

Elections of Senators and Representatives.—SECTION IV. 1. The times, places, and manner of holding elections for Senators and Representatives shall be prescribed in each State by the Legislature thereof; but the Congress may at any time by law make or alter such regulations, except as to places of choosing Senators.

Meeting of Congress.—2. The Congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December, unless

\* See Article XIV, Amendments.

they shall by law appoint a different day.

**Organization of Congress.—SECTION V.** 1. Each House shall be the judge of the elections, returns, and qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members in such manner and under such penalties as each House may provide.

**Rule of Proceedings.—2.** Each House may determine the rules of its proceedings, punish its members for disorderly behavior, and with the concurrence of two-thirds expel a member.

**Journals of each House.—3.** Each House shall keep a journal of its proceedings, and from time to time publish the same, excepting such parts as may in their judgment require secrecy; and the yeas and nays of the members of either House on any question shall, at the desire of one-fifth of those present, be entered on the journal.

**Adjournment of Congress.—4.** Neither House, during the session of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two Houses shall be sitting.

**Pay and Privileges of Members.—SECTION VI.** 1. The Senators and Representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the Treasury of the United States. They shall in all cases, except treason, felony, and breach of the peace, be privileged from arrest during their attendance at the session of their respective Houses, and in going to and returning from the same; and for any speech or debate in either House they shall not be questioned in any other place.

**Other Offices Prohibited.—2.** No Senator or Representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States which shall have been created, or the emoluments whereof shall have been increased during such time; and no person holding any office under the United States shall be a member of either House during his continuance in office.

**Revenue Bills.—SECTION VII.** 1. All bills for raising revenue shall originate in the House of Representatives, but the Senate may propose or concur with amendments, as on other bills.

**How Bills Become Laws.—2.** Every bill which shall have passed the House

of Representatives and the Senate shall, before it become a law, be presented to the President of the United States; if he approve, he shall sign it, but if not, he shall return it, with his objections, to that House in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration two-thirds of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered; and if approved by two-thirds of that House it shall become a law. But in all such cases the votes of both Houses shall be determined by yeas and nays and the names of the persons voting for and against the bill shall be entered on the journal of each House respectively. If any bill shall not be returned by the President within ten days (Sundays excepted) after it shall have been presented to him, the same shall be a law, in like manner as if he had signed it, unless the Congress by their adjournment prevent its return; in which case it shall not be a law.

**Approval and Veto Powers of the President.—3.** Every order, resolution, or vote to which the concurrence of the Senate and House of Representatives may be necessary (except on a question of adjournment) shall be presented to the President of the United States; and before the same shall take effect shall be approved by him, or, being disapproved by him, shall be repassed by two-thirds of the Senate and the House of Representatives, according to the rules and limitations prescribed in the case of a bill.

**Powers Vested in Congress.—SECTION VIII.** 1. The Congress shall have power:

To lay and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defence and general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States.

2. To borrow money on the credit of the United States.

3. To regulate commerce with foreign nations, and among the several States, and with the Indian tribes.

4. To establish a uniform rule of naturalization, and uniform laws on the subject of bankruptcies throughout the United States.

5. To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures.

6. To provide for the punishment of



counterfeiting the securities and current coin of the United States.

7. To establish post-offices and post-roads.

8. To promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries.

9. To constitute tribunals inferior to the Supreme Court.

10. To define and punish piracies and felonies committed on the high seas, and offences against the law of nations.

11. To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water.

12. To raise and support armies, but no appropriation of money to that use shall be for a longer term than two years.

13. To provide and maintain a navy.

14. To make rules for the government and regulation of the land and naval forces.

15. To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions.

16. To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States respectively the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress.

17. To exercise exclusive legislation in all cases whatsoever over such district (not exceeding ten miles square) as may, by cession of particular States and the acceptance of Congress, become the seat of Government of the United States, and to exercise like authority over all places purchased by the consent of the Legislature of the State in which the same shall be, for the erection of forts, magazines, arsenals, dry-docks, and other needful buildings.

18. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the Government of the United States, or in any department or officer thereof.

Immigrants, How Admitted.—SECTION IX. 1. The migration or importation of such persons as any of the States now existing shall think proper to admit, shall not be prohibited by the 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.

Habeas Corpus.—2. The privilege of the writ of habeas corpus shall not be suspended, unless when in cases of rebellion or invasion the public safety may require it.

Attainder. 3. No bill of attainder or ex post facto law shall be passed.

Direct Taxes.—4. No capitation or other direct tax shall be laid, unless in proportion to the census or enumeration hereinbefore directed to be taken.

Regulations Regarding Customs Duties.—5. No tax or duty shall be laid on articles exported from any State.

6. No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another, nor shall vessels bound to or from one State be obliged to enter, clear, or pay duties in another.

Moneys, How Drawn.—7. No money shall be drawn from the Treasury but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

Titles of Nobility Prohibited.—8. No title of nobility shall be granted by the United States. And no person holding any office of profit or trust under them shall, without the consent of the Congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign state.

Powers of States Defined.—SECTION X. 1. No State shall enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money; emit bills of credit; make anything but gold and silver coin a tender in payment of debts; pass any bill of attainder, ex post facto law, or law impairing the obligation of contracts, or grant any title of nobility.

2. No State, shall, without the consent of the Congress, lay any impost or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws; and the net produce of all duties and imposts, laid by any State on imports or exports, shall be for the use of the Treasury of the United States; and all such laws shall be subject to the revision and control of the Congress.

3. No State shall, without the consent of Congress, lay any duty or tonnage, keep troops or ships of war in time of peace, enter into any agreement or compact with another State, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

Article II. Executive Power, in Whom

**Vested.—SECTION I. 1.** The Executive power shall be vested in a President of the United States of America. He shall hold his office during the term of four years, and, together with the Vice-President, chosen for the same term, be elected as follows:

**Electors.—2.** Each State shall appoint, in such manner as the Legislature thereof may direct, a number of electors, equal to the whole number of Senators and Representatives to which the State may be entitled in the Congress; but no Senator or Representative or person holding an office of trust or profit under the United States shall be appointed an elector.

**Proceedings of Electors.—**Proceedings of the House of Representatives.—

**3.** The electors shall meet in their respective States and vote by ballot for two persons, of whom one at least shall not be an inhabitant of the same State with themselves. And they shall make a list of all the persons voted for, and of the number of votes for each, which list they shall sign and certify, and transmit, sealed, to the seat of the Government of the United States, directed to the President of the Senate. The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted. The person having the greatest number of votes shall be the President, if such number be a majority of the whole number of electors appointed, and if there be more than one who have such majority, and have an equal number of votes, then the House of Representatives shall immediately choose by ballot one of them for President; and if no person have a majority, then from the five highest on the list the said House shall in like manner choose the President. But in choosing the President, the vote shall be taken by States, the representation from each State having one vote. A quorum, for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. In every case, after the choice of the President, the person having the greatest number of votes of the electors shall be the Vice-President. But if there should remain two or more who have equal votes, the Senate shall choose from them by ballot the Vice-President.\*

**Time of Choosing Electors.—4.** The Congress may determine the time of

\* This clause is superseded by Article XII, Amendments.

choosing the electors, and the day on which they shall give their votes, which day shall be the same throughout the United States.

**Qualifications of the President.—5.** No person except a natural-born citizen, or a citizen of the United States at the time of the adoption of this Constitution, shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of thirty-five years and been fourteen years a resident within the United States.

**Provision in Case of His Disability.—**

**6.** In case of the removal of the President from office, or of his death, resignation, or inability to discharge the powers and duties of the said office, the same shall devolve on the Vice-President and the Congress may by law provide for the case of removal, death, resignation, or inability, both of the President and Vice-President, declaring what officer shall then act as President, and such officer shall act accordingly, until the disability be removed or a President shall be elected.

**Salary of the President.—7.** The President shall, at stated times, receive for his services a compensation which shall neither be increased nor diminished during the period for which he shall have been elected, and he shall not receive within that period any other emolument from the United States, or any of them.

**Oath of the President.—8.** Before he enter on the execution of his office he shall take the following oath or affirmation:

'I do solemnly swear (or affirm) that I will faithfully execute the office of President of the United States, and will, to the best of my ability, preserve, protect, and defend the Constitution of the United States.'

**Duties of the President.—SECTION II.**

**1.** The President shall be Commander-in-Chief of the Army and Navy of the United States, and of the militia of the several States when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offences against the United States except in cases of impeachment.

**May Make Treaties, Appoint Ambassadors, Judges, etc.—2.** He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators pres-

ent concur; and he shall nominate, and by and with the advice and consent of the Senate, shall appoint ambassadors, other public ministers and consuls, judges of the Supreme Court, and all other officers of the United States whose appointments are not herein otherwise provided for, and which shall be established by law; but the Congress may by law vest the appointment of such inferior officers as they think proper in the President alone, in the courts of law, or in the heads of departments.

**May Fill Vacancies.**—3. The President shall have power to fill up all vacancies that may happen during the recess of the Senate by granting commissions, which shall expire at the end of their next session.

**May Make Recommendations to and Convene Congress.**—SECTION III. He shall from time to time give to the Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; he may, on extraordinary occasions, convene both Houses, or either of them, and in case of disagreement between them, with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

**How Officers May be Removed.**—SECTION IV. The President, Vice-President, and all civil officers of the United States shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.

**Article III. Judicial Power, How Vested.**—SECTION I. The judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as the Congress may from time to time ordain and establish. The judges, both of the Supreme and inferior courts, shall hold their offices during good behavior, and shall, at stated times, receive for their services a compensation which shall not be diminished during their continuance in office.

**To What Cases it Extends.**—SECTION II. 1. The judicial power shall extend to all cases, in law and equity, arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers, and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which

the United States shall be a party; to controversies between two or more States; between a State and citizens of another State; between citizens of different States; between citizens of the same State, claiming lands under grants of different States, and between a State, or the citizens thereof, and foreign States, citizens or subjects.

**Jurisdiction of the Supreme Court.**—2. In all cases affecting ambassadors, other public ministers, and consuls, and those in which a State shall be party, the Supreme Court shall have original jurisdiction. In all the other cases before-mentioned the Supreme Court shall have appellate jurisdiction, both as to law and fact, with such exceptions and under such regulations as the Congress shall make.

**Rules Respecting Trials.**—3. The trial of all crimes, except in cases of impeachment, shall be by jury, and such trial shall be held in the State where the said crimes shall have been committed; but when not committed within any State the trial shall be at such place or places as the Congress may by law have directed.

**Treason Defined.**—SECTION III. 1. Treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

**How Punished.**—2. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood or forfeiture except during the life of the person attainted.

**Article IV. Rights of States and Records.**—SECTION I. Full faith and credit shall be given in each State to the public acts, records, and judicial proceedings of every other State. And the Congress may by general laws prescribe the manner in which such acts, records, and proceedings shall be proved, and the effect thereof.

**Privileges of Citizens.**—SECTION II. 1. The citizens of each State shall be entitled to all privileges and immunities of citizens in the several States.

**Executive Requisitions.**—2. A person charged in any State with treason, felony, or other crime, who shall flee from justice, and be found in another State, shall, on demand of the Executive authority of the State from which he fled, be delivered up, to be removed to the State having jurisdiction of the crime.

**Laws Regulating Service or Labor.**—3. 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 up on claim of the party to whom such service or labor may be due.

**New States, How Formed and Admitted.**—SECTION III. 1. New States may be admitted by the Congress into this Union, but no new State shall be formed or erected within the jurisdiction of any other State, nor any State be formed by the junction of two or more States, or parts of States, without the consent of the Legislatures of the States concerned, as well as of the Congress.

**Power of Congress over Public Lands.**—2. The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this Constitution shall be so construed as to prejudice any claims of the United States, or of any particular State.

**Republican Government Guaranteed.**—SECTION IV. The United States shall guarantee to every State in this Union a republican form of government, and shall protect each of them against invasion; and, on application of the Legislature, or of the Executive (when the Legislature cannot be convened), against domestic violence.

**Article V. Constitution, How Amended.**—The Congress, whenever two-thirds of both Houses shall deem it necessary, shall propose amendments to this Constitution, or, on the application of the Legislatures of two-thirds of the several States, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this Constitution, when ratified by the Legislatures of three-fourths of the several States, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress; provided that no amendment which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the Ninth Section of the First Article; and that no State, without its consent, shall be deprived of its equal suffrage in the Senate.

**Article VI. Validity of Debts Recognized.**—1. All debts contracted and engagements entered into before the adoption of this Constitution shall be as valid against the United States under

this Constitution as under the Confederation.

**Supreme Law of the Land Defined.**—2. This Constitution and the laws of the United States which shall be made in pursuance thereof, and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land, and the judges in every State shall be bound thereby, anything in the Constitution or laws of any State to the contrary notwithstanding.

**Oath: of Whom Required and for What.**—3. The Senators and Representatives before mentioned, and the members of the several State Legislatures, and all executive and judicial officers, both of the United States, and of the several States, shall be bound by oath or affirmation to support this Constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

**Article VII. Ratification of the Constitution.**—The ratification of the conventions of nine States shall be sufficient for the establishment of this Constitution between the States so ratifying the same.

**DONE** in Convention by the unanimous consent of the States present the seventeenth day of September, in the year of our Lord one thousand seven hundred and eighty-seven, and of the Independence of the United States of America the twelfth. In witness whereof we have hereunto subscribed our names,

GO: WASHINGTON,  
Presidt. and Deputy from Virginia.

#### AMENDMENTS TO THE CONSTITUTION

*Articles in addition to, and Amendment of, the Constitution of the United States of America, proposed by Congress, and ratified by the Legislatures of the several States, pursuant to the Fifth Article of the original Constitution.*

**Article I. Religion and Free Speech.**—Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

**Article II. Right to Bear Arms.**—A well-regulated militia being necessary to the security of a free State, the right of the people to keep and bear arms shall not be infringed.



**Article III. Soldiers in Time of Peace.**—No soldier shall, in time of peace, be quartered in any house without the consent of the owner, nor in time of war but in a manner to be prescribed by law.

**Article IV. Right of Search.**—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 persons or things to be seized.

**Article V. Capital Crimes and Arrest Therefor.**—No person shall be held to answer for a capital or other infamous crime, unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia, when in actual service, in time of war or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

**Article VI. Right to Speedy Trial.**—In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defence.

**Article VII. Trial by Jury.**—In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise reexamined in any court of the United States than according to the rules of the common law.

**Article VIII. Excessive Bail.**—Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

**Article IX. Enumeration of Rights.**—The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.

**Article X. Reserved Rights of States.**—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.

**Article XI. Judicial Power.**—The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States, by citizens of another State, or by citizens or subjects of any foreign State.

**Article XII. Electors in Presidential Elections.**—The electors shall meet in their respective States, and vote by ballot for President and Vice-President, one of whom at least shall not be an inhabitant of the same State with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice-President; and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each, which lists they shall sign and certify, and transmit, sealed, to the seat of the Government of the United States, directed to the President of the Senate; the President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted; the person having the greatest number of votes for President shall be the President, if such number be a majority of the whole number of electors appointed; and if no person have such majority, then from the persons having the highest numbers, not exceeding three, on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by States, the representation from each State having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. And if the House of Representatives shall not choose a President, whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President shall act as President, as in the case of the death or other constitutional disability of the President. The person having the greatest number of votes as Vice-President shall be the Vice-President, if such number be a majority of the whole number of electors appointed, and if no person have a majority, then from the two highest numbers on the list the Senate shall choose the Vice-President; a quorum for

the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

**Article XIII. Slavery Prohibited.**—1. Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

2. Congress shall have power to enforce this article by appropriate legislation.

**Article XIV. Protection for all Citizens.**—1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

**Apportionment of Representatives.**—2. Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice-President of the United States, Representatives in Congress, the executive and judicial officers of a State, or the members of the Legislature thereof, is denied to any of the male inhabitants of such State, being of twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

**Rebellion Against the United States.**—3. No person shall be a Senator or Representative in Congress, or elector of President and Vice-President, or hold any office, civil or military, under the United States, or under any State, who, having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any State Legislature, or as an executive or judicial officer of any State, to support the Constitution of the United

States, shall have engaged in insurrection or rebellion against the same, or given aid and comfort to the enemies thereof. But Congress may, by a vote of two-thirds of each House, remove such disability.

**The Public Debt.**—4. The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

5. The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

**Article XV. Right of Suffrage.**—1. The right of the citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color or previous condition of servitude.

2. The Congress shall have power to enforce the provisions of this article by appropriate legislation.

**Article XVI.** The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment, among the several states, and without regard to any census or enumeration.

**Article XVII.** 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.

When vacancies happen in the representation of any State in the Senate, the executive authority of such State shall issue writs of election to fill such vacancies, provided that the Legislature of any State may empower the Executive thereof to make temporary appointments until the people fill the vacancies by election as the Legislature may direct.

**Article XVIII. Prohibition.**—1. After one year from the ratification of this article, the manufacture, sale, or the transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof, for beverage purposes, is hereby prohibited.

2. The Congress and the several States shall have concurrent power to enforce this article by appropriate legislation.

3. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution, within seven years from the date of the submission thereof to the States by the Congress.

#### RATIFICATION OF THE CONSTITUTION

The constitution was ratified by the thirteen original States, Delaware being the first, Dec. 7, 1787; Rhode Island the last, May 29, 1790.

#### RATIFICATION OF THE AMENDMENTS

I to X inclusive were declared in force December 15, 1791.

XI was declared in force January 8, 1798.

XII regulating elections, was declared in force September 28, 1804.

XIII. The emancipation amendment was proclaimed December 18, 1865.

XIV. Reconstruction amendment was proclaimed July 28, 1868.

XV. Negro citizenship amendment was proclaimed March 30, 1870.

XVI. The income tax amendment became a provision of the Constitution, February 3, 1913.

XVII. Popular election of Senators became a provision of the Constitution, April 8, 1913.

XVIII. The prohibition amendment received its thirty-sixth ratification January 16, 1919, and became effective January 17, 1920.

In 1796 George Washington took leave of the people in a famous address. Its concluding portions are here given:

#### WASHINGTON'S FAREWELL ADDRESS

Here, perhaps, I ought to stop; but a solicitude for your welfare, which cannot end but with my life, and the apprehension of danger natural to that solicitude, urge me, on an occasion like the present, to offer to your solemn contemplation, and to recommend to your frequent review, some sentiments, which are the result of much reflection, of no inconsiderable observation, and which appear to me all-important to the permanency of your felicity as a people. These will be afforded to you with the more freedom, as you can only see in them the disinterested warnings of a parting friend, who can possibly have no personal motive to bias his counsel;

nor can I forget, as an encouragement to it, your indulgent reception of my sentiments on a former and not dissimilar occasion. Interwoven as is the love of liberty with every ligament of your hearts, no recommendation of mine is necessary to fortify or confirm the attachment.

The unity of government, which constitutes you one people, is also now dear to you. It is justly so; for it is a main pillar in the edifice of your real independence—the support of your tranquillity at home, your peace abroad, of your safety, of your prosperity, of that very liberty which you so highly prize. But as it is easy to foresee that, from different causes and from different quarters, much pains will be taken, many artifices employed, to weaken in your minds the conviction of this truth; as this is the point in your political fortress against which the batteries of internal and external enemies will be most constantly and actively (though often covertly and insidiously) directed—it is of infinite moment that you should properly estimate the immense value of your national union to your collective and individual happiness; that you should cherish a cordial, habitual and immovable attachment to it; accustoming yourselves to think and speak of it as of the palladium of your political safety and prosperity; watching for its preservation with jealous anxiety; discountenancing whatever may suggest even a suspicion that it can, in any event, be abandoned; and indignantly frowning upon the first dawning of every attempt to alienate any portion of our country from the rest, or to enfeeble the sacred ties which now link together the various parts.

For this you have every inducement of sympathy and interest. Citizens by birth or choice of a common country, that country has a right to concentrate your affections. The name of America, which belongs to you in your national capacity, must always exalt the just pride of patriotism, more than any appellation derived from local discriminations. With slight shades of differences, you have the same religion, manners, habits, and political principles. You have, in a common cause, fought and triumphed together; the independence and liberty you possess are the work of joint counsels and joint efforts, of common dangers, sufferings and successes.

It is important, likewise, that the habits of thinking, in a free country, should inspire caution in those in-

trusted with its administration, to confine themselves within their respective constitutional spheres, avoiding in the exercise of the powers of one department, to encroach upon another. The spirit of encroachment tends to consolidate the powers of all the departments in one, and thus to create, whatever the form of government, a real despotism. A just estimate of that love of power, and proneness to abuse it which predominates in the human heart, is sufficient to satisfy us of the truth of this position. The necessity of reciprocal checks in the exercise of political power, by dividing and distributing it into different depositories, and constituting each the guardian of the public weal, against invasions by the others, has been evinced by experiments, ancient and modern; some of them in our own country and under our own eyes. To preserve them must be as necessary as to institute them. If, in the opinion of the people, the distribution or modification of the constitutional powers be, in any particular, wrong, let it be corrected by an amendment in the way which the Constitution designates. But let there be no change or usurpation; for though this, in one instance, may be the instrument of good, it is the customary weapon by which free governments are destroyed. The precedent must always greatly overbalance, in permanent evil, and partial or transient benefit, which the use can, at any time yield.

Observe good faith and justice toward all nations; cultivate peace and harmony with all; religion and morality enjoin this conduct; and can it be that good policy does not equally enjoin it? It will be worthy of a free, enlightened, and, at no distant period, a great nation, to give to mankind the magnanimous and too novel example of a people always guided by an exalted justice and benevolence. Who can doubt that, in the course of times and things, the fruits of such a plan would richly repay any temporary advantages which might be lost by a steady adherence to it? Can it be that Providence has not connected the permanent felicity of a nation with its virtue? The experiment, at least, is recommended by every sentiment which ennobles human nature. Alas! is it rendered impossible by its vices?

Against the insidious wiles of foreign influence (I conjure you to believe me, fellow-citizens), the jealousy of a free people ought to be constantly awake; since history and experience prove that foreign influence is one of the most baneful foes of republican government. But

that jealousy to be useful, must be impartial; else it becomes the instrument of the very influence to be avoided, instead of a defence against it. Excessive partiality for one foreign nation, and excessive dislike for another, cause those whom they actuate to see danger only on one side, and serve to veil, and even second, the arts of influence on the other. Real patriots, who may resist the intrigues of the favorite, are liable to become suspected and odious, while its tools and dupes usurp the applause and confidence of the people, to surrender their interests.

The great rule of conduct for us in regard to foreign nations, is, in extending our commercial relations, to have with them as little political connection as possible. So far as we have already formed engagements, let them be fulfilled with perfect good faith. Here let us stop. Europe has a set of primary interests, which to us have none, or a very remote relation. Hence she must be engaged in frequent controversies, the causes of which are essentially foreign to our concerns. Hence, therefore, it must be unwise in us to implicate ourselves by artificial ties, in the ordinary vicissitudes of her politics, or the ordinary combinations and collision of her friendships or enmities. Our detached and distant situation invites and enables us to pursue a different course. If we remain one people under an efficient government, the period is not far off when we may defy material injury from external annoyance; when we may take such an attitude as will cause the neutrality we may at any time resolve upon, to be scrupulously respected; when belligerent nations, under the impossibility of making acquisitions upon us, will not lightly hazard the giving us provocation; when we may choose peace or war, as our interest, guided by justice, shall counsel.

In offering to you, my countrymen these counsels of an old and affectionate friend, I dare not hope that they will make the strong and lasting impression I could wish; that they will control the usual current of the passions, or prevent our nation from running the course which hitherto has marked the destiny of nations; but if I may even flatter myself that they may be productive of some partial benefit; some occasional good; that they may now and then recur to moderate the fury of party spirit, to warn against the mischiefs of foreign intrigues, to guard against the impostures of pretended patriotism; this hope will be full recompense for the solicitude



for your welfare by which they have been dictated.

GEORGE WASHINGTON.

United States, September 17, 1793.

Next in order in the series of famous American documents is the 'Monroe Doctrine,' issued in 1823 as part of President Monroe's message to Congress in that year. Spain had long been having trouble with her American colonies and there was serious danger of some of the other nations of Europe giving her aid and receiving American territory in exchange. Russia was also seeking to extend its holdings on the Pacific coast. Under these threatening circumstances Monroe gave warning to all ambitious nations that the United States would not stand idly by and see the southern republics seized by any foreign power. This declaration holds good to-day and has been frequently invoked as a warning to European powers to keep off of American soil. We give below the text of this significant declaration of American policy, the recognized political principle of 'America for the Americans.'

#### THE MONROE DOCTRINE

In the discussions to which this interest has given rise, and in the arrangements by which they may terminate, the occasion has been deemed proper for asserting, as a principle in which rights and interests of the United States are involved, that the American continents, by the free and independent condition which they have assumed and maintain, are henceforth not to be considered as subjects for future colonization by any European power. . . . We owe it, therefore, to candor and to the amicable relations existing between the United States and those powers to declare that we should consider any attempt on their part to extend their system to any portion of this hemisphere as dangerous to our peace and safety. With the existing colonies or dependencies of any European power we have not interfered and shall not interfere. But with the governments who have declared their independence and maintain it, and whose independence we have, on great consideration and on just principles, acknowledged, we could not view any interposition for the purpose of oppressing them or controlling in any other manner their destiny by any European power in any other light than as the manifestation of an unfriendly disposition toward the United States.

Though this doctrine has the weight

only of an executive statement, it has been maintained as resolutely as though it were a section of the Constitution, being invoked on several occasions, and especially in that of the occupation of Mexico by France during the American Civil war. European nations have rarely ventured to disregard it, and never successfully.

The most perilous threat against the stability of the Union came in later years, when the great controversy between the advocates of slavery and emancipation arose. It led, as all know, to one of the greatest wars of the nineteenth century, the struggle in the field between the parties which had for years contended on the rostrum. In the midst of this great war President Lincoln issued a proclamation of freedom for the slaves which the event of the war lifted into the category of the great State papers of the United States. Its terms have since been accepted by North and South alike. The text of this proclamation is here given:

#### THE EMANCIPATION PROCLAMATION

WHEREAS, On the twenty-second day of September, in the year of our Lord one thousand eight hundred and sixty-two, a proclamation was issued by the President of the United States, containing among other things the following, to wit:

'That on the first day of January, in the year of our Lord one thousand eight hundred and sixty-three, all persons held as slaves within any State or designated part of a State, the people whereof shall then be in rebellion against the United States, shall be then, thenceforward, and forever free; and the executive government of the United States, including the military and naval authority thereof, will recognize and maintain the freedom of such persons, and will do no act or acts to repress such persons, or any of them, in any efforts they may make for their actual freedom.

'That the Executive will, on the first day of January aforesaid, by proclamation, designate the States and parts of States, if any, in which the people thereof, respectively, shall then be in rebellion against the United States; and the fact that any State, or the people thereof, shall on that day be in good faith represented in the Congress of the United States, by members chosen thereto at elections wherein a majority of the qualified voters of such State shall have participated, shall, in the absence of strong countervailing testimony,

## United States

be deemed conclusive evidence that such State, and the people thereof, are not then in rebellion against the United States.'

Now, therefore, I, Abraham Lincoln, President of the United States, by virtue of the power in me vested as commander-in-chief of the army and navy of the United States, in time of actual armed rebellion against the authority and government of the United States, and as a fit and necessary war measure for suppressing said rebellion, do, on this first day of January, in the year of our Lord one thousand eight hundred and sixty-three, and in accordance with my purpose so to do, publicly proclaim for the full period of one hundred days from the day first above mentioned, order and designate as the States and parts of States wherein the people thereof, respectively, are this day in rebellion against the United States, the following, to wit:

Arkansas, Texas, Louisiana (except the Parishes of St. Bernard, Plaquemines, Jefferson, St. John, St. Charles, St. James, Ascension, Assumption, Terre Bonne, Lafourche, St. Mary's, St. Martin and Orleans, including the city of New Orleans), Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina and Virginia (except the forty-eight counties designated as West Virginia, and also the counties of Berkeley, Accomac, Northampton, Elizabeth City, York, Princess Anne and Norfolk, including the cities of Norfolk and Portsmouth); and which excepted parts are, for the present, left precisely as if this proclamation were not issued.

And by virtue of the power, and for the purpose aforesaid, I do order and declare that all persons held as slaves within said designated States, and parts of States, are and henceforward shall be free, and the executive government of the United States, including the military and naval authorities thereof, will recognize and maintain the freedom of said persons.

And I hereby enjoin upon the people so declared to be free to abstain from all violence, unless in necessary self-defense; and I recommend to them that in all cases when allowed, they labor faithfully for reasonable wages.

And I further declare and make known, that such persons, of suitable condition, will be received into the armed service of the United States to garrison forts, positions, stations, and other places, and to man vessels of all sorts in said service.

And upon this act, sincerely believed

to be an act of justice, warranted by the Constitution upon military necessity, I invoke the considerate judgment of mankind and the gracious favor of Almighty God.

In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed. Done at the city of Washington, this first day of January, in the year of our Lord one thousand eight hundred and sixty-three, and of the Independence of the United States of America the eighty-seventh.

ABRAHAM LINCOLN.

One more brief but notable declaration from President Lincoln will suffice to close this series of national documents. It is his address at the dedication of Gettysburg Cemetery, November 19, 1863. It has since been regarded as a prose poem unsurpassed for dignity and pathos in the world's history.

### LINCOLN'S GETTYSBURG SPEECH

Fourscore and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battlefield of that war. We are met to dedicate a portion of it as the final resting-place of those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But in a larger sense we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here have consecrated it far above our power to add or detract. The world will little note nor long remember what we say here but it can never forget what they did here. It is for us, the living, rather to be dedicated here to the unfinished work that they have thus far so nobly carried on. It is rather for us to be here dedicated to the great task remaining before us; that from these honored dead we take increased devotion to the cause for which they here gave the last full measure of devotion; that we here highly resolve that the dead shall not have died in vain; that the nation shall, under God, have a new birth of freedom, and that government of the people, by the people, and

for the people, shall not perish from the earth.

The political condition of the United States, as it at present stands, is a result of the several stages of governmental evolution above described, and especially of the operation of the Constitution, the basis of the Federal Union of the States. This Constitution embodies the general principles of government adapted to the organization of such a union, the result being that when particular questions have arisen in the history of the nation, it has frequently become the duty of the Supreme Court to decide on the constitutionality of such questions. Thus numerous acts have been passed by Congress the agreement of which with the Constitution was doubtful. It is not the duty of the Supreme Court to deal with such acts unless a suit is brought by some party or parties to determine their constitutionality, in which case the Supreme Court takes the matter in hand and renders a decision as to whether they are in harmony with the Constitution or the contrary. Such a decision is final and by this means the integrity of the Constitution against discordant acts of Congress is preserved and its exact significance developed. In this way the Supreme Court of the United States has become a great balance wheel by the aid of which the course of government is made to run true. It may be further stated here that the Constitution of the United States differs from that of Great Britain in being a written document, inflexible in its provisions, while that of Great Britain is, properly considered, not a constitution at all, but simply an aggregation of the many acts of Parliament, which is changed or added to by every new Parliamentary measure. The general organization of the Federal republic is as follows: The powers of the national government are of broad and general scope, embracing those subjects that affect the country as a whole or pass beyond the borders of any single State, including the relations of the country to foreign nations and of the States to each other. Under this general governmental organization lie the several States, each a sovereign commonwealth within its own borders and with governmental control over all subjects that relate to itself alone, or to intrastate as distinct from interstate interests. Thus each State has duties of importance belonging to itself, outside of the jurisdiction of the general government, and to deal with these it possesses a governmental organization formed on the model

of the national government. Each State has its Constitution, its Senate and House of Representatives, its Governor (corresponding to the President), its Supreme Court, with duties similar to those of the National Supreme Court, and in all these respects is a copy in miniature of the Federal governmental organization. It has its own code of laws, which is not operative beyond its borders, and in this way is a little nation in itself, with powers which cannot be abrogated. Tracing down the details of this composite scheme of government we come to the cities, in which in some measure the same type of organization is preserved, as they have a legislative body of two branches, and a Mayor as their chief executive official. They lack the Supreme Court and their local government is in some measure under State control, but in various respects each is a little sovereignty in itself. This is especially the case in the metropolitan city of New York, the present population of which exceeds that of the remainder of the State, and which has control of local interests of great diversity and importance, in the management of which it has accumulated a municipal debt far greater than that of any State in the Union and surpassed only by the national debt of the country as a whole.

In the development of this great congeries of self-governing units some friction has from time to time arisen, and there has been vigorous discussion of State and National jurisdiction and powers, the result being at present the existence of two great political parties, the Democratic and the Republican, the first standing for State rights, the second favoring a broadening of the National sovereignty. While these parties differ in other particulars, this fundamental distinction has usually been maintained, and since the formation of the government two parties with these general views have existed, at first those of the Federalists and Anti-Federalists, and after them parties with various names, but with this division of views. At present the tendency seems to be towards a widening of the powers of the national government, but it has not escaped vigorous opposition from the adherents of the States rights doctrine. There has also recently been developed a degree of friction between the executive and the legislative branches of the general government, the executive in some respects trenching upon the functions of the legislative and this vigorously maintaining its rights and privileges. There has also been manifested a tendency to bring the

great business organizations of the country within some considerable degree of governmental control, under the plea that their vast growth and power has made them inimical to the rights of the public at large and that it is the duty of the government to act as guardian of the industrial rights of the people.

With this brief review of the status of governmental and industrial affairs now existing within the United States it will be of interest to consider in some measure the workings of the great Federal organization here outlined. In the preceding article, on the subject of the United States in general, the organization of the government under the Constitution is stated, and in the Constitution itself, as above given, may be found the clauses which define this organization. But in the working of the government machinery several adventitious departments have arisen, some account of which is necessary before the operation of the governmental organization can be properly understood. This has principally to do with the great executive departments of the government, the series of officials who compose the cabinet of the President, but who were not provided for in the Constitution, having arisen through the multiplicity of executive labors.

It was quickly perceived, in fact, that the duties of the executive branch of the government were too varied and numerous for management and control by any one official, and at the start President Washington was obliged to call several persons to his aid, the so-called cabinet officers, at first consisting of the Secretaries of State, of War, and of the Treasury, and the Attorney-General, appointed in 1789. These had no official standing under the government, but were simply aids to the President, chosen by him and removable at his will, yet indispensable to the multitudinous duties arising in the conduct of public affairs. This continues the position of these officials to the present day, in which they form the President's official family and body of advisers, but possess no power beyond that which the President chooses to give them and whose advice he is in no respect obliged to take. From time to time it became advisable to add other officials to the four above named. The Postmaster-General was at first looked upon as a temporary position only, and did not become permanent until 1794, and this official was not considered a Cabinet officer until 1820. The Secretary of the Navy was added to the list in 1798. The later additions to the list were those

of Secretary of the Interior in 1849, Secretary of Agriculture in 1889, and Secretary of Commerce in 1903, and Secretary of Labor in 1913. Under each of these officials there are assistants and a considerable number of division and other officers, the scope of departmental work having grown wide and its duties numerous and complicated as time went on and the country grew in population and wealth. Members of the Cabinet receive salaries of \$12,000 a year. The duties of the several heads of departments are as follows:

*Duties of the Secretary of State.*—The Secretary of State is charged, under the direction of the President, with the duties appertaining to correspondence with the public ministers and the consuls of the United States, and with the representatives of foreign powers accredited to the United States; and to negotiations of whatever character relating to the foreign affairs of the United States. He is the medium of correspondence between the President and the chief executives of the several States of the United States; he has the custody of the Great Seal of the United States, and countersigns and affixes such seal to all executive proclamations, to various commissions, and to warrants for the extradition of fugitives from justice. He is regarded as the first in rank among the members of the Cabinet. He is the custodian of the treaties made with foreign states, and of the laws of the United States. He grants and issues passports, and exequaturs to foreign consuls in the United States are issued through his office. He publishes the laws and resolutions of Congress, amendments to the Constitution, and proclamations declaring the admission of new States into the Union.

*Duties of the Secretary of the Treasury.*—The Secretary of the Treasury is charged by law with the management of the national finances. He prepares plans for the improvement of the revenue and for the support of the public credit; superintends the collection of the revenue, and directs the forms of keeping and rendering public accounts and of making returns; grants warrants for all moneys drawn from the treasury in pursuance of appropriations made by law, and for the payment of moneys into the treasury; and annually submits to Congress estimates of the probable revenues and disbursements of the government. He also controls the construction of public buildings; the coinage and printing of money; the administration of the life-saving, revenue-cutter and the public



health and marine-hospital branches of the public service, and furnishes generally such information as may be required by either branch of Congress on all matters pertaining to the foregoing.

*Duties of the Secretary of War.*—The Secretary of War is head of the War Department, and performs such duties as are required of him by law or may be enjoined upon him by the President concerning the military service. He is charged by law with the supervision of all estimates of appropriations for the expenses of the department, including the military establishments; of all purchases of army supplies; of all expenditures for the support, transportation and maintenance of the army, and of such expenditures of a civil nature as may be placed by Congress under his direction. He also has supervision of the United States Military Academy at West Point and of military education in the army, of the Board of Ordnance and Fortification, of the various battlefield commissions, and of the publication of the Official Records of the War of the Rebellion. He has charge of all matters relating to national defense and sea-coast fortifications, army ordnance, river and harbor improvements, the prevention of obstruction to navigation, and the establishment of harbor lines; and all plans and locations of bridges authorized by Congress to be constructed over the navigable waters of the United States require his approval. He also has charge of the establishment or abandonment of military posts, and of all matters relating to leases, revocable licenses, and all other privileges upon lands under the control of the War Department.

*Duties of the Attorney-General.*—The Attorney-General is the head of the Department of Justice and the chief law officer of the government. He represents the United States in matters involving legal questions; he gives his advice and opinion, when they are required by the President or by the heads of the other Executive Departments, on questions of law arising in the administration of their respective departments; he appears in the Supreme Court of the United States in cases of especial gravity and importance; he exercises a general superintendence and direction over United States attorneys and marshals in all judicial districts in the States and territories; and he provides special counsel for the United States whenever required by any department of the government.

*Duties of the Postmaster-General.*—The Postmaster-General has the direction and management of the Post-Office

Department. He appoints all officers and employees of the department, except the four Assistant Postmasters-General and the purchasing agent, who are appointed by the President, by and with the advice and consent of the Senate; appoints all postmasters whose compensation does not exceed \$1,000; makes postal treaties with foreign governments, by and with the advice and consent of the President; awards and executes contracts, and directs the management of the domestic and foreign mail service.

*Duties of the Secretary of the Navy.*—The Secretary of the Navy performs such duties as the President of the United States, who is Commander-in-Chief, may assign him, and has the general superintendence of construction, manning, armament, equipment and employment of vessels of war.

*Duties of the Secretary of the Interior.*—The Secretary of the Interior is charged with the supervision of public business relating to patents for inventions; pensions and bounty lands; the public lands and surveys; the Indians; education; the Geological Survey and Reclamation Service; the Hot Springs Reservation, Arkansas; Yellowstone National Park, Wyoming and the Yosemite, Sequoia, and General Grant parks, California, and other national parks; distribution of appropriations for agricultural and mechanical colleges in the States and territories; and supervision of certain hospitals and eleemosynary institutions in the District of Columbia. He also exercises certain powers and duties in relation to the territories of the United States.

*Duties of the Secretary of Agriculture.*—The Secretary of Agriculture exercises personal supervision of public business relating to the agricultural industry. He appoints all the officers and employees of the department with the exception of the Assistant Secretary and the Chief of the Weather Bureau, who are appointed by the President, and directs the management of all the bureaus, divisions, offices, and the Forest Service, embraced in the department. He exercises advisory supervision over agricultural experiment stations, which receive aid from the National Treasury; has control of the quarantine stations for imported cattle, of interstate quarantine rendered necessary by sheep and cattle diseases, and of the inspection of cattle-carrying vessels; and directs the inspection of domestic and imported food products under the meat inspection and pure food and drug laws. He is charged with the duty of

issuing rules and regulations for the protection, maintenance, and care of the National Forest Reserves. He also is charged with carrying into effect the laws prohibiting the transportation by interstate commerce of game killed in violation of local laws and excluding from importation certain noxious animals, and has authority to control the importation of other animals.

#### *Duties of the Secretary of Commerce.*

The Secretary of Commerce and Labor is charged with the work of promoting the commerce of the United States, and its mining, manufacturing, shipping, fishery and transportation interests. His duties also comprise the investigation of the organization and management of corporations (excepting railroads) engaged in interstate commerce; the administration of the Lighthouse Service, and the aid and protection to shipping thereby; the taking of the census, and the collection and publication of statistical information connected therewith; the making of coast and geodetic surveys; the collecting of statistics relating to foreign and domestic commerce; the inspection of steamboats, and the enforcement of laws relating thereto for the protection of life and property; the supervision of the fisheries as administered by the Federal Government; the supervision and control of the Alaskan fur seal, salmon and other fisheries; the jurisdiction over merchant vessels, their registry, licensing, measurement entry, clearance, transfers, movement of their cargoes, and passengers, and laws relating thereto, and to seamen of the United States; the super-

nese; the custody, construction, maintenance and application of standards of weights and measurements; and the gathering and supplying of information regarding industries and markets for the fostering of manufacturing. He has power to call upon other departments for statistical data obtained by them.

It is his further duty to make such special investigations and furnish such information to the President or Congress as may be required by them on the foregoing subject-matters and to make annual reports to Congress upon the work of said department.

#### *Duties of the Secretary of Labor.*

The Secretary of Labor is charged with fostering, promoting and developing the welfare of the wage-earners of the United States; improving their working conditions and advancing their opportunities for profitable employment. He has power to act as mediator and to appoint commissioners of conciliation in labor disputes whenever in his judgment the interests of industrial peace may require it to be done. Further, he is vested with authority over any bureau, office, officer, board, branch or division of public service included in the Department of Labor.

The act creating the Department of Labor, approved March 4, 1913, changed the name of the Department of Commerce and Labor to the Department of Commerce. The Bureau of Labor, Bureau of Immigration, Division of Naturalization and Children's Bureau were organized into this new department.

The Army of the United States at the beginning of the second year of America's

Army Pay Table.

GRADE.	PAY OF OFFICERS IN ACTIVE SERVICE.—Yearly pay.				
	First 5 years' service.	After 5 years' service.	After 10 years' service.	After 15 years' service.	After 20 years' service.
		10 p. c.	20 p. c.	30 p. c.	40 p. c.
Lieutenant-General .....	\$11,000	.....	.....	.....	.....
Major-General .....	8,000	.....	.....	.....	.....
Brigadier-General .....	6,000	.....	.....	.....	.....
Colonel (b) .....	4,000	\$4,400	\$4,800	\$5,000	\$5,000
Lieutenant-Colonel (b) .....	3,500	3,850	4,200	4,500	4,500
Major (b) .....	3,000	3,300	3,600	3,900	4,000
Captain .....	2,400	2,640	2,880	3,120	3,360
First Lieutenant .....	2,000	2,200	2,400	2,600	2,800
Second Lieutenant .....	1,700	1,870	2,040	2,210	2,380

vision of the immigration of aliens, and entrance into the European war (1918) the enforcement of the laws relating had a strength of 1,500,000 men. The thereto, and to the exclusion of Chi Army and Navy pay is as per table:

# United States

# United States

Chaplains have the rank and pay of \$24, an increase of \$12; over \$24, and less than \$45, an increase of \$8; and those whose base pay is \$45 or more per respectively.

GRADE.	PAY OF RETIRED OFFICERS.—Yearly pay.				
	First 5 years' service.	After 5 years' service.	After 10 years' service.	After 15 years' service.	After 20 years' service.
Lieutenant-General .....	\$8,250	.....	.....	.....	.....
Major-General .....	6,000	.....	.....	.....	.....
Brigadier-General .....	4,500	.....	.....	.....	.....
Colonel (b) .....	3,000	\$3,300.00	\$3,600	\$3,750.00	\$3,750
Lieutenant-Colonel (b) .....	2,625	2,887.50	3,150	3,375.00	3,375
Major (b) .....	2,250	2,475.00	2,700	2,924.40	3,000
Captain .....	1,800	1,980.00	2,160	2,340.00	2,520
First Lieutenant .....	1,500	1,650.00	1,800	1,950.00	2,100
Second Lieutenant .....	1,275	1,402.50	1,530	1,657.44	1,785

(a) Service increase of pay of officers below rank of brigadier-general cannot exceed 40 per cent. in all.

(b) The maximum pay of a colonel is \$5000, of a lieutenant-colonel \$4500, and of a major \$4000.

month, an increase of \$6 per month.

First-class seamen receive \$33.40 per month; seamen gunners, \$36.00; firemen, first class, \$46.50; musicians, first class, \$43.20; second-class seamen, \$35.90; third-class seamen, \$32.60. First-class

Navy Pay Table.

RANK.	At Sea.	On Shore Duty.	Rank.	At Sea.	On Shore Duty.
Admiral .....	\$14,850	\$13,500	Midshipmen (after graduation) .....	\$1,400	\$1,400
Rear-Admirals, first 9	8,800	8,000	Mates .....	1,500	1,125
Rear-Admirals, second nine .....	6,600	6,000	Medical and Pay Directors and Inspectors having the same rank at sea .....	4,400	4,000
Brigad'r-General, Commandant Marine Corps .....	6,600	6,000	Fleet-Surgeons and Fleet-Paymasters ..	4,400	4,000
Captains .....	4,400	4,000	Surgeons and Paymasters .....	3,300	3,000
Commanders .....	3,850	3,500	.....	2,200	2,000
Lieutenant-Commanders .....	3,300	3,000	Chaplains .....	to	to
Lieutenants .....	2,640	2,400	.....	4,400	4,000
Lieutenants (Junior Grade) .....	2,200	2,000	Professors and Civil Engineers .....	2,640	2,400
Ensigns .....	1,870	1,700	.....	to	to
Chief Boatswains, Chief Gunners, Ch'f Carpenters, Chief Sail-makers .....	1,870	1,700	Naval Constructors...	4,400	4,000
Midshipmen (at Naval Academy) .....	600	600			

The pay of non-commissioned officers is from \$40.20 to \$96 per month, and of privates from \$33 to \$36.60 per month.

The Act of Congress of May 22, 1917, provided that commencing June 1, 1917, and continuing until six months after the war, all enlisted men of the navy of the United States whose base pay does not exceed \$21 per month shall receive an increase of \$15 per month; those whose base pay is over \$21, and not exceeding

petty officers receive from \$47.60 to \$77.50; second-class, from \$46.50 to \$52; third-class, \$41. Chief petty officers receive from \$61 to \$83 per month, present war pay. In the messmen branch attendants receive from \$32.60 to \$41; cooks from \$41 to \$61; stewards to commanders in chief and commandants, \$72; cabin and wardroom stewards, \$61; other stewards, \$46.50.

Hospital apprentices receive from \$20.90 to \$26.40 per month; pharmacists' mates, from \$38.50 to \$44; chief pharmacists' mates, acting appointment, \$66; chief pharmacists' mates, permanent appointment, \$77 per month.

The organization of the legislative branch of the government is as follows:

**The Senate.**—Two Senators are elected by the legislature of each State for terms of six years each. Each Senator must be thirty years or over of age, and must have been for at least nine years a citizen of the United States. He must be a citizen of the State from which he is chosen, and cannot, while in the Senate, hold any civil position under the government nor act as a Presidential elector. He is elected in the following manner: The election takes place on the second Tuesday after the organization of the legislature chosen next before the expiration of the preceding senatorial term. In each house of the legislature the members present, by a viva voce vote, the name of a person or persons for Senator, and the name of the person receiving the greatest number of votes is entered upon the journal of that house. At noon on the next day the members of both houses meet in a joint session, at which the journals of the two bodies are read, and if the same person received a majority of the votes in both houses he is declared elected Senator. However, if no person receives such majorities, the members in joint session proceed by a viva voce vote to choose a Senator, a majority of all the members being necessary for an election. If such a majority is not secured at the first session, the two houses meet jointly at noon on each succeeding legislative day and take at least one ballot for Senator until one is elected at the legislature adjourns. If a vacancy in the representation of any State in the Senate occurs by reason of death or otherwise, such vacancy is filled by the legislature in the same manner as a Senator is regularly elected. But if such vacancy should occur during a recess of the legislature, or if the legislature should adjourn without electing a Senator, the governor of such State may fill the vacancy by a temporary appointment until a Senator is elected at the next session of the legislature. This method has been varied in one important particular since the passage in 1913 of the XVII amendment to the Constitution; Senators being now chosen by direct vote of the people. This important function is thus taken from the legislature.

**House of Representatives.**—The House

of Representatives is composed of members chosen each two years by the people of the several States. The number of members depend upon the population of the States, each one representing a fixed number of inhabitants, varying after each census. As fixed under the 1910 census the total number of members is 436, including three from the new States of Arizona and New Mexico, admitted in 1912, there being one for each 211,877 of population.

**Qualifications.**—A Representative must have attained to the age of twenty-five years and have been seven years a citizen of the United States. He must be an inhabitant of the State from which he is chosen and cannot hold any civil office under the United States during his term of office nor serve as a Presidential Elector. By custom he is a resident of the district from which he is chosen.

**Election.**—The number of Representatives to which each State is entitled is determined by Congress after each decennial census. Congress has fixed the time of their election as the 'Tuesday next after the first Monday in November' in every even-numbered year. In States entitled to more than one Representative, they are elected by 'districts composed of contiguous territory and containing as nearly as possible an equal number of inhabitants,' which districts are determined and the boundaries fixed by the legislatures of the States. When, in a reapportionment, a State's representation is increased, the additional Representatives are chosen by vote of the whole State, until the State is redistricted. They are called Representatives or Congressmen-at-Large.

**Judicial Branch of the Government.**—The judicial power of the United States is vested in a Supreme Court, nine Circuit Courts, nine District Courts of Appeal, eighty-six District Courts, and a Court of Claims. Judges of the United States courts are appointed by the President with the consent of the Senate and serve during good behavior.

The Supreme Court is composed of a Chief Justice, and eight Associate Justices. The court sits at Washington, and holds one session annually, commencing on the second Monday in October.

The United States is divided into nine judicial circuits. To each circuit the Supreme Court allots one of its justices, who must attend at least one term of such court in every two years. For each circuit there are also appointed two or more circuit judges. The Circuit Court sits twice a year in each district within the circuit.



The Circuit Courts of Appeal are nine in number and were created for the purpose of relieving the Supreme Court of certain classes of appeals. A Circuit Court of Appeals consists of three judges, two of whom form a quorum. It is held by the justice of the Supreme Court allotted to that circuit and two circuit judges, but a district judge is also competent to act. No judge, however, can hear a case in the Circuit Court of Appeal at the trial of which he presided in the District or Circuit Court.

Congress has set apart each State as a judicial district, except in case of the more populous States, which are divided into two or more districts. There are eighty-six judicial districts in the States and territories. There are one or more resident judges in each district and the court is held by a district judge.

The Court of Claims consists of a Chief Justice and four Associate Judges.

The State governments are organized in the following manner:

*The Executive Department.*—At the head of this department is the Governor, elected by the people, for a term of one to four years. It is his duty to see that the laws are executed. He may call to his assistance judges and sheriffs and, in case of need, the militia of the State. When public business is conducted with another State, the Governor acts in the name of the State. He sends a message to the legislature at the opening of its session, informing it of the conditions throughout the State, and in time of pressing need may call the legislature in extra session.

In many States the Governor has the power to pardon criminals, or commute their punishment. He appoints many officers and in some States he appoints the judges of the State courts. Most of the States elect a Lieutenant-Governor to serve when the Governor is unable to be at his post. He acts as the President of the State Senate. The Secretary of State, sometimes elected, sometimes appointed by the Governor, is the highest clerk of the executive department. The State Comptroller or Auditor manages the financial business of the State government. The State Treasurer is the custodian of the funds of the State, which he disburses only on orders from the officers designated by law. The Attorney-General is the law officer of the State. The Superintendent of Public Instruction is the head of the school system of the State.

In addition to these officers, which are found in almost every State there are in

many States other executive officers and boards whose duties are very important, such as the Insurance Commissioner, the Board of Railroad Commissioners, the Inspector of Factories, the Liquor License Commissioners, the Board of Charities, the Board of Health, the Tax Commissioner, the Board of Pardons, the Superintendent of Banks, the Board of Medical Examiners, the Commissioner of Agriculture and the Board of Public Works.

*The Legislative Department.*—The legislature of a State is always divided into two branches—a Senate and a House of Representatives. In some States the lower house is called the Assembly, in others the House of Delegates, in New Jersey the General Assembly. In many of the States the whole legislature is called the General Assembly. Both the Senate and the lower house are representative bodies. The counties or towns and cities are represented in the lower house according to population, determined by a census taken every five or ten years. The State is divided into senatorial districts from each of which a senator is elected. The minimum age for senators is generally higher than for representatives, and their term is usually longer.

The State legislature may not pass any law contrary to the Constitution of the State nor of the United States. It grants charters for the government of cities, boroughs and villages; and for the organization of railroad companies, banks, colleges, and many other public and private institutions. It makes laws governing the public schools. It defines the boundaries of counties and towns. It makes laws concerning property, real and personal. It makes laws concerning the social relations, marriages, divorces, etc. It makes laws regulating the manner of holding elections and the qualifications of voters. It regulates railroads and other public utilities operating within the State. It regulates manufacturing, trading, mining, agriculture, hunting, fishing, etc.

*The Judicial Department.*—The lowest court is conducted by a justice of the peace or magistrate, who acts in the name of the State. He renders decisions only in small and unimportant cases. The next court is called the Circuit Court, the District Court, the Superior Court, the Supreme Court, or the Court of Common Pleas. This court sits in the courthouse at the county seat. The same judge may serve in several counties. The judges are generally elected, but in some States appointed

by the Governor. Appeals from the lower court are taken to the Supreme Court, or Court of Appeals, the highest court of the State. It usually meets at the capital of the State. In some States there is an intermediate court between the lower and higher, which hears appeals in certain classes of cases.

*The District of Columbia.*—The municipal government of the District of Columbia is vested by act of Congress approved June 11, 1878, in three Commissioners, two of whom are appointed by the President from citizens of the District having had three years' residence therein immediately preceding that appointment, and confirmed by the Senate. The other Commissioner is detailed by the President of the United States from the Corps of Engineers of the United States Army, and must have lineal rank senior to captain, or be a captain who has served at least fifteen years in the Corps of Engineers of the Army. The Commissioners appoint the subordinate official service of said government, except the Board of Education, which is appointed by the Supreme Court of the District of Columbia.

*County Government.*—Every State and territory is divided into counties (in Louisiana called parishes). In the Southern States and in many of the Western States the county—outside of towns and cities—assumes most of the functions of local government. Each county has a county seat where the public business is transacted. Most of this business is done by a Board of County Commissioners or Supervisors, called in some States the county court; in others the levy court, because it levies the taxes. There are no County Commissioners in Rhode Island.

As a rule the County Commissioners fix the rate of taxation for the county, appropriate money for the payment of the salaries of county officers and to meet the other expenses of county government, make contracts for building and repairing roads and bridges, appoint subordinate county officials, and represent the county in the courts when it is sued for damages.

At every county seat one or more judges sit for the trial of cases. These judges are generally State officers, but they receive the assistance of several county officers. The Sheriff carries out the orders of the judge. He has the custody of prisoners, executes the death penalty, sells property and preserves peace and order. When necessary he may call to his aid deputies or helpers. The Prosecuting Attorney, called also,

the State's Attorney, the District Attorney, the County Attorney, or the Solicitor, appears in the county court and presents the case against a criminal. The Coroner takes charge of the body of a person found dead or who dies mysteriously, and inquires into the cause of death. If foul play is suspected, he impanels a jury and holds an 'inquest.' In some States in case of a vacancy by death, resignation or inability to act of the sheriff he assumes the duties of that office. The Clerk of the County Court or Prothonotary keeps the records of the county court. In some States he keeps a record of deeds and mortgages, issues marriage certificates and records births and deaths.

The above officers are found in almost every State; in many States there are also a County Treasurer, County Auditor, County Assessors, County Tax Collectors, Register or Recorder of Deeds and Superintendent of Schools.

*The Probate or Orphans' Court.*—In Georgia the judge of this court is called 'Ordinary'; in New York and New Jersey 'Surrogate.'

*Township Government.*—In the Middle Atlantic and Middle Western States, township government is organized. It usually supports public schools, cares for public roads, and helps the poor. In many States it levies and collects taxes for these purposes. The township officers vary greatly in different states. The more usual ones are the Supervisor or Trustee, who cares for roads and bridges; the School Directors, who control the public schools; the Township Clerk, the Assessors, the Tax Collector, the Auditors, the Constable, who assists the justice of the peace and is the peace officer of the township, and the Overseers of the Poor.

*Town Government.*—The town as a political organization is characteristic of the New England States. It corresponds in effect to the townships elsewhere, being partly rural, and containing villages, all combined into one political group. Its most important feature is the town-meeting, composed of all citizens and usually held once a year in the town hall. At this meeting the rate of taxation is fixed, money is appropriated, by-laws are passed, and town officers are elected. The principal officers are: The Selectmen, who carry into effect the measures adopted at the town meeting; the Town-clerk, who keeps the records; the Assessors; the Tax-collector; the Town-treasurer; the Overseers of the Poor; the Constable; the Surveyor of Highways, who keeps roads and

## Univalve

bridges in repair; the Fence-viewers, who settle disputes over boundaries, and the Field-driver, or Pound-keeper, who takes charge of stray animals.

**Village or Borough Government.**—In thickly settled communities a village or borough may be organized under a charter from the State. It usually has a President or Mayor or Chief Burgess and a body of Trustees, Commissioners, Councilmen or Burgesses, who pass local laws or ordinances, levy taxes, and provide for police and fire protection, street paving, sewerage, etc.; and School Directors, who provide for the needs of the schools. It may also have a Clerk, a Treasurer, Assessors, a Tax Collector, a Constable and a Street Commissioner.

**City Government.**—When the village or borough grows to a large size, it becomes a city; it is still organized under a charter from the State, but with broader functions and greater powers. The city always has two departments—executive and legislative—the judicial department being a part of the State government.

The Mayor is the executive officer of the city. His powers and functions vary greatly. He is nearly always elected by the people, but in a few cases is chosen by the City Council. His term of office varies from one to four years. His chief duty is to carry out the ordinances of the Council. In most cities he can veto an ordinance, but it can be passed over his veto by a two-thirds or three-fourths vote.

The City Council is the legislative department of the city. In large cities it often has two branches, whose members are called Aldermen and Councilmen, or Select and Common Councilmen. These members are usually elected by wards. They meet in the city hall and make laws, called ordinances, for the government of the city. Their powers and limitations are defined by the State legislature.

**The Commission Plan.**—In many cities of the country, more than 300 in number, the 'Commission' plan of city government has been adopted. The commission consists of a Mayor and a small body of Councilmen or Aldermen, each the head of a department, and all elected by the whole body of voters without regard to wards or precincts and usually without regard to party. The commission both makes the laws and executes them. The Mayor is chairman of the commission but does not have the veto power.

**Univalve** (ū-ni-valv), a mollusc with a shell composed of a single

piece. The univalves include most of the Gastropoda, as land-snails, sea-snails, whelks, limpets, etc. The majority of univalve shells are cone-shaped and spiral.



UNIVALVE SHELL OF *Buccinum undatum*.

A, Apex. B, Base. C, Aperture. D, Anterior canal. E, Posterior canal. F, Inner lip, pillar lip, columellar lip or labium. G, Outer lip or labrum. H, I, J, K, L, M, N, Peristome or margin of aperture. W, Whorls or volutions. S, Sutures, or lines of separation. V, Varix. —The last whorl of the shell, usually much larger than the rest, is called the 'body whorl,' the rest of the volutions constitute the 'spire.'

**Universalist** (ū-ni-ver'sa!-ist), a Christian sect which according to the 'profession of belief' as adopted in 1803, at Winchester, New Hampshire, by the New England Convention, believes in the Holy Scriptures; in one God, whose nature is love, revealed in one Lord Jesus Christ, by one Holy Spirit of Grace, who will finally restore the whole family of mankind to holiness and happiness; that believers ought to be careful to maintain order and practice good works, as holiness and true happiness are inseparably connected. The system of government is a modified Presbyterialism. The general convention, held annually, consists of clerical and lay delegates from each State convention. There are in the United States about 900 churches and 55,000 members.

**Universal Language**, a language invented to serve as a medium of commercial communication for all countries; with the possibility of its eventually superseding all existing languages. Such languages have been partly or fully worked out at various times, as by Urquhart, Dalgarno, Wilkins, Leibnitz, and various others in the past, and in Volapük and Esperanto of recent times. Vigorous efforts have been made to get these two artificial languages adopted, but as yet with little prospect of success. Pigeon English and the *Lingua Franca* of the Mediterranean

are partial and spontaneous efforts in the same direction.

## Universal Prime Meridian,

In astronomy, the meridian of Greenwich, adopted at an international conference of scientific men, held at Washington, D. C., in 1883. While adopted by the other principal countries, it was not adopted by France until 1911, but is now in use throughout Europe and the United States. Universal time, for international purposes, was adopted at the conference above named. It is reckoned from mean noon at the Universal Prime Meridian, the day commencing at midnight, and being divided into 24 (instead of into two portions of 12) hours each.

**University** (ū-ni-ver'si-ti), a corporate body or corporation established for the purposes of instruction in all or some of the most important branches of literature and science, and having the power of conferring certain honorary dignities, termed *degrees*, in several faculties, as arts, medicine, law, theology and others. In most cases the corporations constituting universities include a body of teachers or professors for giving instruction to students; but this is not absolutely essential to a university, the staff of London University, for instance, being merely an examining body. In the middle ages, when the term began to be used in reference to seminaries of learning, it denoted either the whole body of teachers and learners, or the whole body of learners, with corporate rights and under by-laws of their own, divided either according to the faculty to which they were attached, or according to the country to which they belonged (hence the 'nations' into which the students were classed, and which still exist in some universities). At a later period the expression *universitas literarum* (the whole of literature or learning), was used to indicate that all the most important branches of knowledge were to be taught in these establishments. Some, forming their notion of a university from the universities of Oxford and Cambridge, suppose that it necessarily means a collection and union of colleges, that it is a great corporation embodying in one certain smaller and subordinate collegiate bodies; but this is not correct, for many universities exist in which there are no colleges. The oldest of the European universities were those of Bologna and Paris, and these formed the models on which most of the other early universities were established, a papal bull being generally regarded as necessary to this. The United States

possesses the largest number of institutions bearing the name of universities, but a large proportion are sectarian, and may represent only a single faculty, and in no proper sense deserve the name. For the chief universities see under separate heads, and refer to the articles on the different countries.

**University College**, a college or institution belonging to a university, or such as might belong to a university. The University College, London, is closely connected with London University. (See *London, University of*.) The name is given especially to three of the four colleges which are intended to form a Welsh University, viz. the *University College of Wales* at Aberystwith, *University College of South Wales* at Cardiff, and the *University College of North Wales* at Bangor. The students of these colleges, proceeding to degrees, have to go through a course at either London, Dublin, Edinburgh, or Glasgow. The University College of Oxford is the oldest of its colleges, founded about 1253.

**University Extension**, a movement in progress to extend the means of higher education to persons of all classes and of both sexes engaged in the regular occupations of life. Any community may avail itself of the privileges by forming a local committee, which provides the necessary funds and fixes fees, etc. The mode of instruction consists in courses of lectures by specialist graduates of the universities, each lecture being preceded or followed by a class, in which the students are orally examined by the lecturer, who also corrects written papers done at home. An examination is held at the end of each course and certificates awarded. The movement began in 1872 with Cambridge University, but Oxford did not go heartily into it till 1885. The movement has extended widely in Britain and in 1890 reached the United States, where there has developed a liberally conducted movement for university extension, spreading from Philadelphia as a center to many sections of the country, being established mainly in connection with colleges and universities. A well-developed plan has been evolved by which institutions of learning in every section are enabled to share in the benefits of the movement and to extend them to others.

**University Settlements**, in the houses poor districts of cities where educated men and women live and come in contact with the poorer classes for social,



## Unterwalden

educational and civic purposes. These settlements provide clubs, and offer a home and recreation for poor workers. Children are taken care of and have many amusements, all with a view to waken in them a desire for better things and right living. The first settlement in the United States was founded in New York city September 1, 1880, by the graduates of several women's colleges. It has since extended to all the large cities of the country, Hull House, Chicago, opened in the same month with the New York settlement, being one of the most notable examples.

**Unterwalden** (ün'ter - väi - den), a Swiss canton, bounded on the north by the Vierwaldstätter Lake, on the east by mountains which separate it from Uri, on the south by Bern, and on the west by Lucerne; area, 295 sq. miles. It is divided into two valleys, Upper and Lower (Ohwalden and Nidwalden), by a forest called Kernwald, and these districts being also politically distinct, send each one representative to the Swiss Council. The chief town of Ohwald is Sarnen, and of Nidwald, Stanz. Pop. 28,000. Both cantons are almost entirely Roman Catholic.

**Unyoro** (ü-nyö'rö), a district of Equatorial Africa, lying to the west and north of Uganda, to which it is tributary, and stretching to the Nile.

**Upanishads** (ü-pan'i-shad), in Sanskrit literature, a name given to a series of treatises or commentaries on the Vedic hymns, the contents of which are partly ritualistic, partly speculative. They are of different dates, some of them being as old as several centuries B.C.



Upas Tree (*Antiaris toxicaria*).

**Upas** (ü'pas), a tree common in the forests of Java, and of some of the neighboring islands, and found also in tropical Africa. It is a species of the genus *Antiaris* (*A. toxicaria*), nat.

order Artocarpaceæ. Many exaggerated stories were formerly current concerning the deadly properties of this plant, its exhalations being said to be fatal to both animal and vegetable life at several miles distance from the tree itself. The truth is, that the upas is a tree which yields a poisonous secretion and nothing more.

**Upervivik** (ü-per'ne-vik), the most northerly of the Danish settlements in Greenland, on an island off the west coast, in lat. 72° 48' N. It has long been a place of call for arctic expeditions.

**Upholsterer-bee.** See *Carpenter-bee*.

**Upolu** (ü-pö-lü'), the chief of the Samoan group of islands in the South Pacific. It is about 150 miles in circumference, and cotton and cocoa-nut oil are its principal products. Apia is the capital. It belongs to Germany. Pop. 19,842.

**Upper Senegal-Niger**, an inland colony in French West Africa, formed in 1804 out of the territories of Senegambia and the Niger, with the exception of the former Senegal protectorate, which was restored to Senegambia. In 1907 the several Dabomey districts were added to the colony, which now has an area of 302,136 sq. miles. Capital, Bamaka; pop. 5,000,000.

**Upsala** (up-sä'lä), a town of Sweden, 45 miles N. W. of Stockholm. It has a cathedral (archiepiscopal, the finest in Sweden), which contains the tombs of some Swedish kings and of Linnaeus; a celebrated university founded in 1477, with a library of about 250,000 volumes, a botanical garden, observatory, etc. Pop. 22,855.

**Upshur** (up'shur), ABEL PARKER, statesman, born in Northampton Co., Virginia, in 1790. In 1841 he was appointed Secretary of the Navy by President Tyler. Two years later, on the resignation of Daniel Webster, he was appointed Secretary of State. Early in 1844 he was on the United States steamer *Princeton*, on the Potomac River, in company with the President and other members of the cabinet, to witness experiments with a large wrought-iron gun which burst, and mortally wounded him together with several others. He died near Washington, February 28, 1844.

**Up'upa.** See *Hoopoe*.

**Uræmia** (ü-rë'mi-a), a diseased condition of the body arising from the presence of urea in the blood, in consequence of the urine not being

properly secreted, as in Bright's disease or other ailments, thus leaving in the blood elements that should be carried off.

**Ural** (u'ral), a river of Russia, which rises in the Ural Mountains, forms part of the boundary between Europe and Asia, and enters the Caspian after a course of about 1000 miles.

**Ural Mountains**, a series of mountains stretching nearly north and south between Europe and Asia, from the shores of the Arctic Ocean for a distance of about 1900 miles; highest summit, 5513 feet. There is but little striking scenery, and the rise is so gradual in some parts that the traveler from Perm to Ekaterinburg, for instance, hardly notices that he has crossed the chain. The Ural Mountains are celebrated for the mines of gold, platinum, copper, coal and iron which they contain, and in the south are many broad valleys of remarkable fertility.

**Uralsk** (u-ralsk'), a town of Russia, on the Ural, 170 miles w. s. w. of Orenburg. It has a considerable trade, especially in fish and caviare. Pop. 43,606. It is the capital of Uralsk province, which borders on the Caspian Sea, with an area of about 125,000 sq. miles.

**Urania** (u-ra'ni-a), in Greek mythology, the muse of astronomy. She is generally represented holding in her left hand a celestial globe to which she points with a little staff.

**Uranium** (u-ra'-ni-um) a rare metal whose chemical symbol is U, atomic weight 240, specific gravity 18.4. The chief source of uranium is pitchblende. Metallic uranium is obtained in the form of a black powder, or sometimes aggregated in small plates, having a silvery luster and a certain degree of malleability. It forms several oxides, which are used in painting on porcelain, yielding a fine orange color in the enameling fire, and a black color in that in which the porcelain itself is baked. It is strongly radio-active, per-

haps from containing radium, a constituent of pitchblende.

**Uranus** (u'ra-nus), in Greek mythology, the son of Gaea, the earth, and by her the father of the Titans, Cyclopes, etc. He hated his children, and confined them in Tartarus, but on the instigation of Gaea, Kronos, the youngest of the Titans, overthrew and dethroned him.

**U'ranus**, in astronomy, one of the seventh from the sun, discovered by Sir William Herschel in 1781. It was first called *Georgium Sidus* in honor of George III, and afterwards *Herschel*, in honor of the discoverer, finally receiving its present name in accordance with the practices of naming the planets after the deities of mythology. To the naked eye it appears like a star of the sixth magnitude. Its mean distance from the sun is about 1754 millions of miles, and the length of the year 30,686.82 days, or about 84 of our years. Its mean diameter is estimated at about 33,000 miles. Its volume exceeds the earth's about 74 times, but as its mean density is only 0.17 (the earth's being 1) its mass is only about 12½ times more. The length of its day is supposed to be between 9 and 10 hours. It is now generally admitted that this planet has four satellites, which differ from the other planets, primary and secondary (with the exception of Neptune's satellite), in the direction of their motion, this being from east to west, and they move in planes nearly perpendicular to the ecliptic.

**U'rari**. See *Curari*.

**Ura Tyube** (u'ra tyü'be), a town of Russian Turkestan, in the district of Sir Darya, with walls and a citadel. Pop. 22,088.

**Urban** (ur'ban), the name of eight popes, of whom the most notable were: **URBAN II** (Othon de Lagny), 1088-99, was elected by one party in the church, and in a council held at Rome he excommunicated his rival Clement III and his supporter, the Emperor Henry IV. By his decision and energy he extended the power of the papedom, and it was at his instigation that the first crusade was undertaken, and Jerusalem captured.—**URBAN VI** (Bartolommeo Prignano), 1378-89, so exasperated the cardinals by his reforming zeal that they caused a schism in the church by electing Clement VII. The two popes excommunicated each other until Urban died, under circumstances which suggested poisoning.—



Urania, antique statue in the Vatican.

## Urbana

**URBAN VIII** (Maffeo Barberini), 1623-44, was more of a temporal prince than a cleric, extending the power of the church by raising armies, building fortresses, and entering into an alliance with France against the powers of Austria and Germany. He condemned Galileo and Jansen.

**Urbana**, a city, county seat of Champaign Co., Ohio, 47 miles w. by N. of Columbus. Here is Urbana University (Swedenborgian), organized in 1851. It has manufactures of strawboard, wool, brooms, paper and automatic telephones, etc. Pop. 7739.

**Urbana** (ur-ban'a), a city, county seat of Champaign Co., Illinois, 31 miles w. of Danville. It is the seat of the University of Illinois, a flourishing institution with over 5000 students, of the Illinois Laboratory of Natural History, and of a Government Experiment Station. It has railroad repair shops and other industries. Pop. 8500.

**Urbino** (ür-bä'nö), a town of North Italy, province of Pesaro e Urbino, 21 miles west by south of Pesaro. It is the see of an archbishop, the seat of a university; the chief buildings being the ducal palace and the cathedral. It was the birthplace of Raphael, whose house is still shown. Pop. 18,244.

**Urchin**, SEA. See *Echinus*.

**Urdu**. See *Hindustani*.

**Ure** (ür), **ANDREW**, chemist, born at Glasgow in 1778; died in 1857. He was educated at Glasgow and Edinburgh universities, where he was graduated in medicine; became professor of chemistry at the Andersonian Institution (1804), director of the Observatory, Glasgow (1809), and was appointed analytical chemist to the Board of Customs (1834) in London. His chief works are: *A Dictionary of Chemistry* (two vols., 1821), *The Cotton Manufactures and Mines* (two vols., 1837) and a *Dictionary of Arts, Manufactures and Mines* (two vols., 1837-39), enlarged by Dr. Robert Hunt (4 vols., 1875-78).

**Uredo** (ü-rë'dö), a genus of minute parasitic fungi, the species of which are parasitic on plants. The diseases called smut, brand, burnt ear, rust, etc., are caused by their ravages.

**Ureter** (ü-rë'ter), the excretory duct or tube which conveys the urine from each kidney to the bladder. In man it is about the size of a goose-quill; and its length is from 16 to 18 inches.

**Urethra** (ü-rë'thra), in anatomy, the canal leading from the bladder to the external urinary opening, and serving for the excretion of the urine. In the male it is a complicated structure varying in length from 8 to 9 inches, and in the female it is a narrow membranous canal about 1½ inches in length.

**Urfa** (ür-fä'), a town of Turkey in Asia, in Upper Mesopotamia, a seat of an Armenian bishop, and of a French and an American mission. Pop. about 60,000.

**Urga** (ür-gä), a Chinese town in Northern Mongolia, on the river Toia, on the trade route between Peking and Kiachta. Pop. 30,000.

**Uri** (ü'ri), a canton in Switzerland, bounded by Schwyz, Unterwalden, Valais, Tessin, Grisons and Glarus; area, 415 square miles. It is one of the most mountainous of the Swiss cantons, presenting a complete chaos of mountain masses, the most famous of which is the St. Gothard. An interesting mass is the Urirothstock, 9020 feet high. The most important portion of the canton is the valley of the Reuss, which enters the Lake of Uri, an arm of the Lake of Lucerne. The chief industry is cattle-rearing; sheep and goats are also numerous; and timber is exported. The inhabitants are mostly Roman Catholics, and speak German. Uri was one of the three original Swiss cantons. It is visited by many tourists. The capital is Altorf. Pop. 19,700.

**Uric Acid** (ü'rik), an acid which occurs in small quantity in the healthy urine of man and quadrupeds, and in much larger quantity in the urine of birds. Uric acid constitutes the principal proportion of the urinary calculi and the concretions causing the complaint known as the gravel.

**Urim** (ü'rim), a kind of ornament or appendage belonging to the costume of the Jewish high-priest in ancient times, along with the *thummin*, in virtue of which he gave oracular answers to the people, but what the urim and thummin really were has not been satisfactorily ascertained.

**Urinary Calculi**. See *Calculus*.

**Urine** (ü'rin), an animal fluid or liquor secreted by the kidneys, whence it is conveyed into the bladder by the ureters, and through the urethra discharged. In its natural state it is acid, transparent, of a pale amber or straw color, a brackish taste, a peculiar odor, and of a specific gravity varying from 1.012 to 1.030. The character of the urine, however, is apt to be altered

by the state of health, the season of the year, age, food, and a variety of other causes. A knowledge of the urine in health, and of the variations to which it is subject in disease, is of the utmost importance to the medical practitioner. One of its morbid constituents is diabetic sugar. See *Diabetes*.

**Urmiyah.** See *Urumiyah*.

**Urn**, a kind of vase, often one for holding the ashes of the dead. See *Cinerary Urn, Vase*.

**Urodela** (û-ro-dê'la), an order of amphibian vertebrates in which the larval tail is always retained in the adult, the body being elongated posteriorly into the tail. There are two sections, the *Perennibranchiate Urodela*, in which the gills are retained through life, as in proteus, siren, etc.; and the *Caducibranchiate*, in which the gills disappear at maturity, as in newts and salamanders.

**Ursa Major, Ursa Minor.**

See *Bear, Great and Little*.

**Ursine Seal** (ur'sin; *Otaria ursina* or *Arctocephalus ursinus*), one of the otaries or eared seals, a native of the North Pacific, about 8 feet long. Called also *sea-bear*.

**Ursinus College**, a non-sectarian collegiate institution, established in 1869 at Collegeville, Pa. It has about 300 students.

**Urson** (ur'sun), a name given to the *Erethizon dorsatum*, or Canadian porcupine, which is 18 inches in length, and the quills of which are smaller than in the common porcupine.

**Ursula** (ur'sû-la), St., a virgin martyr, according to the legend a daughter of a prince in Britain put to death at Cologne by a horde of Huns, some say in 384, others in 453, together with 11,000, or more probably 11, virgins who accompanied her.

**Ursulines** (-linz), or NUNS of St. URSULA, a sisterhood founded by St. Angela Merici at Brescia, in 1537. They devote themselves to the succor of poverty and sickness and the education of female children. They had many houses in France during the seventeenth century. The Canadian Ursulines date from 1639.

**Ursus.** See *Bear*.

**Urticaceæ** (ur-ti-kâ'se-è), a nat. order of exogenous trees, herbs and shrubs. In an extended sense the order includes the Ulmæ, or elm family; the Artocarpeæ, or breadfruit family; and the Cœnabineæ, or hemp

family. But the order is more frequently confined to the Urticæ, or nettle family, typical genus, *Urtica*. (See *Nettle*.) The juice of the restricted order is watery, not milky; the wool in the arborescent or shrubby species, which are tropical, is soft and light. The fiber of the bark of some is valuable. It is in the restricted Urticaceæ that species covered with stinging hairs are found.

**Urubamba** (ur-û-bam-ba), one of the head streams of the Amazon (which see).

**Urubu** (û-rû-bû), the native name of an American vulture, the *Catharista Iota* (black vulture or sopilote), very nearly allied to the turkey-buzzard, which it closely resembles. This voracious bird is common in the villages and towns of the southern portion of the United States, acting as a scavenger.

**Uruguay** (û-ru-gwî', or û-ru-gwa'), a river of South America, which rises in Brazil, in the province of Santa Catharina, flows first westwards, then gradually turns south, and finally enters the estuary of La Plata opposite Buenos Ayres; length, about 800 miles.

**Uruguay, OF BANDA ORIENTAL DEL** URUGUAY, a republic of South America, bounded on the north and northeast by Brazil, on the east by the Atlantic, on the south by the Rio de la Plata, and on the west by the Uruguay, separating it from the Argentine Republic; area estimated at 72,150 square miles. The surface forms a vast undulating plain, generally flat, but broken in the interior by several ridges of moderate elevation. Gold is mined to some extent, and silver, copper and lead exist. The principal river is the Negro, which divides the state into two nearly equal portions, and on the southeast frontier is the large lake of Merim. The climate is mild and healthy, the general range of the thermometer being from 32° to 90° F. The extensive plains seem admirably adapted for agriculture, but they are occupied by large herds of horses, sheep and cattle, the rearing of these being the principal industry. The principal agricultural products are wheat, maize, oats, rye, millet and flaxseed. The chief exports are hides, tallow, preserved meat, sheepskins, bones, wool and horse hair, while the chief imports are cotton goods, woollens, coal and iron. Primary education is compulsory; there are normal, secondary and higher institutions, and a university at Montevideo. The Roman Catholic is the state religion, but all faiths are tolerated. The country is divided into nineteen provinces, and



by the constitution of 1830 it is governed by a president, a senate and a house of representatives. Uruguay at one time formed part of the Spanish viceroyalty of Buenos Ayres, and the language of the country is Spanish. Capital and chief port, Montevideo. Pop. (1908) 1,042,668.

**Urumiyah** (û-ry-mê'a), or UR'MI-YAH, a town of Persia, said to be the birthplace of Zoroaster, in the west of the province of Azerhijan, situated near a lake of the same name, 65 miles southwest of Tahreez. The surrounding district is of surpassing fertility. Pop. about 30,000.—The lake, situated 4300 feet above sea-level, is about 80 miles long from north to south, by 20 miles broad. It is extremely shallow throughout.

**Urumtsi** (u-rûm'tsê), a city of Central Asia, in the Chinese province of Dzoungaria, on the northern side of the Thian-Shan Mountains. It was formerly of great commercial importance in the trade between Russia, Turkestan and India. Pop. estimated at 30,000.

**Urus** (û'rus), a kind of large ox which ran wild in Gaul at the period of the Roman invasion, as described by Cæsar, perhaps the wild ox such as still exists in England, at Chillingham in Northumberland and Hamilton in Lancashire, or else the anrochs.

**Usagara** (û-sa-ga'ra), part of the German possessions in East Africa, occupying an extensive area of country inland north of the river Rufiji. It has mountains of considerable height, and is generally fertile.

**Usambara** (û-sam-ba'ra), a mountainous territory of German East Africa, situated about 50 miles N. W. of Zanzibar, extending inland from opposite the island of Pemba. The country grows rice, maize, india-rubber and tobacco.

**Usbecks** (ûs'beks), or USBEKS, a Turkish tribe which at one time formed the ruling class throughout Western Turkestan, in Bokhara, Khokand, Khiva and Balkh, and partly also in Eastern Turkestan. In Western Turkestan they are now completely under the control of Russia, but in the districts mentioned they still form the nobility and landowners.

**Usedom** (û'ze-dom), a Prussian island in the Baltic, on the coast of Pomerania; area, 150 square miles. The inhabitants are employed in agriculture and fishing; chief towns, Swinemünde and Usedom. Pop. about 33,000.

**Ushant** (nsh'ant; French, *Ouessant*), an island of France, 15 miles off the west coast of the department of Finistère, to which it belongs; area, 6 square miles. It presents a very bold and rocky coast; fishing and the rearing of sheep are the principal occupations. Pop. 2761.

**Ushas** (û'shas), in Hindu mythology, one of the ancient elemental divinities, the goddess of the dawn. In the Vedic hymns she is represented as a young wife awakening her children and giving them new strength for the toils of the coming day.

**Usher** (ush'er), an officer who has the care of the door of a court, hall, chamber, or the like. In the royal household of Britain there are four gentlemen ushers of the privy chamber. The *Gentleman usher of the black rod* is an officer of the order of the Garter (see *Black-rod*); the *Usher of the green rod*, an officer of the order of the Thistle. The service of ushers is customary in American churches, at weddings, and in places of amusement.

**Usher**, or USSHER, JAMES, Archbishop of Armagh, born at Dublin in 1580; died in 1656. He took orders in 1601; in 1607 received the professorship of divinity at Trinity College, Dublin, and the office of chancellor of St. Patrick's; in 1620 the bishopric of Meath; in 1623 a place in the Irish privy-council; and in 1624 the primacy of Ireland. He was a man of great erudition, his chief works being the *Annales Veteris et Novi Testamenti*, which forms the basis of the received biblical chronology; and *Britannicarum Ecclesiarum Antiquitates*.

**Ushkup**, or USKUB (us'kup), a town of Northwestern Turkey, on the river Vardar, seat of a Greek archbishop, with manufactures of leather, etc. Pop. 20,000.

**Ussuri** (û-sû'ri), a river of Eastern Asia, a tributary of the Amoor, forming for a long distance the boundary between Russia and Chinese territories; length, 300 miles.

**Usufruct** (û'zû-frukt), in law, the temporary use and enjoyment of lands or tenements, or the right of receiving the fruits and profits of lands or other things without having the right to alienate or change the property.

**Usury** (û'zhû-ri). See *Interest*.

**Utah** (û'tâ), a Western State of the American Union, bounded N. by Idaho, N. E. by Wyoming, E. by Colorado, S. by Arizona, and W. by Nevada; area 84,900 sq. miles. The northeastern part

of the State consists of the high ranges of the Uinta and Wasatch Mountains. Practically all of eastern and southeastern Utah consists of a series of broad elevated plateaus, deeply cut by canyons and narrow stream valleys. The western portion of the State lies entirely within the Great Basin region and is separated from the more eastern portion by the steep escarpment of the plateau. Within the Great Basin region broad, nearly level desert areas are interrupted by steep and rugged mountain chains running north and south. Within the plateau portion, there are numerous small valleys which are irrigated for intensive agriculture, but upon the plateau itself grazing is the principal industry. The greater portion of the agricultural land of the State lies along the western border of the mountain and plateau district where the water from higher levels is brought down and applied to the sandy and gravelly loams around the margin of the Great Basin region, and to the finer grained sediments of the stream valleys and of the level floors of recent lake basins. The possible dry farm area of Utah is practically all of that which is covered by mountains or under irrigation canals, with the exception of some of the more desert districts where the rainfall is less than ten inches. The irrigating ditches of the State are over 5,887 miles in length, of an estimated cost of \$17,840,775.00, and the reservoirs are extensive. The agricultural products include wheat, oats, barley, corn, potatoes, onions, cabbage, peas, tomatoes, sugar beets and fruits. Over 37,000 acres are devoted to the sugar beet and 46,000 acres to fruit and nursery interests. The chief wealth of the State is in its agricultural and mineral resources. Its minerals embrace gold, silver, copper, lead, iron, coal, salt, etc. In silver yield, Utah stands next to Montana. Manufactures are mainly confined to goods for inter-mountain consumption, though much beet sugar is made, and there are large smelting works. The capital is Salt Lake City; the next largest city is Ogden. Utah was settled in 1847 by Mormons; organized as a territory in 1850 and in 1896 admitted as a State. In 1882 Congress passed a stringent law against polygamy, and in 1890 the Mormon Church decreed its discontinuance. Pop. (1910) 373,351.

**Utah Lake**, a fresh-water lake in the State of Utah, 30 miles s. of Salt Lake City. It is 25 miles in length N. to S., with an extreme width of 13 miles. Its waters are drained into Great Salt Lake by means

of the Jordan River. Several Mormon towns are on its eastern shores.

**Utahs**, or **UTES**, a tribe of American Indians of the Shoshone family, living on reservations in Utah and Colorado, having sold most of their lands to the United States government. Pop. about 2000.

**U'takamand**. See *Ootacamund*.

**Uterus** (û'ter-us), or **WOMB**, an organ of females, situated between the bladder and rectum, in which the embryo is contained until it arrives at maturity, when it is finally born or expelled. In the virgin female it is somewhat pear-shaped, and measures about 3 inches long, 2 inches broad, 1 inch thick, and weighs about 1½ oz. It is divided into a *fundus* or base, a *body* and a *cervix* or neck. It opens into the vagina by a transverse aperture (*os uteri*). The organ is retained in its place by certain ligaments derived from the peritoneum. Its internal cavity is small, and at each superior angle at the fundus a *Fallopian* tube or oviduct enters. These tubes convey the ova or eggs from the *ovary* (which see) to the uterus. In structure the uterus is composed of an outer serous coat, a middle muscular coat, and an inner mucous lining. The arteries of the uterus are derived from the internal iliac and the aorta; the veins are large, and are called *sinuses* in the impregnated state. The nerves spring from the inferior hypogastric and spermatic plexuses, and from the third and fourth sacral nerves. The womb is liable to many diseases, of which the most frequent and important are inflammatory affections and tumors. It is also liable to become displaced in various ways from laxity of its ligaments and other causes (see *Prolapsus Uteri*).

**Utica** (û'ti-ká), an ancient city of North Africa, on the river Bagrada, near its entrance into the Mediterranean, about 25 miles N. W. of Carthage. After the destruction of Carthage Utica became the capital of the Roman province. It was destroyed by the Arabs in the latter part of the seventh century.

**U'tica**, a city of New York, county seat of Oneida County, situated on the south bank of the Mohawk, 95 miles W. by N. of Albany. It has beautiful parks and charitable institutions, and is the site of a state hospital for the insane. Among its public buildings are the Federal Building, the County Building, City Hall, State Armory, Public Library. It has large and diversified manufacturing interests including twenty-two

textile mills. It is also the center of a large dairy country and is a market for cheese. It is on the Erie Canal and the D. L. and W., the N. Y. C., the H. R., the N. Y. Ont. and W., and the W. Shore railroads. Pop. (1910) 74,419.

**Utilitarianism** (ù-tìl-i-tà'ri-an-izm), the general name given to those schools of morals which define virtue as consisting in utility. The name is more specially applied to the school founded by Jeremy Bentham, of which the most recent exponent is John Stuart Mill, but there are many other developments of the same principle both in ancient and modern schools of morals. See *Ethics*.

**Utopia** (ù-tò'pl-a), a name invented by Sir Thomas More, from the Greek *ou topos* (no place), and applied by him to an imaginary island, which he represents as discovered by a companion of Amerigo Vesputi. As described in his work called *Utopia*, written in Latin and published in 1516, the Utopians had attained great perfection in laws, politics, etc.

**U'traquists.** See *Calistines*.

**Utrecht** (ò'treht), an important town of Holland, capital of a province of the same name, 23 miles southeast of Amsterdam. It is pleasantly situated on the Old Rhine, is traversed by two canals crossed by numerous stone bridges, and is surrounded by strong forts. The town is well built, and has several squares, promenades, a government house, a Protestant cathedral (a fine Gothic building), mint, handsome town hall, palace of justice, etc. Educational establishments include a well-equipped university, a veterinary school, musical college, and schools for drawing and architecture. Utrecht is the central point of the Dutch railway system, and carries on an extensive trade in grain and cattle, and in the manufactures of the place, which include Utrecht velvet, carpets, floor-cloth, cottons, linens, chemicals, etc. Utrecht is the oldest town of Holland, and was called by the Romans *Trajectum ad Rhenum*, that is 'Ford of the Rhine,' later *Ultra-trajectum*. Pop. 121,317. The province of Utrecht has an area of 532 square miles, with a pop. (1905) of 276,543. It is generally flat, is well watered by the Rhine, Vecht, Amstel and other rivers, and is better suited for dairy farming and stock raising than for corn growing.

**Utrecht, PEACE OF,** a series of separate treaties agreed upon at Utrecht by the powers which had been

engaged in the war of the Spanish Succession. On April 11, 1713, the States-general, Prussia, Portugal and Savoy, signed separate treaties with France. The emperor refused to accede to the peace, and his differences with France were subsequently adjusted by the treaties of Rastadt and Baden in 1714. By the treaty with England, France, among other things, recognized the Hanoverian succession, engaged never to unite the crowns of France and Spain, and ceded to Britain Nova Scotia, Newfoundland, St. Kitt's and Hudson Bay and Straits. Gibraltar and Minorca were also ceded on behalf of Spain. Holland retained the Spanish Netherlands until a barrier treaty was arranged with Austria. (See *Barrier Treaty*.) Louis XIV recognized the title of the King of Prussia, who received a part of Spanish Guelderland, and the sovereignty of Neuchâtel in Switzerland, while renouncing the principality of Orange. Savoy and Nice were restored to the Duke of Savoy, who was recognized as presumptive heir to the Spanish monarchy, and received the title of king. Phillip V was not recognized till the conclusion of these treaties, but France treated for Spain, and formal treaties corresponding with those with France were afterwards signed with that power.

**Utrera** (ò-trà'ra), a town of Spain, province of Seville, 18 miles s. e. of the city of Seville. It has a fine Gothic church and a Moorish palace. Pop. 15,138.

**Utricularia** (ù-trik-ù-là'ri-a), the generic name of the bladderworts (which see).

**U'vula.** See *Palate*.

**Uxbridge** (uks'brij), a town of England, in Middlesex, on the Colne, 15 miles w. of London. It has an ancient church, an iron foundry, breweries, brick kilns, etc. There is a good trade in corn and flour. Pop. 10,374.

**Uxmal** (òz-mäl'), an ancient Indian town of Yucatan, Central America, about 35 miles s. w. of Merida. It is now an extensive group of ruins. Some of these are remarkable relics of a past state of Indian civilization. They comprise several large temple buildings of striking architecture and adornment.

**Uz,** in the Old Testament, a region east of Palestine, known as the scene of the story of Job.

**Uzbegs.** See *Usbecks*.

# V

**V**, the twenty-second letter of the English alphabet, a labial, formed by the junction of the upper teeth with the lower lip, and a gentle expiration. It resembles the letter *f*, but is sonant and not like it *surd* or *hard*.

**Vaal River** (väll), a river of South Africa, rises in the Quathlamba Mountains, and after a tortuous course of about 500 miles joins the Orange River (which see). It divides the Transvaal Colony from the Orange River Colony.

**Vaccination** (vak-si-nä'shnn), inoculation with vaccine in order to procure immunity from smallpox, or with modified virus of any disease in order to produce it in a mild form and so prevent a serious attack. The practice of anti-smallpox vaccination was introduced by Jenner, and it soon came into common use instead of inoculation. (See *Jenner* and *Inoculation*.) The usual method in vaccination is to make a few scratches across one another, with a clean lancet point, upon the upper part of the arm. The matter from the cowpox, or from the vaccination pustule produced on another person, is then rubbed on the skin where the scratches have been made. If the vaccination proves successful a small inflamed pustule appears about the third day, and increases in size until the tenth day. On the eighth day the constitutional effects manifest themselves by slight pain in the part, headache, shivering, loss of appetite, etc. These subside spontaneously in one or two days. Afterwards the fluid in the pustule dries up, and a scab forms which disappears about the twentieth day, leaving a slight scar in the skin. Repeated vaccinations, with intervals of several years, have been recommended by medical authorities.

Anti-typhoid vaccination has recently found favor. It was introduced into the United States army and navy early in 1912. The following year not a single case of typhoid occurred, despite the frequent exposure to unsanitary conditions. Anti-typhoid vaccination has also been practiced with satisfactory results in British armies in various parts of the world, in the Japanese and the French army.

**Vaccinium** (vak-sin'l-um), the genus to which the whortleberry belongs.

**Vacuum** (vak'u-nm), empty space, or space devoid of all matter or body. Whether there is such a thing as an absolute vacuum in nature is a question which has been much controverted. The existence of a vacuum was maintained by the Pythagoreans, Epicureans, and Atomists; but it was denied by the Peripatetics, who asserted that 'nature abhors a vacuum.' The modern theory, which seems to be warranted by experience, is that an absolute vacuum cannot exist, the subtle medium known as ether being believed to be everywhere present. In a less strict sense a vacuum (more or less perfect) is said to be produced when air is more or less completely removed from an enclosed space, such as the receiver of an air-pump, a portion of a barometric tube, etc. In the receiver of the air-pump the vacuum can only be partial, as the exhaustion is limited by the remaining air not having sufficient elasticity to raise the valves. The Torricellian vacuum, that is, the space above the mercury in a carefully manipulated barometer tube, is more nearly perfect in this respect, but even this space is to some extent filled with the vapor of mercury.

**Vacuum-brake.** See *Brake*.

**Vacuum Cleaner**, a system of house cleaning by aid of machines creating a partial vacuum and by this means extracting the dust from carpets, sofas, and furniture in general, through a tube with a special nozzle. These machines have come largely into use, worked by hand or power, on small or large scale. The same principle has been applied to other purposes, on the farm, or elsewhere, such as the moving of grain, etc., and promises to become somewhat wide in its applications.

**Vacuum-tube.** See *Geissler's Tubes*.

**Vade Mecum** (vā'de mē'kum; Lat. *Vado*, 'I go'; *mecum*, me; i. e., with me). A portable object



## Vail

for frequent or occasional use; a pocket companion; a book or manual for carrying about on the person. It is popularly given to any readily available work of reference, or a key to any science or profession, as *The Electrician's Vade Mecum*, *The Lawyer's Vade Mecum*, etc.

**Vail** (vâl), ALFRED, inventor, born at Morristown, New Jersey, in 1807; in 1837 became associated with S. F. B. Morse in his electric telegraphy experiments. He made several important inventions in this connection and is credited with that of the alphabet of dots, spaces and dashes which is the distinguishing feature of the Morse system. He was assistant superintendent of the first telegraph line in this country, invented the finger key, and received the first message from Washington. He died Jan. 18, 1859.

**Vail**, THEODORE NEWTON, electrician, was born in Carroll Co., Ohio, in 1845; a cousin of the preceding, and nephew of Stephen Vail, who built the engines for the *Savannah*, the first steamship to cross the Atlantic. He studied medicine, but was soon engaged in the railroad mail service and in 1878 entered the telephone business, organizing the first Bell Telephone Co. After 1893 he was engaged in introducing street railways and telephones in Argentina. He built up the national telephone organization, and has secured control of the Western Union Telegraph Co., and since 1907 has been president of the American Telegraph and Telephone Co., and the New York Telephone Co.

**Valais** (vâ-lâ; German, *Wallis*), a southern canton of Switzerland, abutting on France and Italy; area, 2026 square miles. It is surrounded on all sides by sections of the Alps, with ridges 13,000 to 15,000 feet high, and magnificent glaciers. The Rhone traverses the whole length of the canton, forming the largest valley in Switzerland. The mountain slopes are covered with forests of pine and hardwood trees, succeeded by productive orchards. Rich pastures support numerous cattle, the chief source of subsistence of the inhabitants; and in the lower valley of the Rhone there is much arable land, the finer fruits are grown, and silk-worms reared. The canton produces a good deal of wine. In the Upper Valais German, in the Lower French is spoken. The canton was admitted into the Confederation in 1553. Slon is the capital. Pop. 114,438.

**Valdai Hills** (vâl'di), a range of hills in Western Russia, averaging about 300 feet in height,

but rising in Mount Popovogora to 1080 feet. They are well wooded, and contain the sources of the Voiga, Dnieper, and Dûna.

**Valdepeñas** (vâl-dâ-pân'yás), a town in Spain, New Castile, province of Ciudad Real, 110 miles south of Madrid. It is celebrated for a red wine. Pop. 21,015.

**Val de Travers** (vâl dê trà-vâr), a valley in the Swiss Jura, canton of Neuchâtel, drained by the Reuse flowing into the lake of Neuchâtel. It is cultivated in parts, and contains a deposit of asphalt, yielding annually upwards of 2000 tons. See *Asphalt*.

**Valdivia** (vai-dê've-â), a seaport of Southern Chile, on the navigable Calle-Calle. Pop. 9704.—Its port is Valdivia Port, or Corral, one of the best harbors on the Pacific coast of South America.

**Valdosta** (vai-dos'ta), a city, capital of Lowndes Co., Georgia, 157 miles s.w. of Savannah. It is in a cotton-growing region, and has manufactories of yarn, oil, turpentine, lumber, and fertilizers. Pop. 7656.

**Valence** (vâ-lâns), chief town of the department of Drôme, France, on the left bank of the Rhone, 66 miles south of Lyons. It is a poorly-built town surrounded by old battle-mented walls. It has a citadel, a small ancient cathedral, a public library, a court-house, and a theater. It is a bishop's see, and has manufactories of silk and cotton, and some trade in wine, liquors, spirits, silk, fruit, etc. Pop. 22,950.

**Valencia** (vâ-len'shi-â), a city of Spain, capital of the province of the same name, on the Guadalupe, 2 miles from the Mediterranean and 190 miles e.s.e. of Madrid. It has much of the Moorish character, with mostly narrow winding streets, lined with good houses. It is an archbishop's see, and has a cathedral (dating from 1262 and greatly injured by modernization), a royal palace, an exchange, a general hospital, an academy of the fine arts, and other institutions. The university, founded in 1500, is one of the leading seats of learning in the kingdom. Outside the walls are the bull-ring, a botanic garden, and the Alameda, a delightful walk bordered with orange, pomegranate, and palm trees. The chief manufactures are silk, linen, hemp, glass, cigars, paper, and soap. Valencia was founded by Junius Brutus, 140 B.C. Pop. 233,348. The old province of Valencia is now broken up into the three

## Valencia

provinces of Valencia, Alicante, and Castellon de la Plana. It is one of the most fertile and pleasant regions of Spain.

**Valencia**, a town of Venezuela, about 30 miles south of the Caribbean Sea, connected by railway with Puerto Cabello. It has a number of notable buildings, and an active commerce in coffee, sugar, rum, cattle, hides, etc. Pop. 38,654.

**Valenciennes** (vā-lān-syen), a fortified town of France, in the department of Nord, on the Scheldt, 80 miles S.E. of Lille. It is a somewhat gloomy town with narrow streets, but the houses are in general well built. There is a handsome cathedral of the thirteenth century and a notable town-hall of the seventeenth century. It has important manufactures of lace, fine linen, hosiery, beet-sugar, soap, etc. Pop. (1906) 25,977.

**Valens** (vā-lenz), FLAVIUS, a Roman emperor of the East, born in Pannonia in 328, and declared emperor of the East by his brother Valentinian I, who had already been elected emperor. The chief event of his reign was the war with the Goths under Athanaric, which lasted during the whole of Valens' reign. The Goths were several times defeated, and sued for peace, which was granted them (370). In 377 the Goths, driven southwards by the Huns, asked and received permission to settle on Roman territory. Irritated by the treatment they received at the hands of the imperial officials they soon took up arms, and in 378 defeated Valens and destroyed the greater part of his army. Valens was never seen or heard of afterwards.

**Valentia**, or VALENCIA (vā-len'shl-a), a small fertile island off the southwest coast of Ireland, belonging to County Kerry, about 5 miles long by 2 miles broad. It has slate and flag quarries and productive fisheries. The British Atlantic telegraph cables to Newfoundland start from Valentia, and there is a lighthouse.

**Valentine**, St. (val'en-tin), a saint of the Roman calendar, said to have been martyred in 306 A.D. The custom of choosing valentines on his day (Feb. 14) has been accidentally associated with his name. On the eve of St. Valentine's day young people of both sexes used to meet, and each of them drew one by lot from a number of names of the opposite sex, which were put into a common receptacle. Each gentleman thus got a lady for his valentine, and became the valentine of a lady. The gentlemen remained bound to the

service of their valentines for a year. A similar custom prevailed in the Roman Lupercalia, to which the modern custom has, with probability, been traced. The day is now celebrated by sending anonymously through the post sentimental or ludicrous missives specially prepared for the purpose. But this practice is also on the decline.

**Valentinians** (val-en-tin'i-ans), a sect of Gnostics (which see).

**Valenza** (vā-lent'sā), a town of Northern Italy, province of Alessandria, pleasantly situated on the right bank of the Po. It has a cathedral of the sixteenth century. Pop. 7115.

**Valerian** (va-lē'ri-an; *Valeriana officinalis*), a plant of the order Valerianaceæ, native of Europe, which grows abundantly by the sides of rivers, and in ditches and moist woods.

The root has a very strong odor, which is dependent on a volatile oil. It is used in medicine, in the form of infusion, decoction, or tincture, as a nervous stimulant and antispasmodic. Cats and rats are very fond of valerian. *Valeriana rubra*, or red valerian, is cultivated in gardens, as well as many other species, on account of its elegant flowers. *V. sylvatica*, wild valerian, is found in swamps from Vermont to Michigan; *V. pauciflora* in Ohio, Virginia and Tennessee; *V. ciliata* in low grounds in Canada, Wisconsin and Ohio. The true valerian of the shops is a product of *V. officinalis*.

**Valerianus** (va-le-ri-ā'nus), PUBLIUS LICINIUS, a Roman emperor from 253 to 260. He was taken prisoner by the Persians in 260, and his after fate is unknown.

**Valerius Flaccus** (va-lē'ri-us flak'-us), CAIUS, a Roman epic poet who flourished in the reign of Vespasian, about 70-80 A.D. He was author of the *Argonautica*, a poem which extended to eight books, but was left unfinished.

**Valetta** (vā-let'tā), a strongly fortified seaport, capital of Malta, on the N. E. coast of the island, situated



Valerian (*Valeriana officinalis*).

## Valhalla

on an elevated neck of land, with a large and commodious harbor on each side. The town has wide streets paved with lava, spacious squares, and fine quays, lined with elegant buildings. From the inequality of the site the communication between the different streets is maintained by flights of steps. The cathedral, built in 1580, contains the tombs of the knights of Malta or of St. John (see *John, Knights of St.*), and in a chapel are the keys of Jerusalem, Acre, and Rhodes. Other notable buildings are the governor's residence, formerly the palace of the grand-masters; the library, museum, university, and the military hospital. The dockyard is capable of admitting the largest men-of-war. Some shipbuilding and various other industries are carried on, and the trade includes grain, wine, fruits, cotton, and other manufactures, coals, etc. The mail steamers for Alexandria, Constantinople, etc., call here, and it is the chief station of the British fleet in the Mediterranean. Pop. 61,268. See *Malta*.

**Valhalla** (val-hal'a), in Northern mythology, the palace of immortality, inhabited by the souls of heroes slain in battle, who here spent much of their time in drinking and feasting. The name is applied figuratively to any edifice which is the final resting-place of many of the heroes or great men of a nation, and specifically to an edifice built by Ludwig I of Bavaria, a few miles from Ratisbon. See *Walhalla*.

**Valkyrias** (val-kir'i-as), VALKYRES, in Northern mythology, the 'choosers of the slain,' or fatal sisters of Odin, represented as awful and beautiful maidens, who, mounted on swift horses and holding drawn swords in their hands, presided over the field of battle, selecting those destined to death and conducting them to Valhalla, where they ministered at their feasts, serving them with mead and ale in skulls.

**Valladolid** (vál-yá-do-lid'), a city of Spain, capital of the province of the same name, 98 miles northwest of Madrid. It has a cathedral, many churches and suppressed convents, three hospitals, and a university. The church of Santa María la Antigua dates back to 1088. Columbus died in this city and Cervantes dwelt here 1603-06. It was formerly the capital of Castile. The manufactures consist of silks, cotton and woolen goods, hats, jewelry, paper, etc. Pop. 68,789. —The province has an area of 3042 square miles, and a population of 278,561. It is well watered by the Douro and its tributaries, and is very fertile.

**Valladolid**, a city of Mexico, same as Morelia (which see).

**Vallandigham** (va-ian' de-gam), CLEMENT L., politician, born at New Lisbon, Ohio, in 1820. He was a member of Congress 1858-63, supported the Southern Confederacy in the House of Representatives, and made such violent harangues in favor of the insurgents that he was arrested in May, 1863, on a charge of uttering disloyal sentiments. He was tried by court-martial and sentenced to confinement until the end of the war, this being commuted to banishment to the Confederate lines. Not being warmly received there, he went to Canada. In the same year the Democrats of Ohio denounced his banishment and nominated him for governor, but he was beaten by the largest majority ever given in that state. He died in 1871.

**Vallejo** (val-á'hō or vál-yá'hō), a city and seaport of California, capital of Solano Co., on an arm of San Pablo Bay, 23 miles N. E. of San Francisco, in a fruitful farming region. It has a spacious harbor, flour-mills, shipyards, iron-foundries, and machine-shops. Large quantities of grain are shipped. There is a United States navy yard on Mare Island, near this place. Pop. 11,340.

**Valleyfield**, a town of Quebec province, Canada, on Beauharnois Canal, 3 miles S. E. of Coteau Landing. Has cotton, flour and other industries. Pop. 9447.

**Valley Forge**, a village in Chester Co., Pennsylvania, on the Schuylkill River, and 24 miles W. N. W. of Philadelphia. It is celebrated as the place where Washington with about 11,000 troops went into winter quarters in December, 1777. It was here also that Baron Stenben became inspector-general of the army, and the treaty of alliance with France was announced, May 6, 1778. During the winter the American army suffered very greatly from cold and hunger, and about half of the men were rendered unfit for active duty. The state has converted the locality into a public park, as a historic landmark, and a monument has been erected by the Daughters of the Revolution to the memory of the soldiers who died in camp during that winter of suffering.

**Vallisneria** (val-is-nē'ri-a), a genus of aquatic plants, of the nat. order Hydrocharidaceæ. They grow at the bottom of the water, and the male and female flowers are separate. When the time of fecundation arrives the male flowers become detached, and





## Vampire

In 1861-64, disguised as a dervish, he undertook an extensive journey of exploration through Persia into Turkestan, and visited Kblva, Bokhara, and Samarcand. In 1865 he became professor of Oriental languages at the University of Budapest, and he wrote many valuable linguistic works as well as works on his travels, including *Travels in Central Asia* (1865); *Wanderings and Adventures in Persia* (1867); *Sketches of Central Asia* (1868); *History of Bokhara* (1873); *Central Asia and Anglo-Russian Frontier* (1874); *Islam in the Nineteenth Century* (1875); *The Origin of the Magyars* (1882); *The Coming Struggle for India* (1883); *Story of Hungary* (1887); etc. The *Story of his Life and Adventures* appeared in 1888. He has also been a frequent contributor to periodical literature in England, Germany, and Hungary.

**Vampire** (*vamp'ir*), a superstition of modern origin existing among the Slavonic and other races on the Lower Danube. A vampire is a ghost still possessing a human body, which leaves the grave during the night and sucks the blood of living persons, particularly of the young and healthy. Dead wizards, heretics, and such like outcasts become vampires, as does also any one killed by a vampire. On the discovery of a vampire's grave the corpse must be disinterred, thrust through with a white-thorn stake, and burned.

**Vampire-bat**, a name for certain bats inhabiting South America. The name was given from the blood-sucking habits attributed to these bats, but how many of them really attack animals and suck blood from them is not quite clear. One species at least, known as the vampire-bat (*Vampyrus spectrum*), of large size and having formidable teeth, seems to be conclusively acquitted of the charge, its regular food being fruits and insects. It has large leathery ears, an erect spear-like appendage on the tip of the nose, wings when extended measuring 28 inches. Several bats, however, have been proved to be blood-suckers, the best-known being *Desmodus rufus*, a species only about 4 inches long and 15 or 16 in expanse of wing. It has large prominent upper incisors of peculiar shape, and upper canines somewhat similar, and the stomach and intestines are evidently specially adapted for a diet of blood. This species of bat seems to be generally distributed throughout the warmer parts of South America from Chile to Guiana. The blood-sucking propensities of these bats are by no means so dangerous as

formerly and popularly described; but there is little doubt that they do attack horses and cattle, and sometimes even man in his sleep.

**Van** (*vân*), chief town of a vilayet of the same name in Armenia, Asiatic Turkey. It is pleasantly situated near Lake Van, and is overlooked by an old citadel. Cotton cloth is manufactured and exported. Pop. about 30,000. — Lake Van is a salt-water lake, 5467 feet above sea-level; area, about 1600 square miles. It contains many islands, and has no visible outlet.

**Vanadium** (*va-nâ'di-um*), a metal discovered in 1830, although what was at first considered the metal was really an oxide; chemical symbol V; atomic weight 51.2. Vanadium has a strong metallic luster, considerably resembling silver, but still more like molybdenum. When in mass it is not oxidized either by air or water, but the finely-powdered metal quickly takes up oxygen from the air.

**Van Beneden** (*van ben - e'den*), PIERRE JOSEPH, a Belgian naturalist, born at Mechlin in 1809; died in 1894. He became professor of geology at Ghent in 1835, and at Louvain in 1836, remaining there till his death. In 1843 he established the first laboratory and aquarium for the study of marine life, and he won a wide reputation by his study of parasites.

**Vanbrugh** (*van-brû*), SIR JOHN, an English architect and dramatist, born about 1690, and was educated partly in England and partly in France. He entered the army, became well known in London as a man of fashion, and then turned his attention to play-writing. His first play, *The Relapse*, was brought out at Drury Lane about 1697, and was followed by *The Provoked Wife*, and *Esop*. The first two of these had all the wit and most of the freedom of treatment which characterized that period, but *Esop* was moral and dull, and therefore unsuccessful. How he obtained his knowledge of architecture is not known, but at this time (1702) Vanbrugh designed Castle Howard, the seat of the Earl of Carlisle. Afterwards he entered with Congreve into a speculation to build a great theater at the west end of London, in which he was his own architect; but it did not prove a success. In 1706 he was commissioned by Queen Anne to present the garter to the Elector of Hanover, and the same year he was occupied with the erection of *Bienheim Palace*. This work got him into considerable pecuniary trouble, as parliament, which voted it,

## Vanbrugh

## Van Buren

voted nothing for its payment. He built many other mansions for the nobility; in 1714 he was knighted by George I, in the following year appointed controller of the royal works, and in 1716 surveyor of Greenwich Hospital. He died March 26, 1726. Vanbrugh's plays are admirable in dramatic conception as well as in wit, and his architectural works received the approval of Sir Joshua Reynolds.

**Van Buren** (van bū'ren), **MARTIN**, eighth president of the United States, was born at Kinderhook, New York, Dec. 5, 1782. He early studied law, and in 1812 was elected to the state senate. He was attorney-general from 1815 to 1819, and in 1821 was elected United States senator. In 1828 he became governor of New York, and in the following year President Jackson appointed him secretary of state. In November, 1832, he was elected vice-president by the Democratic party in association with President Jackson, and in 1836 was elected president of the United States. The difficulties which his administration had to face were chiefly connected with the deposit of state funds in private banks, and his term of office was made notable by a business depression of great intensity. He was again nominated for President in the elections of 1840 and 1848, but was unsuccessful on both occasions. He wrote a treatise entitled *An Inquiry into the Origin and Course of Political Parties in the United States*. He died in July, 1862.

**Vancouver** (van-kō'ver), **GEORGE**, an English navigator, born about 1758; died in 1798. He entered the navy as midshipman in 1771; accompanied Captain Cook on his second and third voyages of exploration (1772-74 and 1776-79); was made first lieutenant in 1780; and served in the West Indies until 1789. In 1790 he was put in command of a small squadron sent to take over Nootka from the Spaniards, and was also charged to as-

certain if there was a northwest passage. He sailed in the *Discovery* in 1791, spent some time at the Cape of Good Hope, and afterwards at Australia and New Zealand, the coasts of which he surveyed. He then went north and received formal surrender of Nootka, and spent the three summers of 1792-94 in surveying the coast as far north as Cook's Inlet. On his return voyage he visited the chief Spanish settlements on the west coast of South America, and reached England in 1795, where a narrative of his voyage was published in 1798.

**Vancouver**, a town and port of British Columbia, on the Strait of Georgia, and forming the western terminus of the Canadian Pacific Railway. Though established as late as 1885, it has had a rapid growth and developed a flourishing trade and numerous manufactures. Pop. (1914) 110,000; with suburbs, 156,000.

**Vancouver**, a city, county seat of Clatsop Co., Washington, on the Columbia River, 6 miles N. of Portland, Oregon; served by five railroads. the largest sailing vessels reach the wharf, fruit, lumber, flour, walnuts, potatoes, prunes, and dairy products being the principal shipments. There are saw-mills, fruit-packing industries, etc., mining and manufactures. Pop. 12,000.

**Vancouver Island**, an island in the Pacific, off the west coast of British Columbia, of which province of Canada it forms part; length, from 250 to 300 miles; breadth, from 10 to 70 miles; area, about 12,000 square miles. It is generally mountainous, and heavily timbered. The climate is temperate, and the soil, in the south and east, fertile and favorable to agriculture and fruit growing. The interior is rocky, interspersed with small grass tracts suitable for pasturage, and with lakes and small streams. Coal is worked (Nanaimo), and gold, copper and iron ore, and other minerals are found. Horses, cattle,



sheep and pigs thrive well, and the seas and lakes abound with fish. Large quantities of salmon are exported, and there is an extensive trade in fur, the skins exported being chiefly those of the mink, marten, sable, fox, bear, beaver, otter, seal, and deer. There are numerous good harbors along the coasts, the chief of which is Esquimaux (which see). As this island lies opposite the terminus of the Canadian Pacific Railway it has recently acquired great importance. The chief town of the island, and the capital of British Columbia, is Victoria, in the extreme southeast. Pop. of the island about 50,000.

**Vandals** (van'dais), a German nation or confederation, probably allied to the Goths, who occupied at an early period the country on the south of the Baltic, between the Oder and the Vistula. At a later period they appear to have descended into Silesia, and subsequently occupied Pannonia, Moravia, and Dacia. In 406, in conjunction with a German host, they ravaged Gaul, and thence found their way into Spain. After defeating an allied army of Goths and Romans, they seized Seville and Carthage, and, led by Genseric, crossed to Africa. Here they vanquished the Roman governor (429), and founded a kingdom, which absorbed the greater part of the Roman possessions. Genseric immediately began to revive the maritime glories of Carthage, and extended his conquests to Sicily, Sardinia, and Corsica. He also invaded Italy and sacked Rome in 455. Genseric concluded a long reign in peace in 477. The kingdom of the Vandals was continued under his descendants—Huneric, his son, who immediately succeeded him; Gundamund, 484; Thrasimund, 496; Hilderic, 523; Gelimer, 530. It was overthrown in 534 by Belisarius, the general of the eastern Emperor Justinian.

**Vanderbilt** (van'dér-bilt), CORNELIUS, capitalist, born on Staten Island in 1794; died in 1877. A poor boy, he engaged in steamboat enterprises, which greatly expanded, and in later life in railroad management, and acquired great wealth. His son, William Henry (1821-85) added enormously to this wealth. The Vanderbilt University (Methodist Episcopal) at Nashville, Tennessee, was founded by Cornelius, who presented it with \$1,000,000; to which William H. added \$310,000.

**Van Diemen's Land** (van de'men). See Tasmania.

**Van Dyck** (van-dik'). SIR ANTHONY, except perhaps Titian the

greatest of all portrait-painters, was born at Antwerp on March 22, 1599, where his father was a merchant. He studied painting first under Van Balen, and then under Rubens, quitting the studio of the latter after a few years to proceed to Italy, where he spent about five years (1623-28) chiefly at Genoa, Venice, and Rome, and then returned to Antwerp. Having acquired a great reputation as a portrait painter he was invited to England by Charles I, who bestowed upon him the honor of knighthood, a considerable annuity, and a summer and winter residence. The painter



Cornelius Vanderbilt

rewarded this generosity by unceasing diligence, and executed, besides a multitude of portraits, several mythological and historical paintings. He was fond of splendor, and lived in a very expensive style. Shortly after his marriage to Mary Ruthven, a granddaughter of the Earl of Gowrie, he died (December 9, 1841), and was buried in St. Paul's. Vandyck's great strength lay in portrait painting, and he excelled in the knowledge of *chiaroscuro*, but he sometimes amused himself with engraving and etching.

**Van Dyke** (van dik), HENRY, author, was born at Germantown, Pennsylvania, in 1832. He was educated at Princeton and Berlin, became a pastor at Newport in 1878, at New York in 1882, preacher to Harvard University in 1890-92 and 1898-99, and lecturer at Yale in 1896. As an author he has been prolific, some of his works being *The Poetry of Tennyson* (1889), *The First Christmas Tree* (1897), *The Tolling of Felix and other Poems* (1900), *The Open Door* (1903), *The Spirit of Christmas* (1905), *Out of Doors in the Holy*

*Land* (1908). In 1913 he was appointed ambassador to the Netherlands.

**Vandyke Brown**, a pigment obtained from a kind of peat or bog-earth, of a fine, deep, semitransparent brown color; so called from its being supposed to be the brown used by Vandyck in his pictures.

**Vane** (vān), **SIR HENRY**, an English statesman and writer, born in 1612, eldest son of Sir Henry Vane, secretary of state. He was educated at Westminster and Oxford, afterwards completing his education at Geneva, where he became a puritan and a republican. Returning to England, he found that his religious and political opinions exposed him to much ill-will and annoyance, and he consequently emigrated to New England, arriving at Boston in 1635. He was elected governor of Massachusetts in 1636. In 1637 he returned to England, after which he was knighted, entered parliament, and became treasurer of the navy. He took part in the impeachment of Strafford, and was a zealous supporter of parliament in the civil war and one of the leaders in the Long Parliament. He was also a supporter of the Solemn League and Covenant. He was averse to the execution of the king, and came into conflict with Cromwell in consequence of the forcible dissolution of the Long Parliament (1653). In 1656 he was imprisoned in Carisbrooke Castle for four months, by order of Cromwell, on account of a pamphlet he had written. On his release he continued to resolutely oppose the government of Cromwell and of his son Richard. In 1659 he was a member of the committee of safety and president of the Council of State. After the Restoration he was sent to the Tower (Feb., 1660), and subsequently moved from prison to prison. A rising of the Fifth Monarchy party (Jan., 1661) led to increased severity towards him, and he was tried for high treason before the Court of King's Bench, June 2, 1662, condemned, and beheaded on Tower Hill on June 14th. He wrote various theological works characterized by excessive mysticism, and his religious views gave rise to a small circle of disciples known as Vanists.

**Vanella**. See *Lapwing*.

**Van Eyck**. See *Eyck*.

**Vanilla** (va-nill'a), a flavoring agent used in confectionery, and in the preparation of liqueurs, procured from the fruit of *Vanilla aromatica* and *V. planifolia*, orchidaceous plants of

tropical America, remarkable on account of their climbing habits, and now cultivated in various tropical countries, including Ceylon and India. It has a fragrant odor, and is also used in medicine as a stimulant and promoter of digestion.

**Vannes** (vān), a seaport of France, capital of the department of Morbihan, 64 miles N. W. of Nantes. It has ancient walls and gates. There is a cathedral, and a museum rich in Celtic antiquities. Pop. (1906) 16,728.

**Van Rensselaer** (ren'sei-ler), **STEPHEN**, statesman, was born in New York in 1764; died in 1839. He became known as 'the Patroon,' being a descendant of the older patroons, or great land holders. He was lieutenant-governor of the State for six years, and commanded the New York militia in 1812. He coöperated with Clinton in building the Erie Canal, and founded in 1824 Rensselaer Institute (now the Polytechnic School) at Troy; was distinguished for his zeal in the cause of science.

**Van Wert**, a city, capital of Van Wert Co., Ohio, 27 miles W. N. W. of Lima. It has railroad shops, lumber and flour mills, and oil-well supply works, etc. Pop. 7157.

**Vapor** (vā'pur), in physics, a term applied to designate the gaseous form which a solid or liquid substance assumes when heated. Vapor is, therefore, essentially a gas, and seeing that all known gases have now been proved to be liquefiable, no physical difference can be said really to exist between an ordinary gas, such as oxygen, and a vapor, such as steam. In common language, however, a difference is usually recognized; a gas is a substance which at ordinary temperatures and pressures exists in a state of vapor; while a vapor is produced by the application of heat to a substance which normally exists in a solid or liquid form. The difference has been otherwise explained to be one not so much of kind as of degree; steam in the boiler of a steam-engine being said



Vanilla (*Vanilla aromatica*.)



to be in a state of vapor, while superheated steam is said to be a gas. Aqueous vapor formed on the surface of the land and water is always present in suspension in the atmosphere, and when it meets with a reduction of temperature it condenses into water in the form of rain or dew.

**Var** (vär), a department in the south-east of France, bordering upon the Mediterranean, and covered in the interior with ramifications of the Alps; area, 2340 square miles, of which only a small portion is arable. There are magnificent forests of pine and oak, and the vine, olive, mulberry and tobacco are extensively cultivated. Minerals include salt, lead, coal, marble, gypsum and building stone. The manufactures consist of woollens, perfume, liqueurs, olive-oil, soap, leather and silk. The coast is bold and deeply indented; and the fishing, both of tunny and anchovies, is actively carried on. The capital is Dragnignan. Pop. 826,384.

**Varangians** (vā-ran'jī-anz), or VARAGIANS, the name applied to the Norse vikings, who, at the close of the ninth century, founded various principalities in Russia. Some of them afterwards entered the service of the Byzantine emperors, and became the imperial guards at Constantinople. Here they were recruited by Anglo-Saxons and Danes, who fled from England to escape the Norman yoke.

**Varanidæ.** See *Monitor*.

**Varasdin** (vā-rās-dēn'), a town of Austria, capital of a county of the same name in Croatia. It has an old castle, several Roman Catholic churches, a high school, and manufactories of tobacco, liqueurs, vinegar, and silk wares. Pop. 12,930.

**Variable Quantities**, in mathematics, such quantities as are regarded as being subject to continual increase or diminution, in opposition to those which are constant, remaining always the same; or quantities which in the same equation admit of an infinite number of sets of values. Thus, the abscissas and ordinates of a curve are variable quantities, because they vary or change their magnitudes together, and in passing from one point to another their values increase or diminish according to the law of the curve. See *Calculus* (in mathematical sense).

**Variable Stars**, stars which undergo a periodical increase and diminution of their light. This is supposed to be due to dark com-

panions, which cut off part of their light at intervals by rotating around them.

**Varicose Veins** (var'i-kōs), veins in a diseased state, which became dilated and uneven, and form hard knotty swellings in the situation of their valves. The disease is a common affection of the lower limbs, where sometimes the varix bursts and hemorrhage takes place. It also occurs in the veins of the scrotum and lower rectum, producing in the latter case bleeding piles. Varicose veins are caused by local obstruction of the circulation of the blood, and are common in pregnancy, while stout people, and those who stand most of the day at work, are apt to suffer from them. The treatment consists in the application of proper bandages, and rest to the limb supported in an elevated position.

**Variety** (va-ri'e-ti), in scientific classifications, a subdivision of a species of animals or plants; an individual or group of individuals differing from the rest of the species to which it belongs in some accidental circumstances which are not essential to the species. Varieties are considered as less permanent than species, and those naturalists who look upon species as strictly distinct in their origin, consider varieties as modifications of them arising from particular causes, as climate, nourishment, cultivation, and the like. See *Species*.

**Varna** (vār'nā), a fortified town of Bulgaria (of which it is the chief port), on the Black Sea. It has a good harbor, and a large trade with Constantinople in grain. It is the see of a Greek archbishop. A memorable battle between the Turks and Hungarians was fought here in 1444. It was taken by the Russians in 1828, but restored to Turkey a year later by the Peace of Adrianople. The Crimean expedition sailed from Varna in 1854. Pop. (1906) 37,155.

**Varnhagen von Ense** (farn-hā'gen fon en'se), KARL AUGUST, a German biographer, born at Düsseldorf in 1785; died at Berlin in 1858. He had a considerable military experience in his younger days, and was latterly engaged in the Prussian diplomatic service. Among his chief works are *Biographische Denkmale, Denkwürdigkeiten und Vermischte Schriften, Tagebücher*, and *Lives of Von Seydlitz, Sophia Charlotte, Marshal Keith*, etc.

**Varnish** (vār'nish), a solution of resinous matter, forming a

## Varnish Tree

clear, limpid fluid, capable of hardening without losing its transparency, and used by painters, gliders, cabinet makers, etc., for coating over the surface of their work, in order to give it a shining, transparent, and hard surface, capable of resisting in a greater or less degree the influences of air and moisture. The resinous substances most commonly employed for varnishes are mastic, sandarac, lac, copal, amber, and asphalt; and the solvents are fixed oil, volatile oil, and alcohol. Varnishes are colored with arnotto, gamboge, saffron, dragon's blood, etc. Fixed-oil varnishes are the most durable, and are the best adapted for exposure to the weather. Volatile-oil varnishes consist of a solution of resin in oil of turpentine. They are chiefly used for painting.

**Varnish Tree**, the name given to furnish a resinous juice used for varnishing or for lacquering. They are chiefly natives of the hotter parts of the Eastern Hemisphere.

**Varro** (var'ō), MARCUS TERENTIUS, one of the most learned men and prolific writers of ancient Rome, born B.C. 116, served in the army, and subsequently filled several high offices. Varro was the intimate friend of Cicero, and was proscribed by Antony, but he escaped and returned to Rome under Augustus, and died there in A.C. 27. Of his numerous writings, chiefly on language, history, and philosophy, only one has come down to us entire—a treatise upon agriculture (*De Re Rustica*). Fragments of a treatise on the Latin language (*De Lingua Latina*) are also extant.

**Varuna** (va'rū-na), in Hindū mythology, the god of water, the cause of rain, lord of rivers and the sea,



Varuna, the Indian God of Waters.

the Hindu Neptune or Poseidon indeed. His name corresponds with Greek *Gurānos* (*Urānos*), and meant origi-

nally the sky or heavens. He is represented as a white man, four-armed, riding on a sea animal.

**Varus** (vā'rus), PUBLIUS QUINTILIUS, a Roman general. In 7 A.C., having received from Augustus the command to introduce the Roman jurisdiction into the German territory ordered by Drusus, he was carrying out his mission when he was suddenly attacked by an immense host under Arminius, and his whole army destroyed. Varus put an end to his own life. See *Arminius*.

**Vasa** (vā'sā), GUSTAVUS. See *Gustavus*.

**Vasari** (vā-sā'rē), GIORGIO, an Italian painter and architect, but most distinguished as the biographer of artists, was born at Arezzo, in Tuscany, in 1512, and studied under Luca Signorelli, Michael Angelo, and Andrea del Sarto. As an architect he showed great ability; as a painter he was less successful. His *Vite de' più eccellenti Pittori, Scultori ed Architetti* ('Lives of the Most Excellent Painters, Sculptors and Architects') is of great interest, but contains many errors. Vasari died in 1574.

**Vasculares** (vas-kū-lā-rēs), or VASCULAR PLANTS, a great division of plants, consisting of those in which vascular tissue appears, and including all phanerogamous plants, both exogenous and endogenous. See *Cellulares*.

**Vascular Surgery**, the surgery of the blood vessels, practically created by Alexis Carrel. Vascular surgery was only in its initial stage when Dr. Carrel began his investigations, so that an entire system had to be worked out. The first point was to show that the wall of a vessel could be sutured without giving rise to coagulation in the interior. This had already been done in the case of a puncture in the wall of a vein, but it was now demonstrated that an incision in the wall of an artery could be sutured while the continuity of the 'lumen' or point of opening was preserved. The methods which had proved successful in the surgery of other organs, however, were too gross for the surgery of the blood-vessels and only infinite care led to the desired results. It is now the standard treatment of an incised wound to suture the wound and not to tie the vessel in its continuity.

**Vascular Tissue** (vas-kū-lar), in plants, consists of elongated ducts or cells, which may have closed extremities, so that fluids pass from one cell to another through the partition walls, or these partitions may be partly obliterated, thus forming a continuous tube. See *Botany*.

**Vase** (váz, vás), a name applied to certain vessels of an ornamental character. Vases were made in ancient times of all materials, but those which have come down to us in greatest numbers are the so-called Etruscan vases, made of terra cotta, and adorned with painted figures. (See *Etruscan Vases*.) Such vases have been found in most Greek cities as well as in Etruria, and all are really the productions of Greek art. The Greek vases of the oldest



Grecian Vases.

style mostly come from Corinth and the islands of Thera and Melos; and those of the late rich style have been almost exclusively discovered in Lower Italy (Apulia and Lucania), and were probably manufactured there, chiefly in the fourth and third centuries B.C. Vases were used for all purposes, but one peculiar and very common application of them was to adorn sepulchers. Chased metal vases were in use in ancient times both among the Greeks and



Chinese, Japanese, and Indian Vases.

Romans, and many of the more valuable and beautiful kinds of stone were also used for making vases. Murrine vases (which see) were highly esteemed at Rome. Another favorite kind of vases at Rome was that called cameo vases, made of two layers of glass, the outer of which was opaque, and was cut down so as to leave figures standing out upon the lower layer as a ground. The celebrated Portland vase is an example of this kind. At a later period glass vases surrounded with delicate filigree work

were introduced. Italy, France, and Germany in the sixteenth and seventeenth centuries produced many vases which are the perfection of artistic form and execution, and since the fifteenth century many masterpieces of the glass art in the form of vases have issued from the Venetian manufactories. From India, China and Japan have also been obtained vases of varying materials, especially of porcelain, vying in elegance of form and beauty of ornamentation with those produced in Europe.

**Vasectomy** (vā-sec'tu-mi) is the operation of cutting out a small section of the *vas deferens* of the male. It is done in some penal institutions and homes for mental defectives to prevent procreation of similar public charges. It is legally enforced on these classes of persons in eight states. The result of the operation is to prevent propagation of unfit persons and improve the mental and physical condition of those operated upon. This operation has already been carried out for over six years in one of the States of the Union, which has the most intelligent criminal and charitable code, with actual results that far exceeded expectations. The effect upon the male criminal was to render him much more amenable to discipline, to improve his general nutrition and his mental balance, and to give him a sense of protection against himself and of a new grip upon his life problem. For instance, while the average rate of relapse and return of thousands of convicts sent out from this institution has been about 25 per cent., out of 106 men set at liberty on parole after being submitted to vasectomy, only 5 have relapsed and been brought back. It originated with Dr. H. C. Sharp, of Indianapolis, and is called the 'Indiana plan.' The *vas deferens* can at any time be reunited and thus restored to its pre-operation condition, with the function of procreation restored. The corresponding operation on the female is called *salpingotomy* (which see).

**Vaseline** (vas'e-lén), a name given to a product obtained from petroleum after the lighter hydrocarbons are driven off, and composed of a mixture of paraffins. It is used as a base for ointments, pomades, cold-cream, etc., and for coating surgical instruments and steel surfaces generally to protect them from rust.

**Vassal.** See *Feudal System*.

**Vassar College**, a university at York, founded by Matthew Vassar in

1861 for the higher education of women. It confers the degrees of B.A. and M.A., and the course of studies resembles those of other first-class colleges. Its annual class of students numbers over 1000 and it has endowed funds of nearly \$1,400,000.

**Vateria** (va-tě'ri-a), a genus of plants, nat. order Dipterocarpaceæ. Two species, *V. indica* and *V. lanceafolia*, belong to India, forming large trees, valuable both for their timber, and also for the products which they yield. *V. indica*, whose timber is much employed in shipbuilding, produces the resin called in India *copal* and in England *gum anime*. It also yields a fatty substance called *piney-tallow*.

**Vathi**, or VATHY. See *Ithaca*.

**Vatican** (vat'i-kan), the most extensive palace of modern Rome, the residence of the pope, built upon the Vatican Hill, from which it has received its name, on the opposite side of the river from the bulk of the city, immediately to the north of the cathedral of St. Peter's. It is a long rectangular edifice lying north and south, with an irregular cluster of buildings at either end. The present building was begun by Pope Eugenius III (1145-53), and has been enlarged and embellished by many subsequent popes down to the last one (Pius X). It now possesses twenty courts, and, it is said, 11,000 rooms of one sort or another. Immense treasures are stored up in it. Here are celebrated collections of pictures of many of the great masters, and museums in which all periods of the arts are represented by many of their most perfect productions. Among its noblest art treasures are the frescoes on the ceiling of the Sistine Chapel, painted by Michael Angelo, and consisting of scenes and figures connected with sacred history; and the frescoes painted by Raphael on the ceilings and walls of certain apartments known as *Raphael's stanze*, the subjects being biblical, allegorical, etc. Since the return of the popes from Avignon, the Vatican has been their principal residence, and here the conclaves always meet for the election of new popes. The *Vatican Library* was first constituted by Pope Nicholas V (1447-55), and was added to and enlarged by Leo X, Pius IV, Pius V, and other popes. The most important part of the library is the manuscript collection, which is said to contain about 25,000 MSS. The number of printed volumes has been estimated at from 150,000 to 220,000, including 2500 fifteenth-century editions, and a great number of bibliographical rarities.

**Vatican Codex.** See *Codex*.

**Vatican Council**, the Ecumenical Council of the Church of Rome which met in the Vatican in 1870, under Pope Pius IX, and declared the personal infallibility of the pope when speaking *ex cathedra* to be a dogma of the Church.

**Vattel**, EMRICH VON (fon vat-tei'), a celebrated Swiss jurist and writer, born in Nenschâtel in 1714; died in 1767. His great work was *The Right of Nations, or the Principles of Natural Law Applied to the Conduct and Affairs of Nations and Sovereigns*. This has been published in numerous editions and translated into the principal European languages.

**Vauban** (vô-bân), SÉBASTIEN LE PRESTRE, SEIGNEUR DE, Marshal of France, and the greatest military engineer of that country, descended of an ancient and noble family, was born in 1633, and early entered the army, where he rose to the highest military rank by his merit and services. He was made governor of the citadel of Lille in 1668, commissioner-general of fortifications in 1677, and marshal of France in 1703. He died at Paris in 1707. As an engineer he carried the art of fortification to a degree of perfection unknown before his time. He strengthened and improved above 300 citadels, erected thirty-three new ones, and directed fifty-three sieges.

**Vaucluse** (vô-klüz), a department in the southeast of France; area, 1381 sq. miles. It is rugged and mountainous in the east, but more than one-half of the whole surface is arable, and vineyards occupy about one-sixth of this portion. The mulberry (for the rearing of silk-worms) and olive are extensively cultivated, and much attention is paid to the culture of aromatic and medicinal plants. Vaucluse takes its name from the valley and village of that name, celebrated by Petrarch. Avignon is the capital. Pop. (1906) 239,178.

**Vaud**, or PAYS-DE-VAUD (pe-e-dé-vô; German, *Waadt* or *Waadtland*), a western canton of Switzerland; area, 1244 sq. miles. It has three mountain systems—the Aips in the southeast, the Jura in the west, and the Jorat in the south, connecting the other two. Vaud belongs partly to the basin of the Rhine and partly to that of the Rhone. The soil is moderately fertile; and the vine is extensively cultivated in the south. There are no manufactures of importance. The inhabitants are mostly Protestants. Vaud became a canton of



the Swiss Confederation in 1803. The capital is Lausanne. Pop. 281,379.

**Vaudeville** (va'de-vil'), a term first applied to the Norman folk-song of the fifteenth century, which originated with Oliver Basselin, who lived in the val or Vau de Vere. The folk-song led to a series of plays interspersed with songs, and known as Vaudevilles, occasionally as Virelais. The word is now applied to light theatrical entertainments.

**Vault**, in architecture, a continued arch, or an arched roof, so constructed that the stones, bricks, or other material of which it is composed sustain and keep each other in their places.



1, Gothic Groined Vault. 2, Spherical or Domical Vault.

Vaults are cylindrical, elliptical, single, double, cross, diagonal, Gothic, etc.

**Vaux** (vaks), CALVERT, landscape architect, born at London in 1824, came to the United States in 1848. With L. L. Olmstead he devised the plans for Central Park, New York, and the Metropolitan Museum and the State Reservation at Niagara. He died in 1895.

**Vector** (vek'tér), in mathematics, the name given to any quantity which involves direction as well as magnitude. The simplest example is the position of one point with respect to another, fully represented by the straight line joining them. Other vector quantities are velocity, force, electric induction, etc.

**Vedanta Philosophy** (ve-dan'tá), a system of Brahmanic philosophy, first set forth in a work called the *Vedānta*, said to have been written more than two thousand years ago, and described as containing the quintessence of the *Vedas*. This system is based, like that of the Eleatics among the Greeks, upon the unity of all real existence. The sole real existence is denominated knowledge (*jñāna*), soul, or God. The multiplicity of individual life and variety of external life in the universe is merely phenomenal, and has all proceeded from the one real being by the exercise of the power of ignorance (*ajñāna*), which may be vanquished by a religious and ascetic mode of life, or by meditation on the one supreme spirit,

Brahma, and by the extinction of all consciousness of outward things.

**Vedas** (vā'daz; from the Sanskrit root *vid*, meaning 'know'), the oldest of the Shastras or sacred writings of the Brahmans, and the oldest compositions in the Sanskrit language. Their date is unknown. Sir W. Jones fixes it at 1500 B.C., and Ritter at 1400 to 1600 B.C. They are four in number, called respectively the *Rig*, *Yajur*, *Sāma*, and *Atharva Veda*. All the Vedas are believed to be inspired, and are held by the Brahmans in the highest respect. The religious system of the Vedas is at bottom monotheistic. It derives a polytheistic appearance from the mention of the deity by various names according to the difference of his manifestations and attributes (*Sūrya*, *Mitra*, etc., the sun; *Soma*, the moon; *Agni*, fire; *Indra*, the firmament, etc.), but the unity of the supreme being is expressly asserted in more than one passage. Each of the Vedas is divided into three parts: the first called the *Saṁhitā*, a collection of hymns and prayers called *mantras* or *gānas*; the second, *Brahmana*, which relates chiefly to ritual; and the third, the *Jñāna* or *Upanishads*, which is the philosophical portion of the work. The Upanishads are sometimes called collectively the *Vedānta*. The *Rig-veda* is the oldest of the Vedas, and the *Atharva-veda* the latest. Some scholars question whether the latter should be regarded as a Veda. Varying greatly in age, the Vedas represent many stages of thought and worship, the earliest being the simplest, the later following and reflecting the development of the Brahmanical system, with all its superstitions and rites.

**Veddahs** (ved'da-), a wild, semi-savage race, about 400 in number, residing in the interior of Ceylon, and said to be a remnant of the aborigines of Ceylon. The forest Veddahs live in trees and caves and subsist on game, which they kill with rude bows and arrows. The village Veddahs dwell in certain districts, but hold slight intercourse with the other inhabitants. The two tribes do not intermarry, and they have their own chiefs whom they elect and obey.

**Vedder** (ved'er), ELIHU, painter, born at New York in 1836. He became a student in Italy, and finally made that country his permanent residence. His works are frequently marked by a mystical and poetical quality and are highly suggestive. His best pictures are *The Lair of the Sea Serpent*, *A Venetian Dancing Girl*, *The*

*Death of Abel, and An Arab Listening to the Sphinx.* His illustrations of Fitzgerald's translation of the *Rubaiyat* of Omar Khayyám (1884) won great praise.

**Vega Carpio** (vā'gā kar'pē-ō), **FELIX LOPE DE**, a Spanish poet and dramatist, born at Madrid in 1562 of poor but noble parents; died there in 1635. After studying at Alcalá he became the secretary of the Duke of Aiva. In 1582 he joined the army, and in 1588 accompanied the Invincible Armada. After being twice married and twice a widower, he in 1609 became a priest, and subsequently entered the order of St. Francis. He had already published various poems, but his dramatic and poetical productions were now multiplied with extraordinary rapidity. He enjoyed an immense popularity, and received marks of distinction from the King of Spain and Pope Urban VIII. About three hundred of his dramatic works have been printed. They reveal an inexhaustible but ill-regulated imagination, a strong mixture of the sublime and the ridiculous, and extraordinary facility in versification. He wrote altogether upwards of eighteen hundred comedies, but only some four hundred and fifty are extant in print or manuscript.

**Vegetable Chemistry**, the department of organic chemistry which investigates the chemical compounds found in vegetables. These compounds are chiefly made up of carbon, hydrogen, oxygen and nitrogen, but potash, soda, lime, and other substances are occasionally present in small and variable quantities. Sugar, starch, gum, and other distinct compounds existing already formed in plants, and capable of separation without suffering decomposition, are called *proximate* or *immediate principles* of vegetables. *Proximate analysis* is the separation of a particular principle from others with which it is mixed. *Ultimate analysis* consists in the reduction of the proximate principles to their simplest parts. The more important classes of compounds to be obtained from vegetables are acids, alkaloids or alkaloids, oils and resins. Coloring matter, tannin, albumen, gluten, yeast, and other substances are also obtained. Of the acids the chief are acetic acid or vinegar, oxalic, tartaric and benzoic acids. The alkaloids are organic bases which produce remarkable toxicological effects. During the germination of seeds there is a conversion of starchy matter into sugar. The nutrition of plants may be regarded as de-

pending upon solar energy, organic and mineral constituents, and water. See *Botany*.

**Vegetable Ivory**, the name which is applied to the kernels of the nuts (*curozo-nuts*) produced by the *Phytelphas macrocarpa*, a palm growing in South America. It is very hard and compact, has the appearance of ivory, and may be turned in the lathe, being used for buttons, umbrella handles, etc. The stem of the palm is extremely short, but the leaves rise to the height of 30 or 40 feet.

**Vegetable Marrow**, a species of gourd cultivated as a culinary vegetable, and used fried, boiled, or otherwise. See *Squash*.

**Vegetable Physiology**, the functional activities of plants. These include the functions of *germination*; *respiration*, as shown in the inhalation of oxygen and exhalation of carbon dioxide; *transpiration*, the vaporization of water by the heat yielded in respiration; *assimilation*, the taking in of carbon under the influence of sunlight, a process the reverse of respiration; *absorption*, the intaking of water from the air and soil; *metabolism*, the formation of complex organic substances from the simple chemical elements; *growth*; *plant movements*; *reproduction*, and other processes of a physiological character.

**Vegetarianism** (vej-e-tā'ri-an-izm), the theory and practice of living solely on vegetables. The doctrines and practice of vegetarianism are as old as the time of Pythagoras, and have for ages been strictly observed by many of the Hindus; and of late years the practice of subsisting solely upon vegetable food has come prominently before the public in connection with dietetic reform.

**Veil** (vē'yl). See *Camillus* and *Rome*.

**Vein** (vān), in mining, a crack or fissure in a rock, filled up by substances different from the rock, and which may either be metallic or non-metallic. Veins are sometimes many yards wide, having a length of many miles, and they ramify into innumerable smaller parts, often as slender as threads. Metallic veins are chiefly found in the primary, and lower and middle secondary rocks.

**Veins** (vānz), a system of membranous canals or tubes distributed throughout the bodies of animals for the purpose of returning the impure blood to the heart and lungs, after it has been conveyed to the various parts

by the arteries. They are not elastic and have no pulsation (thus differing from the arteries), the motion of the blood in them being mainly secured by pressure of the moving parts between which they are embedded, the backward flow of the blood being prevented where necessary by a series of valves which permit a current only towards the heart. The veins at their farthest extremities form capillaries which collect from the tissues the blood brought by the arterial capillaries. These minute branches unite to form veins, which similarly unite in turn, forming gradually larger branches and trunks as they approach the heart. The venous blood from the head, neck, and upper limbs is all returned to the heart by one great vein, the *vena cava superior*, while that from the lower limbs and belly is returned by the *vena cava inferior*. The portal vein (*vena portæ*) receives the venous blood from the intestines and conveys it through the liver to the *vena cava inferior*. From each lung to the heart come two pulmonary veins carrying back the blood that has been purified in the lungs, after being carried to them by the pulmonary artery. See *Heart*.

**Velasquez** (ve-lás'keth), or in full **DON DIEGO RODRIGUEZ DE SILVA Y VELASQUEZ** (or VELAZQUEZ), an eminent Spanish historical and portrait painter, was born at Seville in 1599. He studied first under Francisco Herrera the elder, and afterwards under Francisco Pacheco. He was appointed principal painter to Philip IV in 1623. In 1629 he went to Italy, where he closely studied the works of Michael Angelo, Raphael, and Titian. On his return to Spain in 1631 he was received with great distinction, and in 1658 the king raised him to the dignity of a noble. He died in 1660. His compositions exhibit strong expression, freedom of pencil, and admirable coloring. Among his best works are the *Aguador*, or 'Water Carrier'; the *Orlando Muerto*; a *Nativity*, or *Adoration of the Shepherds*; the *Brothers of Joseph*; *Moses Taken from the Nile*; portraits of Philip IV and of Elizabeth his queen, Pope Innocent X, and other dignitaries; and many pictures from history and from common life.

**Velde** (vel'de), **ADRIAN VAN DER**, a celebrated Dutch landscape painter and engraver, was born at Amsterdam in 1635, and died in 1672. He came under the influence of Wouverman, and excelled in pastoral scenes, which he executed in admirable drawing and color. He also painted some large historical and religious pieces, and etched

a number of plates.—His father, **WILLEM VAN DER VELDE** the Elder, was born at Leyden in 1610. He was originally bred to the sea, but afterwards studied painting, and early became distinguished for his excellence in marine subjects. He entered the service of Charles II of England. He chiefly painted in black and white, and is said to have been present at several sea-fights in order to sketch the incidents. He died at London in 1693.—Another son, **WILLEM VAN DER VELDE**, the Younger, was born at Amsterdam in 1633, and painted the same class of subjects as his father, whom he surpassed. He also entered the service of Charles II. His principal works are chiefly to be found in the royal collections and cabinets of England. He died at London in 1707.

**Velella** (vei-el'a), a curious genus of coelenterate animals, of the class Hydrozoa, order Physophoridae, and represented by free-swimming oceanic forms, which occur around the British coasts, but more frequently in warm seas. The best-known member, *Velella vulgaris*, or 'Sallee Man,' is about 2 inches in length by 1½ in height. It is of a beautiful blue color and semitransparent, and floats on the surface of the sea with its vertical crest exposed to the wind as a sail.

**Velez-Malaga** (vā'lāth mā'lā-gā), a city of Spain, in Andalusia, province of Malaga, on the Velez, 1½ miles from the Mediterranean, and 14 miles N. E. of Malaga. The district is very fertile, and produces sugarcane, maize, etc. Pop. 23,586.

**Velino** (vā-lē'nō), a small stream of Central Italy, a tributary of the Nera, at its junction with which it forms beautiful falls about 350 feet high. See *Terni*.

**Velleius Paterculus.** See *Paterculus*.

**Velletri** (vel-lā'trē), a town in Italy, province of Rome, and 21 miles southeast of Rome. The chief buildings are the cathedral, a handsome Gothic structure rebuilt in 1660; the town-hall, built from the designs of Bramante; and the palaces Lancellotti or Ginetti, and Borgia. Pop. 14,243.

**Vellore** (vel'lōr'), a town and fort of India, presidency of Madras, district of North Arcot, on the Palār River. The town has a Vishnuite temple, mosque, military offices, church, missions, a hospital, barracks, etc. Pop. 43,537.

**Vellum.** See *Parchment*.

**Velocipede** (ve-los'i-ped), a light vehicle or carriage impelled by the feet of the rider himself. One of the older forms of this carriage consisted of two wheels of nearly equal size, placed one before the other, and connected by a beam on which the driver's seat was fixed. The rider, sitting astride the machine, propelled it by the thrust of each foot on the ground. This form dates from the early part of the last century. In the latter half of the century treadles operating cranks on the axle of the front wheel came into use, and soon many modified and improved kinds became popular under the name of the bicycle and tricycle. See *Bicycle, Tricycle*.

**Velocity**, the rate at which a body changes its position in space. Velocity is popularly expressed as so many miles per hour, or as so many feet per second. The velocity of a body is *uniform* when it passes through equal spaces in equal times, *variable* when the spaces passed through in equal times are unequal, *accelerated* when it passes through a greater space in equal successive portions of time, as is the case of falling bodies under the action of gravity, and *retarded*, when a less space is passed through in each successive portion of time. *Angular velocity* is such a velocity as that of the spoke of a wheel, being measured as a number of angles of a specified extent (as right angles) divided by a measure of time in specified units. See *Fall of Bodies, Dynamics, Projectiles, Motion*, etc.

**Velvet** (vel'vet), a rich silk stuff, covered on the outside with a close, short, fine, soft shag or nap. In this fabric the warp is passed over wires so as to make a row of loops which project from the backing, and are thus left, by withdrawing the wire, for an uncut or *pile* velvet, but are cut with a sharp tool to make a *cut* velvet. Florence and Genoa have been long noted for the manufacture of velvet, but Lyons, in France, is now its principal seat. Cotton and woolen fabrics woven in this manner are called *velveteen* and *plush* respectively.

**Vendace** (ven'das), a species of fishes, of the family Salmonidae, genus *Coregonus* (*C. Willoughbi*), found in Europe in some of the rivers and lakes of Britain and Sweden. The average length is about 6 to 7 inches. The fish is esteemed a great delicacy, and is taken with the sweep-net about August.

**Vendée** (vân-dâ), a western maritime department of France; area,

2595 sq. miles. The surface is much diversified, and is watered in the north by tributaries of the Loire, and in the south by the Lay and tributaries of the Charente. The principal crops are grain, flax, and hemp; and a white wine is also produced. Capital, La Roche-sur-Yon. At the time of the revolution the Vendéans espoused the royalist cause, and, inspired by La Rochejaquelein, Cathelineau, and other leaders, and aided by the hilly and wooded nature of the ground, they resisted the republicans with varied success from 1793 to 1796, when the rising was completely quelled by the activity of General Hoche. In 1799-1800, and again in 1814 and 1815, some risings took place in favor of the Bourbons, but they were quickly suppressed. Pop. (1906) 442,777. See *Chouans* and *La Rochejaquelein*.

**Vendémiaire** (vân-dâ-mi-âr; that is, 'vintage month'), the first month in the French revolutionary calendar, from September 22 to October 21. See *Calendar*.

**Vendetta** (ven-det'a; an Italian word from *L. vindicta*, revenge), a blood-feud; the practice of the nearest of kin executing vengeance on the murderer of a relative. In Corsica the vendetta is regarded as a duty incumbent on the relatives of the murdered man, and, failing to reach the real murderer, they take vengeance on his relatives. The practice exists, although to a more limited extent, in Sicily, Sardinia and Calabria, as well as among the Druses, Circassians, Arabs, etc.

**Vendôme** (vân-dôm), a town of France, in the department of Loir-et-Cher, on the Loir. It is regularly and well built, and contains a fine old church. Pop. (1906) 7381.

**Vendôme**, LOUIS, DUKE OF, the celebrated general of Louis XIV, was the grandson of César, eldest son of Henry IV and Gabrielle d'Estrées. He was born in 1654, early entered the military service, and received, in 1702, the command of the French army in the war of the Spanish Succession. After having distinguished himself in Italy, Tyrol, and Belgium, the Duke of Burgundy was placed over him; and the disagreement of the two commanders caused the defeat of the French at Oudenarde (July 11, 1708). Vendôme was recalled. Soon after being placed in command in Spain he gained several distinguished successes, but died in 1712. His brother, Philip, was grand prior of the order of the Knights of Malta in France. He was born in 1655, served in the Spanish war of Succession, and died in 1724.



**Veneer** (ve-nēr'), a thin layer of choice hard wood, such as mahogany, rosewood, maple, etc., glued to the surface of wood of a commoner sort, such as fir or pine, so as to give the whole the appearance of being made of the more valuable material. It is mostly used for furniture, and owing to recent improvements in sawing machinery, layers as thin as paper can be obtained.

**Venesection.** See *Phlebotomy*.

### Venetian Architecture (ve-nē'-shan)

**VENETIAN GOTHIC**, that style of Italian architecture employed by the Venetian architects from the fifteenth to the early part of the seventeenth century. The principal characteristics are: each story is provided with its own tier of columns or pilasters, with their entablature, and separated from the other stories by conspicuous friezes or belts, often in the form of balustrades broken by pedestals and ornamented by figures; arched windows ornamented with columns, the spandrels being often filled with figures; ornamental parapets are common; and the whole has a rich and varied effect. This style of architecture is characterized by Fergusson as "Gothic treated with an Eastern feeling, and enriched with many details borrowed from Eastern styles."

**Venetian School**, in painting, that school which counts among its masters Titian, Paul Veronese, Giorgione, Tintoretto, and many other illustrious names. See *Painting*.

**Venezuela** (ven-e-zwē'la), a northern republic of South America, bounded by the Caribbean Sea, British Guiana, Brazil, and Colombia; area, 599,538 square miles. The Andes enter Venezuela from the west in two branches; the western branch has a moderate elevation, rarely exceeding 4000 feet, but the eastern branch, which is about 300 miles long by 60 miles broad, has an average altitude of 12,000 feet, culminating in Sierra-Nevada-de-Merida with summits attaining 15,000 feet. There are other branches running north-east and parallel to the north coast, and in the south, on the frontiers of Guiana, are the mountains of Parima. From these mountains to the coast chain at Caracas, and from the Andes to the mouth of the Orinoco, extend vast plains (or llanos) with an area of 300,000 sq. miles. The chief rivers are the Orinoco and its affluents; the principal lakes are Maracaibo and Tacarigua. The climate is equatorial in character,

and the seasons are distinguished into the wet and the dry. It is not unhealthy on the whole. The greater part of Venezuela is liable to earthquakes. The valleys and tablelands of the coast mountains are the chief seats of cultivation. The region of palms extends from the sea-level to the height of 3300 feet; mingled with the palms are cacti, mimosa, the pineapple, the milk tree, mahogany, and trees yielding caoutchouc, sarsaparilla, copaiba, and other drugs. Above 2000 feet are the forests of cinchona or Peruvian-bark tree, the vanilla, plantain, etc. All the grains of temperate regions attain perfection at an elevation of 8000 feet. Cultivated plants include the cacao, coconut, tobacco, maize (two crops yearly), cotton, coffee, sugar and indigo. Among the minerals are gold, silver, tin and copper; good coal is found in the coast districts; asphalt and petroleum abound round Lake Maracaibo. The gold mines are now being worked by English and other capital. The wild animals include the jaguar (now rare), puma, tapir, ounce, monkeys, serpents, alligators, the manatee, etc. The population is of Spanish, Indian and Negro origin, either of pure or mixed blood. More than half the population are mestizoes, mulattoes and other mixed breeds. Venezuela was formerly divided into twenty states, four territories, and a federal district, but a readjustment in 1904 reduced the number of states to thirteen, and made the territories five. The Republic of Venezuela was formed in 1831 by secession from the other members of the free state founded by Bolivar. (See *Colombia*.) The capital is Caracas. The chief ports are La Guayra, Puerto-Cabello, Maracaibo and Ciudad Bolivar. Discovery of gold led Great Britain to claim that the boundary of British Guiana extended to the Orinoco, thus including the gold fields. Upon Venezuela's protest, and at the instance of the United States government, the dispute was arbitrated by the Congress at The Hague, and a satisfactory adjustment made. Columbus reached the coast of Venezuela in 1498, and it was visited by Ojeda and Vespucci in 1499. It was settled by Spain, but a struggle for independence began in 1810, resulted in its freedom and formation into a federal republic. As in Latin America generally it has been the scene of many rebellious outbreaks, and under its recent president, Castro, it came into hostile relations with several foreign nations, Castro disregarding his commercial engagements. This gave dissatisfaction among the people, and, in De-

ember, 1908, during a visit to Europe, he was deposed, Vice-President Gomez being installed in his place. Pop. 2,591,000.

**Venice** (ven'ls; Italian, *Venezia*), a city and seaport of Northern Italy, capital of the province of the same name, on a number of islets in a shallow lagoon in the northwest of the Adriatic, 23 miles east of Padua by rail. The islets are very low, and the houses are mostly supported on piles. A railway viaduct nearly 2½ miles long connects the town with the mainland. The city is divided into two parts by the Canal-azzo or Grand Canal, spanned by an elegant bridge, the Rialto, and several lesser bridges. The numerous branch canals are crossed by about 380 bridges, which rise rapidly towards the center to afford passage to the gondolas and other boats. The city is also intersected by *calli* or

ceilings and walls painted by Tintoretto, Paolo Veronese, and other distinguished masters. The Ponte-dei-Sospiri (Bridge of Sighs) connects the palace with the public prisons on the opposite side of a narrow canal. The church of St. Mark, now the cathedral (erected 976-1071), is in the Romanesque-Byzantine style, and is surmounted by five domes. The principal front is adorned with 500 columns of precious marbles, and the interior is lavishly decorated. Above the doorway are the four celebrated bronze horses brought from Constantinople by the Doge Dandolo in 1204. Other notable churches are Santa-Maria-Gloriosa-de-Frari (thirteenth century), containing the tomb of Titian, and numerous works of art; San Giovanni-e-Paolo; and Il-Santissimo-Redentore, one of Palladio's finest structures. Of the numerous palaces the chief are the Palazzo-Reale; the Palazzo-Glustiniani; the Palazzo-Contarini-Fasan, restored in 1867; and the Palazzo-Corner della-Ca-Grande, now the seat of the government authorities. The remaining public buildings include the Accademia delle Belle Arti, containing works by Titian, Giorgione, Tintoretto, Paolo Veronese, and others; the Dogano, or custom-house; the arsenal; the Zecca, or mint; etc. The chief manufactures are woollen cloth, cloth of gold and silver, velvet, lace, ornamental and colored glass, mosaic, jewelry, castings, etc. The trade is extensive; the imports include colonial goods, dye-woods, coal, iron, oil, etc.; exports, timber, rice, linen, glass, coral, etc. The harbor is spacious, but the entrances are shallow.— Venice is supposed to have been founded in the fifth century by inhabitants of the surrounding districts, who took refuge from the cruelty of Attila on the islets at the mouth of the Brenta. In 697 Pauluccio Anafesto was elected the first doge or duke, and in 819 the seat of government was removed from Malamocco to Rivoalto (Rialto), and the adjacent islands were connected by bridges. The Crusades (1096-1271) greatly increased the wealth and power of the Venetians by giving employment to their shipping. In 1204 the Doge Enrico Dandolo conquered Constantinople, and upon the division of the Byzantine Empire Venice received a large accession of territory. Under Dandolo's successors the Venetians gradually lost all their mainland possessions. But in 1386 they captured Corfu, Durazzo, Argos, etc.; in 1406 their general, Malatesta, conquered Vicenza, Belluni, Verona, and Padua; and besides these and other conquests on land, the Venetian fleet defeated the



narrow lanes for pedestrians; but the canals are really the streets of Venice, and it possesses neither horses nor wheeled carriages. Near the center of the city there is one street about 18 feet wide, the Merceria, but the great center of business and amusement is the Piazza, or Square of St. Mark, and the piazzetta adjoining it. The Piazza is about 570 feet long by 200 broad, contains some of the more remarkable public buildings, and is lined with handsome shops and cafés. The piazzetta faces the sea. The Palace of the Doges, reconstructed by Marino Fallier in 1354, abuts on the piazzetta. It is in the Venetian Gothic style, and has two of the sides resting on double ranges of arcades. It contains a number of beautiful halls, some with

Turkish at Gallipoli in 1416, and in 1421 subjugated all the towns along the Dalmatian coast. At the close of the fifteenth century Venice had a population of 200,000, and was the center of activity of the commerce of Europe. Its power then began to decline, its commerce was gradually superseded by that of the Portuguese, and in 1508 a league to subdue the republic was formed at Cambrai between Pope Julius II, the Emperor of Germany, and the kings of France and Spain. All its possessions on the mainland were taken, and the work of destruction was all but completed by warfare with the Turks at intervals from 1649 to 1718. The French took possession of the city in 1797. It subsequently became part of the Austrian Empire, of Napoleon's kingdom of Italy, and from 1815 to 1866 of the Lombardo-Venetian Kingdom under Austria. In 1866 the city and province were ceded to Napoleon III, Emperor of France, under whose auspices they were united by a plebiscite to the Kingdom of Italy. Pop. 169,563.

**Venice**, GULF OF. See *Adriatic Sea*.

**Venire facias** (ve-nî're fâ'si-as; Latin, 'that you cause to come'), in law, a writ or precept directed to the sheriff, requiring him to cause a jury to come or appear in the neighborhood where a cause is brought to issue to try the same. This writ was abolished in England in 1852, but the precept issued by the justices of assize, which is substituted, is sometimes loosely spoken of as a *venire*.

**Venlo** (ven-lô'), a town of the Netherlands, province of Limburg, on the right bank of the Meuse. It has manufactories of needles and cigars. Pop. 15,000.

**Venomous Animals**, animals capable of inflicting poisonous wounds by means of special organs or contrivances. They include spiders, bees, wasps, hornets, scorpions, certain serpents, etc. In all cases the venomous matter must be introduced directly into the circulation to produce its effects.

**Venosa** (vâ-nô'sâ; anc. *Venusia*), a town of Italy, province of Potenza. It has a cathedral, and a castle dating from the fifteenth century. Horace was born here. Pop. 8503.

**Ventilation** (ven-ti-lâ'shun). See *Warming and Ventilation*.

**Ventimiglia** (-mêl'yâ), a town of Italy, province of Porto Maurizio, 7 miles east of Mentone. It

is a bishop's see, and is surrounded by forts. Pop. 5059.

**Ventnor** (vent'ner), a watering-place of England, on the south-east shore of the Isle of Wight, in the district of Undercliff. It has many accommodations for visitors and a good beach for bathing. Pop. 5787.

**Ventose**. See *Calendar*.

**Ventricle**. See *Heart*.

**Ventriloquism** (ven-tril'n-kwizm), the art of speaking in such a way as to cause a hearer to believe that the sound comes, not from the person speaking, but from a different source. The name (Latin, *venter*, belly, and *loqui*, to speak) originated from the erroneous supposition that the sounds uttered were formed in the belly, whereas practice alone is necessary to carry this act of illusion to a high degree of perfection. The sounds are formed by the ordinary vocal organs—the larynx, the palate, the tongue, the lips, etc. The art of the ventriloquist consists merely in this:—After drawing a long breath he breathes it out slowly and gradually, dexterously modifying and diminishing the sound of the voice; besides this he moves his lips as little as possible, and by various contrivances diverts the attention of his auditors. This art was known to the ancient Greeks.

**Venue** (ven'û), in English law, the place, that is, the county, where an action is to be tried, and from whence juries are to be summoned for trial of causes. The venue, in all cases, civil and criminal, may be changed for sufficient cause.

**Venus** (vê'nus), the Roman name of the goddess of love, called by the Greeks Aphrodite. In the Iliad she is described as the daughter of Zeus and Dione; but Hesiod represents her as the offspring of Uranus, born among the foam (Greek, *aphros*) of the sea. She surpassed all other goddesses in beauty, and hence received the apple which was to be awarded to the most beautiful by Paris. She was the wife of Hephaestus (Vulcan), but also bestowed her love on the gods Ares (Mars), Dionysus (Bacchus), Hermes (Mercury), and Poseidon (Neptune), and the mortals Anchises and Adonis. The myrtle, rose, poppy, apple, and other fruits were sacred to her, as were also the dove, sparrow, swan, swallow, ram, hare, and tortoise. The chief places of her worship in Greece were the islands of Cyprus and Cythera. In Rome several temples were erected to her under different names. In the best

days of art this goddess was always represented draped, in later times nude. The scene of her arising from the sea



Venus, antique statue in the British Museum.

was sculptured by Phidias on the base of the statue of Zeus at Olympia, and one of the most famous pictures of Apelles represented the same subject. The Venus of Capua and the Venus of Milo represent her as Venus Victrix, with one foot on a helmet and raising a shield. The Venus de' Medici is supposed to be a free copy of a statue of her by Praxiteles, which was celebrated above all her other statues in ancient times.

Among modern statues of Venus, famous is that by Canova, in which she is represented as issuing from the bath.

**Venus**, one of the inferior planets, having its orbit between Mercury and the earth, and the most brilliant of all the planetary bodies. From its alternate appearance in the morning and evening it was called by the ancients *Lucifer* and *Hesperus*, the morning and evening star. The mean distance of Venus from the sun is about 66,134,000 miles, its diameter 7510 miles, and its period of revolution round the sun about 224.7 mean solar days. Its volume is equal to about  $\frac{1}{11}$ ths of the earth, but its density being slightly greater its mass is actually equal to about  $\frac{1}{11}$ ths of the earth. It probably revolves about an axis, in a period of about 23 hrs. 21 min., the axis of rotation being inclined to the ecliptic at an angle of about 75°. According to its various positions relatively to the sun and earth it exhibits phases like the moon. Like Mercury, Venus transits the face of the sun, but at longer intervals. The transits of Venus are of much more importance than those of Mercury, because, being nearer to us when in transit, its position on the sun is measurably different for observers placed on different parts of the earth. See *Transit*.

**Venus' Fly-trap.** See *Dionaea*.

**Vera Cruz** (va'ra krüs), the chief seaport of Mexico, and capital of a state of the same name. The harbor is merely an open, unsafe roadstead, but there is a large trade. The town has broad and regular streets, and some good buildings, and is defended by the fortress of San-Juan-de-Ulloa on an island in front of the harbor. The situation of the town is exceedingly unhealthy. It was founded by Cortez in 1520 and was captured by General Scott in 1847. Pop. 48,033.—The state stretches along the s. w. part of the Gulf of Mexico; area, 29,285 square miles. The products embrace all kinds of grain crops, tobacco, sugar, cotton, fruits, dyewoods and timber. Cattle, horses and sheep are numerous. Pop. 981,030.

**Veratrin** (ve-rä'trin), or **VERATRIA** ( $C_{27}H_{45}NO_{11}$ ), a vegetable alkaloid found in *Veratrum Sabadilla*, *Veratrum album*, etc. It is generally obtained as a crystalline powder, nearly white, very acrid and poisonous, insoluble in water, but very soluble in alcohol. In the form of tincture, and still more in that of ointment, veratrin is much used as an external application in cases of neuralgia and obstinate rheumatic pains. The smallest quantity entering the nose causes violent and even dangerous sneezing.

**Veratrum** (ve-rä'trum), a well-known genus of plants belonging to the nat. order Melanthaceæ. *Veratrum album* (common white hellebore) is a native of moist alpine meadows in the southern, central and northern parts of Europe. It has large plicated leaves, erect stems, and large panicles of greenish flowers. It yields the substance veratrin (which see). Every part of both is acrid and poisonous, especially the rhizomes. The *V. viride* of North America (American hellebore) is an acrid emetic, and acts strongly in lowering the action of the heart.

**Verb**, in grammar, that part of speech whose essential function is to predicate or assert something in regard to something else (the subject or thing spoken of); as, the boy *runs*, the man *lifts* the stone, fishes *swim*, he *suffers* much. Verbs usually have the power of indicating time and mode by means of tenses and moods, these varying in the different languages, as does also the conjugation or system of verbal inflections and forms as a whole. They have been divided into *active* and *neuter verbs*, according as they predicate action or state. Active verbs are divided into *intransitive* and *transitive*, according as the action is confined to the actor or passes from



him to an object. Intransitive verbs often take an objective of their own nature; as, he *runs* a race; he *sleeps* the sleep of death. When a verb may be used either transitively or intransitively, as he *walks* the horse, he *walks* to church, the verb in the former use is said to be *causative*. Many causative verbs are distinguished from their corresponding intransitives by a change of form, as *sit, set; lie, lay; fall, fell*. *Passive verbs* affirm suffering or endurance of what another does. Hence, only verbs which take an object after them can have a passive voice, because it can be said of objects only that they suffer or endure the action directed on or towards them by the subject of the active verb. Passive verbs are thus the correlatives or complements of active verbs.

**Verbascom.** See *Mullein*.

**Verbena** (ver-bē'nā), a genus of plants, the type of the nat. order Verbenaceæ. Most of the species



Verbenas — Garden varieties.

are American; about seventy are enumerated. *V. officinalis* (common vervain), a plant widely distributed, was once held in great repute for its medicinal virtues, and entered into the composition of various charms and incense. Several species are cultivated for

the great beauty of their flowers, being fine border plants. The verbena of the perfumers is the lemon-grass, from which the 'oil of verbena' is extracted.

**Verbenaceæ** (ver-be-nā'æ-sē), a nat. order of plants, consisting of trees, shrubs, and herbaceous plants common in the tropics of both hemispheres, but rare in Europe, Asia and North America. They have generally opposite or whorled, simple or compound leaves without stipules; flowers in opposite corymbs, or spiked alternately, sometimes in dense heads, seldom axillary or solitary. The verbena and teak are examples.

**Vercelli** (ver-chel'iē), a town of North Italy, province of Novara, near the right bank of the Sesia, 44 miles w. s. w. of Milan by rail. It has a modern cathedral, a castle, now

converted into courts of justice; hospital, cavalry barracks, etc., flourishing manufactures and trade. Pop. 17,922.

**Verd-antique** (verd-an-tēk'), in mineralogy, an aggregate of serpentine and white crystallized marble, having a greenish color. It is beautifully mottled, takes a fine polish, and is much used for ornamental purposes. The term is also given to a green incrustation on ancient coins, brass or copper. *Oriental Verd-antique* is a green porphyry used as marble.

**Verden** (fär'dēn), a town of Prussia, in Hanover, on the Aller, 21 miles s. n. of Bremen. It has a fine Gothic cathedral, a gymnasium, breweries, distilleries and manufactories of cigars. Pop. 9842.

**Verdi** (ver'dē), GIUSEPPE, an Italian operatic composer, born in 1814. His first production was *Oberto, Conte di San Bonifazio* (1839), and in 1842 he brought out with great success at the La Scala, Milan, his *Nabucco*, followed by *I Lombardi* (1843), *Ernani* (1844), *Rigoletto* (1851), *Il Trovatore* (1853), *La Traviata* (1853), *Un Bello in Maschera* (1860), *Aida* (1871), *Montesuma* (1878), and *Otello* (1886). Verdi had a fine dramatic gift, and his melodies are showy and taking. He died in 1901.

**Verdict.** See *Jury*.

**Verdigris** (ver'di-gris), a poisonous substance, prepared by exposing copper to the air in contact with acetic acid, and used as a pigment, as a mordant, in medicine, etc.

**Verditer** (ver'di-tēr), a blue pigment prepared by dissolving verdigris in acetic acid.

**Verdun** (ver'dun), a town of France, department of the Meuse, 150 miles E. N. E. of Paris. It is a walled town defended by a citadel, the work of Vauban. The chief buildings are the episcopal palace, the barracks, and the public library. Verdun is famous for its liqueurs and confectionery, and it has breweries, tanneries, dye-works, etc. The Germans captured it in 1871 and vigorously besieged it in 1916. This siege was of such importance in the history of the European war that a special description of its purpose and general events is requisite to a just conception of this great conflict. It constitutes one of the leading phases of the war in its western field, paralleling the Battle of the Marne (q. v.) as a desperate effort to break through the French lines at a vulnerable point and expose Paris to peril of capture. Verdun was a specially hard point at which to smash the French line, being the strong-

## Verdun

est of a series of fortified places facing the German frontier. An attack on it at the beginning of the war had led to great development in its outer defenses, so that it became rather a fortified area than a fort. Its fall, then, would have been so much the more serious for France, and the army under the German Crown-Prince was selected to undertake its capture.

A well-devised effort to take the city by surprise, one that nearly succeeded, was the method pursued. A series of violent attacks, extending widely along the western front, was made in the early weeks of 1916, which was intended to mislead the Allies as to the projected assault, Verdun being left at rest. These continued through late January and early February, Arras being specially their center, the indications being that a drive was about to be made upon Dunkirk and Calais. The French were next attacked in Champagne and at other points, while all remained quiet at the strong fortress on the Meuse. The result was a weakening of the garrison of Verdun. Suddenly, on the 23d of February, the storm broke, eight German army corps (300,000 men) taking part in it. These were hurried upon the weakened French lines with such impetuous force that in the first day's assault more than six miles of trenches were carried, the defenses being penetrated to a depth of nearly two miles, while 3000 French prisoners were taken. The second day added as much more to the captures, bringing the Germans from a distance of 8 miles to a point only  $4\frac{1}{2}$  miles from the fortress. The next day Fort Douaumont was taken and held firmly against the furious counter-attacks of the French. The purpose of the Germans had now become evident and troops were hurried to the danger point in all haste, the British taking over several miles of French trenches to permit this reinforcement. In the first six days the Germans claimed to have taken 16,800 prisoners and 78 cannon. But French resistance in this direction now stiffened, and the Germans found it advisable to shift to new points of attack. The first assaults on the left bank of the Meuse were made on March 6 and defensive points were carried there and during the following week, including the Forest of Cumières, but in the succeeding period the Germans were firmly faced.

Le Mort Homme (Dead Man's Hill) became a central point in the struggle in mid-March, both sides claiming its capture, though each referred to a different hill. Malancourt was taken by the Germans on March 31, and the village of Vaud and Caillette Wood. On April 5

## Vereshtchagin

Harcourt was captured and on the 6th Bethincourt fell into their hands. On the 11th Germany claimed a total of 26,000 French prisoners, but the loss of the Germans in their assaults on the French posts had been very heavy and their efforts now slackened, while the French began a series of counter-attacks, though with no marked change in the situation, losses and gains being successively made. Thus on May 22 the French recaptured part of Fort Douaumont and some trenches on Dead Man's Hill, but they lost their hold on the fort three days later and also the village of Cumières, west of the Meuse. Incessant assaults on the part of the Germans followed, with no marked gains, but on June 7, by a sudden shifting of the point of attack, Fort Vaux was captured. On the 23d, after two weeks of furious fighting, Thiaumont was taken by the Germans and by July 1 it had been lost and taken three times by either side, while on the 4th it again fell into German hands. The Somme drive had now been launched on the part of the Allies and it was hoped that this would lessen the German pressure on Verdun, but the attacks continued, though with no marked gains. For more than four months this great contest had continued and though the Germans had gained considerable territory and a number of the outlying forts, Verdun remained intact and the great effort to break through the French line had so far failed.

The fighting points now shifted to other sections of the long battle-line, and comparative quiet remained at Verdun until the end of October, when the policy of surprise shifted to the other side. An attack was made on October 24, and was so sudden and impetuous that the Germans were utterly overwhelmed. Not at a single point were they able to stop the furious rush. Douaumont and Thiaumont were wrested from their hands, the German line being broken over a front of 4 1-3 miles and penetrated to a depth of nearly two miles. Thus in three hours the French recaptured ground which it had taken the Germans months to capture and hold.

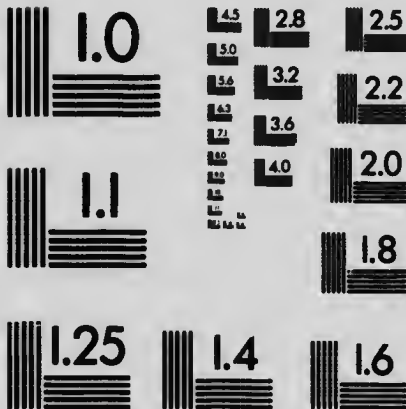
**Verdun.** a town of Quebec province, Canada,  $1\frac{1}{2}$  miles from Montreal. Pop. (1911) 11,629.

**Vereshtchagin** (ve-res-tch'gin), WASILY, a Russian historical painter, born in 1842, and was educated at the naval school in St. Petersburg. In 1864 he entered the École des Beaux Arts at Paris, where Gérôme was his master. He joined the Caucasian expedition under General Kaufmann in 1867, and in 1869 went to



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## Vergil

Siberia. He took part in the Russo-Turkish war, and was wounded at Plevna. From that time on he visited all the chief cities of Europe exhibiting his pictures. He was drowned in the sinking of a Russian warship during the Russo-Japanese war in 1904.

**Vergil.** See *Virgil*.

**Verjuice** (ver'jōs), a sharp vinegar made of the juice of the crab-apple; also the sour juice of unripe grapes is used for culinary purposes.

**Verlaine** (ver-lān'), PAUL, French lyrical poet, born in 1844; died in 1896. In a quarrel with Rimbaud, he aimed a pistol and was imprisoned for two years. He left prison a devout Catholic. His poems are remarkably beautiful both in thought and rhythm.

**Vermeer** (ver-mār'), or JAN VAN DER MEER, OF DELFT, a Dutch painter, born in 1632; died in 1675. He was greatly influenced by Pieter de Hooch. His genre pictures are highly prized.

**Vermejo** (ver-ma'hō), or RIO GRANDE. See *Paraguay*.

**Vermes** (ver'mēs; Latin, 'worms'), the sixth class of animals in the Linnean arrangement of the animal kingdom, comprising all animals which could not be arranged under Vertebrata and Insecta.

**Vermicelli** (-chel'lē; Italian, 'little worms'). See *Macaroni*.

**Vermiform Appendix**, an outgrowth from the intestines which, so far as is known, is peculiar to man, certain of the higher apes, and the wombat. The vermiform appendix in the human species hangs from the cæcum, which is the point of junction between the smaller intestines and the ascending colon. In size and shape it resembles a man's little finger. It is functionally useless to man and it appears to be the relic of an organ of utility to some of the lower animals. Its living membrane secretes a mucus which in health constantly wells up into the lower end of the colon where the ileocecal valve opens, and this mucus acts as a lubricant to the valve. The appendix is subject to inflammatory attacks arising probably from the ingestion of matter from the bowels. Attacks of this kind are somewhat frequent, the usual treatment being surgical, the diseased organ being removed. Lighter attacks are treated in remedial methods.

**Vermifuge** (ver'mi-fūj). See *Anthelmintics*.

**Vermilion** (ver-mil'yun), the name given to a pigment of a

beautifully scarlet color, obtained from crystallized mercuric sulphide. It is extensively employed in painting, in making red sealing-wax, and other purposes.

**Vermin** (ver'min), obnoxious insects, as bugs, fleas and lice; troublesome animals, as rats and mice; game-destroying species, as weasels, polecats, also hawks and owls. The fox is called vermin, but not in a sense of disrespect.

**Vermont** (ver-mont'), one of the United States, bounded N. by Quebec, E. by New Hampshire (from which it is separated by the Connecticut River), S. by Massachusetts and W. by New York and Lake Champlain. Length 143 miles, width 40 to 85; area, 9564 square miles. The surface is traversed from south to north by the Green Mountains (French, *Verts Monts*), which culminate in Mansfield Mountain in the N. W., 4280 feet high. They are generally covered by dense forests, but afford excellent pasturage. The drainage is shared between Lake Champlain in the west, and the Connecticut and its affluents. The surface is generally fertile, the best soil being on the western slope of the mountains near the border of Lake Champlain. The climate is healthy, and the temperature ranges from 20° below zero in winter up to 90° in summer. Farming and grazing are the chief occupations, all the agricultural staples being abundantly produced, while the yield of maple sugar is nowhere equalled. Wool and dairy products are large and excellent, and cattle, sheep and horses are raised in large numbers. Vermont is the greatest breeding state for fine horses and for Spanish merino sheep. Manufactures are of much importance and cover a wide range of goods, including cotton and woollen goods, leather, bar and pig iron, machinery, etc. Large quantities of lumber are exported and there are extensive marble, granite and slate quarries. Rutland is the largest marble center in the world, and Barre the largest granite center. There is a considerable internal and transit trade, but the foreign trade is limited, being chiefly carried on through New York and Massachusetts. Vermont was first settled by emigrants from Massachusetts, and joined the Union in 1791, after the state of New York had renounced a claim to the territory for \$30,000. Montpelier is the capital, but Burlington (1910) (pop. 20,463) is the largest town. Pop. 355,956.

**Vernal Grass** (ver'nal; *Anthoxanthum odoratum*), a sweet-scented pasture grass, that to

which the odor of new-mown hay is chiefly due, growing in most of the States.

**Vernation** (ver-nā'shun), a botanical term, indicating the manner in which the leaves are arranged in the leaf bud. In some plants the leaves are placed together in a very simple method, in others they are curiously folded, rolled, or plaited and interlaced with each other, but so as to separate readily when the time for their expansion comes.

**Verne** (vern), JULES, a popular French romancer, born at Nantes in 1828. He studied law for some time, but afterwards began writing short pieces for the stage. In 1863 he published *Five Weeks in a Balloon*, and the vein of the marvelous, tinged with a quasi-scientific truthfulness, was afterwards worked by him with great success. His more popular works are: *Twenty Thousand Leagues under the Sea*, *From the Earth to the Moon*, *Across Africa in a Balloon*, *To the Center of the Earth*, and *Round the World in Eighty Days*. Most of his works have been translated into English and German. He died in 1905.

**Vernet** (ver-nā), JEAN ÉMILE HORACE, a French painter, grandson of Claude Joseph Vernet, a distinguished painter of sea pieces and seaport scenes; and son of Antoine Charles Horace Vernet, painter of battle and genre pictures. He was born in Paris in 1798; and died in 1863. His first master in art was his father, and at an early age he acquired the favor of the Imperial court by his battle pieces, in which he adopted a realistic treatment in opposition to the classical school of David. His pictures connected with the wars of Napoleon are very numerous. In 1828 Charles X appointed him director of the French Academy in Rome, a post he ably filled till the end of 1834, producing a series of pictures, partly historical, partly genre. Louis Philippe then commissioned him to paint galleries of the museum at Versailles with scenes relating to the conquest of Algeria, a country which he several times visited. In 1840 we find him traveling in Egypt, Palestine, and Syria; in 1842 he accompanied the Emperor Nicholas on a journey from St. Petersburg to Sebastopol; and in 1845 he visited Spain and Algeria. In 1853 he followed the French army to Varna, but soon returned to Paris and produced his last great picture, *The Battle of the Alma*.

**Vernier** (ver-ni-er), an index fitted to slide along the edge of a

scale (as that of a barometer) and having divisions marked upon it, by means of which readings may be taken to small fractions of the parts actually marked on the scale. Suppose we have a scale of inches and tenths of an inch, and suppose the index is  $\frac{3}{10}$ ths of an inch, and divided into 10 divisions. Suppose that in taking a reading the end of the index is past the 8 figure on the scale we write down 8, that it is past 3 of the tenth spaces and part of another we add .3, then looking up the index we find that its 6th division most nearly coincides with a division on the scale and we add .06, and so the position of the index is taken as marking 8.36 inches.

**Vernon**, a town (township) in Tolland Co., Connecticut, which contains the city of Rockville and the village of Vernon, in which woollens, warps, and yarns are manufactured. Pop. 9087.

**Verona** (vā-rō'nā), a city of Northern Italy, capital of the province of same name, beautifully situated on both sides of the Adige. The town is surrounded by battlemented walls, and is entered by five beautiful gates. The streets are narrow and crooked, but there are several elegant squares. Verona has a Roman amphitheater, supposed to have been built about the second or third century of our era, the interior of which is nearly perfect; an imposing cathedral in the Gothic style dating from the fourteenth century, and many other magnificent churches rich in paintings and other art treasures. Other notable edifices are the Palazzo del Consiglio, adorned with statues of celebrated natives of the town; and the Gothic tombs of the Della Scala family (Scaligeri), who ruled Verona from 1262 to 1389. Modern public buildings include theaters, a museum, a library, hospitals, literary institutions, etc. The town has manufactures of silks, woollens, hats, etc., and a considerable trade. Verona was subject to the Romans in the second century B.C., and on the decline of the Roman Empire it was taken by the Goths, and became the capital of Theodoric's empire. In 774 it was captured by Charlemagne, and subsequently became an independent republic. Weary of the continual dissensions of its nobles, it voluntarily ceded itself to Venice, under which it remained from 1405 to 1797. It subsequently belonged to the Austrians, and in 1866 became a city of the new Kingdom of Italy. Pop. (1914) 84,755.

**Veronese** (vā-ro-nā'ze), PAUL, the popular name of Paolo Cagliari, an eminent Italian artist, born

at Verona in 1528. He studied painting under his uncle, Antonio Badile, and worked successively in Venice, Rome, and other cities of Italy, but Venice was his chief residence. He was an excellent colorist, and was distinguished by the richness and fertility of his imagination. He was a contemporary of Titian and Tintoretto. He died at Venice April 19, 1588. His pictures are exceedingly numerous and varied in subject. Among his masterpieces are: *The Marriage at Cana* (now in the Louvre), *The Calling of St. Andrew to the Apostleship*, *The Rape of Europa*, *The Family of Darius at the Feet of Alexander*, *Adoration of the Magi*, *Consecration of St. Nicholas and St. Helena*, and *The Vision of the Invention of the Cross*. The last five mentioned are in the British National Gallery.

**Veronica** (ve-ron'i-ka). See *Speed-well*.

**Veronica**, SAINT, a female saint who, according to legend, met out Saviour bending under the weight of the cross, and offered him her veil to wipe the sweat from his brow, when the divine features were found miraculously impressed on the cloth. This veil was brought from Palestine to Rome, where it is still preserved by the canons of St. Peter's.

**Verrazzano** (ver-rat-sa'nō), or VER-RAZANI, GIOVANNI DE, an Italian navigator, born about 1486. He is believed to have visited the coast of North America in the service of France in 1508 or earlier. In 1524 he is said to have traced the coast from Cape Fear to New England, probably entering the Hudson River and Newport. This visit has been doubted by some writers and does not seem well authenticated. He finally became a privateer or pirate, and was taken and executed at Pico, Spain, in 1527.

**Versailles** (ver-sälz'; French pron. ver-sä-yè), a town of France, capital of the department of Seine-et-Oise, in a plain, 11 miles s. w. of Paris. It is regarded as one of the handsomest towns in Europe, having been built under the auspices of the sovereigns of France, particularly Louis XIV, who made it the seat of his court and erected the palace. The latter is a large and imposing building with an extensive park and gardens, fine fountains, etc. Louis Philippe converted the palace into a national museum, and it contains an immense collection of statues and paintings representing personages and events connected with the French monarchy from Clovis downwards. In October, 1870,

the Germans established their headquarters at Versailles; and from March, 1871, till 1879 it was the seat of the French government. Pop. (1911) 60,458.

**Verse**, a measured and cadenced form of speech or composition, usually adopted in poetry. It seems to be the natural language of passion, yet it has unquestionably been improved and developed by art. The use of rhymed cadences is a comparatively modern invention. (See *Rhyme*.) Grammarians have elaborately classified the varieties of verse, and analytically distinguished the possible divisions of words into bars of accented and unaccented syllables. (See *Rhythm*.) The term is also applied to a line of poetry consisting of a certain number of metrical feet disposed according to the rules of the species of poetry which the author intends to compose. Verses are of various kinds, as hexameter, pentameter, etc. *Blank verse* is verse in which the lines do not end in rhymes. (See *Blank Verse*.) *Heroic verse* is rhymed verse in which the lines usually consist of ten syllables, or in English of five accented syllables, constituting five metrical feet.

**Versecz** (ver'shets), a town of Hungary, county of Temesvar. It is the see of a Greek bishop, and has silk mills, and a large trade in silk and wine. Pop. 22,199.

**Verst**, a Russian measure of length, equal to 3500 English feet, or very nearly two-thirds of a mile.

**Ver'tebra**. See *Spine*.

**Vertebrata** (ver-te-brä'ta), the name given to the highest subkingdom of animals, consisting of those animals which in early life usually possess a backbone, but which invariably possess a *notochord* (which see); which have never more than four limbs disposed in pairs; which possess jaws as parts of the head; and which have the great nerve-centers contained within a special case formed by the skull and spinal column. In all Vertebrata save the lancelet a distinct heart is developed. The Vertebrata include the classes Pisces (fishes), Amphibia (frogs, etc.), Reptilia (reptiles), Aves (birds), and Mammalia (quadrupeds and man). They have also been classified into Ichthyopsida, including Pisces and Amphibia; Sauropsida, comprising Reptilia and Aves; and Mammalia. See these headings.

**Vertigo** (ver'ti-gō), an attack of giddiness or swimming of the head in which objects appear to move in various directions though stationary, and

the person affected finds it difficult to maintain an erect posture. It is a common symptom of an irregular (excessive or defective) supply of blood to the brain and of nervous and general debility; but it frequently arises from some disturbance of the digestive organs.

**Vertue** (ver'tü), GEORGE, a distinguished engraver, born in Westminster in 1684. He enjoyed the patronage of Sir Godfrey Kneller, and became engraver to the Society of Antiquaries in 1717. He died in 1756. His best-known works include twelve *Portraits of Poets* and ten *Portraits of Charles I and His Friends*.

**Vertumnus** (ver-tum'nus), a Roman deity who presided over crops and orchards. He is generally represented as a young man crowned with flowers, and holding in his right hand fruit, and a horn of plenty in his left. He was the husband of Pomona.

**Verulam**, LORD. See *Bacon*.

**Vervain**. See *Verbena*.

**Verviers** (ver-vi-ä), a town of Belgium, province of Lige, on the Vesdre, 14 miles E. S. E. of Lige. It is celebrated for its manufacture of broadcloth, which is the staple of the town. There are also cotton, leather, and other manufactures. Pop. 40,168.

**Vesalius** (ve-sä'li-us), ANDREAS, the father of modern anatomy, born at Brussels in 1514; died at Zante in 1564. He was physician to the Emperor Charles V and to Philip II. His chief work, *De Corporis Humani Fabrica*, opened a new era in the science of medicine.

**Vesoul** (vé-söl), a town of France, capital of the department of Haute-Saône, on the Dargeon, 27 miles N. of Besançon. It is surrounded by vineyards, and is well built. Pop. 8702.

**Vespa**. See *Wasp*.

**Vespasian** (ves-pä'zhl-an: Lat. VESPASIANUS), TITUS FLAVIUS, Emperor of Rome, was born near Reate, in the country of the Sabines, in A.D. 9. After serving with distinction in Germany and in Britain as commander of a legion, he was made consul. He afterwards became proconsul of Africa, and on the rebellion of the Jews he was sent with an army into Judæa (A.D. 66). He reduced nearly all Galilee, and was preparing to attack Jerusalem when he received news of Nero's death (A.D. 68). Then followed the emperors Galba, Otho and Vitellius,

and in A.D. 69 Vespasian was himself elected emperor by the army, and arrived in Rome about the middle of the year 70, leaving the siege of Jerusalem to his son Titus. He immediately reformed the discipline of the army, purified the senatorial and equestrian orders, and im-



Coin of Vespasian.

proved the administration of justice. He favored arts, letters, and learned men, particularly Quintilian, Pliny and Josephus. He rebuilt a part of the city, restored the capitol, and erected the gigantic amphitheater, the ruins of which are still celebrated under the name of the *Coliseum*. Vespasian died A.D. 79.

**Vespucci Amerigo** (ves-püt'ché a-ma-ré'gō), or AMERICUS VESPUCCIUS, an Italian navigator, after whom the continent of America is named; born in Florence in 1451. He took part in a voyage to America in 1499, by which part of the mainland of South America was explored. In 1501 he was sent by Portugal on an exploring voyage to Brazil. He appears to have made four voyages to the New World, probably serving as astronomer. Without any initiative on his part, his name was applied by a mapmaker to the lands visited by him, and in time came to designate the whole continent. He died in 1512.

**Vesta** (ves'ta), a Roman divinity, the goddess of the hearth. She was worshiped, along with the Penates, at every family meal, when the household assembled round the hearth, which was in the center of the room. Her public sanctuary was in the Forum, and the sacred fire was kept constantly burning in it by the vestals, her priestesses. The vestals are said to have been established by Numa. There were at first four, and afterwards six of them. They were taken from six to ten years of age. They were bound to virginity for thirty years, the term of their service, after which they were allowed to marry. Their per-



sons were inviolable, and they were treated with great honor, and had important public privileges. The punishment of a vestal who was guilty of unchastity was burying alive.

**Vesta**, in astronomy. See *Asteroids*.

**Vestals**. See *Vesta*.

**Vestments** (vest'ments), SACRED, the official garments worn by ministers of religion. The term is also applied to the altar cloths. Among Catholics and High Churchmen, who believe that Christianity has retained a special priesthood and ritual, much importance is attached to vestments. See *Ritualism*, also *Chasuble*, *Stole*, etc.

**Vestry** (ves'tri), a room adjoining a church where the vestments of the clergy are kept. Hence the place of meeting of those having the charge of parochial affairs, and collectively the persons themselves to whom these affairs are intrusted. In England the minister, church-wardens, and chief men of a parish generally constitute a vestry, and the minister, whether rector, vicar, or perpetual curate, is ex-officio chairman. The powers of the vestry include the expenditure of the parish funds, the repairing or alteration of churches or chapels, and the appointment of certain parish officers. In London the vestries are highly important bodies. In the Episcopal Church in the United States the vestry is a committee chosen annually by the parish, which, in conjunction with the church wardens, manages its temporal concerns.

**Vesuvius** (ve-sū'vi-us), a volcanic mountain of Southern Italy, 10 miles E. S. E. of Naples. It rises in the center of a plain 2300 feet above the sea, in a pyramidal cone of about 1900 feet; total height, over 4200 feet, liable to alteration at eruptions. The cone is truncated, and about 2000 feet in diameter. Previous to an eruption about 1838 the top was an uneven plane, but was then converted into a hollow cup sloping to a depth of 500 feet. A precipitous rocky ridge, 1400 feet high, called Monte Somma, lies to the north of the cone, from which it is separated by a deep valley called the Atrio del Cavallo. At the western extremity of this valley an observatory has been established. The lower belt of the sloping plain is about 2 miles broad; it is laid out in vineyards and well cultivated. Above this belt the plain is rugged and covered with scoræ. Monte Somma is supposed to have formerly formed a complete cone of larger dimensions than the

present one, being subsequently altered by volcanic forces in the same manner as 800 feet of the present cone was carried away by an eruption of 1822. The first recorded symptoms of activity exhibited by Vesuvius occurred in A.D. 63. In 79 a great eruption buried in ashes the Roman cities of Herculaneum and Pompeii. The next recorded discharge of ashes and lava was in 1036. Since then there have been many violent eruptions, the most noted of which was that of 1631, when it is estimated that 18,000 lives were lost. Many other severe eruptions have since taken place, a very violent one in 1872, and several within the present century. A wire-rope railway, traversed by one carriage going up while another is coming down, was opened in 1880, and carries visitors to within a short distance of the crater.

**Vestibule Trains**, trains of railroad cars provided with inclosed and connected platforms. The expedient of inclosing, or as it has been termed, the vestibuling of, car platforms for the comfort and convenience of passengers having occasion to pass from car to car while a train is in motion adds considerably to their safety.

**Veszprim** (ves'prim), a town of Western Hungary, north of Lake Balaton, with a fine cathedral. Pop. 14,144.

**Vetch**, the popular name applied to plants of the genus *Vicia*, more especially to *V. sativa*, the common vetch or tare. The name is also applied, with various epithets, to many other leguminous plants of different genera; as, the *horseshoe vetch*, of the genus *Hippocrepis*; the *milk-vetch*, of the genus *Astragalus*, etc. See *Tare*, *Vicia*.

**Veterinary Art** (vet-er-e-nā'ri), the art which deals with the nature, causes, and treatment of the disorders of domestic animals. The first veterinary school was instituted in 1762 at Lyons; in 1766 that at Alfort near Paris was opened. A similar institution was established at London in 1791, and in the year following one in Berlin. In Edinburgh instruction in veterinary medicine began to be given by Mr. Dick in 1819, and in veterinary surgery in 1823. In the United States veterinary chairs have been added to some of the universities, but most of the schools are private institutions.

**Veto** (vē'tō; Latin, 'I forbid'), the power which one branch of the legislature of a country has to negative the resolutions of another branch, or the right of the executive branch of govern-

ment, such as king, president, or governor, to reject the bills, measures, or resolutions proposed by the legislature. In Britain the power of the crown is confined to a veto, a right of rejecting and not resolving, and even this right is rarely exercised, the last occasion being in 1707. In the United States the president may veto all measures passed by Congress, but after that right has been exercised the rejected bill may become law by being passed by two-thirds of each of the houses of Congress.

**Vevey** (ve-vä'), a town of Switzerland, canton Vaud, beautifully situated at the N. E. margin of Lake Geneva, 11 miles E. S. E. of Lausanne, a favorite place for visitors and foreign residents. Pop. 11,781.

**Viaduct** (vi'a-duk't). See *Bridge* and *Railways*.

**Vianna** (vê-ân'á), a seaport of Portugal, province of Minho, at the mouth of the Lima, 40 miles N. of Oporto. Pop. 10,000.

**Viareggio** (vi-â-red'jô), a seaport of Central Italy, province of Lucca, on the Mediterranean, a favorite watering place. Pop. 14,863.

**Viaticum** (vi-at'i-kum), literally provision for a journey; in the Roman Catholic Church, the eucharist administered to patients who are so ill as to be deemed beyond hope of recovery.

**Viatka** (vyât'ká), VYATKA, a town of Russia, capital of the government of same name, on the Viatka, 500 miles E. N. E. of Moscow. It has a cathedral, some manufactures, and a large trade. Pop. 15,776.—The government has an area of 59,172 square miles, and a pop. of 3,082,788. The surface is much broken by low hills, and large tracts are under wood and natural pasture. The soil yields good crops of corn, flax and hemp. The drainage belongs to the basin of the Volga.

**Viborg** (vê'borg), a town of Denmark, on the lake of Viborg, 36 miles N. W. of Aarhus. It is a bishop's see, and has a good cathedral; and manufactures of linen, tobacco, etc. Pop. 3623.

**Vi'borg**, or WIBORG, a seaport of Finland, capital of a government of the same name, on a deep inlet of the Gulf of Finland, 74 miles N. W. of St. Petersburg. It has an active export trade. Pop. estimated 31,000.

**Vibrio** (vi'bri-ô), a name of certain infusoria or microscopic organisms, sometimes called *microscopic eels*, and now often regarded as bacteria, or of fungoid nature.

**Viburnum** (vi-bur'num), a genus of plants, nat. order Caprifoliaceae, including the golden-rose and laurustine (which see), and *V. Lantana*, the wayfaring tree, native of N. America, Europe and Asia. The young shoots are used in Germany for basket-making; the wood is sometimes employed in turning and cabinet making; the berries are used for making ink, and the bark of the root for making bird-lime.

**Vicar** (vik'ar), in a general sense, a representative or viceregent. The pope calls himself *vicar of Christ on earth*. In the Church of England a vicar is the priest of a parish who receives only the smaller tithes or a salary. A *vicar apostolic*, in the Roman Catholic Church, is a bishop who possesses no diocese, but who exercises jurisdiction over a certain district by direct authority of the pope; *vicar general*, the official assistant of a bishop or archbishop.

**Vice-admiral**. See *Admiral*.

**Vice-chancellor**. See *Chancellor*.

**Vice-consul**. See *Consul*.

**Vicenza** (vi-chen'tsá), a town of North Italy, capital of a province of the same name, 49 miles west of Venice, beautifully situated on the Bacchiglione, where joined by the Retrone at the foot of some wooded hills. It is well built, containing handsome streets and several elegant squares. The public buildings are almost all the work of Palladio, who was born here, or of scholars who rather slavishly imitated him. The most remarkable edifices are the Duomo or cathedral; the Palazzo della Ragione (town-hall), an ancient Gothic building, with fine connected buildings by Palladio; the Museum, one of Palladio's finest buildings; the Palazzo-Prefittizio, and the theater, both by Palladio; the Academy of Sciences and Arts, founded in 1550; lyceum, churches and hospitals. Pop. (1914) 56,296.—The province has an area of 1050 sq. miles; pop. 450,000.

**Viceroy** (vis'roi), the governor of a kingdom or country, who rules in the name of the monarch with regal authority as his substitute.

**Vice-president**, an executive official of the United States government, who ordinarily presides over the Senate, voting only in case of a tie vote in that body; but who succeeds to the office of President in case of the death or disability of the elected president. On several occasions the vice-president has succeeded to the presidency.

## Vichy

He is elected with and in the same way as the president, the person receiving the highest number of electoral votes for the vice-presidency obtaining the office, if this number be a majority of the whole body of electors. If not, then the Senate is empowered to choose a Vice-President from the two receiving the most votes. In this case a majority vote in the Senate, if a quorum of two-thirds is present, will suffice for the election.

**Vichy** (vē-shē), a town of France, in the department of the Allier, in a valley of the river of that name, 32 miles s. s. e. of Moulins. It was once a place of strength, and is celebrated for its thermal alkaline springs. The Vichy waters are in much request for disorders of the stomach and bowels, and of the urinary organs, in gout, rheumatism, etc. Much of the water is sent out in bottles. Pop. (1906) 14,520.

**Vicia** (vis'i-a), the vetch genus of plants, which, besides the vetches, includes also the *V. Faba* or common field bean. See *Vetch*.

**Vicksburg** (viks'burg), a city of Mississippi, county seat of Warren Co., situated on the Mississippi and Yazoo Rivers, 400 miles above New Orleans. It is a port of entry and the most important commercial city of the State. Vicksburg has an extensive trade in cotton and is the business center of a large district. Its industries embrace railroad car works, iron foundries, oil mills, saw-mills, wagon, broom, mattress, furniture and ice factories, etc. During the Civil War this place was strongly fortified by the Confederates. After a long siege it was surrendered to Grant, July 4, 1863. Pop. 20,814.

**Vico** (vē'kō), GIOVANNI BATTISTA, a jurist, critic, and historian, was born at Naples in 1668, was educated by the Jesuits, and studied law. In 1697 he was appointed professor of rhetoric at the University of Naples, and in 1735 historiographer-royal. His *Principi d'una Scienza Nuova d'intorno alla Comune Natura delle Nazioni* (1725) has caused him to be regarded as one of the founders of the philosophy of history. He also wrote *De antiquissima Italorum Sapientia* and other works. Vico died at Naples, January 20, 1744.

**Victor Amadeus II**, Duke of Savoy, and first king of Sardinia, was born in 1666; died in 1732. He joined the Austrians in the war of the Spanish Succession, and at the Peace of Utrecht (1713) he obtained the addition of Sicily to his dominions. In 1720 he gave up that island to the Austrians in exchange for

## Victor Emmanuel II

Sardinia, and then took the title of King of Sardinia. He abdicated in favor of his son, Charles Emmanuel III, in 1730.

**Victor Emmanuel II** (VITTORIO EMMANUELE), the eldest son of Charles Albert, king of Sardinia, was born at Turin, March 14, 1820. His aptitude for a military career became evident when he commanded the Savoy brigades against Austria (1848-49), and distinguished himself in the battle of Goito by his reckless valor. After the battle of Novara (March 23, 1849) his father abdicated, and Victor Emmanuel ascended the throne of Sardinia. He had then to negotiate with Austria under most unfavorable circumstances, but he



Victor Emmanuel.

steadily refused to give up the principle of representative government in the Sardinian constitution, and this gained for him the name of honest king (*re galantuomo*) and the good-will of the Italian people. This latter was only gained, however, after much calumny and misunderstanding, but the young king pursued from the first a policy which led to the national unity of Italy. Under the advice of his celebrated minister, Cavour, he regulated the finances, reorganized the army, and secularized the church property, for which he was excommunicated by the pope. He took part in the Crimean war, and in 1859, assisted by France, renewed the contest with Austria, taking part in the battles of Magenta (June 4) and Solferino (June 24). By the Treaty of Villafranca and the Peace of Zürich which followed these successes, Lombardy was added to his dominions, but he had to cede Savoy and Nice to France. Parma, Modena and Tuscany now became united

to Sardinia, and Garibaldi's successes in Sicily and Naples brought the whole of Southern Italy over to Victor Emmanuel. On March 17, 1861, he assumed the title of King of Italy. Venetia was ceded in 1866 and on the withdrawal of the French troops from Rome in 1870, Rome united with Italy and became the capital. He died Jan. 9, 1878. Humbert succeeded him.

**Victor Emmanuel III**, King of Italy, son of King Humbert and Queen Margherita (1860- ), ascended the throne 1901, following the assassination of Humbert. He did valiant work in the Great War.

**Victoria** (vik-tō'ri-a), a state of the Commonwealth of Australia, bounded N. by New South Wales, S. E. by the Pacific, S. by Bass Strait and the Southern Ocean, and W. by South Australia; area, 87,884 square miles. It has about 600 geographical miles of sea-coast, with considerable bays and indentations, especially about the middle, where Port Phillip Bay, with an area of 875 square miles and an entrance barely 2 miles wide, affords shelter sufficient for the largest fleet. The interior, though diversified by mountains, is chiefly distinguished by vast unwooded plains mostly occupied as pasture. There is one principal mountain range, a portion of the Great Dividing Range of Eastern Australia, running from east to west through the colony, with various off-shoots. Its highest peak is Mount Bogong, of 6500 feet elevation. It is divided into separate ranges called the Grampians and the Australian Alps, which are connected by such ranges as the Pyrenees and Hume Range, containing numerous cones and extinct craters, and composed of metamorphic rocks of granite, quartz, syenite, etc. This is the region of the goldfields. The rivers are numerous, but are generally small and dry up in summer, leaving the country parched. The chief is the Murray, which rises in the Australian Alps, forms the northern boundary of the colony for 980 miles, is in all 1300 miles long, and is navigable for several hundred miles. The climate of Victoria is temperate, but liable to sudden fluctuation; and hot winds blow at intervals from November to February, causing great discomfort. The hottest period is in January and February, when the thermometer may rise to 108° in the shade. For the chief animal and vegetable products native to the colony see *Australia*. Some of the common English quadrupeds and birds have been introduced, such as hares, rabbits, deer, pheasants, partridges, larks, etc., and are now becoming quite plenti-

ful. Rabbits have become so numerous in some districts as to prove a serious nuisance and source of loss to the planters. Victoria is the principal gold-producing colony of Australia, the yield amounting in value to about \$15,000,000 annually. The total yield since the discovery of gold in 1851 has been about \$1,500,000,000. Tin, antimony, copper and coal are also among the minerals worked. Agriculture has much improved of late years, wheat and oats being the two cereals chiefly cultivated. The great staple of the colony, however, is wool, the annual wool clip yielding nearly \$20,000,000. The estimated number of sheep approaches 15,000,000 and of cattle nearly 2,000,000. The vine is extensively cultivated, and the wines are becoming well known in Europe. Many kinds of fruits are grown, also tobacco, hops, etc. Victoria is divided into the four districts of Gipps Land, the Murray, Wimmera and Loddon, which are subdivided into thirty-seven counties. The government is invested in a governor appointed by the crown, aided by an executive ministry consisting of twelve members, and a parliament consisting of a legislative council of forty-eight members elected for fourteen provinces, and a legislative assembly of ninety-five members for eighty-four districts. On January 1, 1901, it became one of the states of the commonwealth of Australia. Victoria was first colonized from Tasmania in 1834. It made rapid progress, especially in sheep breeding, and the discovery of gold in 1851 caused a rush of population from all parts. Hitherto it had been known as Port Phillip, and formed part of New South Wales, but in this year (independently of the gold discovery) it was erected into a separate colony under the name of Victoria. In 1850 the population numbered 76,162; in 1854 it was 312,307. In 1856 responsible government was conferred on the colony. The chief towns are Melbourne (the capital), Geelong, Ballarat and Sandhurst. The population was estimated in 1911 as 1,350,000, including nearly 10,000 Chinese, and several hundred aborigines.

**Victoria**, capital of British Columbia, is situated on Vancouver Island, on the north side of the Strait of Juan de Fuca, in very beautiful scenery. The public buildings include the Parliament house, government offices, provincial museum and library, city hall, etc., while in the environs are many attractive villas, surrounded by beautiful gardens. The manufacturing interests include powder works, potteries, coaling, lumber and brewing industries,



## Victoria

and large fish-canning establishments. It is also engaged in boat building. The harbor of Victoria for large vessels is at Esquimaux, 8 miles distant, where there is a station of the British navy. Pop. 31,660.

**Victoria.** See *Hong-Kong*.

**Victoria I** (ALEXANDRINA), Queen of Great Britain and Ireland and Empress of India, only child of Edward, duke of Kent, and of his wife Princess Victoria Mary Louisa, was born at Kensington Palace, May 24, 1819. Her father died January 23, 1820, and she became heiress-presumptive to the crown on the accession of William IV in 1830. The latter dying without issue (June 20, 1837), she ascended the throne of Great Britain and Ireland, that of Hanover falling by the Salic law to her uncle, the Duke of Cumberland. She was crowned in Westminster Abbey, June 28, 1838, and on Feb. 10, 1840, married her cousin, Prince Albert of Saxe-Coburg-Gotha, who died December 14, 1861. In 1876 she assumed the title



Queen Victoria

of Empress of India. Her children were nine in number, of whom the eldest, Victoria, became empress of Germany, and the second, Albert Edward, succeeded her on the throne, as Edward VII. A striking feature of the Victorian era was the rapid development and extension of the British colonies. Of the warlike events of her reign the most important were those of the Crimea and South Africa and the rebellion in India. Her period

## Victoria Nyanza

was so marked by literary progress and political and industrial development that it is spoken of appreciatively as the Victorian era, as a counterpart of the Elizabethan era. She died Jan. 22, 1901.

**Victoria Cross**, a British military decoration instituted at the close of the Crimean war in 1856. It is granted to soldiers and sailors of any rank for a single act of valor in presence of the enemy. It was instituted in imitation of the French cross of the Legion of Honor. It is a Maltese cross, with a royal crown in the center, surmounted by a lion, and the words 'For Valour' indented on a scroll below the crown.



Victoria Cross.

The ribbon is red for the army, and blue for the navy. A pension of £10 a year accompanies the decoration. Since the foundation upwards of 400 officers and men have been recipients of this honor.

**Victoria Falls**, a cataract of the Zambesi (which see), in lat. 17° 55' S., lon. 26° 32' E. The river here, nearly a mile broad, drops 330 feet into a narrow transverse fissure or crack crossing its course, the water then passing away in a narrow rocky gorge. They vie with Niagara Falls in grandeur and surpass them in height. These falls were discovered by Livingstone in 1855. The gorge above the falls is now crossed by a single-span railway bridge, the most elevated structure of its kind in the world, the rails standing 420 feet above the water.

**Victoria Harbor.** See *Labuan*.

**Victoria Land, South Victoria**,

the name given that portion of the supposed Antarctic continent which bounds Ross Sea on the west. It is mountainous in character, and contains the two volcanoes Erebus and Terror. Southward it extends from Cape Adare to a lofty plateau of wide extent.

**Victoria Nyanza**, a lake of East Africa, about 400 miles inland from the Indian Ocean, crossed near its north end by the equator, about 3800 feet above the sea; area, about

## Victoria Regia

26,000 square miles, or nearly as large as Scotland. It communicates with the Albert Nyanza by means of the Victoria Nile, and is the principal feeder of the Nile. It contains many islands, some of them of considerable size. The Ripon Falls, about 1200 feet across, mark the discharge of the Nile from the lake. It was discovered by Captain Speke in 1858. The area of the lake is almost equally divided between British and German East Africa. Its most important tributary is the Kagera, now looked upon as the head-stream of the Nile.

**Victoria Regia**, the name given to water lily, first found in the river Berbice, in British Guiana, in 1837, by Sir Robert Schomburgk. It belongs to the nat. order of Nymphaeaceae, and was

tive, born at Arras in 1771. He began his career as a thief, and was successively soldier, deserter, gambler, and vagabond, being often imprisoned for his offenses. He entered the police service as a detective in 1810, his success in this vocation being so great as to give him a wide reputation. He died in 1850, leaving a history of his exploits, which is not considered truthful.

**Vienna** (vā-en'nā; German, *Wien*), formerly the capital of Austria-Hungary, is situated in a plain on the right bank of the Danube, and is intersected by a narrow arm of the river into which fall the Wien and other small streams. The city proper is surrounded with a rampart and ditch, called the Lines, and consists of the Innere Stadt, or old town, and the municipal districts



Street in Vienna.

dedicated by the discoverer to Queen Victoria. The leaves measure 5 or 6 feet across; they are of a bright green above and a deep violet on the lower surface, with a uniformly turned-up margin about 3 inches high. The flowers are more than 1 foot in diameter, are of all shades from white to pink, and exhale an agreeable odor. The plant is successfully cultivated in the United States.

**Vienna** (vi-kun'yā), a ruminant animal (*Acuchenia vicugna*), closely allied to the llama. It is a native of South America, frequenting the lofty slopes of the Andes of Chile, etc., near the region of perpetual snow, and somewhat resembles the chamois in its habits. See *Llama*.

**Vidocq** (vā-dok), EUGENE FRANÇOIS, a famous French detec-

of Leopoldstadt, the chief commercial district; Landstrasse, the official district; Mariabühl, Neubau, and Margarethen, manufacturing districts; Alsergrund, containing large general and military hospitals; and the residential districts of Wieden, Josefstadt, and Favoriten, besides extensive suburbs. The old town is still the court and fashionable quarter of the city, and is encircled by the Ringstrasse, a handsome boulevard, 55 yards wide. Vienna is on the whole a handsome, well-built town, with fine squares and straight and spacious streets. The Prater, a public park on the bank of the Danube, is about 4 miles long and 2 broad, and is considered the finest public park in Europe. Of the churches the most remarkable is the Domkirche, or cathedral, of St. Stephen, a cruciform

## Vienna

## Vienna

Gothic structure, with a main tower 453 feet high. The interior is adorned with numerous statues and monuments, and the tower contains a bell of 18 tons weight. The Capuchin church contains the imperial burying vaults; the Votivkirche (1856-70) is one of the finest



St. Stephens, Vienna.

specimens of modern Gothic. The imperial palace (Kaiserliche Burg) is a poor though ancient structure; the imperial summer residence, Schönbrunn, is about 2 miles from the city. The modern palaces of the archdukes and

others of the nobility are, many of them, handsome buildings. Deserving of special mention are the houses of parliament, the magnificent Gothic town-house (1872-83), the courts of justice, the museums of art and of natural history, and the exchange. The university was founded in 1237, and reorganized by Maria Theresa. It has some 350 teachers, 6000 students, and a library of 340,000 vols. Other notable public buildings are the Josephinum (an academy for army surgeons), the Polytechnic Institute, and the Seminarium, a Roman Catholic institute for the training of priests. There are also Hungarian and Protestant theological institutes, an academy of fine arts, a conservatoire of music, several public libraries and museums, and a number of gymnasia and schools. The imperial library contains 900,000 volumes and 25,000 MSS. The imperial museum of natural history is one of the finest in Europe. The Treasury, among other imperial treasures, contains the regalia of Charlemagne. There are many hospitals and other benevolent institutions, and the scientific and literary associations are too numerous to mention. The principal theaters are the Hofburg and the Stadt theaters, and the fine Opera house. Vienna is the first manufacturing town in the empire, and its manufactures include cotton and silk goods, leather, porcelain, arms, hardware, and many other articles. There is also a large inland trade. Vienna appears to have been a Roman station in the first century. It was afterwards included in Upper Pannonia, and called Vindobona. After being taken by Attila, about 450, and by Charlemagne, about 791, it became the capital of the margraviate of Austria in 1142, a free imperial city in 1237; it was besieged by Sultan Solymán in 1526, and by Kara Mustapha in 1683, was occupied by Napoleon, November 13, 1805, and May 12, 1809; the old walls were demolished in 1860. Following the disruption of the Austro-Hungarian monarchy (see *Austria-Hungary*) in 1918 Vienna, as the capital of the much reduced state of Austria, lost its prestige in great measure. The population in 1911 was 2,005,291.

**Vienna, CONGRESS OF.** This congress was assembled on November 1, 1814, to reorganize the political system of Europe after the first overthrow of Napoleon. The principal powers represented in it were Austria, Russia, Prussia, England, and France. Spain, Portugal, Sweden, and other minor powers were also consulted on matters more nearly concerning them. The

leading territorial adjustments effected by the congress were the following:— Austria recovered Lombardy and Venetia, while Tuscany and Modena were conferred on collateral branches of the imperial house. The King of Sardinia recovered Piedmont and Savoy, with the addition of Genoa. Murat retained Naples, but the Bourbons were soon reinstated. Holland and Belgium were erected into a kingdom for William I, Prince of Orange. Hanover, with the title of king, was returned to the King of England, and Great Britain retained Malta, Heligoland, and several conquered colonies. A federative constitution, with a diet at Frankfort, was established for Germany. Prussia received the duchy of Posen, the Rhine province, and a part of Saxony. Russia received the greater part of the grand-duchy at Warsaw, Cracow becoming a free state, protected by Russia, Austria, and Prussia. Sweden retained Norway, and Denmark was indemnified with Lauenburg. The congress was suddenly broken up by Napoleon's escape from Elba (February, 1815); but its acts were signed by the powers interested on June 9, 1815.

**Vienne** (vē-enn), a western department of France; area 2711 square miles. The surface is generally flat; it is well watered by the Vienne and the Creuse. Three-fifths of the surface is arable, and all kinds of cereals, maize, hemp, and indifferent wines are produced. Iron is abundant, and there are excellent quarries of marble, granite, millstones, whetstones, lithographic stones, and limestone. The manufactures consist of woollens, lace, cutlery, paper, pig-iron, etc. The capital is Poitiers. Pop. 336,343.—**HAUTE-VIENNE** (ôt-vē-enn; 'Upper Vienne') is a hilly department adjoining Vienne on the southeast; area, 2130 sq. miles. Almost the whole department belongs to the basin of the Loire, and it is crossed by the upper course of the Vienne. The principal crops are huckwheat, rye, beans and peas; and horses, mules and swine of a superior breed are reared. Minerals include iron, copper, tin, lead, coal, antimony and kaolin. Porcelain, woolen and other tissues, paper and leather are the chief manufactures. Limoges is the capital. The Limoges chinaware ranks with the finest made. Pop. (1906) 333,621.

**Vienne**, a town of France, department of Isère, on the Rhone, 40 miles N. N. W. of Grenoble. It is an ancient place, with narrow dark streets. It has a cathedral, a museum, public library, college, etc. Vienne contains

numerous Roman remains, and figures prominently in ecclesiastical history, and was the capital of the Burgundian kingdom. Pop. 24,619.

**Viersen** (fēr'sen), a town of Rhenish Prussia, district of Düsseldorf, 18 miles W. of town of that name, and 10 miles S. W. of Crefeld. It has important manufactures of satin, plush, silk, woolen, linen, and cotton fabrics; leather, tobacco, etc. Pop. 27,577.

**Vierwaldstättersee**. See *Lucerne*, Lake of.

**Vierzon** (vyār-zōn), a French town, department of Cher, 124 miles S. of Paris. It has manufactures of machinery, porcelain, glass, etc., and a technical school. Pop. 11,812.

**Vigevano** (vi-jā'vā-nō), a town of Italy, province of Pavia, on the Mora, 15 miles S. S. E. of Novara. It is a bishop's see, and has manufactures of silks, hats, soap and macaroni. Pop. 18,043.

**Vigfússon** (vig'fús-sun), GUDBRAND, a Scandinavian scholar, born in Iceland in 1827; died at Oxford in 1889. He was educated first at the high school of Reykjavik, afterwards at Copenhagen University. He lived in Copenhagen from 1849 till 1864, having devoted himself to the study of old Icelandic literature. His first work, *Timatal*, on the chronology of the *Sagas*, was published in 1855, and revealed the hand of a master. In 1858 he brought out the *Biskupa Sögur*, or 'Lives of the Icelandic Bishops,' and in 1864 the *Eyrbyggja Saga*. In the latter year he came to England to undertake the Icelandic-English Lexicon, begun by Cleasby, and in 1866 began at Oxford this work, which kept him engaged for seven years, the result being the excellent dictionary issued from the Clarendon Press. In 1878 the Clarendon Press published his *Sturlunga Saga*, to which he prefixed *Prolegomena*, containing a complete history of the classic literature of Iceland. This was followed by several minor works and essays, by the *Orkneyinga Saga* and *Hakonar Saga*, and by the *Corpus Poeticum Boreale* (in conjunction with F. York Powell), a complete collection of the ancient Icelandic poetry, with translation. At the time of his death he was engaged upon a work entitled *Origines Islandiæ*.

**Vigil** (vij'il; Latin, *vigil*, watchful), an ecclesiastical term applied at first to the evening, and afterwards to the whole day, preceding a great festival. This name originated from the circumstance that the early Christians spent a part of the night preceding such festivals



in prayers, to prepare themselves for the coming celebration.

**Vigilance Committee**, an organization of citizens formed at times in parts of the United States for the purpose of punishing and discouraging crimes with which the authorities had failed to deal with sufficient vigor. An example of this is the uprising of such a committee

In 1835 appeared his celebrated drama *Chatterton*. He also wrote *Stello* (1832); *Servitude et Grandeur Militaires* (1835); and *Les Destinées*, a philosophical poem published after his death in 1864.

**Vigo** (vē'gō), a city and seaport of Northwestern Spain, province of Pontevedra, on a spacious bay. It is surrounded by walls with bastions, and



in early San Francisco to deal with criminals who defied the law. Lynch law is summary justice (or injustice) applied by such committees. Though usually arising under stress of great provocation, such organizations are apt to develop into an evil, which in its turn needs suppression.

**Vigny** (vēn-yē), ALFRED VICTOR, COUNT DE, a French poet and novelist, born in 1799, entered the royal guard in 1816, but retired from military service in 1828, and devoted himself exclusively to literature. He died in Paris in 1863. His *Poèmes* (1822) and his allegory of *Eloa, ou la Sœur des Anges*, placed him among the leaders of the new romantic school of poets. In 1826 he published *Poèmes Antiques et Modernes*, and also an historical novel, *Cinq-Mars*, which attracted much attention.

has steep, narrow, and tortuous streets. The fishing of sardines and tunnies is important, and there is an active foreign trade. Pop. 23,259.

**Viking** (vik'ing; from the Icelandic *vik*, a bay or fiord, and the termination *ing*, implying one who belongs to or is descended from: literally one who lurked in bays and issued thence to plunder), a rover or sea-robber belonging to one of the bands of Northmen who scoured the European seas during the eighth, ninth, and tenth centuries. This word has been frequently confounded with *sea-king*, a term which is applied to a man of royal race, who took by right the title of king when he assumed the command of men, although only of a ship's crew; whereas the former term is applicable to any member of the rover bands. See *Northmen*.

**Vilas**, WILLIAM F., statesman, born at Chelsea, Massachusetts, in 1840; died Aug. 27, 1908. He became a colonel in the Civil war, was afterwards prominent in the Democratic party, and was postmaster general 1885-89, and secretary of the interior in 1889. He was United States senator 1891-97.

**Vilayet** (vil-a-yet'), a name officially applied since 1865 to the large administrative districts of Turkey.

**Villa** (vél'yá), FRANCISCO (Pancho), a Mexican revolutionist, born 1877. Opponent of Carranza and the United States. See *Mexico*.

**Villach** (vil'áá), an old and picturesque town of Austria, on the Drave, with warm sulphur baths in the neighborhood. It has important industries. Pop. 9690.

**Villafranca** (vel'la-frán'ká), a town of Italy, province of Verona, on the Tartaro. It is celebrated as having been the center of the wars of 1848 and 1866. The preliminaries of peace between Napoleon III and the Emperor of Austria were signed here, July 11, 1859. Pop. 5037.

**Village Communities**, a kind of political and industrial organization claimed to have widely prevailed in early times, and which has left its traces to the present time. Those organizations seem to have been common among the tribes of the Aryan family of mankind, and they still exist in the villages of Russia and India, while evidences of their former existence are found in other localities. A clan of settlers took a tract of land, built their huts, and laid out fields which they cultivated in common as one great family. Every few years the land surrounding the village was divided into family lots, while beyond these lots was a larger area used in common for pasturage or other purposes. The Russian *Mir*, or village, is a significant example of this interesting phase of civilization. The government is in the hands of an elected council of village elders and a headman acting as chief of the council.

**Villajoyosa** (vil-yá-ho-yó'sá), a seaport of Spain, province Alicante, in the Mediterranean. Pop. 8902.

**Villarreal** (vél-yár-rá-ál'), a town of Spain, province Castellón, 4 miles from the Mediterranean, in an orange growing district. It is surrounded by old walls. Pop. 16,068.

**Villars** (vil-ár), CLAUDE LOUIS HECTOR, DUC DE, one of the greatest generals of the age of Louis XIV, was the son of the Marquis de Villars,

and was born at Moulins in 1653. He early distinguished himself under Turénne, Condé, and Luxembourg, and was created *maréchal de camp* in 1690, and lieutenant-general in 1693. In the wars of the Spanish succession he was sent to cooperate with the Elector of Bavaria. He defeated Prince Louis of Baden at Friedlingen, October 14, 1702, for which he received the marshal's baton; and having joined the elector, he defeated the Prince of Baden at Höchstädt, Sept. 21, 1703. His success in dealing with the insurrection of the Camisards (see *Camisards* and *Cavalier, Jean*) obtained for him the title of duke (1705). Having been sent to defend the frontier against Marlborough, he forced the formidable lines of Stollhofen, near Strashurg, and penetrated far into Germany (1705-1707). In 1709 he replaced Vendôme in Flanders, and fought the battle of Malplaquet against Marlborough and Eugene, in which he was seriously wounded. In 1712 he defeated the allies at Denain, took Marchiennes, and relieved Landrecy. After the Peace of Utrecht he opposed Eugene with uninterrupted success, and negotiated with him the Peace of Rastadt, March 7, 1714. On the renewal of the war with Austria, in 1733, he was sent to Italy at the head of an army, with the title of Marshal-general of France. After a successful campaign, he died at Turin in 1734.

**Villefranche** (vél-fránsh), a town of France, department Aveyron, at the junction of the Alzou with the Aveyron. Pop. 6297.

**Villefranche-sur-Saône** (-sur-són), a town of France, in the department of Rhone, on the Saône, 20 miles N. W. of Lyons. Pop. 14,794.

**Villehardouin** (vil-ár-du-an), GEORGE DE, a French historian, born about 1160, died about 1213. He took an important part in the fourth crusade, was present at the siege and capture of Constantinople, and when the Greek emperor was overthrown and Baldwin established in his stead, he received an extensive territory for himself in Thrace. His *Histoire de la Conquête de Constantinople*, is one of the most valuable historical works of the middle ages.

**Villein** (vil'en), a species of feudal serfs who were allowed to hold portions of land at the will of their lord, on condition of performing menial and non-military services. It frequently happened that lands held in villeinage descended in uninterrupted succession from father to son, until at length the

## Villeneuve

occupiers or villeins became entitled, by prescription or custom, to hold their lands so long as they performed the required services. And although the villeins themselves acquired freedom, or their land came into the possession of freemen, the villein services were still the condition of the tenure, according to the custom of the manor. These customs were preserved and evidenced by the rolls of the several courts-baron, in which they were entered, or kept on foot by the constant immemorial usage of the several manors in which the lands lay. And as such tenants had nothing to show for their estates but the entries into those rolls, or copies of them authenticated by the steward, they at last came to be called *tenants by copy of court-roll*, and their tenure a *copyhold*.

## Villeneuve

(vēl'-newv), PIERRE CHARLES JEAN BAPTISTE SILVESTRE DE, a French admiral,

born in 1763, entered the navy in 1777. He led the rear division at the battle of the Nile, and escaped with his own and four other ships to Malta. In 1804 he was made vice-admiral, and in 1805 Napoleon appointed him to the command of the Toulon squadron, with orders to divert the British fleet from the European coasts. He was eventually shut up in Cadiz by Nelson, but with the hope of repairing his ill success by a brilliant victory he sailed out of Cadiz, along with the Spanish fleet under Gravina, and offered the enemy battle off Cape Trafalgar (which see). Villeneuve's flagship, the *Bucentaure*, was captured, and the admiral taken as prisoner to England. In April, 1806, he was released and returned to France, but learning that his reception by the emperor would be unfavorable, he committed suicide.

**Villeneuve**, the name of a number of small towns in France, the most important being Villeneuve sur Lot, in Lot-et-Garonne department, which has interesting mediæval remains. It is a busy industrial and commercial place. Pop. (1906) 6978.

**Villiers**. See *Buckingham*.

**Vilna**, or WILNA (vēl'nā), a town of Russia, capital of the government of the same name, on the Vilia. It is picturesquely situated, and contains numerous churches and convents. It has a governor's palace, a town-house, Greek and Roman Catholic cathedrals, and numerous educational establishments. There is a considerable trade in agricultural produce sent to Baltic ports. Pop. 193,000.—The government, which lies in the Baltic, has an area of 16,406

## Vimy Ridge

square miles and a population of 1,591,112. The surface is generally flat, and the government produces good crops of grain, hemp, and flax. Manufactures and trade are limited. The town of Vilna dates back to the 10th century. It was the capital of Lithuania in 1320, and was united with Poland in 1447. It is reported to have had a printing press as early as 1519. Armies have devastated it many times. It was almost obliterated in the Russo-Polish wars. It was captured by the Russians in 1655 and ceded to Russia in 1656. The Swedes occupied it in 1702 and in 1706. The Russians again took possession in 1788 and it was finally annexed to Russia in 1795, after the partition of Poland. In the great European war the Teutonic forces fought their way to Vilna in 1915. The evacuation by the Russians occurred on September 19.

## Vimeira

(vi-mā'i-rā), a village of Portuguese Estremadura, 3

miles from Torres Vedras. It is remarkable for the battle between Wellington and Junot, fought on August 21, 1808, which was followed by the Convention of Cintra (August 30).

## Vimy Ridge

BATTLE OF. The ridge thus named is

the last elevation in the range of chalk hills which extend from the North Sea to Arras. It has two prolonged summits, the northern one named La Folie, from a former farm on its side; the southern one called Telegraph Hill, as the seat of an old semaphore post. It was laid open to attack as a result of the battle of the Somme (q. v.). As the Germans retired after the assault on the Somme this elevation offered them a post of great natural strength and they prepared to hold it at all costs, planting a strong force in the fortifications along its crest and sides. In the autumn of 1916 a force of Canadians under Sir Julian Byng was moved to this front and remained there during the winter, with desultory fighting until early April. During this period preparations for an attack on this stronghold were actively made, guns and shells in great number being brought to the lines in readiness for the spring campaign. The prelude to the battle was a bombardment of great vigor, guns thundering continuously against the height, while a fleet of aircraft moved to and fro above the trenches, directing the fire of the artillery and driving off German airplanes.

By the time fixed for the assault, at the end of the first week of April, hardly a foot of land remained on the ridge not torn by shellfire. The time fixed for the assault was the hour of 5.30 in the morning. Rain was falling heavily and the ground was a bed of mud. The distance

to the hilltop varied from 1200 yards to a mile. As the Canadians advanced, under the protection of a barrage of shellfire, they were subjected to a fierce bombardment, chiefly of machine guns, on the extreme left. But they were not to be checked, and in a half hour they had reached and won the front line trenches in the center of La Folie ridge. Many of the Germans were ready and eager to surrender, as for a number of days their food supply had been cut off by the intense artillery fire. By nightfall the crest of Telegraph Hill had also been won, the only point still held by the Germans being Hill 145, where a strong resistance was kept up by machine guns. When the morning of April 10 broke, the rain of the preceding day had changed to snow, which swept over the ridge in a driving storm. But the daring Canadians were not to be held back, and in a short time Hill 145 was in their hands. Still another hill here confronted them, an elevation which they had given the name of 'The Pimple.' This was held by a body of the Prussian Guard, and on the morning of the 12th, the time fixed for the assault, the courageous Canadians, who had defeated a strong German counter-attack on the previous day, made a vigorous dash upon this final stronghold. A driving snow-storm was raging, the slopes of the Pimple were deep in mud, but the Canadians hurled themselves forward and won their way to the trenches, where a hand-to-hand fight went on. The assault kept up for nearly an hour, at the end of which the Pimple was won and its garrison dead or prisoners.

By nightfall the Canadian line had extended till it reached beyond the Vimy-Arras Railway, while Vimy, Petit Vimy and several other villages had been taken. In their forward movement the cavalry, which had so little to do in this struggle, played its first active part, riding far in advance of the infantry, and capturing villages and gun positions as it went. The retreat of the Germans from this fierce assault was in no sense a matter of strategy. They were driven back with such impetuosity that they had no time to remove their guns, many of them being left behind uninjured, while a large supply of ammunition was abandoned. The final act in the battle of Vimy Ridge was the dashing capture of Arlenx by the Canadians. The victory, as a whole, is claimed as the most important won by the Allies to that date, and, in the words of Belloc, 'the greatest operation in the military history of England.' However this estimate be regarded, the Canadians won glory for their native land, the chief

among the British colonies. What had been called 'the hinge of the Hindenburg line' was in their hands, and a door had been opened to the plains surrounding Doust. From the Vimy Ridge the British dominated Lens, the important coal regions that surround it, and the valley of the Scarpe. In this week of battle the Canadians captured 4081 prisoners, 63 guns of all calibres, 124 machine guns and 104 trench mortars, while their casualties barely equalled the number of prisoners taken.

**Vincennes** (van-senn), a town of France, department of the Seine, about 2 miles east of Paris. Its large old castle was once the residence of the French kings, but was converted into a State prison by Louis XI. Pop. 29,791.

**Vincennes** (vin-senz'), a city, county seat of Knox county, Indiana, on the Wabash River, 58 miles s. by w. of Terre Haute. The river is navigable to this point. Manufactures include flour, lumber, staves, glass, paper, tools, furniture, steel sashes and doors, steel bridge, farm implements, sewer pipe, etc. There are coal mines, oil and gas wells in the vicinity, and a shipping trade in grain and cattle. Pop. 14,895.

**Vincent** (vin'sent), **JOHN JERVIS**, **EARL OF ST.**, a distinguished British naval commander, born at Meaford, Staffordshire, in 1734. He entered the navy at an early age, and commanded the *Foudroyant* in the action between Admiral Keppel and the French fleet in July, 1778. In 1794 he commanded a squadron in the West Indies, and reduced Martinique, Guadeloupe, and St. Lucia. On the 14th of February, 1797, in command of the Mediterranean squadron of fifteen sail, he defeated twenty-seven Spanish ships of the line off Cape St. Vincent, and was created a peer with the title of Baron Jervis and Earl of St. Vincent, and a pension of £3000 a year. In 1799 he became admiral; in 1801 first lord of the admiralty; and in 1821 admiral of the fleet. He died in 1823.

**Vincent**, St., one of the British West India Islands. See *St. Vincent*.

**Vincent de Paul**, St. See *Paul*, *St. Vincent de*.

**Vinci** (vin'eh), **LEONARDO DA**, one of the greatest Italian painters, also distinguished as a sculptor, architect, and civil and military engineer, a scientific inventor, and a man of universal genius, was the natural son of Pietro da Vinci, a Florentine notary, and was born at the village of Vinci, near Florence, in 1452. He excelled in all accomplishments, and acquired distinction



in mathematics, physics, botany, anatomy, literature, and philosophy; but he especially excelled in the arts of design, and his father placed him in the studio of Andrea Verocchio, a celebrated painter and sculptor, who was soon surpassed by his pupil. Two of his earlier productions are still extant: *The Adoration of the Magi*, in the gallery of the Uffizi at Florence, and *The Virgin of the Rocks* in the British National Gallery. About 1482 he entered the service of Ludovico il Moro, duke of Milan, by whom he was employed in engineering as well as artistic work. His great painting of the *Lord's Supper* was finished in 1499. The original has been wholly defaced, but judging from copies and engravings, this work is universally regarded as one of the greatest ever produced. One of the



Leonardo da Vinci.

best copies is that in the Royal Academy, London, by his pupil, Marco d' Oggionno. After the occupation of Milan by Louis XII (1499) he retired to Florence, where he painted his celebrated portrait of *Mona Lisa del Giocondo*, known as *La Gioconda*, in the Louvre (from which it has recently been stolen). In 1500 he was appointed chief engineer and architect of the pope's army, and visited many of the fortified posts in the papal dominions. In 1507 he returned to Milan, and painted a *Madonna and Child* in the palace of the Meizi at Vaprio. In 1512 he painted two portraits of Duke Maximilian, son of Ludovico, and in 1516 accompanied Francis I to France. He died at Cloux, near Amboise, May 2, 1519. Leonardo executed several important engineering works at Milan, and wrote numerous treatises, few of which have been published: His *Trattato della Pittura* was printed in 1651, and contains a mass of information on the principles of art, of which all subsequent writers

have availed themselves. In 1797 some fragments of Da Vinci's were published at Paris under the title of *Essai sur les Ouvrages Physico-Mathématiques de Léonard da Vinci*, etc., which created a profound sensation by their scientific insight and anticipation of modern discoveries. Da Vinci's paintings were the result of profound theoretical study of his art; he executed slowly, and was seldom satisfied with his finish of a picture, so high was his ideal. His knowledge of anatomy was deep. He made a special study of the human countenance under all circumstances. His extant works are few, and some of those attributed to him are believed to have been executed by his pupils.

**Vindhya Mountains** (vindh'hya), a mountain range in India, stretching east to west from the basin of the Ganges to Guzerat. It forms the N. boundary of the valley of the Nerbudda, and unites the north extremities of the Eastern and Western Ghauts. It is of granitic formation, overlaid with sandstone.

**Vine** (vin), a well-known climbing shrub, type of the order Vitaceæ, which consists of climbing plants with woody stems, simple or compound leaves, peduncles sometimes changed into tendrils, small green flowers, and round berries. The species are found in both the Old and New Worlds, especially in Asia. The best known and most useful of the order is the *Vitis vinifera*, the grapevine, cultivated in the Old World from time immemorial, of which there are numerous varieties, distinguished by possessing lobed sinuately-toothed, naked or downy leaves. It is a native of Central Asia, and its cultivation extends from near 55° north latitude to the equator, but in south latitude it only extends to about 40°. It is rarely grown at a greater altitude than 3000 feet. France is probably the greatest vine-growing country in the world, though its cultivation is active in several other countries of Europe. Several species of vine are indigenous in North America, as the *Vitis Labrusca*, the wild vine or fox-grape; *V. cordifolia* or *riparia*, heart-leaved vine, river-side vine, or frost-grape; and *V. astivalis*, the summer grape. About 1771 a European vine was introduced on the Pacific slope, and the culture has increased to great dimensions, especially in California. In other parts of the United States, however, the native American species are chiefly cultivated, and a number of excellent varieties have been produced, both for table and wine purposes. The vine has also been intro-

duced into Australia, where it thrives well, and quantities of wine are produced. The vine grows in every sort of soil, but that which is light and gravelly is best suited for the production of fine wines. It is a long-lived plant; indeed, in suitable climates the period of its duration is not known. It is propagated from seeds, layers, cuttings, graftings, and by inoculation, the first method being used for obtaining new varieties. Some vines produce dark-colored berries (black or red so called), others white. The Burgundy may be considered the most general vineyard grape of France, and the best wines in Italy and Spain are also made from grapes of this description. The sweet wines are made from sweet-berried grapes allowed to remain on the plants till overripe. Most varieties of the vine bear only once in the season, some oftener, especially in warm climates. In recent times the vine has been subject to a disease caused by the growth of a fungus known as *Oidium*. It appeared about 1845, and gradually spread over Southern Europe. Its ravages abated about 1863, but the vine has since been attacked by a still more destructive disease produced by an insect called the *Phylloxera* (which see). Grapes are extensively used in the dry state under the name of raisins, chiefly imported from Spain and the Levant, and now largely produced in California. The dried currants of commerce are the produce of the small seedless Corinthian grape which is cultivated in Greece and in many of the Greek Islands. The vine is mentioned in the most ancient historical records, and the grape has been in use for the making of wine for more than 4000 years. The Phœnicians introduced the vine into Europe. Vineyards are mentioned in Domesday Book as existing in England, but in the reign of Henry II the cultivation of the vine began to be neglected. For the manufacture of wines see *Wine*.

**Vinegar** (vin'e-gar), the name given to dilute and impure acetic acid (which see), obtained by the vinous fermentation. In wine countries it is obtained from the acetous fermentation of inferior wines, but elsewhere it is usually procured from an infusion of malt which has previously undergone the vinous fermentation. Vinegar may also be obtained from strong beer, by the fermentation of various fruits, or of a solution of sugar mixed with yeast; in short, all liquids which are capable of the vinous fermentation may be made to produce vinegar. The cider of apples, for example, is largely converted into

vinegar. Vinegars yield by distillation a purer and somewhat weaker acetic acid, called *distilled vinegar*. *Wood vinegar* is an impure acetic acid obtained by the distillation of wood; called also *Pyroligneous acid*. Common and distilled vinegar are used in pharmacy for preparing many remedies, and externally in medicine, in the form of lotions. The use of vinegar as a condiment is universal.

**Vinegar-eel**, an animal so called from its eel-like shape, but in fact a minute thread-worm or Nematode which is found in paste, vinegar, stagnant water, and in fermenting and decaying substances. Its body is almost transparent, though with thick cuticle, and it multiplies with great rapidity.

**Vinegar-plant**, a peculiar state of the *Penicillium glaucum*, a fungus found on decaying substances, and in fluids in a state of acetification. It forms a flocculent mass, which is tough and crust-like or leathery. A small piece of this when immersed in a mixture of sugar or treacle and water produces a rather insipid kind of vinegar.

**Vineland**, a borough in Cumberland Co., New Jersey, 34 miles S. by E. of Philadelphia. Glass, boots, shoes, clothing, grape juice and wine are produced, and there is a large poultry industry. A Training School and State Home for Feeble-minded are located here. Pop. 5282.

**Vinet** (vi-nā), ALEXANDRE RODOLPHE, a Swiss theologian and writer, born at Lausanne in 1797; died in 1847. In 1817 he was appointed professor of the French language and literature at the Basel Gymnasium, in 1835 at the Basel University, and in 1837 accepted the chair of theology in the academy at Lausanne. In 1840 he seceded from the national church, maintaining that there should be no connection between Church and State. His views on this subject were enforced in his *Essai sur la Manifestation des Convictions religieuses, et sur la Séparation de l'Eglise de l'Etat* (1842). In 1845 he gave up his c. He was an earnest and eloquent preacher and wrote *Histoire de la Littérature Française, au XVIII<sup>e</sup> Siècle; Etudes sur la Littérature Française du XIX<sup>e</sup> Siècle*, etc.

**Vinland** (vin'land), the name given to the settlement made by the early Norsemen on the North American coast, probably that of New England, though its location is questioned. about 1000 A.D. So called from the vines they found growing, the name signifying 'Wineland.' The settlement existed for about ten years.

**Viol** (vī'ui), a class of ancient musical instruments which may be regarded as the precursors of the modern violins. They were fretted instruments with three to six strings, and were played on with a bow. There were three instruments differing in pitch in a set, the treble, tenor, and bass viols, and in concerts they were commonly played in pairs: two treble, two tenor, and two bass. The bass viol, or *viol de gamba*, was the last to fall into disuse, which it did about the close of the eighteenth century.

**Viola.** See *Violin* and *Violet*.

**Violaceæ.** See *Violet*.

**Violet** (vī'u-let; *Viōla*), the popular name given to the species of the nat. order *Violaceæ*, which are favorite flowers in all northern and temperate climates, and many of them among the first to make their appearance in the spring. The corolla is composed of five unequal petals; the roots are mostly perennial; the leaves are alternate and stipulated; and the flowers are pedunculate. More than a hundred species are known. The greatest favorites are *Viola odorata*, or common sweet violet, and *V. tricolor*, or heart's-ease, the former being especially esteemed for its fragrance. The well-known pansies, so common as garden flowers, are but varieties of *V. tricolor* produced by cultivation.

**Violet,** one of the colors. See *Color*, *Spectrum*, etc.

**Violet-wood.** See *King-wood*.

**Violin** (vī'u-lin), a musical instrument, consisting of four catgut strings, the lowest of which is covered with silvered copper wire, stretched by means of a bridge over a hollow wooden body, and played with a bow. It is considered the most perfect of musical instruments, on account of its capabilities of fine tone and expression, and of producing all the tones in any scale in perfect tune. It forms with its cognates, the viola, violoncello or bass violin, and double-bass, the main element of all orchestras. The principal parts of the violin are the *scroll* or *head*, in which are placed the pins for tuning the strings; the *neck*, which connects the scroll with the body, and to which is attached the *finger-board*, upon which the strings are stopped by the fingers of the left hand as it holds the neck in playing; the *belly*, over which the strings are stretched, and which has two f-shaped sound holes, one on each side; the *back* or under side; the *sides* or *ribs*, uniting

the back and belly; the *tail-piece*, to which the strings are fastened; and the *bridge*. The back, neck, and sides are generally of sycamore, the belly of deal, the finger-board and tail-piece of ebony. Almost all the different pieces are fastened together with glue. The four strings of the violin are tuned at intervals of fifths, G, on the upper space of the bass staff, D, A, E, reckoning upwards. Every intermediate semitone in its ordinary compass of  $3\frac{1}{2}$  octaves may be produced by stopping the strings with the fingers and the compass may be almost indefinitely extended upwards by the harmonics produced by touching the strings lightly. The *viola*, or tenor violin, has four strings tuned C (in the second space of the bass staff), D, A, G, reckoning upwards, and is an octave higher than the violoncello and a fifth lower than the violin. (See *Violoncello* and *Contrabasso*.) The violin can, to a limited extent, be made to produce harmony by sounding two or three strings together. The finest violins are by old makers, which cannot be imitated, and the precise cause of their superiority has never been satisfactorily explained. The Cremona violins stand in the first rank, the celebrated maker being the Stradivari (Straduaris), Amati, and Guarneri (Guarnerius); of German makers the most celebrated are Stainer or Steiner and Klotz; Vuillaume of the French, and Forrest of the English.

**Violoncello** (vī-u-lon-sel'ō, or chel'ō), a powerful and expressive bow instrument of the violin kind, held by the performer between the knees, and filling a place between the violin and double-bass. It has four strings, the two lowest covered with silver wire. It is tuned in fifths, C (on the second ledger-line below the bass staff), G, D, A, reckoning upwards, and is an octave lower than the viola or tenor violin. Its ordinary compass from C on the second ledger-line below extends to A on the second space of the treble, but soloists frequently play an octave higher.

**Viper** (vī-per),

a name applied to various venomous serpents belonging to the family Viperidæ, sub-order Viperina, and characterized, like other members of that section, by having no teeth in the upper jaw save the two



Head and Tail of Common Viper (*Felias berus*).

hollow poison-fangs. The common viper or adder (*Pelias berus* or *Vipera communis*), the only venomous serpent which occurs in Britain, appears to be very local in its distribution. It is generally of a brownish-yellow color, with zigzag markings and black triangular spots. Its bite is, as a rule, not fatal, but may induce pain, sickness, and fever. The food consists of frogs, mice, birds, eggs, etc. The viper is viviparous—retaining its eggs within the body till the young are hatched. Among other serpents denominated vipers are the death viper or adder (*Acanthophis antarctica*) of Anstralia; the horned viper or asp (*Cerastes Hasselquistii*) and plumed viper (*Crotho cornuta*) of North Africa. No species of viper is found in America, though *Heterodon niger* has been called the black viper.

**Virchow** (fär'hö), RUDOLPH, a German pathologist and anthropologist, born in 1821, studied medicine at Berlin, and early became famous as a lecturer on pathological anatomy at Berlin University. His advanced liberal opinions during the movement of 1848 induced the government to deprive him (temporarily) of his appointment. In 1849 he accepted a chair at Würzburg, where he remained seven years, return-

in the Prussian parliament and Reichstag, and was made a member of important commissions, etc. In 1856 he was elected an honorary member of the Royal Society of Medicine, London; in 1859 a corresponding member of the French Academy of Medicine; and in 1873 a member of the Berlin Academy of Sciences. He was one of the founders of the German Anthropological Society, and an enthusiastic worker in this field, accumulating facts (partly in company with Schilemann) in Asia Minor, the Caucasus, Egypt, Nubia, etc. Among his important works are: *Cellular Pathology, Handbuch der Speziellen Pathologie und Therapie, Ueber den Hungertyphus, Die Aufgabe den Naturwissenschaften in dem neuen nationalen Leben Deutschlands, Die Freiheit der Wissenschaft im Modernen Staat*, and many others. Most of his medical works have been translated into English. He died Sept. 5, 1902.

**Virgil** (ver'jil), full name, PUBLIUS VIRGILIUS (or VERGILIUS), MARO, the most distinguished epic, didactic, and pastoral poet of ancient Rome, was born at Andes (probably *Pietola*), a little village near Mantua, October 15, 70 B.C. His father possessed a farm there, which he cultivated himself, and Virgil received a good education. He appears to have come to Rome about 41 or 40 B.C., when his estate was lost at the time of the agrarian division. It was restored to him, however, on application to Augustus, who henceforward became his patron. He also enjoyed the patronage of Mæcenas, and was intimate with Horace. His health was delicate, and his retiring nature led him to reside for the most part outside Rome, either at Tarentum or Naples. His *Eclogues*, a series of bucolic or pastoral poems, were written about 41-39 B.C. His *Georgics*, a poem on agriculture, was completed in B.C. 31. The *Æneid*, an epic in twelve books on the fortunes of Æneas (which see), was probably begun about B.C. 29. It occupied the author many years, and never received his finishing touches. In B.C. 20 Virgil appears to have engaged on a tour in Greece. But Augustus, having arrived at Athens on his return from the East, Virgil determined to accompany him home. At Megara, however, he fell sick, and he died at Brundisium, B.C. 19. His poems exhibit a remarkable command of language, and great taste and skill in the management of all the materials of poetry. He is unrivaled in beauty of versification. He was amiable and modest, free from envy and jealousy, and of irreproachable character. Mediæval



Rudolf Virchow.

ing to Berlin in the autumn of 1856 as professor in the university and director of the pathological institute attached to it. He rendered immense service to medical science by his discoveries in regard to inflammation, ulceration, tuberculosis, and numerous other morbid processes of the human body, and had great influence on the whole of modern medicine, including hospital reform and sanitary science. After 1862 he was one of Bismarck's most powerful opponents



## Virginal

legends represent him as a benevolent enchanter, in which character many stories were current regarding him in Italy.

**Virginal** (vir'ji-nal), an obsolete keyed musical instrument with one string, jack and quill to each note. It differed from the spinet only



Virginal.

in being square instead of triangular, and was the precursor of the harpsichord, now superseded by the pianoforte.

**Virginia.** See *Appianus Claudius Crassus*.

**Virginia** (ver-jin'i-a), a South Atlantic State of the American Union, bounded N. E. and E. by Maryland, District of Columbia and the Atlantic, S. by North Carolina and Tennessee, W. and N. W. by Kentucky and West Virginia; area, 42,627 square miles. The western portion of the state is traversed from S. S. W. to N. N. E. by the great range of the Alleghenies, with ramifications known by various local names, and intersected by extensive and fertile valleys. More to the eastward runs the Blue Ridge range, the beautiful Shenandoah Valley, or Valley of Virginia, lying between these two mountain ranges. The surface of the state may be divided into three sections: the seaboard or tidewater district, the soil of which is of excellent quality, yielding large crops; the Piedmont, or 'foot-hill' region, 500 to 1000 feet high, which abuts on the Blue Ridge and is less fertile; and the mountain district, which has many rich and fertile valleys. The Valley of Virginia in this district has been called the garden of America. The width of the mountainous district is from 80 to 100 miles. The highest point is Rogers Mountain, 5719 feet above sea-level. The seaboard or tidewater district is generally level, not exceeding 60 feet above the tide in its highest parts. Virginia is rich in minerals, including coal, iron, copper, lead, manganese, zinc,

gold, gypsum, rock-salt, and various others; the most valuable of those worked being coal and iron. Gypsum exists in vast beds. The State abounds in mineral springs of wide repute medicinally. The chief rivers are the Potomac, the Rappahannock, the York, and the James, which flow into Chesapeake Bay. The Roanoke passes into North Carolina. The soil in the tidewater region is a light sandy loam, yielding large crops of vegetables and small fruits. Some cotton is grown here. Most of the Valley region is rich and fertile, well adapted for cereals, chiefly corn, wheat, oats and rye. Tobacco is largely grown in many parts of the State. Much of the mountain region is forested. The lumber interest is of considerable importance, and there is excellent pasturage. Cattle and sheep are numerous, and dairying and wool growing are important industries. There are profitable fisheries, especially that of the oyster. The manufacturing interests are comparatively small, the chief seats being Richmond, Alexandria, Danville and Lynchburg, the chief products being in lumber and timber, tobacco manufactures, flour-mill and grist-mill products, etc. There are good advantages for commerce, but its development has not yet been large. There are many places of interest to tourists, especially the celebrated Natural Bridge and Luray Cave. Elementary and intermediate education is free to all; advanced instruction is free to a certain number; and the higher instruction of the University of Virginia is free to all male natives over eighteen years of age who possess a certain standard of culture. The chief cities of the state are Richmond (the capital), Norfolk, Petersburg, Lynchburg, Alexandria, and Portsmouth. Virginia was first settled at Jamestown in 1607 and 1609 by chartered London companies. It was made a royal colony in 1624, and continued a loyal royal province till the Revolution. At Yorktown General Cornwallis surrendered, October 19, 1781. Negro slavery was introduced in 1619, and for a considerable period after that date felons or convicts were sent over from England in large numbers, and sold for a term of years for work on the plantations. Its capital, Richmond, was the capital of the Confederate States, and during the whole of the Civil war the State was occupied by hostile armies. At the close of the war the State was under military control till 1870, when it was readmitted to the Union. Pop. (1910) 2,061,612.

**Virginia**, a city in St. Louis Co., Minnesota, 54 miles N. W.

of Duluth. It has iron mining interests. Pop. 10,473.

**Virginia City**, county seat of Storey Co., Nevada, is situated in a rocky region of the Sierra Nevada, at an elevation of 6205 feet. It owes its importance to its gold and silver mines, especially the famous Comstock Lode and the Big Bonanza, which were long the richest producers of silver in the United States. Pop. 2244.

**Virginia Creeper**, the *Parthenocissus quinquefolia*, a climbing plant, native of the United States, used as an ornamental covering for walls, etc., and sometimes called *American Ivy*.

**Virginia Military Institute**, a state school established in 1839 at Lexington, Va. The instructors hold commissions in the state militia and the students are organized as a military corps of cadets. During the Civil War the cadets were in active service for thirteen months.

**Virginia University** (officially *The University of Virginia*), near Charlottesville, Virginia, was chartered in 1819, and opened in 1824 under the rectorship of Thomas Jefferson. It enjoys state patronage, receives an annual grant of money, and has a library containing 75,000 volumes.

**Virgin Islands** (ver'jin), a group of small islands in the West Indies belonging to the United States and Great Britain. St. Croix, St. Thomas and St. John were purchased by the United States from Denmark in 1917. Culebra, Culebrita and Vieques also belong to the United States (formerly to Spain) and the rest of the group, Tortola, Anegada, Virgin and Gorda to Great Britain. The area of the group is about 150 square miles. See *Danish West Indies*.

**Virginius Affair**, THE, arose from the capture (October 31, 1876) of the United States steamer *Virginius* off Jamaica, by the Spanish warship *Tornado*. The ship was taken to Santiago, Cuba, and 52 of the passengers and crew were court-martialed and executed. The action of the local officials was disowned by the Spanish government.

**Viscacha** (vis-kä'chä; *Lagostomus trichodactylus*), a rodent animal of South America, allied to the chinchilla, about 2 feet long and stoutly built, with a short tail, inhabiting the pampas of the Argentine Republic, and living in burrows like the prairie dog of North America.

**Vischer** (fish'er), PETER, a German sculptor, born at Nuremberg, Bavaria, in 1455, son of a worker in bronze. Little is known of his private life, but he attained great fame as an artist, and received orders both from German and foreign princes. His most celebrated work is the tomb of St. Sebaldus in Nuremberg, which contains seventy-two figures, besides those of the apostles and prophets. He died at Nuremberg in 1529.

**Visconti** (vis-kon'te), an old Milanese family, celebrated for its political consequence and its patronage of science. The family reached the summit of its grandeur and splendor in the reign of Gian Galeazzo, who assumed the government in 1385. In later years it decreased in importance.

**Viscount** (vi'kount), a title of nobility next in rank to that of earl, and immediately above that of baron. It is the most recently established English title, having been first conferred by letters patent on John, Lord Beaumont, by Henry VI in 1440. The title is frequently attached to an earldom as a second title, and is held by the eldest son during the lifetime of the father. See *Peer, Nobility and Coronet*.

**Vishnu** (vish'nö), the second god of the Hindu triad (the others being Brahma and Shiva), and by his special worshippers considered to be the

greatest. In the early Vedas he appears as a manifestation of the sun, and he was not regarded as the most exalted deity, this rank being accorded to him by the later writers of the Rāmāyana, the Mahābhārata, and more especially of the Purāṇas. The Brahmanic myths relating to Vishnu are characterized by the idea that whenever a great physical or moral disorder affected the world, Vishnu descended in a small portion of his essence to set it right. Such descents are called *avatars*, or incarnations, and are generally given as ten, nine of which are already past, the tenth being yet to come. He is generally represented as having four arms, each hand holding some particular object, and as riding on a being half man half bird.



Vishnu on his Man-bird Garuda.

**Visible Speech**, a term applied by Prof. Alexander Melville Bell, its inventor, to a system of alphabetical characters designed to represent every possible articulate utterance of the organs of speech. The system is based on an exhaustive classification of the possible actions of the speech organs, each organ and every mode of action having its appropriate symbol. It is said that this invention is of great utility in the teaching of the deaf and dumb to speak, and in enabling learners of foreign languages to acquire their pronunciation from books.

**Visigoth** (vis'i-goth). See *Goths*.

**Vision** (viz'un). See *Eyc*, *Optics*, *Sight*.

**Vistula** (vis'tū-lā; German, *Weichsel*, vik'sél), a river which rises in the Carpathians, traverses Galicia, Poland, and Prussia, and after a course of about 650 miles empties by several mouths into the Gulf of Danzig. It flows past the towns of Cracow, Warsaw, Bromberg, and Danzig, and is navigable from the first-mentioned place.

**Vitaceæ** (vi-tā'se-ē). See *Vine*.

**Vitalians** (vi-tā'li-anz). See *Apollinarians*.

**Vitamine** (vi'ta-mīn), the scientific term for certain complex, nitrogen-containing, crystalline substances which are present in natural foods, the food value of which is far in excess of their calorific value. These vitamins are as yet unisolated. At least two such substances appear to be essential: the one is soluble in fat and is present in milk, beef fat, cod-liver oil and egg yolk, but is not found in the ordinary vegetable oils or in the common cereals, except corn; the other vitamine is water-soluble and is more widely found in food where there are active cell structures. Highly polished rice presents a food completely void of vitamins, while the rice polishings contain all the vitamins of the rice. A great advantage of the white bean as a food is its high content of water-soluble vitamine. The withdrawal of vitamins from a diet otherwise well-balanced results in disease and death as surely as would the withdrawal of protein or of water. The word vitamine was coined in 1913 by Dr. Casimir Funk, a Russian chemist.

**Vitelline** (vi-tel'lin) consists of casein and albumen, forming the yolk of birds' eggs.

**Vitellius** (vi-tel'li-us), AULUS, a Roman emperor, born about 15 A. D. He was a favorite with Caligula, Claudius and Nero, and was put by Galba

in command of the German legions. His army soon proclaimed him emperor. Galba was slain by the partisans of Otho and a contest arose for the throne in which Otho was defeated and Vitellius recognized as emperor. Meanwhile Vespasian had been proclaimed at Alexandria, and one of his generals marched against Rome, defeated the supporters of Vitellius, and put him to death (69 A. D.).

**Vitepsk** (vā'tyepek), or **VITEBSK'**, a town in Russia, capital of the government of the same name, on the Dūna, 315 miles S. of Petrograd. The streets are narrow and dirty, and the houses mostly of wood. Its manufactures are woolen and linen cloth, leather, and mead. It has a considerable trade. Pop. 103,840.—The government has an area of 17,433 square miles. The surface is generally flat, and much occupied by woods and morasses. The whole drainage is carried to the Baltic. The soil suits rye better than any other grain. The only mineral of value is iron. Pop. 1,502,916.

**Viterbo** (vā-ter'bō), a town of Italy, in a fertile valley in the province of Rome, 40 miles N. W. of the city of Rome. It has a Gothic cathedral containing the tombs of several popes, an ancient Episcopal palace, and a town-hall. Pop. 17,344.

**Viti Levu** (vā'tā lā'vō), the chief island of the Fiji group.

See *Fiji*.

**Vitis** (vi'tis), the typical genus of the order Vitaceæ, comprising the vines (q. v.).

**Vitoria** (vā-tō'rē-a), a town of Spain, in Biscay, capital of the province of Alava, 65 miles N. E. of Burgos. The chief buildings are four parish churches, a palace of deputies, an academy of music, theater, and prison. It has a Gothic cathedral built in the twelfth century, but with few features of interest. Leather, soap, etc., are manufactured. Pop. 33,617.

**Vitriol** (vit'ri-ul), BLUE. See *Copper*.

**Vitriol**, GREEN, the same as copperas or sulphate of iron. See *Copperas*.

**Vitriol**, OIL OF, the common name for strong sulphuric acid (q. v.).

**Vitruvius Pollio** (vi-trō'vi-us pol-i-ō), MARCUS, a celebrated Latin writer on architecture, who flourished in the time of Julius Cæsar and Augustus, and wrote his work *De Architectura* probably about B. C. 13. This treatise is valuable as a compendium of the writings of numerous Greek architects.

**Vitry-le-François** (vê-trê-le-frân-swa), a fortified town of France, dep. Marne, on the river Marne. Pop. 8561.  
**Vittoria.** See *Vitoria*.

**Vitus' Dance**, *St.* (vi'tus), or *Chorea*, a spasmodic or convulsive disease, allied to rheumatism, and due to an irritable condition of the spinal cord, in which the muscles of the extremities and other parts are thrown into various involuntary motions, and perform in an irregular manner those motions usually controlled by the will. The disease attacks both sexes, but chiefly the female, and is specially a disease of childhood, occurring in those who are of a weak constitution or improperly nourished. It generally appears from the eighth to the fourteenth year. In serious cases the spasmodic movements are violent and incessant, and speech and swallowing are interfered with.

**Vivandiere** (vi-van-di-êr), a woman attached to French and other European continental regiments, who sells provisions and liquor. The dress of the vivandieres is generally a modification of that of the regiment to which they are attached.

**Viverridae** (vi-ver'l-dê), a family of mammals containing the civets and allied tribes.

**Viviparous Animals** (vi-vip'a-rus), animals which bring forth their young alive. See *Reproduction*.

**Vivisection** (viv-e-sek'shun), the practice of operating with the knife upon living animals for the purpose of ascertaining some fact in physiology or pathology which cannot be otherwise investigated. It is also practiced in order to illustrate previously known facts, and to enable students to acquire operative dexterity. Vivisection for the latter purpose solely is condemned in the United States, but is carried on in the veterinary colleges in France. Though the term vivisection strictly is applicable to cutting operations only, it is generally employed for all scientific experiments performed on living animals, whether they consist of cutting operations, the compression of parts by ligatures, the administration of poisons, the inoculation of disease, the subjection to special conditions of food, temperature, or respiration, or to the action of drugs and medicines.

**Vizagapatam** (vê-zâ-gu-pu-tâm'), a town of British India, Madras Presidency, at the entrance of the Veragatam into the Bay of Bengal.

It is a military station. Pop. 40,892.  
**Vizier** (vi'zir; Arabic, *vazir*, a bearer of burdens), a title given to high political officers in the Turkish Empire and other Mohammedan countries. The president of the divan or prime minister is known as grand vizier.

**Vlaardingen** (vlâr'din-gin), a town of the Netherlands, province of S. Holland, on the New Maas, a seat of the Dutch herring fishery. Pop. 17,000.

**Vladikavkas** (vlâ-dyê-kaf-kas'), a town of Russia, capital of Terek district, at the northern base of the Caucasus. Pop. 49,924.

**Vladimir** (vlâ-dyê'mêr), one of the oldest towns in Russia, capital of a government of the same name, 105 miles N. E. of Moscow. It has considerable manufactures, and a trade in fruit. During the thirteenth century it rivaled Moscow in importance. Pop. 39,170.—The government has an area of 18,815 square miles, and a population of 1,730,400. There are important manufactures of linens and woollens, and several blast-furnaces.

**Vladivostok** (vlâ-dyê-vâs-tok'), a seaport town of Asiatic Russia, on the Siberian coast, Sea of Japan. It was founded in 1861, and since 1870 has been the chief station of the Russian Pacific fleet. Vast sums have been spent on wharves, shipyards, and arsenals, and it is the termination of one of the branches of the Trans-Siberian Railway. The trade is of growing importance and there are a number of manufactures. Pop. (1911) 91,464.

**Vliessingen** (vli's-sin-gen). See *Flushing*.

**Vocational Guidance**, a new movement in education, having for its object the direction of young persons into vocations for which they are adapted.

**Vocational Training.** Movements to introduce into the schools instruction in agriculture, domestic science and the trades have been widespread in recent years; and experiments have given highly satisfactory results. Investigations have shown that the fourteen-year-old child who leaves school to find employment is ill-trained and unfamiliar with the needs of industry. To remove these conditions is the object of vocational training.

**Voice** (vois), the name given to the result of the production of sound in nearly all higher vertebrate animals. 'Speech' (which see) is a modification of 'voice.' In man the voice is produced by the inferior laryngeal ligaments (see *Larynx*). These 'vocal cords' consist of



two elastic folds of mucous membrane, so attached to the cartilages of the larynx and to muscles that they may be stretched or relaxed and otherwise altered so as to modify the sounds produced by their vibration. The higher the note produced the greater is the tension of the cords; and the range of voice therefore depends upon the amount of tension which the cords can undergo. Regarding the compass and application of the voice in speaking and singing physiologists have noted three kinds of sequence. In ordinary speaking a monotonous sequence is observed, the notes having nearly all the same pitch, and the variety of the sounds being due rather to articulation in the mouth than to definite movements of the glottis and vocal cords. A passage from high to low notes, without intervals, forms the second kind of sequence; or the same sequence is observed in the passage from low to high notes. Such a sequence is exemplified in crying and howling both in man and in lower animals. The true musical sequence forms the third, in which the successive sounds have vibrations corresponding in relative proportions to the notes of the musical scale. The male voice admits of division into tenor and bass, and the female into soprano and contralto. The lowest female note is an octave or so higher than the lowest note of the male voice, and the female's highest note is about an octave above that of the male. The compass of both voices taken together is about four octaves, the chief difference residing in the pitch and also in the quality or timbre. The difference of pitch between the male and female voice is due to the length of the vocal cords, while the difference in timbre appears to result from differences in the nature and extent of the walls and cavity of the larynx, throat, and mouth. *Chest notes* differ from *falsetto* notes in that the former are natural notes produced by the natural voice, while the latter are produced by a stopping action on the cords. Finally it may be noted that the actual strength of the voice depends on the degree of vibration of the vocal cords, and also in a minor degree on the resonance of the larynx, lungs, and chest generally.

**Volapük** (vö'la-pük), the name given to a universal language invented by Johann Martin Schleyer, of Constance, after twenty years' labor. The name means 'world-speech,' being based on English *world* and *speak*, and a number of the vocables are modified English words. In structure the language is simple and extremely regular,

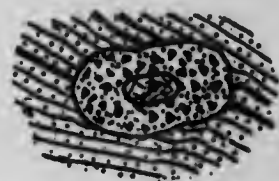
and the orthography is entirely phonetic, the words being pronounced as they are written, and vice versa. The study of Volapük made some progress, but has been superseded by a new artificial language called Esperanto (which see).

**Volatile Oils** (vol'a-till). See *Oils*.

**Volcano** (vol-kä'nö), in a popular sense, a conical hill or mountain composed of material (volcanic ashes and lava) brought up by igneous forces from the interior of the earth through a pipe or vent. At the top there is a cup-shaped hollow called the crater. A volcanic eruption generally commences



Outline of Volcanic Neck.



Ground-plan of Volcanic Neck.

a, Surrounding strata. b, Volcanic vent.  
c, Core of lava.



Section of Volcanic Neck.

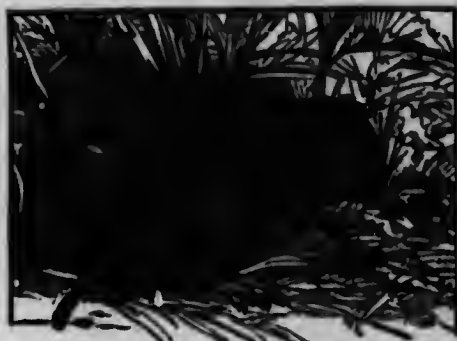
a, Surrounding strata. s s, Surface of ground. c, Crater. d d, Original cone, restored.

with the discharge of immense quantities of gases. This is followed by the ejection of ashes and hot fragments of rock. Lastly there is a flood of molten rock or lava. Volcanoes which show such outbursts more or less frequently are called *active* volcanoes; those which are known to have been active in historic times, but have long been quiescent, are called *dormant* or *sleeping* volcanoes; and those which present all the phenomena of volcanoes, but which have shown no activity in historic times, are called *extinct* or

dead volcanoes. The mud volcanoes or *seals* of the Crimea and elsewhere (conical hills of slowly-flowing mud); the *fumeroles* (fissures from which steam issues); the *solfataras* (holes from which sulphurous fumes proceed) of Italy, etc.; the geysers and hot springs of the Yellowstone Park, Iceland, New Zealand, etc., are signs of weak or decreasing volcanic activity in the special districts in which they occur. Volcanoes may occur as isolated conical mountains, such as Vesuvius, Etna, or the Peak of Teneriffe. They also form various groups or systems of mountains. One remarkable fact in the distribution of volcanoes is their proximity to the sea, for out of 323 active volcanoes enumerated by Fuchs, all, excepting two or three in Central Asia and about the same number in America, are within a short distance at least of the ocean. There are certain regions over the whole of which active volcanic vents are distributed at intervals. Of these great regions that of the Andes is one of the best defined. An almost uninterrupted line of volcanoes stretches from the 46th degree N. lat. in Chile to the north of Mexico, including Tunguragua, Cotopaxi, Antisana, Pichincha, Orizaba, Popocatepeti, Jorullo, etc. Another continuous line of volcanic action commences in the north of Alaska, passes through the Aleutian Isles over to Kamtchatka in N. E. Asia, then proceeds southward without interruption through a space of between 60° and 70° of latitude to the Moluccas. It includes the Kurile, Japanese, and Philippine Islands, traverses Java, Sumatra, Borneo, Celebes, New Guinea, and extends to various parts of the Polynesian Archipelago and New Zealand. A volcano in this series, on the island of Krakatoa, in the Straits of Sunda, burst into one of the most violent eruptions on record on the 26th of August, 1883. (See *Krakatoa*.) In the Old World the volcanic region extends from the Caspian Sea to the Azores, embracing the greater part of the Mediterranean and its most prominent peninsulas. Here volcanic action is most prominently visible in Vesuvius, Etna, and the Lipari Islands. Among disconnected volcanic groups may be mentioned Iceland (Mt. Hecia, in particular), the Sandwich Islands, and the island of Bourbon, Madagascar, and Mauritius. (See *Vesuvius*, *Etna*, *Hecia*, etc.) Also those of the West Indies, especially Mount Pelée in the island of Martinique, an outbreak of which on May 8, 1902, destroyed the city of St. Pierre and all its inhabitants, about 30,000 in number. (See *Pelée*, *Mount*.)

Submarine volcanoes show a frequent existence, but such phenomena are for the most part inaccessible. In the present century several instances of the rise and disappearance of islands owing to volcanic action have been observed. Various theories have been proposed to account for the immediate cause of volcanic action. It is now generally accepted that it is produced by internal heat at a certain depth beneath the surface of the earth, and the evolution of a great body of elastic vapor, apparently in many cases due to the sudden vaporisation of water which has made its way downward, expanding and seeking to escape where the least amount of resistance is presented, and manifesting itself in the explosions that accompany an eruption, or in the upheaval of rocks and the production of earthquakes. See also *Earth*, *Geysers*, *Earthquakes*, etc.

**Vole** (vôl; *Arvicola*), a genus of rodents closely allied to the rats and mice, and included in that family. Some are terrestrial, others aquatic. The common vole of Europe (*A. agrestis*), the meadow-mouse, or short-tailed field-mouse, is injurious to young plantations, devouring the bark and destroying



Common Vole (*Arvicola agrestis*).

the roots. It is reddish brown above and gray below. The water-vole (*A. amphibius*) or water-rat is much larger, and swims well though its feet are not webbed. It is of a pale or chestnut brown, tinted with gray. There are many other species in the Old and New World.

**Volga** (vol'gà), a river in Russia, the longest in Europe; rising in a small lake in the east of the Valdai Hills, and falling into the Caspian Sea by about seventy mouths, near Astrakhan, after a total estimated course of 2400 miles. Its basin is estimated at from 500,000 to 700,000 square miles. It flows generally southeast past Tver.

## Volhynia

Yaroslav, Kostroma, and Nijni-Novgorod to Kasan, thence south past Simbirsk and Saratov, and proceeds southeast from Sarepta to the Caspian. Its chief tributaries are the Kama on the left bank and the Oka on the right. It is navigable by barges from its source, and



communicates with the Caspian, Baltic, and Polar Seas by a system of canals. Its banks are fertile and well wooded, and its waters abound in fish, particularly sturgeon, carp, and pike of extraordinary size.

**Volhynia** (vol-in'i-a), a government in Southwest Russia; area, 27,690 square miles. The soil is fertile, producing all kinds of grain, particularly wheat; and fine breeds of cattle and horses are reared. The hills in the south are rich in iron. There are also considerable manufactures. The capital is Jitomir. Pop. 3,547,500.

**Volition** (vō-lish'un). See Will.

**Volney** (vol'ne), CONSTANTINE FRANÇOIS, a distinguished French author and traveler, born at Craon in 1757; died in 1820. He published in 1787 his *Travels in Egypt and Syria*, a work of high reputation, and in 1791 his *Ruins, or Meditations on the Revolutions of Empires*, a philosophical work which attracted great attention. Among his other works was one on the *Climate and Soil of the United States*.

**Vologda** (vō-log'dà), a government in Northeast Russia; area, 155,033 square miles. The surface is for the most part covered with woods, lakes, and morasses. Its forests furnish considerable quantities of timber and charcoal. Pop. 1,365,587.—The capital is VOLOGDA, on a river of the same name,

in a beautiful district, 85 miles E.S.E. of St. Petersburg. Pop. 27,822.

**Volsci** (vol'si), an ancient Italian tribe who dwelt in Latium, on both sides of the river Liris (Garigliano). Their principal city was Corioil, from which Coriolanus derived his surname. After having several times endangered the Roman State they were conquered, and disappeared from history (388 B.C.).

**Volta** (vol'tà), ALESSANDRO, an Italian natural philosopher, born at Como in 1745; died there in 1827. Two treatises, published in 1769 and 1771, in which he gave a description of a new electrical machine, laid the foundation of his fame. He was successively professor of physics at the gymnasium in Como and in the University of Pavia, where he invented the electrophorus and electroscope. He also devised several other electrical appliances, and in 1800 the voltaic pile (which see). In 1728 he made a tour through France, Germany, England and Holland. In 1801 Napoleon invited him to France, where a medal was struck in his honor. In 1810 he was created a senator of Italy, with the title of count; and in 1815 was made director of the philosophical faculty of Padua.

**Voltaic Electricity** (vol-tà'ik), galvanic electricity, galvanism. See *Galvanic Battery* and *Galvanism*.

**Voltaic Pile**, Volta's arrangement for producing a current of electricity,

consisting of a pile of alternate disks of two dissimilar metals, as copper and zinc, zinc and silver, zinc and platinum, separated by pieces of flannel or pasteboard moistened with salt water or with water acidulated with sulphuric acid.

**Voltaire** (vol-târ), FRANÇOIS

MARIE AROUET DE, a celebrated French writer, born at Paris, November 21, 1694; died there May 30, 1778. His father was François Arouet, a notary, and he was destined for the legal profession, but abandoned the law for letters. In 1718 a tragedy named *Edipe*



Voltaic Pile.  
p, positive, n, negative end.

was brought out by him, and was a great success. It is said that this play was finished, and that two cantos of his epic the *Henriade* were written in the Bastille, where he was confined from May, 1717, to April, 1718, for writing certain satirical verses on the regent. He now became the fashionable poet and resided mainly at Paris, leading a life of gaiety and pleasure in the society of the great. It was about the beginning of this period that he adopted the name of Voltaire. In 1726 he was again imprisoned in the Bastille for sending a challenge to the Chevalier Rohan, by whom he had been grossly insulted. He was liberated within a month, and went to England on the invitation of Lord Bolingbroke. Here he resided till 1729 in friendship with the leading deists, and acquired some knowledge of English literature. His *Henriade* was completed and published by subscription in England. After his return to France he lived chiefly at Paris till 1734. During this period he raised himself from very moderate circumstances to a condition of affluence by successful monetary speculations. From 1734 to 1749 he resided with the Marchioness de Châtelet at Cirey, in Lorraine. She died in 1749, and Voltaire then accepted the oft-repeated invitations of Frederick the Great to come and live at his court at Potsdam. Here he was received with great honor, but a series of disagreements with the king ended in Voltaire's retirement from the Prussian court in 1753. He then resided for a short time at Strasbourg, Colmar, and Lyons, removing at the end of 1754 to Geneva. For almost the whole of the remainder of his life he lived in Switzerland, or close to its borders. In 1760 or 1761 he fixed his residence with his niece, Madame Denis, at Ferney, where he received a constant succession of distinguished visitors, and maintained a correspondence which included in its range most of the crowned heads of Europe. In Feb., 1778, he went to Paris, where he was received with enthusiasm by all classes. But the excitement of the occasion hastened his death. His works embrace almost every branch of literature; poetry, the drama, romance, history, philosophy, and even science. Hatred of fanaticism and superstition was his chief characteristic, and nearly all his works are strongly animated by a spirit of hostility to the priests and the religion they represented. He upheld theism, however, with as much zeal as he denounced Christianity and priesthood. Voltaire's literary fame chiefly rests on his philosophical novels:

*Zadig*, *Candide*, *L'Ingénu*, etc.; his histories: *Siecle de Louis XIV.*, and *Histoire de Charles XII.*; his correspondence; and more than all, perhaps, on his poetical epistles, satires, and occasional light poems, which all exhibit wit, gaiety, vivacity, and grace. Several of his tragedies, such as *Zaire*, *Alzire*, *Méropé*, *Mahomet*, had great success in their day, but are not assigned a high place in French literature. His comedies, the best of which is *L'Enfant Prodigue*, were less successful. His *Henriade*, an epic poem, had great success, and exercised a powerful influence when it first appeared, but is not highly esteemed now. His *Pucelle*, dealing in mock-heroic manner with the history of Joan of Arc, abounds in obscene passages, and treats sneeringly of religion, virtue and all that men hold most sacred, but is viewed by Brougham as 'the great masterpiece of Voltaire's poetic genius.'

**Voltameter** (vol-tam'e-ter), an instrument in which a current of electricity is made to pass through slightly acidulated water, and as the water is thus decomposed, oxygen and hydrogen being liberated, the quantity of electric current passing through in a given time may be ascertained in terms of the quantity of water decomposed.

**Volterra** (völ-ter'ä; ancient *Volaterræ*), a town in Italy, province of Pisa, 33 miles southwest of Florence. It was anciently one of the twelve principal cities of Etruria, is surrounded by Etruscan walls, and possesses a museum rich in Etruscan antiquities. Pop. 5522.

**Volterra**, DANIELE DA. See *Ricciarelli*.

**Voltmeter** (volt'mä-ter), an instrument for measuring the pressure, electromotive force, or difference of potential at the ends of an electric current. There are a number of such instruments, of which the gold-leaf electroscope may be considered a crude example.

**Volturno** (vol-tör'nó), a river of Italy, rising in the province of Campobasso, flows S.E. to its junction with the Calore, and then west past Capua into the Mediterranean.

**Volunteers** (vol-un-tärz'), citizens who of their own accord offer the state their services in a military capacity without the stipulation of a substantial reward. The oldest volunteer force in Great Britain is the Honorable Artillery Company of the city of London, which received its charter of incorporation from Henry VIII. In



case of a war of magnitude the United States has always relied on its volunteer soldiery. During the Civil War, including reenlistments, there were 2,656,533 men in the field—the great body of whom were volunteers.

**Volunteers of America**, a religious and philanthropic organization, founded in 1896 by Commander and Mrs. Ballington Booth, formerly of the Salvation Army, in part as a protest against the rigid militarism of that body. Over 100



Volutes of the Ionic and Corinthian Capitals.

a a, Volutes.

b, Helix.

stations for philanthropic work are in operation in the United States, and activities are being extended to other lands.

**Volute** (volūt'), in architecture, a kind of spiral scroll used in the Ionic, Corinthian, and Composite capitals, of which it is a principal ornament. The number of volutes in the Ionic order is four. In the Corinthian and Composite orders they are more numerous, in the former being accompanied with small ones, called *helices*.

**Vomer** (vōmer), in anatomy, one of the bones of the skull, forming in man part of the septum or division between the cavities of the nostrils. In fishes it is a feature of importance for classification purposes.

**Vomit** (vom'it) to expel matters forcibly from the stomach through the œsophagus. At times it is sympathetic, as in affections of the kidneys, uterus, brain, etc. At others it is symptomatic, as in gastritis, peritonitis, etc.

**Vondel** (von'del), JOOST VAN DEN, one of the most celebrated poets of Holland, born in 1587; died in 1659. His works display so much genius and elevated imagination that he has been called the Dutch Shakespeare. They include metrical versions of the Psalms, of Virgil, and of Ovid, together with satires and tragedies. Of the latter *Palamedes*, the *Conquest of Amsterdam*, and *Lucifer* are considered the masterpieces of Dutch tragedy.

**Von Holst**, HERMANN EDWARD, a distinguished historian,

born at Fellin, Livonia, in 1841. He was professor of history at Strassburg and Freiburg, and at the University of Chicago after 1892. He wrote *Constitutional History of the United States*, *Constitutional Law of the United States*, lives of John C. Calhoun, John Brown, etc.

**Voodoo, or Voudoo** (vō'dō), the name given by the negroes of the United States and the West Indies to certain superstitious rites and beliefs brought from Africa, also to the sorcerer who practiced these rites. If the negro wished to destroy an enemy he sought the aid of the voodoo 'doctor,' who would often undertake to remove the designated party. This, it is thought, was usually done by the aid of poison, though apparently by incantations. At one time no slave could be induced to expose himself to the wrath of one of these conjurers, and in many cases the victim of a voodoo is thought to have died from sheer fright, all hope being given up when he believed he was under the fatal spell. Voodooism flourished most in this country in the rice, cotton, and sugar plantations of the far South, where the negroes were less immediately under the influence of their masters than those living farther north.

**Vorarlberg** (fōr'ärl-berg), a western district of Austria-Hungary, officially included in the Tyrol. Area, 1005 square miles; pop. 129,237.

**Voronej** (va-rō'nyesh), a town of Russia, capital of the government of the same name, on the Voronej, 290 miles S.E. of Moscow. It is an important entrepôt on the railway between Moscow and the Sea of Azov. It has manufactures of woollen and linen cloth, soap and vitriol, tanneries, and a considerable trade. Pop. 84,146.—The government has an area of 25,440 square miles, and a pop. of 3,097,700. It is intersected by the Don, which receives the whole of the drainage, partly through its tributaries, the Voronej and Khoper. The soil is generally fertile, and large crops of grain are raised.

**Vortex** (vor'teks), the form produced when any portion of a fluid is set rotating round an axis. Familiar examples are seen in eddies, whirlpools, waterspouts, whirlwinds, and on a larger scale in cyclones and storms generally. Descartes supposed certain vortices to exist in the fluid or ether of space endowed with a rapid rotatory motion about an axis, and filling all space, and by these he accounted for the motions of the universe.

**Vortex Ring**, in physics, a vortical column returning into itself so as to form a ring composed of a number of small rotating circles placed side by side, like beads on a string, as the singular smoke-rings which are sometimes produced when a cannon is fired, or when a smoker skillfully emits a puff of tobacco smoke. Recent investigations of the motion of vortices suggested to Lord Kelvin the possibility of founding on them a new form of the atomic theory, and the vortex atom was for a time widely accepted by scientists, but was finally abandoned by its author, as mathematically incapable of demonstration.

**Vorticella**, or 'BELL-ANIMALCULE,' a genus of stalked infusoria, having a fixed stem capable of being coiled into a spiral form, and vibratile organs called cilia fringing the bell-shaped disc or head, which are constantly in rapid motion and attract particles of food. The species are very numerous in fresh water, and are generally microscopic.

**Vosges** (vôzh), a chain of mountains about 100 miles long, extending N. N. E. to S. S. W. along the frontiers of France and Alsace, nearly parallel with the Rhine. The breadth varies from 20 to 45 miles, and the highest peak is Ballon-de-Guebwiller, 4685 feet. A great part of the Vosges is densely wooded, and the eastern and southern slopes are often covered with vineyards. There is also excellent pasturage. The Ill, Lauter, Moselle, Meurthe, Saar and Saône rise in this chain.

**Vosges**, an eastern frontier department of France; area, 2279 square miles. It is bounded on the east by the Vosges Mountains, which send out ramifications over the greater part of its surface, while in the south it is traversed by the chain of the Faucilles. Grain, hemp, flax and potatoes are extensively grown, and the department is famous for its kirsch-wasser. It was in this mountainous region that France struck its first blows in the European war. While Germany was invading Belgium, France drove strongly into the Vosges uplands, penetrating Alsace as far as Mulhausen. But its forces were eventually driven back nearly to the frontier. They held the steep escarpment facing the valley of the Rhine against all the efforts of the German army to displace them until the tide of war drew their forces to the more westerly region, when the Vosges campaign ended. The principal rivers are the Meuse, Mouzon, Madon, Moselle, Saône

and Meurthe, all unnavigable within the department. The minerals are valuable. The manufactures are various. Epinal is the capital. Pop. 429,812.

**Voss** (fos), JOHANN HEINRICH, a German poet and translator, born in 1751. He received a scanty school education, served for a time as private tutor in a family, and in 1772 went to Göttingen, where he studied the classical and modern languages, and was one of the founders of the Göttingen Dichterbund, or poets' union. In 1775 he retired to Wandsbeck in order to edit the *Musenalmanach*, which he published till 1800. In 1778 he became rector of a school at Otterndorf, in Hanover, and in 1782 went as rector to Eutin. In 1805 he became professor at Heidelberg, where he remained till his death in 1826. Between 1785 and 1802 he published several volumes of original poems, the best of which is the idyllic *Luisen*. As a translator Voss exhibited great skill in the handling of meters, and a wonderful command of language. Among his translations that of Homer's works is undoubtedly the greatest, being the classical German version of these great epics. A translation of Shakespeare, which he undertook with his sons, was published in nine volumes in 1820.

**Vossius** (vosh'e-us), GERHARD JOHANN, a Dutch classical scholar, born in 1577, studied at Dordrecht and Leyden. In 1614 he undertook the direction of the theological college at Leyden, and subsequently became professor of rhetoric and chronology. Favoring the Remonstrants, he became obnoxious to the prevailing party in the church, and was deprived of his office. Archbishop Laud then conferred on him a prebendary stall at Canterbury, with permission to continue his residence in the Netherlands. In 1633 he was invited to Amsterdam, to occupy the chair of history, and continued there till his death in 1649. Several of his sons, especially Isaac, also distinguished themselves as scholars.

**Voussairs** (vös'wärz), the wedge-shaped stones which form an arch. The under sides of the voussairs form the intrados or soffit of the arch, and the upper sides the extrados. The middle voussair is the keystone.

**Vowel** (vou'el), a simple articulated sound, which is produced merely by voice proceeding from the larynx, modified by a greater or less elevation or depression, expansion or contraction of the tongue, and contraction

or expansion of the lips. The vowel sounds of the English alphabet are imperfectly represented by five letters, *a*, *e*, *i*, *o*, *u* (and sometimes *io* and *y*). Vowels are distinguished from consonants in that they result from an open position of the vocal organs, while consonants are the result of an opening or shutting action of the organs; thus the former can be pronounced by themselves, while consonants require to be sounded with the aid of a vowel.

**Vulcan** (vul'kan),

Latin *Vulcanus*), in Roman mythology, the god who presided over the fire and the working of metals, and patronized handicraftsmen of every kind. By some writers he is said to have been born lame, but by others his lameness is attributed to his having been thrown from Olympus. He was completely identified with the Greek Hephaestus (which see).

**Vulcanite** (vul'ka-nit), a kind of vulcanized caoutchouc, differing from ordinary vulcanized caoutchouc in containing a larger proportion of sulphur—from 30 to 60 per cent.—and in being made at a higher temperature. It is of a brownish-black color, is hard and tough, cuts easily, and takes a good polish, on which account it is largely used for making into combs, brooches, bracelets, and many other ornaments. As it is especially distinguished by the large quantity of electricity which it evolves when rubbed, it is much used in the construction of electric machines. See *Vulcanization*.

**Vulcanization** (vul'kan-i-zā'shun), a method of treating caoutchouc or india-rubber with sulphur to effect certain changes in its properties, and yield a soft (vulcanized india-rubber) or a hard (vulcanite) product. Other ingredients, as litharge, white-lead, whiting, etc., are added to the sulphur to give color, softness, etc. The substance thus formed possesses the following properties: it remains elastic at all temperatures; it cannot be dissolved by the ordinary solvents, neither is it affected by heat within a considerable

range of temperature; finally, it acquires extraordinary powers of resisting compression, with a great increase of strength and elasticity. See *Vulcanite* and *India-rubber*.

**Vulgar Fractions.** See *Fractions*.

**Vulgate** (vul'gat), the Latin translation of the Bible, which has, in the Roman Catholic Church, official authority, and which the Council of Trent, in their fourth session, on May 27, 1546, declared 'shall be held as authentic in all public lectures, disputations, sermons, and expositions; and that no one shall presume to reject it, under any pretense whatsoever.' Even in the early period of the church a Latin translation of the Old Testament existed, called *Itala*, made after the Septuagint. St. Jerome found that this translation was not always accurate, and between 385-405 A. D. made a new Latin translation from the Hebrew, which, however, was only partially adopted by the church. In the sequel the translations were combined, and formed the *Vulgate* (*versio vulgata*, common or usual version). This grew up between the eighth and sixteenth centuries. The version now in use is the edition published by Clement VIII in 1592 (improved edition 1593).

**Vulture** (vul'tūr), the common name for the raptorial birds belonging to the family *Vulturidae*, characterized by having the head and part of the neck destitute of feathers, and a



Vulcan, from an antique.



Egyptian Vulture (*Neophron percnopterus*).

rather elongated beak, of which the upper mandible is curved at the end. The strength of their talons does not correspond with their size, and they make more use of their beak than of their claws and are unable to carry off their

prey, like the eagles and hawks. In general they are of a cowardly nature, living chiefly on dead carcasses and offal. Their wings are very strong and give them remarkable powers of swift and long sustained flight. Unlike other birds of prey the female is smaller than the male. Their geographical distribution is confined chiefly to warm countries, where they act as scavengers to purify the earth from the putrid carcasses with which it would otherwise be encumbered. The griffon vulture (*Vultur fulvus*) inhabits the mountainous parts of the south of Europe, as does also the cinereous or brown vulture (*V. cinereus*). The former measures nearly 4 feet from tip of beak to end of tail. The bearded vulture, or lämmergeier (*Gypaetos barbatulus*), inhabits the Alps, Asia, and Africa. The Egyptian vulture (*Neophron percnopterus*) is often called 'Pharaoh's Chicken' from its frequent occurrence in ancient hieroglyphics, where it is used as an emblem of paternal love. This bird is very common in Northern

Africa and Persia and is frequently seen in the south of Europe. It is about 2 feet long, has pointed wings, and is raven-like in form. Greatest among the vultures are the lämmergeier, 4 feet in length, the king vulture (*Sarcorhamphus papa*) of South America, and the giant condor (*Sarcorhamphus condor* or *gryphus*) of the Andes, the largest of the family, and the most powerful flyer among birds. The turkey-buzzard (*Cathartes aura*), about 2½ feet long, is common in the eastern United States and is protected in southern cities for its services as a destroyer of carrion. See Condor, Egyptian Vulture, King Vulture, Lämmergeier, and Turkey-buzzard.

**Vyatka** (vyát'ká), a city of Russia, capital of a government of the same name, is situated on Vyatka River, 280 miles N. E. of Nijni-Novgorod. It is largely engaged in the corn trade and the manufacture of wax and tallow candles. Pop. about 20,000.—The government has an area of 59,239 square miles, and a pop. of over 3,000,000.





# W

**W**, the twenty-third letter of the English alphabet, representing a consonantal sound formed by opening the mouth with a contraction of the lips, such as is performed in the rapid passage from the vowel sound *u* (oo) to that of *i* (ee). The character is formed, as its name indicates, by doubling the *u* or *v*. At the end of words or syllables it is either silent, as in *low*, or it modifies the preceding vowel, as in *new*, *how*, having then the power of a vowel.

**Waal** (vāl), a branch of the Rhine. See *Rhine*.

**Wabash** (wā'bash), a river, the most important northern tributary of the Ohio. It rises in the N. W. of Ohio, winds across Indiana, forms the boundary between Indiana and Illinois, and falls into the Ohio after a course of 550 miles. It is navigable for steamboats to La Fayette, and connects Lake Erie with the Ohio by the Wabash and Erie Canal.

**Wabash**, a city, capital of Wabash Co., Indiana, on the Wabash River, 47 miles S. W. of Fort Wayne. It has active manufactures of furniture, paper, machinery, hats, large railroad shops, etc.; in the vicinity is excellent building stone. Pop. 8687.

**Wace** (wās), an Anglo-Roman poet, native of Jersey, born in 1115; died in 1184. Two important works by him remain, the *Brut d'Angleterre* (see *Layamon*), and the *Roman de Rou*, a history of Rollo and the dukes of Normandy, including the conquest of England.

**Waco** (wā'kō), a city, county seat of McLennan county, Texas. It is situated on the Brazos River, 100 miles N. E. of Austin, and as the center of a large and fertile cotton and wheat growing district, commands a large trade in agricultural products. Its industries include flour and cotton-seed oil mills, brick, tile and bottle works, etc. It has warm and medicinal artesian waters. Pop. 42,000.

**Wadai**, or WADAY (wā-dī'), an extensive negro state in the

central Soudan, between Kanem and Bagirmi in the W. and Darfur in the E., with a pop. estimated at about 2,000,000. It consists principally of an elevated plateau, very fertile in some parts, but extending into the Sahara and largely arid. Its fertile districts produce abundantly maize, millet, indigo, cotton, etc. The prevailing religion is Mohammedan. Formerly very powerful and warlike, it is now a protectorate of France, constituting part of the Lake Chad territory or *Hinterland* of French Congo. Capital Abeshr.

**Wade** (wād), BENJAMIN FRANKLIN, statesman, born at Springfield, Massachusetts, in 1800; died in 1878. He studied law, was admitted to the bar in Ohio in 1825, and elected state senator 1837 and 1841, made judge in 1847, and elected United States senator by the Whigs in 1851, remaining in the senate till 1869. He advocated the Homestead bill, voted for the repeal of the Fugitive Slave Law, opposed the Kansas-Nebraska bill of 1854, and during the Civil war was prominent in public affairs. He was elected president of the senate in 1867, and was a prominent candidate for the vice-presidency in 1868.

**Wade**, JAMES FRANKLIN, military officer, born in Ohio in 1843. He entered the army as lieutenant in 1861, served with distinction throughout the war, was brevetted brigadier-general of volunteers in 1865, entered the regular army, and rose in rank from major in 1868 to brigadier-general in 1897. He took an active part in the war with Spain and was made military governor of Cuba in 1899. He subsequently served in the Philippines as major-general, commanded the Atlantic division 1904-07, and retired in 1907.

**Wadelai** (wā-dā-lī'), a military post in the Equatorial Province of what was formerly the Egyptian Soudan, on the Albert Nyanza, now in the Congo Free State, about 35 miles N. of the Albert Nyanza. It is famous as the chief station of Emin Pasha. See *Shnitzer*.

## Wading Birds. See *Grallatores*.

**Wadi** (wā'di), a watercourse; chiefly one that is dry part of the time.

**Wafer** (wā'fer), a thin circular cake of unleavened bread, generally stamped with the Christian monogram, the cross, or other sacred symbol, used in the Roman Catholic Church in the administration of the Eucharist.—Also a small disc of dried paste usually made of flour and water, gum and coloring matter, used for sealing letters, etc.

**Wager** (wā'jer), a bet or something staked on the event of a contest or some unsettled question. The party whose opinion proves to be correct receives what has been staked by both. By statutes of England, Scotland, and the United States all contracts or agreements, whether by parole or in writing, depending on wagers, are null and void, and money due thereon cannot be recovered in any court of law. A wager is therefore merely a debt of honor.

**Wages** (wā'jez), generally speaking, the payment given for personal services; but the term is now usually restricted to the money paid at short intervals for mechanical or muscular labor, other than that performed by the more educated classes, to which the word *salary* bears reference. In some States wages can be legally attached for debt.

**Wagner**, CHARLES, a French writer, born in Alsace in 1852. He became an evangelist, inculcating simple Christianity divested of dogmatism, and attracted great attention by *The Simple Life*, in which this principle was maintained. Other works were *Youth, Courage*, etc. He lectured in the United States in 1904. Died May 12, 1918.

**Wagner** (vā'h'nér), WILHELM RICHARD, one of the most celebrated of modern composers, born at Leipzig in 1813; died at Venice, Feb 13, 1883. He received his education at Leipzig and Dresden. From 1834 he filled various musical engagements at Magdeburg, Riga and Königsberg. In 1839-41 he went to Paris and London, and composed his operas of *Rienzi* and the *Flying Dutchman*. The brilliant success of these operas secured him the conductorship at the Royal Opera of Dresden in 1843. He joined the insurrectionary movement of 1848-49, and was compelled to exile himself. Until his return to Germany in 1864 he spent most of his time in Switzerland, Italy, Paris and London. His *Tannhäuser* and *Lohengrin* appeared in 1845 and 1850, respectively. The late King of Bavaria, Louis II, became an enthusiastic

and liberal patron of Wagner, and the theater at Baireuth, especially built for Wagner, was chiefly supported from the king's purse. Here his famous tetralogy *Der Ring des Nibelungen*, consisting of *Das Rheingold*, *Die Walküre*, *Siegfried* and *Götterdämmerung*, was first performed in 1876 before an unusually brilliant and appreciative audience. About a year before his death he produced his last creation, *Parsifal*. In 1870 he had married, as second wife, Cosima von Bülow, a daughter of the Abbé Liszt. Wagner labored to reform dramatic



Wilhelm Richard Wagner.

music according to the ideas of Gluck and Weher, and gave his creations a national character by selecting his subjects from old German heroic legends. His theory (not in itself specially original) was that in a perfect musical drama the three arts, poetry, music, and dramatic representation, should be welded together into one well-balanced whole. This theory he demonstrated with consummate ability and unsurpassed magnificence. His particular views on music are embodied in a well-known work entitled *Oper und Drama*.

**Wagram** (vā'gram), a village of Lower Austria, on the left bank of the Rossbach, 12 miles N. E. of Vienna, famous for the great battle in 1809 between the French under Napoleon and the Austrians under the Archduke Charles, each about 150,000 strong. The battle was well contested, but the result gave Napoleon a decisive victory, which was followed up by an armistice and the treaty of Schönbrunn (October 14).

**Wagtail** (wag'tāl), a name of birds included in the family of the warblers, and so termed from their habit of jerking their long tails when running or perching. They inhabit

meadow lands and pastures, frequent water pools and streams, are agile runners, and have a rapid flight. Their food consists of insects. Their nests, built on the ground, contain from four to six eggs. These birds belong to both Old and New Worlds, and migrate southward in winter. Representative varieties, distributed principally over the European continent and the East, are the white wagtail (*Motacilla alba*); the gray wagtail (*M. campestris* or *Boarula*); and the yellow or Ray's wagtail (*M. sulphurea* or *Budytes Rayi*).

**Wah.** See *Panda*.

**Wahabees** (wā-ha'bēs), WAHA'BIS, or WAHA'BITES, a Mohammedan sect, founded in Arabia about 1760 by Abd-el-Wahāh, an oriental scholar of high attainments. He deemed it his mission to restore Islamism to strict harmony with the teachings of the Koran and the Sunna. Thousands flocked to the Wahabee standard, and enabled the reformer to secure the whole of his native province Nejd, and to carry his victorious arms into Yemen. Under his successors the greater part of Arabia fell under the Wahabee power. Mecca and Hejaz were captured in 1803, and the loss of the sacred city roused the Turks to action. Several expeditions were sent from Egypt, and in 1818 Ibrahim Pasha was at last successful in dispersing the Wahabee forces, in capturing their capital, Derayah, and their leaders, who were executed at Constantinople. The Wahabees, however, gradually regained their influence, especially in their native homes of Nejd, where they form at present an independent state of Arabia. The latest statistics of Islamism estimate their number at four millions.

**Waikato** (wā-kā'tō), one of the principal rivers of New Zealand, in the North Island; length, about 200 miles. It traverses a district of great fertility.

**Wainscot** (wān'skot), the name given to paneled boards (usually oak or chestnut) employed to line the internal walls of an apartment. Wainscoting of oak was commonly used in England for interior lining in Elizabethan and Stuart times.

**Wainwright** (wān'rit), RICHARD, naval officer, born at Washington in 1849, was graduated from the Naval Academy in 1868, became lieutenant commander, and was executive officer in the *Maine* when the ship was blown up in Havana harbor in 1898. He commanded the *Gloucester* in the naval fight at Santiago and sunk two

Spanish torpedo-boat destroyers. He is now a rear-admiral in the navy.

**Waite** (wāt), MORRISON HENRIK, jurist, born at Lyme, Connecticut, in 1816; died in 1888. He was graduated from Yale College in 1837, became a prominent lawyer in Ohio, and in 1874 became Chief Justice of the Supreme Court of the United States.

**Waits** (wāts), the name given at one time to the king's minstrels, whose duty it was to guard the streets at night and proclaim the hour; to the musicians of a town; and to private hands when employed as serenaders. The term is now applied in England to those who sing or play carols on Christmas and New Year's Eve with a view to donations.

**Waitzen** (vīt'sen), or VÁCZ (vāts), a market town and bishopric of Hungary, on the left bank of the Danube, 20 miles N. of Budapest. It has a splendid cathedral and several monastic and scholastic establishments. Pop. 10,808.

**Wakatipu** (wā-kā-tē'pō), a picturesque lake in the South Island of New Zealand; area, 112 acres. Queenstown and Glenorchy, on the borders of the lake, are favorite tourist resorts, on account of the magnificent mountain scenery in the vicinity.

**Wake** (wāk), a term corresponding originally to *vigil*, and applied to a festival held on the anniversary of the day on which the parish church was consecrated and dedicated to a saint. A *lyke* or *lich wake* (Anglo-Saxon, *līc*, a corpse) is the watching of a dead body by night by the relatives and friends of the deceased. The practice, once general, is now confined to the lower Irish classes, and is frequently accompanied by scenes much out of keeping with the sad occasion.

**Wakefield** (wāk'fēld), a municipal and parliamentary borough of England, in the West Riding of Yorkshire, on the Calder, 9 miles S. of Leeds. It is well built, with wide and regular streets, and several fine public buildings. Leeds, Bradford, and Halifax have to a great extent absorbed the woollen manufactures of Wakefield, but there are still several important establishments, and the trade in wool, corn, flour, and malt is very extensive. Wakefield was created a bishopric in 1888. Pop. 51,516.

**Wakefield**, a town (township) of Middlesex Co., Massachusetts, 10 miles N. of Boston. It has important manufactures of rattan and knit goods, boots and shoes, stoves, pianos, etc. Pop. 12,000.



**Walcheren** (vâl'ke-rën), an island of Holland, province of Zeeland, at the mouth of the Scheldt. It is level, below high-water mark, very fertile, populous, and prosperous. It contains the thriving towns of Flushing, Middelburg (capital) and Veere. Pop. about 40,000.

**Walcott** (wol'kot), **CHARLES DOOLITTLE**, geologist, born at New York Mills, New York, in 1850. He studied geology, became assistant on the New York and afterwards on the United States Geological Survey, and director of the latter in 1894. He wrote *The Trilobite*, *The Cambrian Fauna of North America*, etc.

**Waldeck** (vâl'dek), a small principality of Western Germany, under Prussian administration, consisting of the two separate territories of Waldeck and Pyrmont; total area, 433 square miles; pop. 59,127. It is chiefly agricultural. The reigning house is one of the most ancient in Germany.

**Waldenses** (wai-den'séz), a Christian sect which owes its origin to Peter Waidus (Waldo), a rich citizen of Lyons. About 1170 Waldo by his preaching collected numerous followers, who were often confounded with the Aibigenses and others, whose fate they shared. Their chief strongholds were, and still are, in the mountain tract of the Cottian Alps, southwest of Turin, where, since 1848, they (about 10,000) enjoy the same religious rights, and now also the same political rights, as the Roman Catholics of Italy. The design of the founder was to reform the clergy, and to preach the word of God freely to everyone in his native language; but his followers went far beyond the original plan. They made the Bible alone the rule of their faith, renounced entirely the doctrines, usages, and traditions of the existing church, and formed a separate religious society. They were, therefore, excommunicated as heretics, and for centuries suffered occasional persecution. Separate congregations found their way to various parts of Europe, and some of these became attached or amalgamated with other reformed sects. The spiritual teachers of the modern Waldenses are supplied from the academies of the Calvinistic churches. The Waldensian rites are limited to baptism and the Lord's supper, respecting which they adopt the notions of Calvin. Each congregation is superintended by a consistory composed of elders and deacons, under the presidency of the pastor, which maintains the strictest moral discipline, and adjusts small differences. From the time of their

origin the Waldenses have been distinguished by their pure morals and their industry.

**Waldersee** (val'der-së), **ALFRED, COUNT VON**, a German general, born in 1832; died in 1904. He served in the Austrian and French wars of 1806 and 1870, became Moltke's chief assistant in 1881, and chief of staff of the German army on the resignation of Von Moltke. In 1900 he was made commander-in-chief of the allied forces in China.

**Wales** (wâlz), a principality in the southwest of the island of Great Britain, which since Edward I gives the title of Prince of Wales to the heir-apparent of the British crown; area, 7446 square miles; pop. 2,032,193. As a whole it is very mountainous, particularly in the north, where Snowdon, the culminating point of South Britain, rises to the height of 3571 feet; and it is intersected by beautiful valleys, traversed by numerous streams, including among others the large river Severn. It is rich in minerals, particularly coal, iron, copper, lead, and zinc, and to these Wales owes its chief wealth. The coal trade is most extensive, and Cardiff (which see) is one of the largest coal ports in the world. Iron, steel, and copper works are also on a large scale. Besides the mineral industries, there are considerable woolen manufactures, especially of flannel, coarse cloth and hosiery. (See *England and Britain*.) The inhabitants are almost purely Celtic in race, being the descendants of the early Britons, who were able to maintain themselves here when the rest of the country was overrun by the Germanic invaders. Most of the upper class belong to the Church of England (disestablished in 1914), but the vast majority are Protestant Nonconformists, the most numerous bodies being the Congregationalists, the Calvinistic Methodists, and the Baptists.

Previous to the Roman occupation Wales appears to have been chiefly inhabited by three British tribes, called the Silures, Dimetæ, and Ordovices. During the later period of the Roman occupation the subject part of the island was divided into four provinces, of which one, including the country from the Dee to the Severn, was called Britannia Secunda. It was after the invasion of the Saxons that the country acquired a distinctive national character, as the refuge of the vanquished Britons who were gradually driven to the west. From this period till the final conquest of the country by Edward I there was little but a succession of petty wars between the

rival chiefs or kings into which both countries during a great part of the Saxon period were divided, or the more systematic efforts of the larger monarchy to absorb the smaller. Among the greatest of the Welsh heroes of the early period was Cadwallon. After being defeated by Edwin of Deira, or Northumbria, and compelled to flee to Ireland, he returned and defeated the Saxons in numerous battles, but was at last defeated and slain by Oswald of Northumbria in 635. The last of the Welsh princes, Llewellyn, who revolted against Edward I, was defeated and slain by the Earl of Mortimer in 1284, and since that time the principality has been incorporated with England. There were, however, for a number of years, occasional insurrections, some with French assistance. In 1400 Owen Glendower, incensed by an encroachment by Lord Grey de Ruthyn, rose in arms and held his own for a considerable period, Henry IV taking the field against him in vain. In 1401 very severe repressive laws against the Welsh were passed and Sir Henry Percy (Hotspur), Justiciary of Chester, was put in command, but Owen held his own, Henry IV, who invaded the country in 1402, being driven back by extraordinary storms. Owen was recognized as Prince of Wales in 1402, and allied himself with Hotspur and others for a partition of the kingdom, but King Henry intercepted Hotspur in his march, defeating him near Shrewsbury. Owen continued to hold out until his death in 1415. Wales was incorporated with England, with English laws and liberties, in 1536; the lords marchers' surviving jurisdiction was abolished in 1630; and the Welsh judiciary was incorporated in the judicial system of England in 1831.

The native name of the Welsh language is *Cymraeg*, the speech of the *Cymri* (which see). The names Wales and Welsh are of Anglo-Saxon origin, from *wealas*, strangers, foreigners (plural of *wealh*). The Welsh language is, with the other Celtic languages, included in the Indo-European group. The alphabet contains thirteen simple and seven double consonants, and seven vowels, with numerous diphthongs and triphthongs. It is still spoken exclusively by about a quarter of a million of the inhabitants of the principality. The necessities of commerce are, however, gradually doing for the Welsh language what they have done for the Irish and Gaelic, and English is becoming more and more the language of everyday life in Wales. The earliest remains of Welsh literature are supposed to belong to the ninth century.

There are a number of poetic pieces attributed to Taliesin, Aneurin, Merlin, and Llywarch Hen, bards supposed to have lived in the fifth century; but great and reasonable doubts have been thrown on the authenticity of these early productions, which, in their present form at least, are not believed to be earlier than the eleventh century. Subsequent to this time there were numerous poems written, many in praise of warriors, others dealing with love, or descriptive of nature.

Dafydd ap Gwilym (1293-1356) has frequently been called the Ovid of Wales. A welcome guest at every mansion in Wales, he traveled much throughout the land. As a poet of nature, few, if any, English writers equal him and none approached him before Wordsworth. He is familiar with every bird and flower, and his descriptions of natural objects are not the conventional ones of Chaucer, but indicate a profound and loving familiarity with nature's innate secrets. To the earlier poets of Wales we must ascribe the origin of the favorite romances of Arthur and his knights, which had long been floating as folklore, but were first put by them into literary shape. Geoffrey of Monmouth made these legends known to British writers, and within twenty years afterwards the legendary heroes of early Britain were household names throughout Europe. Among the Welsh bards of later date may be named Hnw Morris (1622-1709) and Goronwy Owen (1772-80), the latter the author of *Cywydd y Farn* ('Day of Judgment'), which is regarded as the finest poem in the Welsh language. There are extant a number of prose tales or romances, the chief of which are contained in a collection known as the *Mabinogion*, which dates back to the era of the Arthur romances. All their literature existed in manuscript until 1546, when appeared the first Welsh book ever printed. Modern works in Welsh are largely confined to theology, history and biography, though there were many song writers in the nineteenth century, with some writers of literary essays and novels. Much has been done in the recent period in reediting the old Welsh literature. The *Myvyrian Archæology*, containing poems, historical and other medieval works, was published early in the nineteenth century, the *Mabinogion*, with translations in 1838, and the *Four Ancient Books of Wales*, containing the Book of Aneurin, the Book of Taliesin, the Black Book of Carmarthen, and the Red Book of Hergest, in 1868, and other Welsh texts at different dates.

**Wales**, PRINCE OF, the title applied to the eldest son of the English sovereign since the period of the conquest of Wales by Edward I. After the fall of the last native Welsh princes, Llewellyn and David, in 1284, Edward is fabled to have presented the Welsh with a prince in his infant son Edward, born at Carnarvon Castle, but he was not really created Prince of Wales until 1801. Edward III made his son, the Black Prince, Prince of Wales in 1343, and from that time till the present the title has been continuously borne by the eldest son of the British monarch. Until the reign of Charles II the connection with Wales was maintained by the odd arrangement of providing a Welsh wet-nurse for the infant Prince of Wales. The title has usually been bestowed by patent and investiture, though in a few instances a simple declaration has sufficed to make the heir to the throne Prince of Wales. The eldest son of the sovereign inherits the title of Duke of Cornwall, which title was first bestowed in 1337, on Edward, the Black Prince. Edward III bore the title, before his accession to the throne, of Earl of Chester, and this title has since accompanied that of Prince of Wales. When a Prince of Wales dies before his father, his son, or his next younger brother, is given the title, being heir apparent, though this was not done in the case of Charles I until four years after the death of Prince Henry. The Prince of Wales also bears the Scotch titles of Great Steward of Scotland, Duke of Rothesay, Earl of Carrick, Baron of Renfrew and Lord of the Isles, and the Irish title of Earl of Dublin was created for him in 1849. The Prince of Wales has a separate household and obtains the larger part of the revenues of the Duchy of Cornwall, amounting approximately to \$600,000, with an annuity of about \$100,000. The badge of the Prince is a plume of three feathers, with the motto 'Ich Dien' ('I serve'). Edward VII, when Prince of Wales, visited Canada and the United States in 1860 as 'Lord Renfrew.' His grandson, Edward Albert, Prince of Wales, who had been in active service in the European war, 1914-18, visited Canada and the United States in 1919.

**Wales**, WILLIAM, an English astronomer, born about 1734; died in 1798. He observed the transit of Venus at Hudson Bay in 1768, and accompanied Captain Cook in his second and third voyages. Chosen a Fellow of the Loyal Society in 1776; and published *General Observations Made at Hudson Bay*.

**Walford** (wal'furd), LUCY BETHLA, novelist, born near Edin-

burgh, Scotland, in 1845, daughter of John Colquhoun, author of *The Moor and the Loch*. She wrote *The Baby's Grandmother*, *A Stiffnecked Generation*, *The Matchmaker*, *The Intruder*, and other books. Died in 1915.

**Walvisch Bay** (wal'fish), a British settlement and harbor of refuge in Southwest Africa, on the coast of Damaraland; area, with Penguin Island, about 450 sq. miles; pop. 1000. It was acquired by Great Britain in 1878, annexed to Cape Colony in 1884, and is governed by a resident magistrate from that colony.

**Walhalla** (wál'hál'la), a magnificent and sumptuously rated Doric octostyle peripteral temple, on the Danube, near Ratisbon; built between 1830-42, as a national pantheon, consecrated to celebrated Germans of all walks of life. The idea of the erection is derived from the Walhalla or Valhalla, the ancient paradise of Odin and the Scandinavian deities. (See *Valhalla*.)

**Walker** (wa'ker). FRANCIS AMASA, political economist, was born at Boston, Massachusetts, July 2, 1840, son of AMASA WALKER (1779-1875), author of *Nature and Uses of Money and Science of Wealth*. He was graduated from Amherst College in 1860, became chief of the U. S. Bureau of Statistics in 1869, superintendent of the census in 1870 and 1880, commissioner of Indian affairs in 1871, professor of political economy at Yale in 1873, and president of the Massachusetts Institute of Technology in 1881. His works include *The Indian Question*; *Wages and the Wage Class*; *Money, Trade and Industry*; *Political Economy*; *Land and its Rent*, etc. He died January 5, 1897.

**Walker**, FREDERICK, an English painter, born at London in 1840; died in 1875. At an early age he began drawing, and after spending about eighteen months in an architect's office became a student at the Royal Academy (1858), and commenced designing for wood engravers. The illustrations he supplied from 1860-64 to the *Cornhill Magazine* and *Once a Week* are full of life, and rank high as specimens of this kind of draughtsmanship. Some of these drawings he reproduced in water-color, in which medium he produced a number of exquisite pictures. In 1863 he exhibited his first oil painting, *The Lost Path*, at the Royal Academy, and was made an associate R.A. in 1871. His best works in oil are *The Bathers* and *By the Plough*. Originality, poetic feeling, graceful drawing and remarkable purity and range of color characterize his paintings.

**Walker, GEORGE**, was born of English parents, in county Tyrone, Ireland, in the early part of the seventeenth century, and was killed at the battle of the Boyne in 1690. He studied theology at Glasgow University, and after taking orders obtained the living of the parish of Donoughmore. He was rescued from obscurity by the arrival of James II in Ulster (1689), which caused Walker to seek refuge in Londonderry; and in the memorable siege of that city he took the most prominent part both in word and deed. (See *Londonderry*.) After the siege Walker went to London, was presented with the bishopric of Derry and £5000 and parliament voted him its thanks. Instead of taking quiet possession of his bishopric he accompanied William III in his Irish campaign, and fell a victim to his courage.

**Walker, JOHN**, an English lexicographer, born in Middlesex in 1732; died in 1807. He published *A Rhyming Dictionary* and *Critical Dictionary and Expositor of the English Language*, which became very popular.

**Walker, ROBERT J.**, statesman, was born at Northumberland, Pennsylvania, in 1801; died in 1860. He removed to Natchez in 1826, practiced law there, and was elected United States Senator by the Democratic party in 1835. He strongly supported the annexation of Texas to the United States, was appointed Secretary of the Treasury by President Polk in 1845, and made a report in favor of free trade which attracted much attention. He was appointed Governor of Kansas in 1857, but dissatisfaction with the policy of the government caused him to resign his governorship in 1858.

**Walker, WILLIAM**, filibuster, was born at Nashville, Tennessee, in 1824, and emigrated to California about 1850. In 1855 he led a party of adventurers to Nicaragua, took the side of one of the factions engaged in civil war, captured Granada, assumed the title of President of Nicaragua, and reestablished slavery, which had been abolished. He was driven from power in 1857 and retired to New Orleans. In 1860 he led an expedition against Honduras and was captured and shot at Truxillo in September, 1860.

**Walking Delegate**, the name given an official of a trade union, whose duty is to visit places where members of the union are employed and ascertain if they are keeping the laws of the craft. When an unexpected strike has been ordered by the union directors it is his duty

to notify the workmen to stop work at the place or places indicated.

**Walking-Leaves and Walking-Sticks.** See *Leaf-insects*, *Phasmida*, *Mimicry*.

**Walkyrias.** See *Valkyries*.

**Wallaby** (wo'l'a-bi), a name common to several rather small-sized kangaroos of the genus *Halmaturus*.

**Wallace** (wo'l'as), ALFRED R. JESSELL, naturalist, was born at Usk, Monmouthshire, England, Jan. 8, 1822, and was educated at Hertford Grammar-school. He spent many years in traveling, especially in South America and the Asiatic Islands, and the valuable material collected in these scientific explorations he embodied in *Travels on the Amazon and Rio Negro*, *The Malay Archipelago*, *Tropical Nature*, *The Geographical Distribution of Animals*, etc. His observation of animal life early led him on to the track of natural selection, and before Darwin gave his famous work to the world he had published his *Speculations on the Origin of Species*. His share in establishing the theory was acknowledged by Darwin. But while Darwin, in his later editions of the *Origin of Species*, somewhat modified his original conclusions, Wallace, in his recent work, *Darwinism, an Exposition of the Theory of Natural Selection* (1889), strongly insists upon the complete controlling power of these primary laws and conditions. Wallace, however, differs from Darwin on the subject of the intellectual, moral, and spiritual nature of man. He contends that the higher faculties have been developed not under the law of natural selection, but under a higher law, which has come in imperceptibly; and that the Darwinian theory supports this view. Among his later works are *Miracles and Modern Spiritualism* (in which he declares a full belief), *Island Life*, *Land Nationalization*, etc. He died November 7, 1913.

**Wallace, LEWIS**, soldier and author, born at Brookville, Indiana, April 10, 1827. He served with distinction in the Mexican and Civil wars; was appointed Governor of New Mexico, 1880; and Minister to Turkey, 1881-85. He practiced law and wrote very extensively. Among his works are *The Fair God*; *Ben Hur*; *A Tale of the Christ*, etc. The latter has had a greater circulation than any work since *Uncle Tom's Cabin*. He died February 15, 1905.—His wife, SUSAN E. WALLACE, wrote *The Storied Sea*, *Along the Bosphorus*, and other works.



## Wallace

**Wallace**, **SIR WILLIAM**, the hero of Scottish independence, is said to have been the younger son of Sir Malcolm Wallace of Elderslie and Auchinbothie, by Margaret, daughter of Sir Reynold Crawford, sheriff of Ayr. He was probably born about 1270. For the most detailed particulars we possess about this famous Scottish character we are almost entirely dependent on Blind Harry (see *Harry the Minstrel*); but the narratives cannot bear the scrutiny of the critical historian. Contemporary Scottish records do not exist, while the English chroniclers of the period were but imperfectly informed and prejudiced. Wallace is described as a man of herculean proportions and strength, and it is certain that he possessed in a high degree the qualifications of a commander. He is represented as having been for some years engaged in a partisan war against the English before what is represented by Blind Harry as the turning-point in his career took place, the slaughter of Haselrig in revenge for the murder of his wife, and in pursuance of his vow of eternal vengeance against the invaders of his country. Henceforth he continued in open resistance to the English, and having collected a considerable force was besieging the castle of Dundee when he heard that Surrey and Cressingham were advancing upon Stirling with a large army. He met them in the vicinity of that town, and, thanks to his ingenious military tactics, gained a complete victory (1297). After this Wallace appears with the title of Guardian of the Kingdom, which was temporarily cleared of the English, and is found conducting a series of organized raids into England. In 1298 Edward I entered Scotland with an army estimated at nearly 90,000 men. Wallace retired before him, wasting the country, but was at length overtaken at Falkirk, compelled to fight, and after a gallant resistance his army was routed. He succeeded in escaping, and little is known of his movements henceforth. He was excluded from the peace granted by Edward to the Scottish council of regency in 1304, and every effort was made to secure his apprehension. It was effected through Alexander de Monteth, governor of Dumbarton Castle. Wallace was conveyed to London, and after a mock trial found guilty of treason and rebellion, and executed on August 23, 1305. A memorial to Wallace has been placed on the summit of Abbey Craig, near Stirling, in the form of a Scotch baronial tower, surmounted by an architectural crown, and having a

height of 220 feet. It serves the purpose of a Scottish Walhalla, and busts of eminent Scotchmen are from time to time added.

**Wallace**, **WILLIAM VINCENT**, musical composer, was born of Scotch parents, at Waterford, England, in 1814; died in France in 1865. His father, a bandmaster in the army, taught him to play on the usual military instruments, and procured him teachers of the violin, pianoforte, and guitar. He spent some years in Australia, and made an extensive concert tour in the Australian colonies, in India, and in America. In 1845 he went to London, and devoted himself to composition. His first opera, *Maritana*, was produced at Drury Lane, in 1846, and secured him at once a reputation. *Lurline* and the *Amber Witch* are his other chief operatic compositions. For the pianoforte he wrote numerous airs of great sweetness, which are very popular.

**Wallachia**. See Roumania.

**Wallack** (wal'lak), **JAMES WILLIAM**, an American actor, born in London in 1795; died in 1864. He made his first appearance in the United States at the Park Theater, New York, in 1818, opened the National Theater in 1825, Wallack's Lyceum in 1852, and Wallack's Theater in 1861.—His son, **LESTER JOHN**, born in New York in 1820, conducted Wallack's Theater with much success for many years. He wrote the plays of *The Veteran* and *Rosedale*, also *Memoirs of Fifty Years*. He died September 6, 1888.

**Wallaroo** (wol'a-rö), the native Australian name given to two species of kangaroos, the *Macropus antipodinus*, the red wallaroo, and *M. robustus*, the black wallaroo, found in New South Wales.

**Wallaroc**, a seaport town in South Australia, on the Spencer Gulf, 91 miles north of Adelaide. The Wallaroo and other copper mines are in the neighborhood, and the largest smelting works in the colony are carried on at Wallaroo Bay. Pop. 2920.

**Walla Walla** (wol'la wol'la), a city, capital of a county of the same name in Washington, on the Walla Walla River. It is in a rich grain, fruit and live-stock region with an extensive trade. It has a large foundry, agricultural machine works, flour mills, etc. Here are several collegiate institutions, a state penitentiary, and a military post. Pop. 20,963.

**Wallenstein** (val'en-stin), **ALBRECHT WENZEL EUSEBIUS**

## Wallenstein

## Wallenstein

**BIUS, VON**, Duke of Friedland, a famous leader in the Thirty Years' war, was born on the paternal estate of Hermanic, Bohemia, in 1583; assassinated at Eger in 1634. Both his father and mother belonged to the Bohemian evangelical church, but shortly after their early death Wallenstein went over to the Roman Catholic faith. He finished his studies at the Universities of Bologna and Padua, and traveled in Italy, Germany, France, Spain, England and the Netherlands. He took military service in Hungary, and returned to Bohemia at the peace of 1606 with the rank of captain. When the Thirty Years' war broke out in Bohemia (1618) he joined the imperial forces against his native country. His estates, valued at 30 million florins, he was allowed to form into the territory of Friedland, and in 1624 he was created Duke of Friedland. He raised a large army to assist the emperor against the Lower Saxon League; defeated Count Mansfeld at Dessau (April, 1626), and compelled Bethien Gabor to conclude a truce; conquered Silesia, and bought from the emperor, partly with military services, partly with plunder, the duchy of Sagan and other extensive estates. In September, 1630, owing to the jealousy of the nobles and the license of his followers, he was deprived of his command, and retired to his duchy of Friedland until the emperor was compelled to seek his aid against Gustavus Adolphus. Wallenstein now obtained almost absolute power, and did not fail to abuse it. His behavior henceforth leaves no doubt that the emperor's interests were second to his own, and that he would not have hesitated to join the emperor's enemies to secure his own independence and the crown of Bohemia. After some partial successes he encountered the King of Sweden at Lützen, November 16, 1632, in which battle Wallenstein was defeated and Gustavus killed. Wallenstein had unsuccessfully treated on his own account with the Swedish king, and he now secretly reopened negotiations with France and the German princes, occasionally taking the field to display his military power. The court at Vienna was well aware of his crafty diplomacy, but the emperor was not strong enough to remove him, and had recourse to assassination. This was done at Eger, where Wallenstein had retreated for safety, and where he was killed by Colonel Gordon, commandant of the fortress, and his fellow officers Butler, Leslie, and Devereux. Wallenstein is the subject of and gives the title to one of Schiller's best dramatic poems.

## Wallis

**Waller** (wol'er), EDMUND, an English poet, born at Coleshill, Hertfordshire, in 1605; died in 1687. He was early left an orphan with a considerable estate, and was educated at Eton and King's College, Cambridge. His mother was a sister of John Hampden, and a royalist, but all the rest of his relatives were against the court. It is stated that Waller wrote poetry at eighteen, but his first collection of poems did not appear until 1645. As an elegant amatory and panegyric poet, a brilliant talker and wit, he was a great favorite at court, in parliament, and in society. But his political conduct is not honorable. At heart he probably remained true to royalty, but he sang the praises of the Lord Protector as well as those of the Charleses. He was sent as the commissioner from parliament to the king after Edgehill. Shortly after he plotted in favor of the king, and when detected turned informer. His brother-in-law, Tomkins, and the latter's friend, Chaloner, suffered death, while Waller by his judicious bribery got off with banishment and a fine of £10,000. After nearly ten years of exile in Paris, Cromwell allowed Waller to return in 1653, and he took his usual place in society and parliament, and was afterwards welcome at the courts of Charles II and James II.

**Wallflower** (wal'floo-er), the common name of the species of plants belonging to the genus *Cheiranthus*, nat. order Cruciferae. They are biennial or perennial herbs or undershrubs. Many of them exhale a delicious odor, and are great favorites in gardens. The best known is the *C. Cheiri*, or common wallflower, which, in its wild state, grows on old walls and stony places. In the cultivated plant the flowers are of more varied and brilliant colors, and attain a much larger size than in the wild plant, the flowers of which are always yellow.

**Wallingford** (wol'ing-fér'd), a borough of New Haven Co., Connecticut, on the Quinepiac River and two railroads, 12 miles N. N. E. of New Haven. It has manufactures of silver and plated ware, insulated wire and fireworks. Pop. 11,155.

**Wallis** (wol'is), JOHN, an English mathematician, born in 1616; died in 1703. Educated for the church at Emanuel College, Cambridge, he took orders in 1640, and in 1663 obtained a living in London. He was one of the secretaries to the assembly of divines at Westminster; became Savilian professor of geometry at Oxford in 1649, and D.D.

in 1654. Charles II, for services rendered to the royal cause, made him one of the royal chaplains, and in 1661 he was one of the divines appointed to revise the *Book of Common Prayer*. He was one of the earliest and most useful members of the Royal Society, founded in 1663. He was the author of many mathematical, theological, and controversial works and papers, the most important of which are his *Arithmetic of the Infinities* and his *Mechanics*.

**Walloons** (wa-lönz'), or WALLONS', lineal descendants of the old Gallic Belgæ, who occupy the Belgian provinces of Hainault, Liège, Namur, and part of Southern Brabant and Western Luxembourg. They are superior in physique to their Flemish compatriots, and a large proportion of them have black hair and eyes. In 1905 there were resident in Belgium 3,600,000 Flemish, and 3,300,000 Walloons. Their language, also called Walloon, is a French patois retaining numerous Gallic words, but it somewhat varies in the different provinces.

**Wall Paper**, paper used to cover the wails of dwellings, ornamented with a pattern printed in colors. It has come into very general use, and many of the more costly wall papers are highly artistic and ornamental.

**Wallsend** (walz'end), a town of Northumberland, on the Tyne, 4 miles N. E. of Newcastle. It is named from being situated at the eastern extremity of the Roman Wall, and was formerly famous for its coal. Metal and chemical works form the chief industries. Pop. 41,464.

**Wall Street**, the financial center of New York city, in which the various exchanges and the largest banking institutions are situated, and stocks and bonds are dealt in to a vast extent. Its control over finance has spread until now it affects the whole country and is a rival of the great financial centers of Europe.

**Walnut** (wal'nüt), the common name of species of trees and their fruit of the genus *Juglans*, nat. order *Juglandaceæ*. The best known are the common European species of walnut tree (*J. regia*), a native of several Eastern countries and the black walnut (*J. nigra*), found in most parts of the United States. The latter often grows to large size, the trunk in favorable situations attaining a diameter of 6 to 7 feet. The European species is a large, handsome tree with strong spreading branches. The timber of the walnut is of great value, is very durable, takes a fine polish,

and is a beautiful furniture wood. It is also employed for turning and fancy articles, and especially for gun-stocks, being light and at the same time hard and fine grained. The ripe fruit is one of the best of nuts, and forms a favorite item of dessert. It yields by expression a bland fixed oil, which, under the names of *walnut-oil* and *nut-oil*, is used by painters, and in the countries in which it is produced is a common article of diet. In copper-plate printing it is employed to produce a fine impression, either in black or colors. By boiling the husks



Walnut (*Juglans regia*).

when beginning to decay, and the bark of the roots, a substantial dark-brown color is obtained, which is used by dyers for woollens, and also by cabinet-makers to stain other species of wood in imitation of walnut. The fruit, in a green state, before the shell hardens, is much used for pickling. The American species yields a wood preferable to the European walnut for furniture and carpentry purposes, its abundant use having caused a scarcity of this handsome and valuable lumber. Its nuts are inferior, the shell being much harder, though the kernel is very oily. The butternut (*J. cathartica*) is another noteworthy variety. See *Butternut*.

**Walpole** (woi'pöl), HORACE, Earl of Orford, third son of Sir Robert Walpole, born in 1717; died in 1797. He was educated at Eton, and King's College, Cambridge, on leaving which he traveled two years on the continent in company with Gray, the poet. Returning in 1741 he entered the House of Commons, and he sat for various constituencies up to 1768. He always took

a lively but superficial interest in politics, inclining sentimentally to extreme opinions. In 1747 he purchased Strawberry Hill, near London, where he erected a Gothic villa, laid out the grounds with minute ingenuity, and made it a principal business of his life to adorn and furnish it with objects of curiosity and antiquarian interest. His maintenance was provided for by some sinecure appointments, obtained through his father's influence. To his antiquarian taste he added authorship, first in verse and afterwards more extensively in prose, and in 1757 he established a private printing press at Strawberry Hill, at which he printed not only his own works but those of others. In 1791 he succeeded his nephew in the peerage. He never took his seat in the House of Lords, and appears to have avoided using his title. Walpole's works are numerous; but his fame as a writer rests on his *Letters* and *Memoirs*. The former are held to be unsurpassed in the English language, and both are highly interesting and valuable as a storehouse of the more evanescent traits of contemporary history. His romance, *The Castle of Otranto*, is also well known. Walpole's manners were affected; he was fastidiously aristocratic, sensitive to criticism, and eager for applause; but under his vanity and frivolity there existed a substratum of good sense and sound judgment.

**Walpole**, SIR ROBERT, Earl of Orford, statesman, was born at Houghton, England, in 1676; and died in 1745. He was educated at Eton, and at King's College, Cambridge; succeeded to the paternal estate in 1700, and entered parliament as member for Castle Rising. In 1702 he was elected for King's Lynn, became an active member of the Whig party, and soon distinguished himself by his business capacity, and by his easy, plausible, and dispassionate debates. He was secretary of war and leader in the Commons in 1708, paymaster of the forces in 1714 and 1720, and first lord of the treasury and chancellor of the exchequer in 1715, and again in 1721. From the latter date until 1742 he held without interruption the highest office in the state, that of prime minister. During his long administration the Hanoverian succession, to which he was zealously attached, became firmly established, a result to which his prudence and political sagacity largely contributed. He promoted by an enlightened policy the commercial prosperity of the nation, and relieved the weight of taxation by

many improvements in the tariff. In 1724 he was made a Knight of the Bath, in 1726 a Knight of the Garter, and on February 9, 1742, two days before his resignation, he was created Earl of Orford. In an age famous for venality



Sir Robert Walpole.

and lax morals he was the least corrupted, the soberest, and the hardest working of the leaders of both factions. An able monograph on Walpole has been published by John Morley.

**Walpurga** (val-pŭr'ga), or WALBURGA, a female saint, born in England early in the eighth century; died in 779. She was for many years a nun in a Dorsetshire convent. As a niece of St. Boniface and sister of St. Willibrod, first bishop of Eichstätt, Bavaria (741-786), she was induced to proceed to Germany to found convents, and in 754 she became abbess of Heidenheim, a convent within her brother's bishopric. She died at the latter place, but was buried at Eichstätt, where her shrine was visited by many pilgrims and was the scene of many miracles. The eve of May 1, associated with some of the most popular witch superstitions of Germany, is called *Walpurgis-night*, but her feast falls properly on the 25th of February.

**Walrus** (wŏl'rus), a marine carnivorous mammal, the single species constituting a genus *Trichechus*, as well as the family Trichechidae, and belonging, with its allies, the seals, to the pinnigrade section of the order Carnivora. The walrus, which is also known as the morse, sea-horse and sea-cow, has a general resemblance to the seals, but is especially remarkable from the upper canine teeth being enormously developed in the adults, constituting two



## Walsall

large pointed tusks directed downwards and slightly outwards, and measuring usually 12 to 15 inches in length, sometimes even 2 feet and more. There are no external ears. The animal exceeds the largest ox in size, attaining a length of 20 feet. It is monogamous, and seldom produces more than one young at



Pacific Walrus (*Odobenus obscurus*).

a birth; gregarious but shy, and very fierce when attacked. It inhabits the high northern latitudes, where it is hunted by whalers for its blubber, which yields excellent oil; for its skin, which is made into a durable leather; and for its tusks. Its favorite food consists of crustaceans.

**Walsall** (wol'sal), a parliamentary and municipal borough of England, in the county of Stafford, 8 miles N. N. W. of Birmingham. The present town is almost entirely modern. Extensive coal, iron, and limestone deposits in the immediate vicinity, and ample canal and railway communication with leading trade centers, have made an important manufacturing town of Walsall. Brass and iron foundries are numerous and on a large scale; and for saddlers' and carriage-builders' ironmongery, tools, locks, and keys, etc., Walsall has long been famous. Pop. 92,130.

**Walsh**, ROBERT, author, born at Baltimore, Maryland, in 1784; died in 1850. In 1837 he removed to Paris, and was U. S. consul there 1845-52. He edited the *American Review of History and Politics*, the first American quarterly, and was the author of various works of literature, political in character. He conducted the *American*

*Register*, the *National Gazette*, and the *Museum of Foreign Literature and Science*, and edited *Didactics: Social, Literary and Political*.

**Walsh**, WILLIAM SHEPARD, journalist, 1st, born at Paris in 1854, son of the preceding. He wrote much for periodicals, became editor in 1886 of *Lippincott's Magazine*, and published *Faust: The Legend and the Poem*, *Paradoxes of a Philistine*, *Handy Book of Literary Curiosities*, historical and scientific books for the young, etc.—His brother, HENRY COLLINS WALSH (born 1863), also a journalist, wrote *By the Potomac and other Poems*, *The Last Cruise of the Miranda* (a record of an Arctic voyage), etc.

**Walsingham** (wol'sing-am), SIR FRANCIS, an English statesman of the reign of Elizabeth, born of good family about 1536; died in 1590. After studying at King's College, Cambridge, he traveled on the continent for some time, and acquired a good knowledge of foreign languages and politics. He was introduced by Cecil, Lord Burleigh, to public service, and was employed in embassies to France, the Netherlands, and Scotland. He also sat in the House of Commons for various constituencies, and occupied important public offices. His sagacity and discretion caused him to be much employed, often against his own desire, in the intrigues of Elizabeth, especially against Mary Queen of Scots. The unraveling of the Babington plot was intrusted to Walsingham, and he was also one of the commissioners who tried Queen Mary.

**Walter** (wal'ter), JOHN, an English journalist, born in 1730; died in 1812. He founded the *London Times*, the greatest of British journals, in 1788. He was succeeded by two others of the same name. The last died in 1894 and was succeeded by his nephew, Arthur.

**Walter**, THOMAS U., architect, born at Philadelphia in 1804; died in 1887. He was the architect of Girard College, in Philadelphia, a magnificent Grecian structure, and in 1851 was made architect of the United States Capitol extension. In addition to this work he built several of the department buildings at Washington. He was for many years professor of architecture in the Franklin Institute, Philadelphia.

**Waltham** (wol'tham), a city of Middlesex Co., on the Charles River, Massachusetts, 9 miles west of Boston. The river supplies abundant water-power to its factories of watches, watch-tools, and cottons. The Waltham

## Waltham Abbey

machine-made watches are known throughout the world. There are various other industries, including knit goods, automobiles, bleachery and dye works. Pop. 27,834.

**Waltham Abbey**, a market town of England, in the county of Essex, 12 miles north, by



Waltham Cross.

east of London, on the left bank of the Lea. It derives its name from an old abbey founded by King Harold in 1060; and is now chiefly known for its government gunpowder and gun-cotton factories.

## Waltz

In the hamlet of West Waltham, or Waltham Cross, about a mile from Waltham Abbey, is a famous cross erected 1291-94 by Edward I. Pop. of district 6796.

### Walther von der Vogelweide

(fō'gi-vi-dē), one of the most eminent old German lyric poets of the class of *Minnesingers*, was born about 1170; died at Würzburg about 1230. His earliest patrons were Duke Leopold VI of Austria and his son Frederick. Subsequently he visited, for shorter and longer periods, the courts of most German princes, who were in favor of an imperial as against a papal policy and who could appreciate his distinguished muse. The emperor Frederick II provided him with a small estate near Würzburg, where he seems to have always retired when disgusted with traveling, the courts, and intrigues, and there he died. He was a politician and reformer as well as a poet, and his exquisite and manly verses breathe a liberalism far in advance of his times; while the subjects of his favorite love songs are women true and noble.

**Walton** (wā'tun), IZAAK, the author of the famous *Compleat Angler*, was born at Stafford in 1593; died at Winchester in 1683. For a number of years he carried on successfully in London some branches of the drapery trade, but retired at the age of fifty, and devoted his remaining forty years to a life of cultured ease and pleasure. In 1626 he married a relative of Archbishop Cranmer, and about 1646 a half-sister of Bishop Ken. Through these matrimonial alliances he became friendly and intimate with many of the distinguished ecclesiastics of his time, and wrote the biographical memoirs of some of them. His first edition of the *Compleat Angler* appeared in 1653. It is to his exquisite delineations of rural scenery, his genuine love for the Creator and His works, the ease and unaffected humor of the dialogue, and the delightful simplicity and purity of the style, that this notable work owes its charm.

**Waltz** (wāltz), a dance of Bohemian origin, executed with a rapid wheeling motion, the gentleman having his arm round his partner's waist. The music is written in triple time in crotchets or quavers, and consists of eight or sixteen bar phrases. Several of these phrases are now usually railed to prevent monotony. The *vals à deux temps* is a form of waltz in which two steps are made to each bar of three beats. *Classical waltzes* are composi-

## Wampum

tions in waltz form not intended for dance tunes.

**Wampum** (wam'pum), the Indian name for shell beads, used by the United States tribes for ornament and as money, or a medium of commerce. They were often fastened together into a broad belt, called by them Wampumpaque, or Wampeaque. They were shaped by them out of sea-shells, cut into round pieces, but the colonists soon entered into this enterprise and quickly reduced the value of wampum by producing an oversupply.

**Wanamaker** (wa-na-mä'ker), JOHN, merchant, was born in Philadelphia, Pennsylvania, July 11, 1838. He engaged in the mercantile business in 1861, displayed great ability and enterprise, and in 1876 opened the first department store in the United States. This, started in Philadelphia, has a counterpart in New York, both of them very large and prosperous. In 1889-93 he was postmaster-general, and has taken an active part in politics from the reform side, also in Sunday-school work, the Bethany Sunday School, Philadelphia, founded by him, becoming one of the largest in the country.

**Wandering Jew**, the hero of a medieval legend, which deals with a Jew who cannot die, but is condemned to wander until the day of judgment in punishment for an insult offered to Christ, when on his way to the place of crucifixion. This legend is not of ancient origin, nor is it widespread. No trace of it is found in the literature of the early middle ages, and its popularity has been chiefly confined to a few countries, as Germany, France, Scandinavia and the Netherlands. The legend takes several forms, and has its analogues in the story of Cain, whose curse presents some similarity, and the Arab story of Samiri, the maker of the Golden Calf, who became a similar homeless wanderer. The Wandering Jew appears to make his first appearance in an Italian legend, which may be of great antiquity. This tells how a Jew named Malchus struck Jesus with an iron glove. Since then he has lived underground, doomed to turn endlessly around a pillar until the day of judgment. We first read of the historic Wandering Jew in the *Historia Major* of Matthew Paris (completed in 1259). His version is that an Armenian bishop visited England in 1228, and among the wonders of his country told of a Jew named Cartaphilus, then alive and well known to him, yet who had been a doorkeeper in the palace of Pilate in the time of Christ and had

## Wandering Jew

struck him while being led to the crucifixion, using the words, 'Go, Jesus: go on faster.' Jesus replied, 'I go, but thou shalt wait till I return.' The story goes on to state that Cartaphilus was baptized by Ananias with the name of Joseph and settled in Armenia, and had often eaten at the bishop's table. He was thirty years old when he insulted Christ, and whenever he reached the age of one hundred he fell into a faint and recovered to find himself again thirty years of age. The bishop's brother afterwards visited England, and some of the monks with him confirmed the story. It has been suggested that the name Cartaphilus (Gr., 'very dear') may have arisen from the disciple 'whom Jesus loved,' and of whom he said to Peter, 'If I will that he tarry till I come, what is that to thee?' (John xxi, 22). This saying may have been gradually transformed in its significance into that of the legendary wanderer. As for the Armenian origin of the story, a questionable point is the fact, that there exists no trace of such a story in Armenia or anywhere in the East.

Coming down to a date, three hundred years later, the story crops up again in a new development. Paul von Eltzen, bishop of Sleswick, is said to have seen the Jew at Hamburg in 1547, listening to his sermon. He was a tall, ragged, barefoot, gaunt wanderer, with long hair falling over his shoulders. His name had now become Ahasuerus, and his occupation at the time of Christ that of a shoemaker. He could talk in the language of every country, was never seen to laugh, and rebuked with the greatest severity all blasphemies against the name of Christ. This story became widely current during the succeeding period, and from this time forward we meet with many precise versions and variations.

One of the most celebrated appearances of the Jew was at Brussels in 1640, where he was seen and talked with by two reputable citizens. His name now becomes Isaac Laquedom, which Böttcher thinks is possibly a corruption, by a man of small learning, from the Hebrew *la-kêdem* ('the former world'). These versions made their way into other countries, and their substance appears in a poem in Percy's *Reliques*. The name Laquedom is used in a beautiful French *complainte* on the subject. Still another name has been given the Jew, that of Buttadeus, and various other appearances are on record at Beauvais, Leipzig, Lübeck, Moscow, Madrid and Hull. The latter record is in a tract of 1769, in which four min-

isters of Hull, Yorkshire, tell how 'some time since,' the Jew visited Hull and was locked up, but the prison doors flew open before one condemned to have no resting place. The *Turkish Spy*, writing from Paris in 1644, gravely tells of a conversation with him, now as Michob Ader, in several languages, including a five or six hour talk in Arabic.

In this talk the Jew 'the Younger Brother of Time,' told his listener that there was scarcely a true history in existence. When asked about what had become of the lost Ten Tribes of Israel, he was unable to give any satisfactory account of them. Such are the various notions which have arisen concerning this curious story. The conception involved is one that has been connected with other characters and incidents, like that of Cain fleeing with the brand of murder on him, the Wild Huntsman of German legend, and the famous story of the Flying Dutchman, so weirdly treated by Coleridge. The Wandering Jew has found a place more than once in literature, as in Eugene Sue's novel under that title, and the theme presented itself favorably to Goethe, but was abandoned for that of Faust.

### Wanderoo, Wanderu (wan'der-8; *Macacus*

*silenus*), a monkey of southern Hindustan, especially near the Malabar coast. They are long, slender, black animals, notable for the large mane or ruff, and beard, which stand out like a gray or white frame to the black face, and give it a very peculiar aspect.

**Wandsworth** (wons'worth), a London suburban parliamentary borough, created in 1885. Pop. 311,402. Wandsworth proper is situated at the confluence of the Wand with the Thames, immediately to the s. w. of Battersea, and is an important center of industry.

**Wantage** (won'taj), a market town of England, Berkshire, on a small tributary of the Thames, situated in the fertile vale of the White Horse. Pop. 3628.

**Wapentake** (wä'pen-täk, wop'n-täk), the name formerly given in some of the northern shires of England, and still given in Yorkshire, to a territorial division of the county, corresponding to the *hundreds* of the southern counties.

**Wapiti** (wop'i-ti), a species of deer, the North American stag (*Cervus Canadensis*), bears considerable resemblance to the European red deer, though it is larger and of a stronger make, its antlers also being larger. It

is found in Canada and the northern parts of the United States from the Atlantic to the Pacific. Its flesh is not much prized, being coarse and dry, but its hide is made into an excellent kind of leather.

**Wapping** (wop'ing), a district of East London, in Middlesex, on the north bank of the Thames, inhabited chiefly by persons employed in the shipping of the port of London. Here are the London Docks, St. Catherine's Docks, etc., and the stupendous warehouses belonging to the custom-house, etc. See *London*.

**War** (war), a contest between nations or countries (*international war*), or between parties in the same country (*civil war*), carried on by force of arms, usually arising in the first case from disputes about territorial possessions and frontiers, unjust dealings with the subjects of one country by another, questions of race and sentiment, jealousy of military prestige, or mere lust of conquest, rarely nowadays from the whim of a despot. In the case of civil war it arises from the claims of rival contenders for supreme power in the state, or for the establishment of some important point connected with civil or religious liberty. In all cases the aim of each contending party is to overthrow or weaken the enemy by the defeat or dispersion of his army or navy, the occupation of important parts of his country, such as the capital or principal administrative and commercial centers, or the ruin of his commerce, thus cutting off his sources of recuperation in men, money, and material. International or public war is always understood to be authorized by the monarch or sovereign power of the nation: when it is carried into the territories of a hitherto friendly power it is called an *oppressive* or *offensive* war, and when carried on to resist such aggression it is called *defensive*. Previous to the outbreak of hostilities between countries, the power taking the initiatory step issues a *declaration of war*, which now usually takes the form of an explanatory manifesto addressed to neutral governments. During the progress of the struggle certain *laws, usages, or rights of war* have come to be generally recognized; such laws permitting the destruction or capture of armed enemies, the destruction of property likely to be serviceable to them, the stoppage of all their channels of traffic, and the appropriation of everything in an enemy's country necessary for the support and subsistence of the invading army. On the other hand



though an enemy may be starved into surrender, wounding, except in battle, mutilation, and all cruel and wanton devastation, are contrary to the usages of war, as are also bombarding an unprotected town, the use of poison in any way, and torture to extort information from an enemy; and generally the tendency in all laws and usages of war is becoming gradually more favorable to the cause of humanity at large. These principles of warfare, it should be stated, refer to warlike conflicts as now conducted. As conducted in former, less civilized times, no such rules existed and war was carried on with little regard to mercy or morality. See also *International Law*.

**War,** PEASANTS'. See *Peasants' war*.

**Warbeck** (wār'bek), or OSBEC, PERKIN, the son of a Flemish Jew, was set up by Margaret of York, dowager-duchess of Burgundy, as a pretender to the crown of England against Henry VII. For this purpose she claimed to recognize him as her nephew, Richard Plantagenet, duke of York, the younger of the two princes who were murdered in the Tower by Richard III. He was patronized by France and Scotland, married a kinswoman of the Scottish king, James IV, made several fruitless invasions of England and Ireland, was taken prisoner after an attempt on Cornwall (Oct., 1497), and confined to the Tower, where, his plotting being continued, he was executed (November, 1499).

**Warblers** (wār'blerz; Syviadæ), the name applied to a family or denti-rostral insectorial birds, generally small, sprightly, very shy, and remarkable for the clearness, sweetness, and flexibility of their song. Insects form their food, and most of them are migratory. The typical warblers belong to the genus *Sylvia* (which see).

**Warburton** (wār'bēr-tun), WILLIAM, an English prelate, was born at Newark-upon-the-Trent in 1698; died at Gloucester in 1779. He was brought up to the law, but not finding this profession to his taste he relinquished it, and in 1723 took deacon's orders in the church. In 1727 he began to distinguish himself as a writer by his inquiry into the *Causes of Prodiges and Miracles*. This led to his being presented to the rectory of Brand Broughton, in Lincolnshire, where he remained many years, composing here most of those works which contributed to the establishment of his fame. In 1786 appeared his first important work,

the *Alliance Between Church and State*, etc., but his great work is the *Divine Legation of Moses*. It was assailed in many quarters, and Warburton carried on the controversy with ability and intemperate vigor. A defense of Pope's *Essay on Man* secured him the friendship of the poet. By the death of Ralph Allen (which see), Warburton succeeded to the splendid seat of Prior Park, in Gloucestershire. He was appointed, in 1746, preacher to the society of Lincoln's Inn, and from that time his advancement was rapid, until he became the bishop of Gloucester in 1759.

**Ward** (ward), ARTEMAS, a Revolutionary general, born at Shrewsbury, Massachusetts, in 1727; died in 1800. He served in the French and Indian war under Abercrombie. At the siege of Boston, in 1775, he became second in command under Washington. He resigned in April, 1776, and was a member of Congress from 1791 to 1795.

**Ward,** ARTEMUS. See *Browne, C. F.*

**Ward,** EDWARD MATHEW, an English painter, born at London in 1816; died at Windsor in 1879. In 1835 he joined the classes at the Royal Academy. The following year he went to Italy, where he studied fresco painting under Cornelius. He took part in the competition, opened in 1843, for decorating the House of Parliament, his design being illustrative of events in the history of Boadicea. Eight of his designs were finally accepted, and executed by him in the corridor of the House of Commons in 1853. For his subjects he generally chose interesting historical episodes and popular characters; hence, many of his paintings have been largely reproduced by the engraver. *Dr. Johnson in Lord Chesterfield's Ante-room*, and the *Royal Family of France in the Temple*, are considered his best works.

**Ward,** MRS. HERBERT D., ELIZABETH STUART PHELPS, American author, born in Boston in 1844; died in 1911. She took an active interest in temperance and other reform movements. Her works include *Gates Ajar*, *A Singular Life*, *The Man in the Case*, *Story of Jesus Christ*.

**Ward,** HERBERT DICKINSON, author, born at Waltham, Massachusetts, in 1861. He married Elizabeth Stuart Phelps (which see) in 1888. He became an editorial writer for daily and monthly publications, and wrote *The New Senator at Andover*, *The Master of the Magicians*, *The Captain of the Kit-tiwink*, *The Burglar Who Moved Para-*

disc, *The Light of the World*, *Love Letters of an American Girl*, etc.

**Ward, Mrs. HUMPHRY** (Mary Augusta Arnold), was born at Hobart, Tasmania, June 11, 1851, a granddaughter of Dr. Arnold of Rugby. Her father, Thomas Arnold, was an author of some reputation. She married T. Humphry Ward, editor of *Men of the Time*, *The English Poets*, etc. As a novelist she is known under her husband's name. She gained a wide popularity in 1888 by her novel of *Robert Elsmere*, which had a phenomenal success. Other works from her pen are *David Grieve*, *Marcella*, *Sir George Tressady*, *Lady Rosa's Daughter*, *The Case of Richard Meynell*, and a number of others, all of considerable popularity.

**Ward, JAMES**, a British painter, born in London in 1769; died at Cheshunt in 1859. He early became eminent as an engraver, and only took to painting when arrived at middle age. His exquisite delineation of animals speedily secured him fame, and he was extensively patronized by George III.

**Ward, JOHN QUINCY ADAMS**, sculptor, born at Urbana, Ohio, in 1830; died May 2, 1910. After studying medicine for a time he became a sculptor and won the reputation of being one of the ablest that this country had produced. Among his works are the statues of *Shakespeare*, Central Park, New York; of *General Thomas*, at Washington, D. C., and of *General Washington* at Newburyport. He also produced *The Escaped Slave*, *The Indian Hunter*, *The Good Samaritan*, etc. He became a member of the National Academy of Design in 1863, and its president in 1872.

**Ward, LESTER FRANK**, geologist and sociologist, born at Joliet, Illinois, in 1841. He was graduated at Columbian College, Washington, D. C., in 1869, served as assistant geologist in the United States Geological Survey 1881-88, and afterwards as geologist and paleontologist. Among his many works are: *Dynamic Sociology*, *Geological Distribution of Fossil Plants*, *Principles of Sociology*, *Pure Sociology*, *Applied Sociology*, etc. He died April 18, 1913.

**Ware** (wâr), a town of Hampshire Co., Massachusetts, on Ware River, 27 miles E. N. E. of Springfield. It has manufactures of cottons and woollens, boots and shoes, hosiery, paper, etc. Pop. 8774.

**Ware** (wâr), **WILLIAM**, author, born at Hingham, Massachusetts, in 1797; died in 1852. He became a church pastor at New York and elsewhere, and for a time edited the *Chris-*

*tian Examiner*. His *Letters from Palmyra*, in the *Knickerbocker Magazine*, were published in 1836, under the name of *Zenobia*, which was followed by *Aurelian* and *Probus*, classical romances, which brought him a high reputation. Other works were *The Works and Genius of Washington Allston*, and *Sketches on European Capitals*.

**War Indemnity**, the sum of money exacted from a defeated country by its victorious antagonist. This money payment replaces the spoils of war of former history, and was first adopted within the past century, the highest indemnity ever exacted being the \$1,000,000,000 paid by France to Germany after the war of 1870-71. A similar indemnity has been demanded in all recent wars, on the principle of repayment to the conqueror of the costs of making war. It is aside from land exactions, since Germany took from France also the province of Alsace-Lorraine. The conduct of the United States has been generous in this respect. After the war with Mexico it paid that country for the territory occupied and retained, and after the war with Spain, in 1898, paid Spain \$20,000,000 for its property in the Philippines. It was the same with the Boxer indemnity exacted from China in 1900, the United States remitting its share of this indemnity, a generosity not displayed by any of the European nations concerned.

**Waring** (wâr'ing), **GEORGE F.**, engineer and author, born in Westchester Co., New York, in 1833. He was an engineer of Central Park, New York City, 1857-61, served in the Civil war, becoming a cavalry colonel, and afterwards attained distinction as a sanitary and agricultural engineer. He executed the new sewerage works of Memphis, Tennessee, in 1880, in 1895 was appointed street commissioner of New York, and surprised the people of that city by an honest administration, and in 1898 went to Havana and endeavored to eradicate the causes of yellow fever. The result was that he took the fever himself and died of it. He wrote *Elements of Agriculture*, *Sanitary Drainage*, *Village Improvements* and *Farm Villages*, etc.

## Warming and Ventilation.

The condition of the atmosphere of our houses and apartments is of such importance to health and vigor of mind that warming and ventilation, two closely allied subjects, are receiving more and more attention as sanitary science advances. Their neglect has

been the cause of, and is still responsible, for an incalculable amount of human disease and suffering. The body, to remain in health, requires a certain degree of heat; so that, if the surrounding atmosphere is too low in temperature, artificial means must be employed to raise it. The temperature which is found the most agreeable for the air of apartments, in which the occupants are not engaged in bodily exercise, is from 63° to 65° F. The charcoal brazier is a very ancient method of warming an apartment. The Greeks and other nations commonly used it, and they sought to correct the deleterious nature of the fumes by burning costly odorous gums, spices, and woods; but the carbonic acid given off by the combustion of charcoal is very injurious to health. The ordinary open coal-fire is, if not the most economical, at least the most agreeable means of heating apartments, but the waste of heat is very considerable. This waste early led to the introduction of closed stoves, first in earthenware and then in metal. These closed stoves, of which there are innumerable varieties in form and construction, are particularly favored in America and on the European continent, and certainly effect a great saving in fuel; but they do not form natural ventilators, like the open fire-places, and are liable to overheat the rooms and to render the air in them too dry. For public buildings, warehouses, conservatories, etc., the most extensively employed systems of heating are those of steam and hot-water pipes. The hot-water apparatus, in its simple and practical form, was introduced by Atkinson in 1822. The circulation of water is brought about on the principle of the expansion of water by heat, and its greater lightness in consequence. Whatever be the height of the water above, the water when heated in the lower part of a boiler will rise to the surface, making room for other and cooler particles to be heated, in their turn; hence if a pipe full of water rise from the top of a boiler to any required height, and then return by gentle bends to the boiler at the lower part, heated water will rise and occupy the upright pipe, and the colder water will descend into the boiler to take its place. Thus a continuous circulation may be maintained through pipes in a building, the heated water rising up, passing on, and returning cooled, to the lower part of the boiler, causing a satisfactory temperature to be everywhere felt. The greater the elevation to which the heated water ascends, and the higher the initial tem-

perature of the water, the greater is the motive power for circulation. There are also several systems of heating by passing steam or hot air through pipes.

Ventilation is the means of renewing the atmosphere, and of maintaining its purity by expelling foul air and admitting fresh, without drafts. Of the products which vitiate the air pulmonary exhalations are the most important. Air which has been utilized by living beings is always charged with carbonic acid, and also with a very small amount of watery vapor, the quantity of which is increased as the air is warmed; and smaller quantities of ammonia, and organic matter, especially bacteria, still further assist in rendering the atmosphere not only unfit but dangerous for respiration. Authorities on hygiene vary somewhat as to the amount of air necessary for healthy living rooms, but it is generally admitted that not less than 1000 cubic feet of fresh air per healthy person should be supplied every hour, and from 3000 to 4000 cubic feet to rooms occupied by invalids. We may renew the air in a room in an instant by throwing open doors and windows, but this process probably would be attended with danger to the health of the inmates from the violence with which the air currents would enter and leave the room. The most common form of ventilation is the chimney, and with a good fire in an open grate it proves under ordinary conditions to be sufficient. The difference in the weight of hot air and burnt gases in the chimney and the column of air outside supplies the motive force necessary to expel the former. Mechanical ventilation is generally effected by means of gratings in the ceilings or cornices in communication with flues leading into the open air, and a variety of arrangements have been invented to prevent down-drafts. Public and other large buildings are commonly ventilated in the roof, though sometimes by gratings in or near the floor, but this latter method is objectionable on account of draft. Automatic ventilation is, of course, irregular, owing to changes in wind and temperature, which increase or reduce, or even revert the motive power. In places where large numbers of people congregate and a uniform renewal of air is required, it is therefore necessary to resort to machinery. Many systems are in operation, varying with the nature of the building to be ventilated. Air flues, shafts, or pipes are usually the medium through which air passes in and out, and this passage is generally regulated

by pumps or fans moved by steam or gas engines. The proper ventilation of mines forms one of the most difficult and important functions of a mining engineer. See *Mining*, and also *Sanitation*.

**Warner** (war'ner), CHARLES DUDLEY, author, was born at Plainfield, Massachusetts, in 1829, and was graduated from Hamilton College in 1851. In 1853 he was connected with a surveying party on the Missouri frontier; he then studied law and practiced in Chicago; became connected with the newspaper press; traveled in Europe; and in 1884 became joint-editor of *Harper's Magazine*. His works include: *My Summer in a Garden*, *Saunterings*, *Backlog Studies*, *My Winter on the Nile*, *In the Levant*, *Washington Irving*, etc. He edited *Library of the World's Best Literature*. Died October 20, 1900.

**Warner**, SUSAN, an American writer, born at New York in 1819; died in 1885. In 1851 she published, under the pseudonym of Elizabeth Wetherell, a novel entitled *The Wide, Wide World*, which soon attained extraordinary popularity on both sides of the Atlantic. *Queechy*, which appeared in 1852, was almost equally popular. She wrote also various other works, but none that had any special favor with the public.

**Warp.** See *Weaving*.

**Warping** a mode of fertilizing poor or barren land by means of artificial inundation from rivers which hold large quantities of earthy matter, or *warp*, in suspension. The operation, which consists in inclosing a body or sheet of water till the warp has deposited, can only be carried out on flat low-lying tracts which may be readily submerged.

**Warrant** (wor'ant), an instrument or document authorizing certain acts which without it would be illegal. Warrants may be divided into executive, judicial, and commercial warrants. The first include *Death*, *Extradition*, and *Treasury Warrants* (authority to receive payments at the treasury). Common forms of judicial warrants are: the *Warrant of Arrest*, usually issued by a justice of the peace for the apprehension of those accused or suspected of crimes; the *Warrant of Commitment*, a written authority committing a person to prison; the *Distress Warrant*, a warrant issued for raising a sum of money upon the goods of a party specified in the warrant; the *Search Warrant*, an authority, generally granted to police

officers, to search private premises. Commercial warrants usually authorize the delivery of goods or money, such as *Dock Warrants*, *Dividend Warrants*, etc.

**Warranty** (wor'an-ti), in law, a guarantee or security; a promise or covenant by deed, made by a bargainer for himself and his heirs, to warrant or secure the bargainee and his heirs against all men in the enjoyment of an estate or other thing granted.

**Warren** (wor'en), a city, capital of Warren Trumbull Co., Ohio, 14 miles N. W. of Youngstown. It has large potteries, extensive machine shops, produces electric lamps and appliances, etc. It is in a rich agricultural and dairying country. Pop. 11,081.

**Warren**, county seat of Warren Co., Pennsylvania, on the Allegheny River, 120 miles N. E. of Pittsburgh on three railroads. It is in an agricultural and oil region, but the chief industries are connected with oil products and manufacturing. Here is a State Insane Asylum. Pop. 13,650.

**Warren**, a town in Bristol Co., Rhode Island, 10 miles S. E. of Providence. Cotton goods and yarn are manufactured. A trading post was established here in 1632. Pop. of town 6585.

**Warren**, GOUVERNEUR KEMBLE, military officer, born at Cold Spring, New York, in 1830; died in 1882. He was graduated at West Point Academy in 1850, and became a colonel of volunteers in 1861, and brigadier general in 1862. In 1863 he was made chief of topographical engineers, and subsequently chief of engineers. He was promoted major general in May, 1863, and in March, 1864, was put in command of the 5th corps of the army. General Sheridan was displeased with his conduct at the battle of Five Forks, April 1, 1865, and removed him from his command. He was mustered out in May, 1865, as major of engineers, and in 1876 was made lieutenant-colonel in the United States army. A statue of him was placed on Little Round Top, Gettysburg, in 1888.

**Warren**, JOSEPH, a Revolutionary patriot, born at Roxbury, Massachusetts, in 1741. He studied medicine and began to practice his profession in 1764. He became one of the patriot leaders prior to the Revolution, delivering the anniversary oration upon the Boston Massacre, in 1772. After the meeting of the Provincial congress at Concord in October, 1774, he acted as chairman of the committee of safety, charged with the



duty of organizing the militia. In May, 1775, he was chosen president of the Provincial congress, and in June was made major-general of the Massachusetts force. Hearing that the British troops had reached Charleston, he hurried to Bunker Hill, and while endeavoring to rally the militia there he was struck by a musket ball and instantly killed, June 17, 1775.

**War Revenue.** The taxation act of 1917, designed to meet war expenditures by the United States government, covered a wide scope, including taxes on incomes, on excess profits and on a large number of articles used in daily life operations. The taxes on incomes provided by the existing law covered a tax of 1 per cent on the net income of all single persons over \$3000 and married persons over \$4000, with a surtax on incomes over \$20,000, this gradually increasing in percentage as the income grew larger. Under the new law the exemption was reduced and applied in the case of single persons to incomes over \$1000 and of married persons to incomes over \$2000. Under the 1917 enactment an additional supertax was imposed in the following rates: 1 per cent on amounts between \$5000 and \$7000, 2 per cent between \$7000 and \$10,000, 3 per cent between \$10,000 and \$12,000, 4 per cent between \$12,000 and \$15,000, 5 per cent between \$15,000 and \$20,000, 7 per cent between \$20,000 and \$40,000, 10 per cent between \$40,000 and \$60,000, 14 per cent between \$60,000 and \$80,000, 18 per cent between \$80,000 and \$100,000, 22 per cent between \$100,000 and \$150,000, 25 per cent between \$150,000 and \$200,000, 30 per cent between \$200,000 and \$250,000, 34 per cent between \$250,000 and \$300,000, 37 per cent between \$300,000 and \$500,000, 40 per cent between \$500,000 and \$750,000, 45 per cent between \$750,000 and \$1,000,000, and 50 per cent over \$1,000,000. Under these laws the total tax on incomes of \$100,000 amount to \$16,180; on incomes of \$500,000 to \$192,680; on those of \$1,000,000 to \$475,180. In addition to these taxes on individuals there was imposed a corporation tax of 40 per cent on the annual income of the corporation, joint-stock company, etc. Taxes on excess profits were also imposed in addition to those above enumerated, upon the income of every corporation, partnership, or individual, these being equal to the following percentages of the net income: 20 per cent of the amount of the net income (in excess of certain deductions provided for), if not in excess of 15 per cent of the invested capital for the taxable year, 25 per cent of the net

income if in excess of 15 but not of 20 per cent of the invested capital; and so on in increasing percentages up to 60 per cent of the amount of the net income in excess of 33 per cent of the invested capital. The amount of deduction is varied and intricate in its application to the different cases involved.

In addition to these income taxes, there is a considerable variety of war taxes, an important one being that on beverages. On distilled spirits now in bond or that may hereafter be produced in or imported into the United States, if intended to be used as beverages, a tax of \$2.10 on every proof gallon, or wine gallon when below proof. If not to be used as beverages the tax is \$1.10 per gallon. On beers, ales, porters and other fermented liquors, the tax will be \$1.00 on every barrel containing not more than 31 gallons. The tax on cigars and other tobacco products varies.

After December 1, 1917, a tax became imposed on tickets of admission to places of amusement of 1 cent on each 10 cents or fraction thereof, including admission by season ticket or subscription. Also all dues for membership in any club or association are taxed 10 per cent if amounting to over \$12 per year.

The largest revenue bill in all history, under which taxes estimated at \$6,086,000,000 for the year 1919 and approximately \$4,000,000,000 annually were levied upon the taxpayers of the United States, was reported to the House of Representatives February 6, 1919, by Representative Claude Kitchin, of the Ways and Means Committee. Individual and corporation incomes and war profits and excess profits bore most of the burden of taxation under the provisions of the bill. Taxes on individual incomes were nearly doubled; in some instances tripled. The tax payable by married persons with an income of \$2500 was increased from \$10 to \$30; those with incomes of \$3000 paid \$60; \$3500, \$90; \$4000, \$120; \$5000, \$150; \$6000, \$250; \$7000, \$390; \$8000, \$530; \$9000, \$680; \$10,000, \$830; \$20,000, \$2630; \$50,000, \$11,030; \$100,000, \$35,030; \$500,000, \$300,030; \$1,000,000, \$650,030. The exemption for single men remained at \$1000, and for married men \$2000, with \$200 additional for each dependent other than the wife. Men in the military and naval service were granted a salary exemption of \$3500. The bill levied a tax of 80 per cent on war profits, and taxed excess profits 30 per cent minus an exemption of \$3000 on invested capital, and 65 per cent on profits exceeding 20 per cent, less the same exemption on invested capital.

## Warrington

**Warrington** (wŏr'ing-tun), a town of Lancashire, England, with a small portion in Cheshire. River, canal, and railway communications secure it exceptional carrying facilities. Tanneries, on, glass, and soap works, cotton mills, and breweries are numerous. The Manchester Ship Canal passes here. Pop. 72,178.

**War Risk Insurance.** See *Insurance*.

**Warrnambool** (wŏr'nam-bŏl), a seaport town of Victoria, 170 miles southwest of Melbourne. It lies in a fertile agricultural district, and has an extensive trade in wool, flour, and dairy produce with Melbourne. Pop. 6410.

**Warsaw** (wŏr'sŏ), a city of Poland, capital of the reconstructed republic (see *Poland*), formerly capital of Russian Poland. It is on the left bank of the Vistula, and extends for over 5 miles along that river. Its water communications have long made it one of the most important commercial centers of Eastern Europe, and it is now connected by rail with Moscow, Petrograd, S. W. Russia, Dantzic, and Berlin. Two bridges connect it with Praga, a suburb on the right bank of the river. Warsaw is famous for its huge churches, numerous and magnificent palaces and monuments, remnants of former Polish grandeur; for its educational institutions; and for its many and extensive gardens, parks, and suburban drives. It was formerly also exceptionally rich in literature and art treasures; most of these have been confiscated and transferred to Petrograd. Leather, boots and shoes, woolen and linen stuffs, plated ware, machinery, chemicals, spirits and beer, are some of the most important industrial products. It became an important place in the middle ages, and early in the seventeenth century supplanted Cracow as the capital of Poland. As such it was several times stormed and captured, coming under Russian rule in 1813. Although strongly protected by the fortresses on the Narev and Novo-Georgievsk on the Vistula, it was taken by the German armies on August 5, 1915, one year after the opening of the European war (q. v.). The population in 1913 was 872,000.

**Warship.** See *Navy* and *Ironclad*.

**Wart** (wŏrt), a small dry hard tumor making its appearance most frequently on the hands, sometimes on the face, and rarely on other parts of the body, and occurring usually on children. Warts may be described as collections of abnormally lengthened papillae of the

skin, and closely adherent and ensheathed in a thick covering of hard dry cuticle. In most cases they disappear of themselves, or they may be removed by applications of nitric or glacialacetic acid, etc.

**War Tax.** See *War Revenue*.

**Wartburg** (vŏrt'byrkh), an ancient mountain castle in Germany, near Eisenach, in the grand duchy of Saxe-Weimar. It was built in 1067 as a residence for the landgraves of Thuringia. Here, according to the legend, took



The Wartburg.

place the poetic contest known as the 'War of the Wartburg,' between Walther von der Vogelweide and six other eminent poets of Germany, in 1206. It was the residence of Luther in 1521-22, and the room in which he worked at the translation of the Bible is still shown.

**Warthe** (vŏrt'é), or WARTA, a river of Germany. It rises in Poland, 35 miles N. W. of Cracow, flows N. and W., then through Prussia W. N. W., and after watering Posen joins the Oder at Küstrin. Total length, 483 miles, of which 220 are navigable.

**Wart-hog**, a name common to certain members of the hog family, genus *Phacochoerus*, distinguished from the true swine by their dentition,



Head of Wart-hog.

which in some respects resembles that of the elephants. The head is very large; immense tusks project from the mouth outwards and upwards, and the cheeks are furnished with flesh-like excrescences resembling warts. They feed on the roots of plants, which they dig up with their tusks. The African wart-hog or haruja (*P. Eliani*) of Abyssinia, and the black-necked wart-hog of the Dutch settlers of the Cape (*P. Ethiopianus* or *Pallasii*) are familiar species.

**Warton** (war'tun), THOMAS, an English poet and critic, son of the Rev. Thomas Warton, professor of poetry at Oxford, was born at Basingstoke in 1728; died at Oxford in 1790. He was educated at Winchester, and Trinity College, Oxford, and early distinguished himself by his poetical compositions and criticisms. He was chosen professor of poetry at Oxford in 1757, a chair he filled with great ability for ten years; appointed Camden professor of history in 1785; and succeeded Whitehead as poet-laureate in the same year. Several church livings were also held by him. He rendered great service to literature by his *History of English Poetry* (1774-81), in three volumes, a work never completed.—His brother, JOSEPH (1722-1800), also deserves mention as a literary critic, and as headmaster of Winchester School (1766-96). To him we owe an essay on the *Writings and Genius of Pope*.

**Warwick** (wo'rik), a parliamentary borough of England, on a rocky hill on the right bank of the Avon, the county town of Warwickshire. The principal object of interest is Warwick Castle, the most magnificent of the ancient feudal mansions of the English nobility. Pop. 12,414.—The county has an area of 902 sq. miles. The surface is gently undulating, well watered, chiefly by the Avon and the Tame; the soil generally fertile, suitable for grain, root, and pulse crops, and there is a large amount of pasture for dairying and grazing purposes. Coal (output over a million tons per annum) and several kinds of building stone are abundant. Warwickshire is also famous for its manufactures and includes

the two great manufacturing towns of Birmingham and Coventry (which see). Pop. (1911) 1,040,628.

**Warwick** (war'wik), a town (township) in Kent Co., Rhode Island. It contains several villages and has important cotton manufactories. Pop. 26,629.

**Warwick**, RICHARD NEVILLE, EARL OF, 'the kingmaker,' a great English nobleman, born in 1428; killed in 1471. He was the son of an earl of Salisbury, and became Earl of Warwick by marrying the heiress of the title and estates. Taking the Yorkist side in the Wars of the Roses, he was the main instrument in placing Edward IV on the throne in 1461 in place of Henry VI, and became the most powerful nobleman in the kingdom. Quarreling with Edward on account of the latter's marriage, he went over to Henry's side, and was able to place him again on the throne, but his army was defeated and himself slain in the battle of Barnet.

**Washburn**, EMOXY, American jurist, born in Leicester, Mass., February 14, 1800; settled in Worcester in 1828; judge of the Court of Common Pleas 1844-48; governor of Massachusetts 1853 and 1854; professor of law at Harvard University 1856-70. He was the author of several works on jurisprudence, among them being *Treatise on the American Law of Real Property*, *Treatise on the American Law of Easements and Servitudes*. Died March 18, 1877.

**Washburne**, CADWALLADER GOLDEN, American soldier, brother of Elihu Benjamin Washburne, born at Livermore, Me., April 22, 1818; settled at LaCrosse, Wis., in 1859. He was in Congress 1856-62; delegate to the peace conference in 1861. After the attack on Fort Sumter he raised the 2d Wisconsin Cavalry, of which he became colonel. Was active during the war and was made major-general in 1862. He was a member of Congress 1867-71, when he was chosen governor of Wisconsin. Died May 14, 1882.

**Washburne**, ELIHU BENJAMIN, statesman, born at Livermore, Maine, in 1816. He practiced law at Galena, Illinois, was elected to Congress in 1852, and remained there until 1869, when President Grant appointed him Secretary of State, and soon after Minister to France. During the Franco-German war he made the American legation a place of refuge for the Germans and other foreigners who would not leave Paris. For this he received honors from the German emperor. He published in 1887 *Recollections of a Minister to France*, and died in that year.

**Washing-machine**, a machine for washing clothes. A great number of machines have been contrived, the most general feature of them being that the clothes are agitated by artificial means in a vessel or trough containing the cleansing agents. There are many kinds of domestic washing-machines, one of the simplest being the dolly, a wooden disk with three or four projecting arms placed horizontally on an upright shaft in a tub. The shaft is fixed in a slip at the bottom and passes through a cross-piece at the top, and is turned either by a cross handle or by simple spur gear. The arms are moved around backward and forward among the clothes. Nearly all domestic washing-machines consist of a tub or cistern of a form suited to the character of the moving parts of the apparatus. Some operate by squeezing the clothes between grooved rollers, others by rubbing them between corrugated surfaces by a rocking or up and down movement, others have a combined squeezing and rubbing action, while still others are constructed on the principle of the old dash wheel used in dye and bleaching works. Some recent washing-machines, which have come into considerable use, consist of a ribbed drum or cage formed of tubes fixed into the end of the drum. The clothes are placed inside the cage, which is kept revolving in opposite ways by turns inside a thin metal case, the hot, soapy water circulating freely between the tubes.

**Washington** (wash'ing-ton), one of the Pacific States of the American Union, in the extreme northwest section, being bounded N. by British Columbia, W. by the Pacific Ocean, E. by Idaho, and S. by Oregon; area, 69,127 sq. miles. Prior to 1861 it also comprised the present States of Idaho and Montana. It is drained by the Columbia and its tributaries, and the elevated Cascade Mountain range runs through the State from N. to S., about 100 miles from the Pacific coast, dividing it into two distinct parts. The western part is a rich timber country with heavy rainfall and many highly fertile valleys, in which hops, fruits of all kinds, and vegetables of immense size are grown. The eastern part is well adapted for the growth of all kinds of grain, and other farm products, some sections being admirably suited for wheat raising. Cattle and live stock of all kinds do well, the abundance of grasses and lightness of the snowfall permitting them to graze through the winter season. The State is very rich in natural resources and advantages, and the coast district enjoys

a climate similar to that of Britain. Coal, iron ore and timber are abundant, and rich deposits of the precious metals are worked in the N. E. The Columbia River and Puget Sound swarm with salmon, which are tinned and exported. There are magnificent natural harbors on the Pacific. Puget Sound, which penetrates deeply into the State, is a vast harbor, with 1594 miles of shore line, and Seattle, its principal port, is becoming the metropolis of the northwest coast. Olympia, at the head of Puget Sound, is the capital. Shipbuilding is an important industry, and other manufactures are growing rapidly. More than 20,000,000 acres of the State are in timber, many of the trees being of immense size. Pop. (1910) 1,141,990.

**Washington**, capital of the United States, is in the District of Columbia, at the confluence of the Anacostia with the Potomac, here navigable by ships of the largest class; 230 miles by rail from New York, 40 miles S. W. of Baltimore. The site was selected in 1790 by Washington himself, and the plan of the city was drawn up on a most magnificent scale. The streets (70-120 feet wide) cross each other at right angles and are intersected diagonally by avenues (120-180 feet wide), which bear the names of States of the Union. A large number of these spacious thoroughfares are planted with fine shade trees, and are well paved and well kept. Numerous open spaces, large and small, some of them beautifully laid out, are distributed throughout the vast area occupied by the city. First among the numerous public buildings ranks the Capitol, an architecturally beautiful edifice on a hill above the Potomac, in the midst of a highly ornamented park of 50 acres. It consists of a central building of freestone, two wings (each with a dome) of white marble, and a lofty central dome of iron, surmounted by a statue of Liberty (total height, 307½ feet). The Rotunda, in the center of the main building, is a magnificent hall, adorned with bas-reliefs and paintings, and a colossal statue of George Washington. The entire structure covers 3½ acres, and cost over \$13,000,000. It accommodates the two Houses of Congress, the U. S. Supreme Court, and until recently the Capitol also housed the extensive library of Congress, now transferred to a magnificent Congressional Library building, an extensive and imposing edifice in the Italian Renaissance style of architecture, erected in 1888-97, at a cost of \$6,180,000. It measures 470 feet in length and 340 in width, its entrance



ball and stairways being unsurpassed in beauty of design and decoration. This ornate edifice contains at the present time nearly 2,000,000 books, pamphlets, manuscripts, maps, etc. The collection is rich in history, political science, official documents and Americana (including important files of newspapers and manuscripts of colonial and later times). Northwestward from the Capitol extends Pennsylvania avenue, 160 feet wide and the most notable of the city's highways, its main drive extending to the Treasury building, an immense edifice in the Grecian style of architecture, near which is the president's house, or executive mansion, commonly known as the White House, built of free stone and surrounded by extensive grounds. It is handsomely furnished and is a place of interest to all visitors to the national capital. West of the White House is a large and handsome building accommodating three of the governmental departments, the State, the War and the Navy, it being 567 feet in length and 342 in width. Other important public edifices are the Land Office (formerly the General Post Office), of white marble; the Patent Office, with a great Doric portico; the building of the Smithsonian Institution (devoted to scientific research and the promotion of useful knowledge), of red sandstone, in the Byzantine style, with picturesque towers; the building of the Department of Agriculture; the Pension Office, Post Office and various others. An interesting edifice among them is the new structure of the United States National Museum, in which is housed an enormous collection of economic products, examples of art and manufacture, and objects of natural history, the latter including the extensive series of African animals contributed by ex-President Roosevelt as a result of his African hunting trip. Other institutions are the Army Medical Museum, with valuable pathological collections, the botanical garden and the zoological gardens, situated in the Rock Creek district. The United States Naval Observatory, of white marble, occupies a retired and commanding site on Georgetown Heights. Other interesting institutions are the Corcoran Gallery of Art, a notable collection of paintings and statuary, housed in a handsome new marble building; the Carnegie Institution, founded in 1902, 'to encourage investigation, research and discovery,' with an endowment by Andrew Carnegie of \$10,000,000; the Washington Academy of Sciences, National Geographic Society, Biological Society, Anthropological Society, International Bureau of the Ameri-

can Republics, etc.

The National Soldiers' Home, two miles above the city, founded in 1831, has 523 acres of improved park and forest and serves as an attractive rural resort and free driving park, in addition to its function of providing a comfortable home for veterans and invalids of the United States Army. The National Asylum for the Insane, with nearly 1000 inmates (either of the Army or Navy, or from the District of Columbia), is situated on the heights above Anacostia, an eastern branch of the Potomac. Among the institutions of learning in the city are the George Washington (formerly the Columbian) University, Georgetown University (Roman Catholic), Howard University (for colored students), Catholic University of America, founded in 1887, American University (Methodist), and the National Deaf Mute College. Monuments are numerous, chief among them being the national Washington Monument, near the Potomac, a towering obelisk of white marble 555½ feet high, built at a cost of \$1,230,000, and containing commemorative slabs from most of the States. Bronze statues, equestrian and others, are very numerous, there being hardly a public square or civic circle without its monument. The city, with its suburb of Georgetown (now West Washington), and the rural portion of the District, covers an area of about 70 square miles. In addition to its many small parks and the zoological park of 167 acres, it possesses Rock Creek Park of over 1500 acres, extending for miles along the picturesque banks of the stream, amid forests of great natural beauty. Washington is abundantly supplied with pure water by a conduit 15 miles long, from the Falls of the Potomac. Opposite, in Virginia, is Arlington, with its beautiful national cemetery, and about 15 miles below the city is Mount Vernon, formerly the home of Washington. Pop. 331,069. (See *Columbia, District of*.)

**Washington**, a city, county seat of Daviess Co., Indiana, 19 miles E. of Vincennes. It is in a farming and coal mining region, and produces canned goods, lumber, furniture and iron products, cooperage stock, underwear, etc. Pop. 7854.

**Washington**, a town, county seat of Carolina, on the Tar River, 33 miles N. of Newbern. It has foundries and manufactures of lumber, knit goods, boats, bugles, flour, oil, etc. Pop. 6211.

**Washington**, county seat of a county of the same name in Pennsylvania, 25 miles S. W. of Pitts-

burgh. It is in a coal and oil region, and has extensive manufactures of tin plate, iron, steel, glass, etc. Here is Washington and Jefferson College and other collegiate institutions. Pop. 25,000.

**Washington,** BOOKER TALIAFERRO, educator, born of African parentage at Hale's Ford, Virginia, about 1859. The son of a slave, he succeeded in obtaining entry at Hampton Institute, was graduated in 1875 and taught there until put in charge of the Tuskegee Normal and Industrial Institute, Alabama, in 1881. This, under his care, has made a remarkable progress in industrial education, and has done much toward solving the race problem between the blacks and whites, while its president is regarded as one of the most remarkable men of the age. He has published *Sowing and Reaping, Up from Slavery, Future of the American Negro* and various other works. Died in 1915.

**Washington,** BUSHROD, judge, was born in Westmoreland County, Virginia, in 1759; died in 1829. He was a nephew of George Washington, and a member of the Virginia Convention which ratified the Constitution of the United States in 1788. In 1798 he was appointed a justice of the United States Supreme Court. The estate of Mount Vernon was left to him in the will of his illustrious uncle.

**Washington,** GEORGE, the hero of American independence, and the 'father of his country,' as he has long been popularly called, was born at Bridges Creek, Westmoreland County, Virginia, February 22, 1732. He came of good English stock, being the grandson of John Washington, who emigrated in 1657 from Northamptonshire, England, where the Washington family had been one of excellent standing. In Virginia John Washington and his brother Lawrence brought a large tract of land on the western side of the Potomac and about fifty miles above its mouth. Here John married, acquired wealth and position, and left the paternal homestead to his second son Augustine, who was the father of George Washington by his second wife, Mary Ball. George was but ten years of age when his father died, six children in all being left to the mother's care. Little or nothing is known of his childhood, though various problematical stories have gathered about his name, some of them, possibly, based upon fact. He appears to have been a strong, healthy boy, quiet and thoughtful beyond his age, not brilliant as a student, but with the innate qualities of a man of action. In 1747 he went to Mount

Vernon, then the residence of his half-brother Lawrence, who had inherited the greater part of the estate. This gave him access to books and to better teachers and brought him in contact with Lord Fairfax, a relative of Lawrence's wife, who possessed a large tract of land in the Shenandoah Valley. The boy, who had been dissuaded by his mother from entering the British navy, had acquired some knowledge of mathematics and surveying, and was employed by Lord Fairfax in 1747 to survey his valley property. He alternated surveying with hunting, spent the winters at Mount Vernon, and in 1751 accompanied his brother, stricken with consumption, to Barbadoes. Here Lawrence died in 1752, leaving George guardian of his only daughter and heir to his estate if she should die without issue. Lawrence had already given his younger brother instruction in the use of arms and the art of war, a training soon to become useful. He was appointed adjutant-general in the Virginia militia at the age of nineteen, and in 1752, when twenty-one years of age, was chosen for a service of great importance. The French had built some forts on territory near Lake Erie claimed by Virginia, and Governor Dinwiddie sent a messenger to warn them off. The messenger returned in fright before finishing his work and the governor now chose Washington, possibly at Lord Fairfax's instigation, as a strong and capable young man, familiar with the ways of the wilderness and fitted for the duty. There was no turning back by the new messenger. He made a long and perilous journey through the wilderness and over the mountains to the French forts south of the Ohio, gave the warning required, and took occasion to study the Indian situation and gain a definite idea of the designs of the French. On his return, which was accomplished at great risk of life, he suggested to the governor the building of a fort at the point where the Monongahela and Alleghany rivers unite to form the Ohio. In the following spring the French came down the Alleghany, drove away the British workmen, and completed the fort for themselves. Washington's military career now began. He was made second in command of a force sent from Virginia to deal with the French, but the death of the colonel threw the command into his hands and he performed his responsible task with great skill and judgment. Outnumbered by the French, he built a small woodland fort where he defended himself with soldierly resolution, surrendering only when defense had become hopeless and favorable

terms were offered.

Orders being sent from England that any English field officer should be superior in command to any colonial officer, even one of higher rank, Washington at once resigned; but in 1755 he consented to accompany Braddock as a volunteer on his unfortunate expedition. The affair would have ended very differently if the opinionated Englishman had listened to the advice of his Virginian aide-de-camp, but, as it proved, Washington was almost the only officer who refused unharmed from the disastrous expedition. He was now placed at the head of the Virginia forces, and in 1756 visited Boston and had an interview with General Shirley, the commander-in-chief, with whom he satisfactorily settled the question of rank. During the remainder of the war he was occupied on the frontier, where the Indians were attacking the settlers, and in 1758 accompanied General Forbes in the second expedition against Fort Duquesne. He commanded the part of the army which occupied that fort in November, 1758, and by putting an end to the operations of the French in that quarter, settled the question of ownership of the Ohio region. This ended his military career for that period. Elected in 1758 to the House of Burgesses of Virginia, he was on his first appearance highly complimented by the speaker for his military service. Washington rose to reply, but in such a state of nervousness, that he could not speak a word. 'Sit down, Mr. Washington,' said the speaker; 'Your modesty equals your valor, and that surpasses the power of any language I possess.' In 1759 he married Martha Custis, a rich young widow, and settled down to the life of a farmer at Mount Vernon, which had fallen to him through the death of his niece. This, added to the estate of his wife, made him one of the richest men in the land, his estate growing through purchase until it reached a total of 8000 acres. He managed it himself, kept his own books, and handled all his affairs with method and judgment while winning a reputation for mercantile integrity. For years he remained a member of the House of Burgesses, but took no prominent part in its debates, being ever more a man of action than an orator. In 1773 he came again prominently into public affairs as a member of the convention that met at Williamsburg and asserted the right of the colonies to self-government, declaring that taxation and representation could not justly be separated. Although Colonel Washington was known as "the silent man" on the floor of

the Virginia House of Burgesses, his conversation and private correspondence teemed with utterances scarcely less fiery than the illustrious words of Patrick Henry. While the Boston Port Bill was under discussion the wealthy Potomac planter listened to the accounts of British oppression of the people of that city because of the brave stand they had taken in defense of their own rights. With his face aflame with righteous wrath Washington rose, hesitated a moment to control his emotion, then said calmly: "I will raise a thousand men, subside them at my own expense, and march them to the relief of Boston."

This convention chose him with Patrick Henry and four others to represent Virginia in the Continental Congress which met at Philadelphia in September, 1774. At the end of the first session, when Patrick Henry was asked whom he considered the greatest man in the Congress, he replied, 'If you speak of solid information and sound judgment, Colonel Washington is unquestionably the greatest man on that floor.'

Washington and his fellow patriots had not aimed at separation from the mother-country, but simply at justice and fair treatment, but after the affair at Lexington, April 19, 1775, nothing remained but to resist British tyranny by force of arms, and on the 15th of June Washington was unanimously elected by Congress the commander-in-chief of the American forces. He had continued a member of Congress, but now left it to take command of the forces then besieging Boston. The battle of Bunker Hill had taken place, with much credit to the provincials for bravery, but Washington found the militia a disorganized mass, more an armed mob of patriots than an army. It took him some time to understand this half disciplined body of New Englanders, and for them to understand him, but he soon brought order out of confusion and won the love and respect of his men. Munitions of war were greatly lacking and Congress was nearly destitute of money or credit and sadly unfit to deal with the situation. Under these circumstances it is a matter of great credit to Washington that in nine months' time he forced the British to evacuate Boston with their army of veterans and surrender to him the first seat of the war.

We must deal briefly with the remaining history of the war, the events of which are noted under UNITED STATES. The defeat of the Americans on Long Island led to the loss of New York and the retreat of Washington across New

Jersey, followed by the brilliant victory at Trenton on Christmas night, 1776, and the subsequent victory at Princeton, on January 3, 1777. These successes greatly revived the spirits of the Americans, which had been much depressed by the preceding ill fortune, but Washington had still many difficulties to contend with in the lack of recruits, the want of money and war materials, and the superiority of his foes in all military requisites. Their one lack lay in their commanders, among whom Cornwallis was the only able soldier. In military genius none of them compared with Washington, and he did not fail to take advantage of their weakness and inefficiency. The next movements of the enemy were Burgoyne's disastrous march southward from Canada and Howe's expedition against Philadelphia by way of Chesapeake Bay. Washington's army was defeated by superior forces at the Brandywine, the British occupied Philadelphia, and their alert opponent soon after attacked them at Germantown, losing the battle mainly through the confusion caused by a fog. But the loss in this quarter was recompensed by the defeat and capture of Burgoyne's army at Saratoga, and Washington's army went into winter quarters at Valley Forge with reviving hope from the cheering news from the North. The winter was a severe one and the men at Valley Forge suffered greatly from want of clothing and other necessities. The spirit of their great leader, however, remained unbroken, and when the tidings of the alliance with France and the danger of the Delaware being closed by a French fleet caused the British to evacuate Philadelphia, Washington was quickly on their track, attacked them at Monmouth, and probably would have given them a crushing defeat but for the misconduct of one of his subordinates. The following winter was passed by the American army at Morristown, New Jersey, and in 1780 the war was transferred to the South, the weakness and destitution of Washington's army obliging him to remain on the defensive, though closely watching the movements of the enemy in and about New York. The climax came in 1781, when Lord Cornwallis injudiciously moved his army to Yorktown, Virginia, fortified that place and awaited reinforcements from New York. The alert American commander took instant advantage of the opportunity. He had been reinforced by a French army, a French fleet had entered Chesapeake Bay and cut off Cornwallis' communication with New York, and Washington at once set out on a

hasty southward march, besieged Yorktown with a force of about 15,000 men, and on October 19 forced Cornwallis to surrender his forts and his force of 7000 veterans. It was the most important event of the war, since it brought it to a rapid close, the discouraged British government giving up the struggle.

Throughout this contest, Washington was obviously the strongest and ablest man in the field, quiet, energetic, capable, rarely losing his temper, quick to take advantage of every opportunity, resolute in endurance, bearing the attacks of his enemies, the lack of resources, the continued difficulties which surrounded him, with the spirit of a hero and the composure of a philosopher, and triumphing in the end as such men must triumph, through an innate force of character that never yields to defeat. Washington has since been regarded as a military genius of a high type, not a dazzling meteor of war like Alexander or Napoleon, but a leader capable of obtaining great results by the wise handling of slender means. A patriot in grain, whose only desire was the independence of his country, he vigorously rejected the demand of his followers that he should make himself a king, and retired to his home at Mount Vernon, taking up with composure and relief his old pursuit of agriculture.

He was not permitted to remain in seclusion. Confusion and inefficiency reigned supreme in governmental relations and the necessity of a stronger government became daily more manifest. In the events that followed, leading to the calling of the Constitutional Convention of 1787, Washington took an active part, and he was chosen president of the convention which, in the short space of a few months, devised the admirable Constitution which has since formed the basis of government of the United States. Unanimously elected the first president of the new Union, he accepted it, as he said, 'with more diffidence and reluctance than ever I experienced before in my life.' The mental characteristics which make a man a great soldier are usually not those that fit him to be a constitutional governor, but Washington's judgment, good sense and moderation adapted him very well to his new duties, and he dealt with the difficulties that surrounded him in his new position with a wisdom that few of his associates manifested. Reflected in 1792, he reluctantly resumed the duties which removed him from the private life that appealed more to his disposition, especially in view of the fact that he was



assailed by political foes as virulently as he had formerly been by military foes. On the 7th of December, 1798, he for the last time met the Houses of Congress, and made to them a dignified Farewell Address, so full of wise advice that it has since been regarded as one of the great state papers of the country. Declining a third term in office, he retired again to Mount Vernon, but in 1798 his services were once more demanded by his countrymen. A naval conflict had arisen between France and the United States, there was danger of a declaration of war, and a small army was raised, of which Washington was appointed commander-in-chief. Fortunately no war followed and the home life of the venerated chief was not again disturbed. He died after a short illness, due to acute laryngitis, at Mount Vernon, on December 14, 1799.

History presents us with few characters so worthy of our admiration and esteem as George Washington. His mental gifts were not of the dazzling kind nor were his talents of the brilliant order, yet he possessed the essentials of wisdom in a high degree, his powers and traits of character being so finely proportioned and adjusted and so firmly controlled by a heroic will and high moral faculty, as to enable him to withstand alike disaster and obloquy, to reject the promptings of ambition, and to pursue the even tenor of his way unmoved by but one aspiration, to promote the happiness, prosperity and good government of his country. The equipoise and harmony of his powers, his keen foresight and rare judgment, led to that wise discrimination which is the outcome alike of well-developed mental and moral faculties. Washington merited the noble title of 'Father of his Country.'

### Washington Court House,

a city, county seat of Fayette Co., Ohio, on Paint Creek, 75 miles E. N. E. of Cincinnati. It has a poultry packing house, and manufactures of stoves, furniture, shoes, fertilizers, etc. Pop. 8000.

### Washington and Lee University,

the outcome of the Augusta Academy, Augusta Co., Virginia, founded in 1749. Becoming the Washington Academy, it was removed in 1803 to Lexington, Va. Before the Civil war 'Stonewall' Jackson was one of its professors. In 1865 Gen. Robert E. Lee became its president, and after his death, in 1870, it was given its present name. In 1900 it had 42 instructors and about 600 pupils.

### Washington Monument,

a magnificent monument erected at Washington, D. C. by the American people in honor of George Washington. It stands in the Mall, a public park extending to the Potomac, and is 555 feet high and 55 feet, 1 1/2 inches square at base, tapering upward to 34 feet, 5 1/2 inches square. It is built of blocks of marble two feet thick, and has a stairway and an elevator in its interior, the States having contributed richly carved stones for the decoration of its interior walls. The corner-stone was laid in 1848 and the work finished Dec. 6, 1884.

**Washita** (wosh'i-ta), a river of Arkansas and Louisiana, an affluent of Red River; length, 600 miles; valuable for navigation.

**Wasp** (wosp), the common name applied to insects of various genera belonging chiefly to the family Vespidae, order Hymenoptera. Those best known belong to the genus *Vespa*, and live in societies, composed of females, males, and neuters or workers. The females and neuters are armed with an extremely powerful and venomous sting, especially so in the Hornet.

### Waste Products, Utilization of.

In the process of manufacture much substance is useless for the purpose intended and vast quantities of material have in the past been thrown aside as 'waste.' Within later times much of this material has been found useful for other purposes, being at times more valuable than the original product. This utilization of waste has proceeded to such an extent that comparatively little material is now discarded as useless. Thus 'waste silk' is now valuable, though it retains this name. Rags of all kinds are now so much in demand that no one speaks of them as waste. Much heat was wasted in the past which is now made useful. The vast heaps of waste coal dust at the mines are now being converted into burnable briquets and utilized in other ways, and the refuse of old smelting works is being made to yield metal by improved processes. The science of chemistry has done much in utilizing refuse, coal tar, for instance, now yielding a multitude of useful products. The saving effected by this utilization is too varied to be further particularized, and the saving amounts to vast sums.

**Watch** (woch), a well-known pocket instrument for measuring time, invented at Nürnberg in the end of the fifteenth century. The wheels in watches

are urged on by the force of a spiral spring, generally of steel, contained in a cylindrical barrel or box, to which one end of a chain is fixed, the chain also making several turns round the barrel outside; the other end of the chain is fixed to the bottom of a cone with a spiral groove cut on it, known as the fusee (which see). On the bottom of the fusee the first or great wheel is put. The barrel-arbor is so fixed in the frame that it cannot turn when the fusee is winding up. The inner end of the spring hooks on to the barrel-arbor, the outer to the inside of the barrel. If the fusee is turned round in the proper direction it will take on the chain, and consequently take it off from the barrel. This coils up the spring; and if the fusee and great wheel are left to themselves, the force exerted by the spring in the barrel to unroll itself will make the barrel turn in a contrary direction to that by which it was bent up. This force communicating itself to the wheels will set them in motion. Their time of continuing in motion will depend on the number of turns of the spiral groove on the fusee, the number of teeth in the first or great wheel, and on the number of leaves in the pinion upon which the great wheel acts, etc. The necessity of keeping the watch from 'running down,' and of making the wheels move with uniform motion, gave rise to the use of the balance-wheel and hair-spring (taking the place of the pendulum of a clock) and the variously and ingeniously designed mechanism, the escapement (which see). On the perfection of the escapement the time-keeping qualities of a watch largely depend. Of the many varieties invented and perfected, watches are now almost exclusively provided with either the horizontal, the lever, the chronometer or the detached escapement. (See *Chronometer*.) In all but the best class of modern watches the fusee has been abandoned in favor of the going-barrel. The latter offers better facilities for keyless work, and keyless watches are manufactured in great quantities. The going-barrel watch can also be produced at a cheaper rate, and for ordinary purposes is amply reliable. The main-spring in this class of watch is very long, but only a few coils are brought into action. The great wheel is attached to the going-barrel itself, thus the spring force is directly transmitted to the escapement. The invention of the spiral hair-spring by Dr. Hooke (about 1658), the scientific application of its properties since, and the intelligent use

of compensation (which see) in the balance, have combined to give to the best chronometers of to-day a uniformity of rate which it is probably impossible to excel. A number of watches for special performances are also constructed. Such are the calendar watch, the repeater, the chronograph (which see), etc. Large quantities of the cheaper class of watches are now made by machinery in the United States, Switzerland, France, Germany, and England. They are generally produced on the interchangeable system, that is, if any part of a watch has become unfit for service, it can be cheaply replaced by an exact duplicate, the labor of the watch repairer thus becoming easy and expeditious.

**Watch** (nautical), a certain part of the officers and crew of a vessel who together work her for an allotted time, the time being also called a watch. The time called a watch is four hours, the reckoning beginning at noon or midnight. Between 4 and 8 P.M. the time is divided into two short or *dog-watches*, in order to prevent the constant recurrence of the same portion of the crew keeping the watch during the same hours.

**Water** (wa'ter), a liquid which covers the greater part of the earth's surface. It was classified among the elements until the close of the eighteenth century, when Lavoisier, profiting by the experiments of Cavendish, proved it to be a compound of hydrogen and oxygen, in the proportion of two volumes of the former gas to one volume of the latter; or by weight 2 parts of hydrogen to 16 parts of oxygen; hence its chemical formula is  $H_2O$ . Pure water is a colorless, tasteless, inodorous liquid; a powerful refractor of light; a bad conductor of heat and electricity; it is very slightly compressible, its absolute diminution for a pressure of one atmosphere being only about 51.3 millionths of its bulk. Although water is colorless in small quantities, it is blue like the atmosphere when viewed in mass. It takes a solid form, that of ice or snow, at 32° F. (0° C.), and all lower temperatures; and it takes the form of vapor or steam at 212° F. (100° C.) under a pressure of 29.9 ins. of mercury, and retains that form at all higher temperatures. Under ordinary conditions water possesses the liquid form only at temperatures lying between 32° and 212°. It is, however, possible to cool water very considerably below 32° F. and yet maintain it in the liquid form. Water may also be heated, under

pressure, many degrees above  $212^{\circ}$  F. without passing into the state of steam. The specific gravity of water is 1 at  $39.2^{\circ}$  F., being the unit to which the specific gravities of all solids and liquids are referred, as a convenient standard, on account of the facility with which it is obtained in a pure state; one cubic inch of water at  $62^{\circ}$  F. and 29.9 inches barometrical pressure, weighs 252.458



Tank and Pump House.

grains. Distilled water is 815 times heavier than atmospheric air. Water is at its greatest density at  $39.2^{\circ}$  F. ( $= 4^{\circ}$  C.), and in this respect it presents a singular exception to the general law of expansion by heat. If water at  $39.2^{\circ}$  F. be cooled, it expands as it cools till reduced to  $32^{\circ}$ , when it solidifies; and if water at  $39.2^{\circ}$  F. be heated, it expands as the temperature increases in accordance with the general law. In

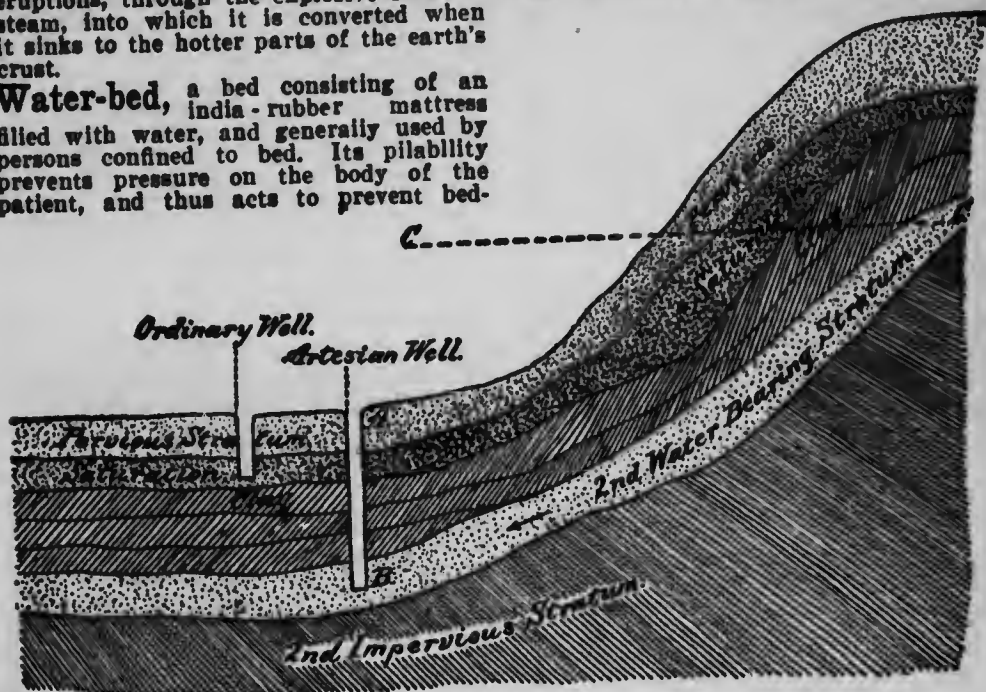
a chemical point of view water exhibits in itself neither acid nor basic properties: but it combines with both acids and bases, forming *hydrates*; it also combines with neutral salts. Water also enters, as a liquid, into a peculiar kind of combination with the greater number of all known substances. Of all liquids water is the most powerful and general solvent, and on this important property its chemical use depends. Without water not only the operations of the chemist but the processes of animal and vegetable life would come to a stand. In consequence of the great solvent power of water it is never found pure in nature. Even in rain-water, which is the purest, there are always traces of carbonic acid, ammonia, and sea-salt. Where the rain-water has filtered through rocks and soils, and reappears as spring or river water, it is always more or less charged with salts derived from the earth, such as sea-salt, gypsum, and chalk. When the proportion of these is small the water is called *soft*, when larger it is called *hard water*. The former dissolves soap better, and is therefore preferred for washing; the latter is often pleasanter to drink. Some springs contain a considerable quantity of foreign ingredients, which impart to the water particular properties. They are known under the general term *mineral waters*, and according to the predominating constituents held in solution are divided into carbonated waters (alkaline, magnesian, calcareous, and chalybeate), sulphatic waters (containing chiefly sulphates), chlorinated waters (containing chiefly chlorides), and sulphuretted waters (containing large quantities of sulphides or of sulphuretted hydrogen). The only way to obtain perfectly pure water is to distil it, but matter simply held in suspension may be got rid of by suitable filtration. The great reservoirs of water on the globe are the oceans, seas, and lakes, which cover more than three-fifths of its surface, and from which it is raised by evaporation, and, uniting with the air in the state of vapor, is wafted over the earth ready to be precipitated in the form of rain, snow, or hail, and make its way by river channels to the sea. Water, like air, is absolutely necessary to life, and healthy human life requires that it should be free from contamination, hence an ample and pure water supply is considered as one of the first laws of sanitation. In addition to the abundant surface pressure of water, it penetrates the rock crust of the earth to considerable depths and by its sol-

## Water-bed

vent powers produces important effects. It can be reached by boring in some of the most arid parts of the earth, and rising to the surface as artesian waters, brings fertility to desert regions. It is supposed also to be the cause of volcanic eruptions, through the explosive force of steam, into which it is converted when it sinks to the hotter parts of the earth's crust.

**Water-bed**, a bed consisting of an india-rubber mattress filled with water, and generally used by persons confined to bed. Its pilability prevents pressure on the body of the patient, and thus acts to prevent bed-

the Waterbury watches and clocks, which are known throughout the world. Electro-plate is also made and there are numerous rolling mills and foundries and extensive manufactures of pins, buttons, pearl goods, lamps and many other products. The city contains a



Geological Drainage of Water into Wells.

sore. Water-beds, however, have been largely superseded by the more convenient and healthier air-beds (which see).

**Water-beetle**, the name given to various species of beetles, having legs adapted for swimming, the two hinder pairs being flattened and fringed with hairs. They are exceedingly voracious both in the adult and larval state, even devouring young fishes.

**Water-boatman** (*Notonecta glauca*). See *Boat-*

*fly*.

**Waterbury** (-ber-i), a city of New Haven Co., Connecticut, in a valley on the Naugatuck River, 77 miles northeast of New York. It is an important railway junction and manufacturing town. Brass and brass goods are the staple products, the largest part of the output of the country being produced here. It is also the seat of

number of benevolent and academic institutions. Pop. 73,141.

**Water-chestnut**. See *Trapa*.

**Water-clock**. See *Clepsydra*.

**Water-colors**, used in painting are colors carefully ground up with water and isinglass or other mucilage instead of oil. Water-colors are often prepared in the form of small cakes dried hard, which can be rubbed on a moistened palette when wanted. Moist water-colors in a semi-fluid state are also used; they are generally kept in metal tubes, which preserve them from drying up.

**Water-cress** (*Nasturtium officinale*), a cruciferous plant distributed throughout Europe, Western Asia, North Africa, introduced into North America and certain British colonies, and choking some rivers of New Zealand, where the stem grows as thick as the



## Water-cure

wrist. It grows on the margin of clear streams, or even partly immersed in the water. It has antiscorbutic properties, and is cultivated near many large towns to be used as salad, or otherwise.

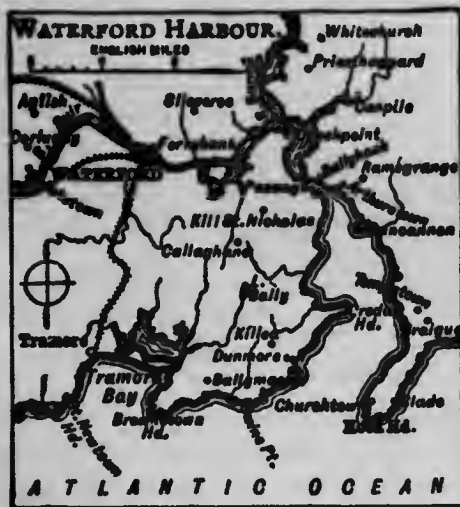
**Water-cure.** See *Hydropathy*.

**Water-dog**, a variety of dog having a curly coat, long ears, a rounded head, and webbed toes. It seems to be allied to the poodle, but differs from the latter in its firmer set and stouter body, and in its larger size. The water-dog is highly intelligent, but less so than the retriever. It is usually of a grayish white varied with black and brown.

**Waterfall.** See *Cataract*.

**Water-flea**, a name given to various genera of small swimming crustaceans belonging to the class Eptamostraca. Among the commonest are *Oypria* and *Cyclops* (which see). One very familiar water-flea is the *Daphnia pulex*. See *Daphnia*.

**Waterford** (wa'ter-furd), a city and seaport in the southeast of Ireland, capital of the county of same name, 97 miles s. s. w. of Dublin, on the right bank of the Suir, which soon after



joins the Barrow, the combined stream reaching the sea by the fine estuary known as Waterford Harbor. It stretches along the Suir for about 1 mile, has convenient quay accommodation for large vessels, and commands a considerable shipping trade. The bulk of the manufactures of Waterford county are carried on at Waterford and its vicinity, and most of the exports pass

## Water-hog

through Waterford Harbor. There are large bacon-curing establishments, breweries, saw and flour mills, etc. The principal buildings are the Episcopal and Roman Catholic cathedrals. Pop. 26,760.—The county belongs to the province of Munster. The area is 721 sq. miles. The coast is in general bold and rocky, and besides the harbors of Waterford and Youghal at its east and west extremities respectively, has the deep indentations of Dungarvan Harbor and Tramore Bay. The interior is largely rugged and mountainous. The principal rivers are the Suir and the Blackwater. Dairying is the chief resource of the rural population. Slate, sandstone, and marble are quarried, and there is a large export of potter's clay. The fisheries are valuable. Pop. 87,187.

**Water-gas**, a gas prepared by passing incandescent carbon. It is used for heating and welding purposes in metallurgy, and also for illumination, especially in the United States. Numerous deaths from poisoning have resulted from its use, however, this being largely due to its want of smell. Burnt in the usual way it gives a blue flame, but by suspending a comb of thin magnesium rods in the flame the filaments are quickly heated to a white heat, producing a bright glow light of high illuminating power, but which is neither unpleasant to the eye nor prejudicial to the sight. Mantels made of several infusible metals are now in common use and give a brilliant light with a comparatively small consumption of gas.

**Water-glass**, a substance which, when solid, resembles glass, but is slowly soluble in boiling water, although it remains unaffected by ordinary atmospheric changes. It consists of the soluble silicates of potash or soda, or a mixture of both. It is prepared either by breaking down and calcining flint nodules, the fragments or particles of which are then added to a solution of caustic potash or soda, whereupon the whole is exposed for a time to intense heat, or by fusing the constituents together in a solid state, and afterwards reducing them to a viscid condition. Among the purposes to which water-glass is applied are painting on glass, coating stone, wood and other materials to render them waterproof, glazing scenery and paintings, fixing wall-paintings, etc.

**Water-hen.** See *Gallinule*.

**Water-hog.** See *Capybara*.

**Waterhouse** (wa'ter-hous), **ALFRED**, architect, was born at Liverpool in 1830; studied architecture in Manchester, and designed various important buildings in that city and London. He also partly reconstructed Balliol College, Oxford and Caius and Pembroke, Cambridge. He was elected a royal academician in 1885.

**Waterhouse**, **JOHN WILLIAM**, an English painter, born about 1840, became a member of the Royal Academy in 1895. Among his paintings are *Mariamne*, *Ulysses and the Sirens* and *The Lady of Shalott*.

**Water-lily.** See *Nymphaeaceae*, *Lotus*, *Nelumbium*, *Victoria Regia*.

**Waterloo** (wa-ter-lō'), a village of Belgium, nearly 10 miles S. E. of Brussels. It is famous for the memorable battle which was fought here on June 18, 1815, and which finally shattered the power of Napoleon. The Prussian defeat at Ligny, and his own unsuccessful engagement at Quatre-Bras on the 16th of June, caused Wellington to retire towards Waterloo, while Blücher concentrated his troops at Wavre, about 10 miles distant. The whole British position formed a sort of curve, the center of which was nearest to the enemy. The French forces occupied a series of heights opposite, there being a valley of no great depth, and from 500 to 800 yards in breadth, between them. Each army probably consisted of about 70,000 men. The object of Napoleon was to defeat the British, or force them to retreat, before the Prussians, who, he knew, were coming up, could arrive in the field; while that of the Duke of Wellington was to maintain his ground till he could be joined by his allies, when it might be in his power to become the assailant. The French began the battle about noon, and it continued with great fury till evening, when the appearance on the scene of the Prussians caused Bonaparte to redouble his efforts. His imperial guards, which had been kept in reserve, made a final attempt. Wellington's line, however, charged them at the point of the bayonet, and the imperial guard began a retreat, in which they were imitated by the whole French army. The British left the pursuit to the Prussians. The whole French army was dispersed and disabled, and their artillery, baggage, etc., fell into the hands of the conquerors. Their loss in killed, wounded, and prisoners amounted to between 40,000 and 50,000. The allied loss amounted to 23,000 killed and wounded.

**Waterloo**, a city, county seat of Cedar River, 100 miles N. E. of Des Moines. It is the trade center of a wide farming and grazing region, and has railroad repair shops, canning and packing factories, and manufactures of gasoline engines, automobiles, farming and creamery implements, etc. Pop. 35,000.

**Waterloo**, **STANLEY**, author, born in 1846. He became a journalist and editor of various papers, the latest the *Washington Critic and Capital*. His works include *A Man and a Woman*, *Armageddon*, *The Wolf's Long Howl*, *The Seekers*, *These Are My Jewels*, *The Cassowary*, etc.

**Watermelon**, a favorite fruit, cultivated largely in the United States and many other countries for its cool and refreshing juice and palatable pulp. It often grows to a very large size, resembling the pumpkin in shape. It is the melon of Scripture.

**Water-ousel**, or **DIPPER**. See *Dipper*.

**Water-pitcher**, the popular name of plants of the order *Sarraceniacae*, the leaves of which somewhat resemble pitchers or trumpets in general form.

**Water-plantain**, the common name of plants of the genus *Alisma*, nat. order *Alismaceae*. One species, *A. Plantago* (great water-plantain), is a common wild plant in wet ditches and by river sides.

**Water Power**, a general phrase applied to the various means by which the energy of moving water may be utilized. To make such a source of energy effectual it is necessary and sufficient to have the water falling from a higher to a lower level. Such conditions more or less favorable exist in all streams, though in many cases the fall is so slight and the velocity of the water so small that practically no useful work can be obtained. Of the various machines by which the necessary transformation is usefully effected, the most common are what are known as water-wheels, in their several forms of turbines, undershot wheels, breast-wheels, and overshot wheels (see these terms). Recently the application of water-power through the aid of turbines to the development of electricity and its secondary application in this form to power purposes at great distances from its source, together with the growing cost of coal as a source of power and its threatened exhaustion in some

localities, have brought the question of the conservation and utilization of water-power into great prominence as a probably indispensable need of mankind. Its most important application in this direction hitherto made has been that of the Falls of Niagara power-works, both on the American and the Canadian side. Here enormous electrical power has been developed by the use of turbines, its most important application being in the city of Buffalo for manufacturing, electric railways and otherwise. It has also been applied extensively in Canada. A great dam on the lower Susquehanna, recently completed and estimated to yield 100,000 horse-power, is supplying Baltimore, many miles distant, with electrical power, and may in the future supply Philadelphia. Applications of water-power in this way have become numerous and extensive in various parts of the United States and in other countries. A great concrete dam, 9006 feet in total length, is being built across the Mississippi at Keokuk, Iowa, at the foot of the Des Moines rapids, which is expected to yield 300,000 horse-power, a little more than half that obtained from the Niagara. In view of the coming wide installation of works of this character, far-seeing capitalists have made insidious efforts to gain control of the leading sources of water-power, not yet occupied, in the United States, having in view doubtless the coming replacement of steam by electricity in railroad traction. To forestall this, the government has withdrawn the important water-power sites in the West from private exploitation, reserving them for the benefit of the people at large when the time for their utilization shall arrive.

**Waterproof Cloth,** cloth rendered impervious to water. There are numerous processes for waterproofing fabrics of all kinds. The earliest patent, that of Macintosh (1823), consisted in covering cloth with a paste obtained by dissolving caoutchouc in benzol or coal naphtha. In the treatment of cotton and linen cloth a small proportion of sulphur is generally added. A thin layer of this rubber solution is spread on the fabric by special machinery, after which the cloth is doubled, pressed and finished in calenders, the waterproof layer being thus in the center of the finished material. Textiles thus manipulated become also impervious to air, and from a hygienic point of view unsuitable for prolonged personal wear. This led to the introduction of other solutions and methods of application intended to produce fabrics which, while resisting rain,

do not altogether obstruct ventilation. Consecutive dipping of cloths in soap and alum solutions, or in gelatine and gall solutions, or in a solution of acetate of lead and then in a solution of alumina, has been resorted to with more or less success. The new substance called aikin, obtained from seaweed, has been strongly recommended for the same purpose. Another recent patent process consists in treating the fibers in the solution instead of the manufactured textile, and the fabric thus produced, while rain-resisting, offers the same ventilation as ordinary materials.

**Water Rabbit,** an American species, most abundant in the swampy tracts bordering on the Mississippi and its tributaries in the southwestern States, whence it is also called the swamp hare. It is an excellent swimmer, and subsists chiefly on the roots of aquatic plants.

**Water Rail,** a bird generally distributed over America and Europe, and fairly common, though not often seen, from its shy, retired habits. It frequents marshes and bogs, and swims and dives well, but has poor powers of flight. It is a delicious bird for the table and is a favorite game bird.

**Water Ram.** See *Hydraulic Ram*.

**Water-rat.** See *Vole*.

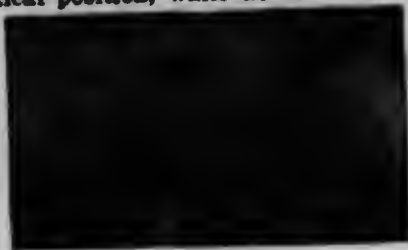
**Water-scorpion,** the popular name of *Nepa*, a genus of hemipterous insects, the species of which inhabit ponds, etc. Some of them are powerful insects, 2 or 3 inches in length. They receive their popular name from the scorpion-like form of the forelegs, with which they seize their prey.

**Watershed.** See *Rivers*.

**Waterspout,** a remarkable meteorological phenomenon frequently observed at sea, and exactly analogous to the whirlwinds experienced on land. It occurs when opposite winds of different temperatures meet in the upper atmosphere, whereby a great amount of vapor is condensed into a thick black cloud, to which a vortical motion is given by the action of the opposing winds, the force of which extends downward. This vortical motion causes the cloud to take the form of a vast funnel, which, descending near the surface of the sea, draws up the water in its vortex, which joins in its whirling motion. The whole column, which after the junction extends from the sea

## Waterton

to the clouds, assumes a magnificent appearance, being of a light color near its axis, but dark along the sides. When acted on by the wind the column assumes a position oblique to the horizon, but in calm weather it maintains its vertical position, while at the same time



Waterspout.

it is carried along the surface of the sea. Sometimes the upper and lower parts move with different velocities, causing the parts to separate from each other, often with a loud report. The whole of the vapor is at length absorbed in the air, or it descends to the sea in a heavy shower of rain. Sudden gusts of wind, from all points of the compass, are very common in the vicinity of waterspouts. What are sometimes called *waterspouts on land*, or *cloud-bursts*, are merely heavy falls of rain of a local character that occur generally during thunder-storms. In sandy deserts they draw up the sand as waterspouts draw up water. The tornado of the central United States is a destructive example of the whirling storms which on the ocean produce waterspouts.

**Waterton**, CHARLES, an English naturalist, born at Walton Hall, Wakefield, in 1782; died in 1865. He was educated at the Roman Catholic College at Stonyhurst, where he evinced a great taste for natural history. He spent many years in travel, and published *Wanderings in South America* and *Essays in Natural History*, with an *Autobiography*.

**Watertown** (wa'ter-town), a village of Watertown township (town), Middlesex Co., Massachusetts, on the Charles River, 7 miles w. of Boston, of which it is a residential suburb. It has a national arsenal and manufactures of paper, rubber goods, woollens, shoddy, soap, starch, etc. Pop. of town, 13,000.

**Watertown**, a city, capital of Jefferson Co., New York, on Black River, about 10 miles from Lake Ontario. The rapids of the river yield abundant water-power, which is utilized in extensive manufactures of

paper, wood-pulp, steam engines, air-brakes, silk, etc. There is here a State armory, hon. the aged and orphans, etc. Pop. 2

**Watertown**, a city, county seat of Dakota, 225 miles west of Minneapolis. It is the trade center of a rich farming country, and has a large wholesale and jobbing trade. Pop. 7010.

**Watertown**, a city of Jefferson and Dodge Cos., Wisconsin, on the Rock River, 44 miles w. by N. of Milwaukee. It is the trade center of an extensive farming region and has manufactures of machinery, bricks, flour, apiary supplies, dairy products, shoes, boxes, etc. Here is the Northwestern University (Lutheran) and the Sacred Heart College (Catholic). Pop. 8820.

**Waterville**, a city of Kennebec Co., Maine, on the Kennebec River, 81 miles N. N. E. of Portland. Various falls afford water-power. Here is Colby College (1820), and the Colburn Classical Institute. Manufactures include cotton and woolen goods, machinery, foundry products, furniture, shirts, etc. At Winslow, on the opposite side of the river, are large paper and pulp mills. Waterville was settled as a part of Winslow in 1764. Pop. 12,500.

**Watervliet** (-vliet), a city of Albany Co., New York, on the Hudson River, opposite Troy, on the Delaware and Hudson Railroad and the Erie Canal. It has a national arsenal, car-works, foundries, woolen factories, hardware works, etc. Pop. 15,074.

**Water-wheel**, a wheel moved by water, as the overshot wheel, the undershot wheel, the breast-wheel and the turbine. (See these terms.)

**Waterworks**, the reservoirs, with their accompanying pumping machinery and distributing pipes, by which water is now supplied to cities. This process is by no means modern. We read in the Bible that King Hezekiah made a pool and a conduit and brought water into the city of Jerusalem. In the Roman Empire the bringing of water into cities by means of aqueducts was very common and many remains of the masonry aqueducts of ancient Rome still exist. The great modern cities of Europe and America have their possible existence to copious supplies of water, brought often from considerable distances, carried in large pipes under the streets and supplied to houses by means of small pipes, a sufficient head of water being needed to drive the supply to the upper stories of houses. Water



## Watford

for this purpose is obtained from various sources, by pumping from rivers, as in Philadelphia, from a lake, as in Chicago, and by conveyance from large reservoirs, as in New York and many other cities. The most striking example of the latter method of supply is that of New York city, which has long been supplied from the Croton reservoir, the water being conveyed through a great rock tunnel to the city. The need of a larger supply has led to the damming of Esopus and Catskill Creeks in the Catskill Mountain region, to form a lake capable of holding 130,000,000,000 gallons. Great tunnels have been made to convey the water to the city, including a number of steel pipe siphons, the most remarkable of which is one which passes under the Hudson River at the great depth of 1100 feet. The amount of water expected from this stupendous work is 500,000,000 gallons daily. The supply for the city of London has for half a century or more been in the hands of eight companies, five of which draw all their supply from the Thames, with the exception of a portion obtained from wells and springs. The East London Company obtains nearly all its supply from the river Lea, the New River Company from the Chadwell, Amwell and Lea, the Kent Company entirely from chalk wells. Meters are used and the average use of water per day per head is 25 gallons. This is greatly exceeded in some American cities, especially in the city of Philadelphia, whose citizens use (or waste) more water than those of any other city in the world. It obtains its supply from the Delaware and Schuylkill rivers, an extensive filtration plant having recently been constructed to purify the waters of these rivers. The system of purification here employed is that of slow sand filtration, but in many places coagulating chemical substances are used for the removal of impurities. A disinfecting agent now coming into wide use is hypochlorite of lime. It must be said in conclusion that the methods of purification now employed have proved very efficacious in the prevention of such epidemic diseases as cholera and typhoid fever.

**Watford** (wot'ford), a town of England, in Hertfordshire, on the river Colne and the Grand Junction Canal. It is well built, and has large breweries, corn and paper mills. A bridge across the Colne connects it with Bushey, a residential suburb. Pop. (1911) 40,953.

**Watkins** (wot'kinz), a village, capital of Schuylker Co., New York, at the head of Seneca Lake, 22

miles N. by W. of Elmira. It has large salt works and brewing industries. It is notable for the deep and picturesque ravine known as Watkin's Glen, in which are numerous beautiful cascades and which attracts large numbers of visitors. Pop. 2817.

**Watkin** (wot'kin), Sir Edward William, railway manager, was born at Salford, England, in 1819; died in 1894. He became secretary to the Trent Valley Railway in 1845, and from that time was director or manager of several of the leading railways, especially the Southeastern. In 1861 he went to Canada in connection with the union of the Canadian provinces, and after 1864 was long a member of parliament. He was a strenuous promoter of the Channel Tunnel, and of Wembley Park Tower, designed to exceed the Eiffel Tower in height. In 1889 he acquired part of Snowden by purchase. He was a knight of several foreign orders.

**Watlingstreet** (wot'ling-strët), one of the Roman military roads in Britain, running from near Dover into North Wales.

**Watson** (wot'son), DAVID (1871- ), a Canadian journalist and army officer. He took command of the second battalion, First Canadian Division, in August, 1914, and was later a divisional commander. See *European War*.

**Watson** (wot'son), JAMES CRAIG, astronomer, born in Elgin County, Canada West, in 1838. He was graduated at the University of Michigan in 1857, and became professor of astronomy there in 1859. In 1863 he was made professor of the observatory. In 1879 he became professor of astronomy in the University of Wisconsin, and died there Nov. 23, 1890. He discovered 23 asteroids, receiving the Lalande medal of the French Academy of Sciences for discovering six of them in one year. He also discovered several comets, was a member of the eclipse expedition of 1869 and 1870, and of the transit of Venus expedition in 1874. He wrote *Theoretical Astronomy*.

**Watson**, JOHN (pseudonym 'Ian Maclaren'), a clergyman and novelist of Scotch parentage, born at Manningtree, Essex, England, in 1850. Educated at Stirling and Edinburgh, he became a Presbyterian minister, and was stationed at Liverpool 1880-1905. His *Beside the Bonnie Briar Bush* made him famous as an author. This was followed by a rapid series of works. A popular preacher and lecturer, he visited the United States on lecturing tours in 1896 and in

## Watson

## Watson

1907, dying during the latter tour at Mount Pleasant, Iowa.

**Watson, JOHN CRITTENDEN**, admiral, born at Frankfort, Kentucky, in 1842. He was graduated at the Naval Academy in 1860, and served in the navy throughout the Civil war, being master on Farragut's flagship, the *Hartford*, from 1862 to the end of the war. He took part in the battles on the Mississippi and in Mobile Bay, in the latter engagement, when Admiral Farragut had taken a position in the port mizen rigging to observe the fight, Watson lashed him to the rigging to prevent the danger of his falling. He was made commodore in 1897, commanded the blockading squadron in the North Cuban coast in 1898, and in 1899 succeeded Dewey in command at Manila, being appointed rear-admiral. He was United States naval representative at the coronation of Edward VII in 1902. Retired August 24, 1904.

**Watson, THOMAS E.**, politician and historian, was born in Columbia Co., Georgia, in 1856. He was elected to Congress by the Populist party in 1891, and was nominated for vice-president by this party in 1896, and for President in 1904. He became publisher of *Tom Watson's Magazine* in 1905, and in 1906 founded the *Jeffersonian Magazine* and the *Weekly Jeffersonian*. He wrote *The Story of France* and *Life of Napoleon*, popular histories; also *Life of Jefferson* and *Bethany, a Study and Story of the Old South*.

**Watt (wot), JAMES**, the celebrated improver of the steam engine, was born at Greenock, January 19, 1736; and died at his seat of Heathfield, Staffordshire, August 25, 1819. His father was a merchant and magistrate of Greenock, and James received a good education in its public schools. Having determined to adopt the trade of mathematical instrument maker, he went to London (1754) to learn the art, but ill health compelled him to return after only a year's apprenticeship. Shortly after his return he endeavored to establish himself in Glasgow. The corporation objecting, he was appointed in 1757 mathematical instrument maker to the university, and resided within its walls till 1763, when he removed into the town. From this time till 1774 he acted as a civil engineer—made several surveys for canals and harbors, and some of his plans were afterwards carried into execution. It was during this period that he conceived and gave shape to his improvements on the steam-engine, which have rendered his name

famous. (See *Steam-Engine*.) To give his inventions practical form he associated himself in 1774 with Mathew Boulton (see *Boulton*), the firm of Boulton and Watt having their works at Soho, Birmingham. He retired from business in 1800. Watt was a fellow of the Royal Societies of London and Edinburgh, and member of the National Institute of France. He was twice married, and was survived by one son, who



James Watt.

carried on the establishment at Soho in partnership with a son of Mr. Boulton's. Besides his great improvements to the steam engine, which first rendered it effective for general industries, Watt invented or improved a variety of mechanical appliances, including a letter-copying press. He was a man of high mental powers generally, and possessed a wide and varied knowledge of literature and science.

**Watt**, the name of the electrical unit of activity or rate of doing work. It is measured by the product of the voltage or electromotive force of the source into the current supplied. Thus a dynamo which is yielding 30 amperes at a voltage of 100 is working with an activity of 3000 watts. The watt is equal to 0.735 foot-pound per second; so that one horse power per second is equal to 746 watts. It is customary to use the kilowatt as the practical unit. It is equal to 1000 watts or 1.2 horse power per second.

**Watteau (vát-ô), JEAN ANTOINE**, a French painter, born at Valenciennes of poor parents, in 1684; died at Nogent-sur-Marne, in 1721. In 1702 he went to Paris, and earned his

bread by working for decorative painters. For many years he struggled in obscurity, but his talent once recognized he rapidly became popular and prosperous. In 1717 he was received at the Academy, and enrolled as a painter of *fêtes galantes*, that is, pleasure parties, balls, masquerades, etc., subjects in which he excelled. Lightness, elegance, and brilliancy form the chief attractions of his style.

**Watterson** (wa'ter-sun), HENRY, journalist, born at Washington, D. C., in 1840. He edited the *Republican Banner*, Nashville, Tennessee, before and after the Civil war, and during this war served in the Confederate army. He edited the *Louisville Journal*, at Louisville, Ky., 1867-68, and after that date the *Courier-Journal*, and won the reputation of being one of the most brilliant of American journalists. He wrote *History of the Spanish-American War*, *Abraham Lincoln*, etc.

**Wattle-bird** (wot'l-hurd), an Australian bird (*Anthochaera carunculata*) belonging to the honey-eaters, and so named from the large reddish watties on its neck. It is about the size of a magpie, and is of bold, active habits.

**Wattle-tree**, a name given in Australia to several species of acacia.

**Wattle-turkey**, a name often given to the brush-turkey. See *Tallegalla*.

**Watts** (wots), GEORGE FREDERICK, an English artist, born in 1820. He first exhibited at the Royal Academy in 1837. Among his more important pictures are: *Life's Illusion* (1849), *The Window Seat* and *Sir Galahad* (1862), *Ariadne* (1863), *Esau* (1865), *Love and Death* (1877), *Time, Death, and Judgment* (1878), *Happy Warrior* (1884), *Hope* (1886), *Judgment of Paris* (1887), *The Angel of Death* (1888), and *Fata Morgana* (1889). He was one of the most subtle and powerful of portrait-painters, among his successful work in this line being portraits of Tennyson, Millais, Leighton, Cardinal Manning, Browning, etc. He was perhaps the greatest idealist in contemporary British art. He became R.A. in 1868, and in 1886 presented some of his famous pictures to the nation. He died June 1, 1904.

**Watts**, ISAAC, an English divine and poet, born at Southampton in 1674; died at London in 1748. In 1702 he became minister of a Dissenting congregation in the metropolis, but ill health compelled him in 1712 to relin-

quish his pastoral duties. His *Psalms and Hymns* give him the first rank among English hymn writers. He was the author of various other works in prose and verse.

**Waukegan** (wa-ke'gan), a city, capital of Lake Co., Illinois, on the w. shore of Lake Michigan, 35 miles w. by N. of Chicago. It is built on a commanding bluff, has a good harbor, and is a popular summer and health resort, having mineral waters which are largely used. There are varied manufactures, including sugar refineries, steel wire, and brass works, scales, and organ works, etc. It is the business center of a large farming district. Pop. 16,069.

**Waukesha** (wa-ke'sha), a town, county seat of Waukesha Co., Wisconsin, on Fox River, 17 miles west of Milwaukee. Here are numerous mineral springs, the waters of which are widely exported. There are iron, aluminum and bridge works, motor works, breweries, etc. A State industrial school for boys, and Carroll College are located here. Pop. 8740.

**Wausau** (wa'sa), a city, county seat of Marathon Co., Wisconsin, 42 miles N. by E. of Grand Rapids. There is a county school of agriculture and domestic science, and extensive industries, including lumber, paper, granite, veneer, flour, turpentine, shoes, leather, saw-mill machinery, etc. Pop. 18,640.

**Wave** (wāv), in physics, a disturbance of matter in such a way that energy is transmitted through great distances, sometimes, but not always, accompanied with a slight permanent displacement of the particles of the conveying medium. When a disturbance is produced at a point in air, waves proceed from that point as concentric spheres and carry sound to the ear of a listener. (See *Sound*.) Light is supposed to be propagated by the wave motion of the ether in a manner somewhat analogous to the propagation of sound in air. (See *Undulatory Theory*.) When waves are produced by the disturbance of a small quantity of liquid, as when a pebble is thrown into a pool, they appear to advance from the disturbed point in widening concentric circles, the height of the wave decreasing gradually as it recedes from the center; but there is no progressive motion of the liquid itself, as is shown by any body floating on its surface. The whole seems to roll onwards, but, in reality, each particle of water only oscillates with a vertical ascent and descent. Where the depth of the liquid is invariable over its extent, or sufficient to allow the oscil-

lations to proceed unimpeded, no progressive motion takes place, each ridge or column being kept in its place by the pressure of the adjacent columns. Should, however, free oscillation be prevented, as by the shelving of the shore, the columns in the deep water are not balanced by those in the shallow parts, and they thus acquire a progressive motion towards the latter, or take the form of *breakers*, hence the waves always roll in a direction towards the shore, no matter from what point the wind may blow. The height of the wave depends in a great measure on the depth of the water in which it is produced. The waves of the ocean have been known to reach a height of 43 feet, from trough to crest. The horizontal pressure of a strong Atlantic wave has been recorded as high as 8 tons to the square foot.

**Wax** (waks), an unctuous-feeling substance partaking of the nature of fixed oil. It is secreted by bees, and is also an abundant vegetable production, entering into the composition of the pollen of flowers, covering the envelope of the plum and of other fruits, and, in many instances, forming a kind of varnish to the surface of leaves. Common wax is always more or less colored, and as a distinct, peculiar odor, of both of which qualities it may be deprived by exposure in thin slices to air, light, and moisture, or more speedily by the action of chlorine. At ordinary temperature wax is solid and somewhat brittle; but it may be easily cut with a knife. Its specific gravity is 0.96. At 155° Fahr. it melts, and it softens at 86°, becoming so plastic that it may be molded by the hand into any form. Wax is insoluble in water, and is only dissolved in small quantities by alcohol or ether. The principal applications of wax are to make candles and medicinal cerates; to give a polish to furniture or floors; to form a lute or cement, for which it is used by chemists; and to serve as a vehicle for colors. (See *Encaustic Painting*.) Sealing-wax is not properly a wax. See also *Candleberry*, *Carnauba*, *China Wax*, *Waspalm*.

**Wax**, MINERAL. See *Ozokerite*.

**Waxahachie**, a town, capital of Ellis Co., Texas, 30 miles s. of Dallas. It has cotton, cotton-seed oil and lumber mills. Pop. 6205.

**Wax-bill**, a small finch, genus *Eschscholzia*, so called from its beak being red like wax. It is often kept in cages.

**Wax Insects.** See *China Was*.

**Wax-myrtle.** See *Candleberry*.

**Wax-painting.** See *Encaustic Painting*.

**Wax-palm** (*Ceroxylon andicola*), a species of palm yielding a substance consisting of two-thirds resin and one-third wax, which is found on its trunk in the form of a varnish. It is a native of the Andes, towering in majestic beauty on mountains which rise many thousand feet above the level of the sea, and sometimes attaining the height of 160 feet.

**Wax Tree**, a genus of tropical American trees, some of the species of which yield a copious supply of yellow resinous juice, which resembles gamboge so closely that it is called American gamboge. Like gamboge, it has purgative properties.

**Wax-wing** (*Ampelis garrula*), an insectivorous bird belonging to the dentirostral section of the order. It derives its name from the appendages attached to the secondary and tertiary quill feathers of the wings, which have the appearance of red sealing wax. An American wax-wing is the cedar-bird (which see).

**Waycross** (wā'kros), a town, capital of Ware Co., Georgia, 60 miles w. of Brunswick, on the Atlantic Coast Line and the Atlanta and Birmingham railroads. It has car works, and manufactures of lumber and naval stores. Pop. 14,485.

**Wayland** (wā'land), FRANCIS, an educator, born in New York city, in 1796. He was graduated at Union College in 1813, and was president of Brown University in 1827-1855. He was the author of many valuable works, including: *Elements of Moral Science*, *Elements of Political Economy*, *Limitations of Human Responsibility*, *Domestic Slavery Considered as a Scriptural Institution*, *Elements of Intellectual Philosophy*, etc. He died in 1865.

**Wayne** (wān), ANTHONY, a Revolutionary soldier, born at Easttown, Chester Co., Pennsylvania, in 1745. A surveyor in his youth, he was elected to the general assembly in 1774, and was a member of the committee of safety in 1775. In the latter year he raised a regiment and entered the army as a colonel. He served in Canada in 1776, afterwards took command of Fort Ticonderoga, and joined Washington's army in 1777 as a brigadier general. He took a leading part in the battles of



Brandywine and Germantown, and was commended by Washington for his gallantry at Mowmouth. His daring and brilliant exploit in the capture of the strong fortifications at Stony Point won him a vote of thanks from Congress. He took part in the siege of Yorktown, was a member of the constitutional convention of 1787, and as major general in 1794 gained a complete victory over the insurgent Indians in western Ohio. He died in December, 1796, on his return from the west. Although called 'Mad Anthony,' on account of his impetuous daring, he did not lack prudence and judgment, and was an able commander.

**Waynesboro** (wān'sbur-o), a town of Franklin Co., Pennsylvania, near South Mountain and Antietam Creek, 14 miles S. by E. of Chambersburg. It has large factories, producing engines, boilers, agricultural implements, machinery, etc. Also stocking and shirt factories, vise works, etc. Copper, iron and oil are found in its vicinity. Pop. 7199.

**Wazan**, or WEZZAN, an inland town of Morocco, picturesquely situated on the northern slope of a two-peaked mountain, 90 miles S. E. of Tangier. It is a sacred city and a place of pilgrimage, the headquarters of the Grand Shereef. The principal buildings are the great mosque and the tombs of a long line of shereefs. The trade, which is carried on chiefly in Morocco, is mostly in the hands of the Jews. Pop. about 20,000.

**Wearmouth**, BISHOP'S, and MONK WEARMOUTH. (See *Sunderland*.)

**Weasel** (wē'zi; *Mustela vulgaris*), a digitigrade carnivorous animal, a native of almost all the temperate and cold parts of the northern hemisphere. The body is extremely slender, the head small and flattened, the neck long, the legs short. It feeds on mice, rats, moles and small birds, and is often useful as a destroyer of vermin in ricks, barns and granaries. The polecat, ferret, ermine and sable are akin. The weasel, like the related species, is very courageous, and is marked by agility and wariness and pertinacious blood-thirst. It is very persevering in hunting, keen in scent and in sight, bites severely and has a disagreeable smell. It usually sleeps during the day, and is most active at night. The fur is sometimes used, but the animal is too small to have any commercial importance.

**Weather** (weth'er). See *Meteorology*.

**Weather Bureau**, a bureau of observation founded in 1870 by the United States Government its purpose being to make daily observations of the state of the weather in all parts of the country, to collate the information thus obtained, and to calculate from the results a forecast for each of various defined districts, these being published so that the people of each district may know in advance the kind of weather likely to occur. While of importance to the agriculturist, these forecasts are frequently of still more importance to ship masters, storm warnings being given that may keep them in port when storms are imminent and thus save their ships from danger of injury or shipwreck. This system has made great progress since its institution, and reports are now received daily from more than 3500 land stations and about 50 foreign stations, while by means of wireless telegraphy some 2000 ships send reports of the weather conditions at sea. Study of results has led to the conception that more than 80 per cent. of winds and storms follow beaten paths, their movements being governed by physical conditions, a knowledge of which enables the bureau officials to estimate very closely their probable speed and direction and send warnings of their coming in advance. These forecasts cover the weather probabilities for 24 to 48 hours in advance and at times embrace general indications for a week. The forecasts are based upon simultaneous observations of local weather conditions taken daily at 8 o'clock in the morning and 8 o'clock in the evening, Eastern time, at about 200 regular stations in the United States and the West Indies, and from reports received daily from various other American localities. The results of these observations are telegraphed to Washington, where they are charted for study and interpretation by experts. These telegraphic reports in their complete form include data regarding the temperature, atmospheric pressure, precipitation of rain, wind direction, wind velocity, general weather conditions, and the kind, amount and direction of movement of the clouds. From these data, associated with those of preceding reports, the forecaster is able to trace the path of a storm area from its first appearance and to form an approximate decision as to its probable future course. In addition to the forecast center at Washington, there are others at Chicago, New Orleans, Denver, San Francisco and Portland, Oregon, the results of which

are sent to the surrounding areas. Within two hours after the morning observations, the forecasts are telegraphed to more than 2300 principal distributing points, whence they are further sent out by mail, telegraph and telephone, being mailed daily to 135,000 addresses and received by nearly 4,000,000 telephone subscribers. Maps of wind and weather conditions are printed and distributed, and other means of disseminating the information are taken. One of the most valuable services rendered is that of the warnings of cyclonic storms for the benefit of marine interests. These are displayed at nearly 300 points on the ocean and lake coasts, including all important ports and harbors, warnings of coming storms being received from 12 to 24 hours in advance. The result has been the saving of vast amounts of maritime property, estimated at many millions of dollars yearly. For storm signals, flags of different colors and markings are displayed, each signifying some special condition of wind and weather likely to occur. Agriculturists also derive great advantage from these warnings, especially those engaged in the production of fruits, vegetables and other market garden products. Warnings of frosts and of freezing weather have enabled the growers of such products to protect and save large quantities of valuable plants. It is said that on a single night in a small district in Florida, fruits and vegetables were thus saved to the value of more than \$100,000. In addition, live stock of great value has been saved by warnings a week in advance of the coming of a flood in the Mississippi; railroad companies take advantage of the forecasts for the preservation, in their shipping business, of products likely to be injured by extremes of heat or cold, and in various other ways the forecasts are of commercial, or other value. Similar bureaus have been established in other countries and progress is being made towards an international study of the weather. In this, observations made in the arctic and antarctic regions may hereafter become of utility. One of the chief stations for observations is that at Mount Weather, in the Blue Ridge Mountains of Virginia. This is equipped with delicate instruments in considerable variety for the study of the varying conditions of the upper air. Kites and captive balloons are sent up every favorable day, ascending to heights of two or more miles, and equipped with self-registering instruments to record the temperature and other conditions of the atmosphere. At other times free balloons are liberated, carrying sets

of automatic registering instruments. Some of these travel hundreds of miles, but nearly all are eventually found and returned.

**Weatherford**, a city, county seat of Parker Co., Texas, 81 miles w. of Fort Worth. It has several collegiate institutions, and cotton and other manufactures. Pop. 6500.

**Weaver-bird** (wē'vr), a name given to birds of various genera, belonging to the Fringillidae or finches. They are so-called from the remarkable structure of their nests, which are woven in a wonderful manner of various vegetable substances. Some species build their nests separate and singly, and hang them from slender



Yellow-crowned Weaver and Nest  
(*P. icterocephalus*).

branches of trees and shrubs; but others build in companies, numerous nests suspended from the branches of a tree being under one roof, though each one forms a separate compartment and has a separate entrance. They are natives of the warmer parts of Asia, of Africa, and of Australia. The *Ploceus icterocephalus*, or yellow-crowned weaver, is a native of South Africa.

**Weaver**, JAMES B., lawyer, born at Dayton, Ohio, in 1833. He served in the Union army during the Civil war, becoming a brigadier general of volunteers. Subsequently he practiced law in Iowa; filled several public offices; edited the *Iowa Tribune*; was a member of Congress 1870-81, and 1885-89; was the Greenback candidate for President in 1880; and in 1892 the candidate of the

Populist party, receiving 22 electoral votes. He was mayor of Colfax, Iowa, in 1904-06. He died February 6, 1912.

**Weaving** (wēv'ing), the art of interlacing yarn threads or other filaments by means of a loom, so as to form a web of cloth or other woven fabric. In this process two sets of threads are employed, which traverse the web at right angles to each other. The first set extends from the end of the web in parallel lines, and is commonly called the *warp*; while the other set of threads crosses and interlaces with the warp from side to side of the web, and is generally called the *weft* or *woof*. In all forms of weaving the warp-threads are first set up in the loom, and then the weft threads are worked into the warp, to and fro, by means of a *shuttle*. It was by this fundamental process of lacing two sets of threads in looms of simple mechanism that the mummy cloths of Egypt, the fine damask and tapestries of the Greeks and Romans, the Indian muslins, the shawls of Cashmere, and the famed textile fabrics of Italy and the Netherlands were produced. From the latter countries weaving by means of a hand-loom was introduced into England. This loom, in its latest form, consists of a frame of four upright posts braced together by cross-beams, the center beam at the back being the warp beam, the beam in front being that upon which the web is wound, while just below this, in front, is the breast-beam for the support of the weaver at his work. At the top of the loom is an apparatus by which the *heddles* are lifted or lowered by means of *treadles* under the foot of the weaver. These heddles consist of two frames, from which depend cords attached by a loop or eye to each thread in the warp. As these threads are attached to the frames, alternately, it follows that when one heddle is raised every second thread in the warp is also raised, while the remaining threads are depressed; and this is called *shedding the warp*. When the warp threads are thus parted there is left a small opening or shed between the threads, and it is through this opening that the weaver drives his shuttle from side to side. The shuttle, which is hollow in the middle, contains the weft-thread wound round a bobbin or pirn, and as the shuttle is shot across the web this weft thread unwinds itself. When the thread is thus introduced it is necessary to bring it to its place in the fabric. This is accomplished by means of the *lay* or *batten*, which is suspended from the top of the loom, and

works to and fro like a pendulum by an attachment of vertical rods at each side called the *swords*. Attached to the lay is what is called the *reed*, which is a sort of comb having a tooth raised between every two threads of the warp, and so by driving up the lay after a weft thread has been introduced the weaver strikes home that thread to its place in the cloth. A great improvement was made upon the hand-loom when John Kay, about 1740, invented the fly-shuttle, as it was called. This enabled the weaver to drive the shuttle both ways with the right hand by means of a cord attached to a box or trough placed at each end of the shuttle-race, which impelled the shuttle to and fro at each jerk of the cord. But the most important improvement was made on the hand-loom by Joseph Jacquard, of Lyons, who, in 1801, invented an apparatus by which the most intricate patterns could be woven as readily as plain cloth. This is accomplished by an ingenious arrangement of hooks and wires, by means of which the warp threads are lifted in any order and to any extent necessary to make the shedding required by the pattern. The order in which these hooks and wires are successively lifted and lowered is determined by means of a series of pasteboard cards punctured with holes corresponding to a certain pattern and the cards passing successively over a cylinder or drum. The hooked wires pass through these holes and lift the warp-threads in an order which secures that the arranged pattern is woven into the fabric. When the pattern is extensive the machine may be provided with as many as 1000 hooks and wires. Another development was made in the art of weaving by the invention of the power-loom by the Rev. E. Cartwright in 1784. In the power-loom, which has been gradually improved and adapted to steam-power, the principal motions of the old method of weaving, such as shedding the warp-threads, throwing the shuttle, and beating up the thread, are still retained. The frame of the power-loom is of cast-iron, and motion is communicated to the loom by means of a shaft, the stroke of the lay being made by cranks attached to the driving shaft, while the shuttle is thrown by means of a lever attachment at the center of the loom. Although the principle of the loom is the same in all kinds of weaving, yet there are numberless modifications for the production of special fabrics. The lappet loom is one suitable for weaving either plain or gauze cloths,

## Webb City

and also for putting in representations of flowers, birds, or the like. *Cross* weaving is a term applied to that process in which, as in gauze weaving, the warp threads, instead of lying constantly parallel, cross over or twist around one another, thus forming a plexus or interlacing independent of that produced by the weft. *Double* weaving consists in weaving two webs simultaneously one above the other, and interweaving the two at intervals so as to form a double cloth. *Kildderminster* or *Scotch* carpeting is the chief example of this process. *Pile* weaving is the process by which fabrics like that of velvets, velveteens, corduroy, and Turkey carpets are produced. In the weaving of these fabrics, besides the ordinary warp and weft, there is what is called the pile-warp, the threads of which are left in loops above the surface till cut, and the cutting of which constitutes the pile.

**Webb City**, a city of Jasper Co., Missouri, 5 miles N. W. of Joplin. It is the center of a lead and zinc region, and has large mining interests. Has also a foundry, iron works, etc. Pop. 11,817.

**Webb**, CHARLES HENRY, humorist, born at Rouse's Point, New York, in 1834; died in 1905. Under the pen name of 'John Paul' he wrote for several newspapers, his humorous sketches being chiefly contributed to the *New York Tribune*. He wrote several burlesque dramas.

**Weber** (vā'bér), KARL MARIA FRIEDRICH ERNST, BARON VON, a German musical composer, was born at Eutin in Holstein in 1786. His father was a musician and had him carefully educated. In 1800 he wrote the opera of the *Waldmädchen* ('Wood-maiden'), and had it performed at Chemnitz and Freiberg in Saxony. In 1803 he visited Vienna, where he became acquainted with Haydn and the Abbé Vogler, from whom he received great help in his studies. The latter procured him a musical directorship in Breslau, on which he entered in 1804. Two years later he exchanged this post for a similar one at Carlsruhe, and he was subsequently (1813-16) director of the opera at Prague. At the close of 1816 he settled at Dresden, where he was founder and director of the German opera. In 1820 he went to Berlin to bring out *Der Freischütz*, the most celebrated of his compositions. It was performed in London and Paris two years later. In 1822 *Euryanthe* was produced on commission for Vienna, and was brought out there

in August, 1823. In 1826 Weber visited London to superintend the production of *Oberon* at Covent Garden Theater. It was enthusiastically received. The composer, however, was out of health, and died in London, June 5, 1826. Besides operas, he wrote a large number of other works.

**Webster** (web'ster), a village in Webster township (town), Worcester Co., Massachusetts, on the French River, 18 miles S. by W. of Worcester. It has extensive manufactures of cotton and woolen goods, boots and shoes, optical goods, etc. The lake is a summer resort. Pop. 11,509.

**Webster**, city in Hamilton Co., Iowa, on the Boone River, 20 miles E. of Fort Dodge. It has railroad shops and various manufactures. Pop. 5208.

**Webster**, DANIEL, famous orator and statesman, born January 18, 1782, at Salisbury, New Hampshire. He studied for four years at Dartmouth College, and having adopted the legal profession was admitted as a practitioner in the Court of Common Pleas for Suffolk county. In 1818 he was elected to Congress by the Federal party in New Hampshire, and from that period to the close of his life took a



Daniel Webster.

prominent part in public affairs, being especially distinguished as an orator. No public speaker could surpass him in producing an impression on an audience, and he is regarded as one of the greatest of the world's orators. He became a senator in 1827, and in 1836 (and again in 1848) was an unsuccessful candidate for the presidency. In 1841, under the presidency of General Harrison, he was appointed secretary of state, and he had an important part in the arrangement of the Ashburton Treaty of 1842. He



was opposed to the admission of Texas as a slave state and to the Mexican war, but supported Clay's 'compromise' of 1850. In 1850, on the death of President Taylor, he became secretary of state under President Fillmore. This office he continued to occupy till his death, which took place at his estate of Marshfield, Massachusetts, October 24, 1852. Among his many notable orations the most famous was that called out by the nullification movement of South Carolina in 1830. His great argument in defense of the Union and the Constitution on that occasion has rarely or never been surpassed in the history of oratory. Its closing sentence, 'Liberty and Union, now and forever, one and inseparable,' has become an American watchword.

**Webster Groves**, a city of St. Louis Co., Missouri, 10 miles w. s. w. of the central point of St. Louis, to which it is closely related. Pop. 7080.

**Webster**, JOHN, a dramatic poet of the seventeenth century, was clerk of the parish of St. Andrew, Holborn, and a member of the Company of Merchant Tailors. His works are: *The White Devil* (1612); *The Devil's Law-case* (1623); *The Duchess of Melfy* (1623); *Appius and Virginia* (1634); *The Thracian Wonder* (1661); and *A Cure for a Cuckold*, a comedy (1661). He also assisted Dekker in writing the *History of Sir Thomas Wyatt*, and the comedies *Westward Ho!* and *Northward Ho!* By some critics he is accounted second only to Shakespeare.

**Webster**, NOAH, lexicographer, was born at West Hartford, Connecticut, in 1758, and educated at Yale College. He chose the law as a profession, but relinquished it for teaching (1782). About the same time he began the compilation of books of school instruction, and published his *Grammatical Institute of the English Language*, in three parts: Part 1, *Webster's Spelling Book*; Part 2, *A Plain and Comprehensive Grammar*; Part 3, *An American Selection of Lessons in Reading and Speaking*. All these works had an enormous sale. His literary activity was henceforth very great, the works issued by him during the next few years including important legal and linguistic studies. In 1789 he settled at Hartford to practice law, but removed in 1793 to New York, where for some time he devoted himself to journalism. In 1806 he published an 8vo *English Dictionary*, which led the way for his great work,

the *American Dictionary of the English Language*. In preparing this work he visited England, and finished the dictionary during an eight months' residence in Cambridge. The first edition of his dictionary was published in 1828 (2 vols. 4to); it was followed by a second in 1840; since which time several enlarged and improved editions have appeared. He died in May, 1843.

**Wedge** (wedj), a piece of wood or metal, thick at one end, and sloping to a thin edge at the other, used in splitting wood, rocks, etc. In geometrical terms it is a body contained under two triangular and three rectangular surfaces. It is one of the mechanical powers, and besides being used for splitting purposes is employed for producing great pressure, and for raising immense weights. All that is known with certainty respecting the theory of the wedge is that its mechanical power is increased by diminishing the angle of penetration. All cutting and penetrating instruments may be considered as wedges.

**Wedgwood** (wedj'wud), JOSIAH, a celebrated potter, born at Burslem, Staffordshire, England, in 1730. He received little education, and went to work in his brother's factory at the age of eleven. An incurable lameness, the result of smallpox, which subsequently compelled him to have his right leg amputated, forced him to give up the potter's wheel. He removed for a time to Stoke, where he entered into partnership with persons in his own trade, and where his talent for ornamental pottery was first displayed. Returning in 1759 to Burslem, he set up a small manufactory of his own, in which he made a variety of fancy articles. His business improving, he turned his attention to white stoneware, and to the cream-colored ware for which he became famous; and he succeeded in producing a ware so hard and durable as to render works of art produced in it almost indestructible. His reproduction of the Portland Vase is famous. He also executed paintings on pottery without the artificial gloss so detrimental to the effect of superior work. (See *Wedgwood-ware*.) His improvements in pottery created the great trade of the Staffordshire Potteries. He died in 1795. See *Pottery*.

**Wedgwood-ware**, a superior kind of semivitrified pottery, without much superficial glaze, and capable of taking on the most brilliant and delicate colors produced by fused metallic oxides and ochres; a.

named after the inventor. It is much used for ornamental ware, as vases, etc., and, owing to its hardness and property of resisting the action of all corrosive substances, for laboratory mortars.

**Wednesbury** (wenz'ber-i), a parliamentary borough of England, in Staffordshire, 10 miles s. s. e. of Stafford, in the district known as the Black Country, and an important seat of wrought-iron manufactures. It has an ancient church. Pop. 28,108.

**Wednesday** (wenz'dä), the name of the fourth day of the week (in Latin, *dies Mercurii*, day of Mercury), derived from the old Scandinavian deity Odin or Woden.

**Weed** (wêd), **THURLOW**, journalist, born at Cairo, New York, in 1797; died November 22, 1882. He served as a private in the war of 1812, afterwards engaged in newspaper work, and in 1820 founded the *Albany Evening Journal*, which became the organ of the Whig party, and which he controlled for 35 years. He was a leader in state and national politics, but declined all offices for himself. He supported Lincoln and the Civil war, and was sent by the President on a mission to Europe in 1861-62. He wrote *Letters from Europe and the West Indies*, *Reminiscences*, and *Autobiography*.

**Weed**, a name applied to uncultivated plants growing wild or contaminating cultivated ground. Many are useful.

**Week** (wêk), a period of seven days, one of the common divisions of time, the origin of which is doubtful. Among the nations who adopted the week as a division of time, the Chinese, Hindus, Egyptians, Chaldeans, Jews, Persians, and Peruvians have been mentioned, but in some cases the antiquity of the practice is doubtful, and in others the name has been applied to other cycles than that of seven days. The nations with whom the weekly cycle has been traced with certainty to the greatest antiquity are the Egyptians and the Hebrews. With the former we only know of its existence, but with the latter it had a much more important character. The use of the week was introduced into the Roman Empire about the first or second century of the Christian era from Egypt, and had been recognized independently of Christianity before the Emperor Constantine confirmed it by enjoining the observance of the Christian Sabbath. With the Mohammedans the week has also a religious character, Friday being observed by them as a Sabbath.

**Weeks**, **FEAST OF**. See *Pentecost*.

**Weeper-monkey**, or *SAL*. See *Sapajou*.

**Weeping-ash**, *Fraxinus pendula*, a variety of ash differing from the common ash only in its branches arching downwards instead of upwards.

**Weeping-birch**, a variety of the birch-tree, known as *Betula pendula*, with drooping branches, common in different parts of Europe.

**Weeping-willow**, a species of willow, the *Salix Babylonica*, whose branches grow very long and slender, and hang down nearly in a perpendicular direction. It is a native of the Levant, but has been introduced into the United States and other countries.

**Weerd**, or *WEERT* (vârt), a town of Holland, in the province of Limburg. Pop. 8677.

**Weever** (wê'ver), a name of several acanthopterygious fishes of the genus *Trachinus*, included by many authorities among the perches. Two species are found in the Atlantic, viz. the dragon-weever, sea-cat, or sting-bull, *T. draco*, about 10 or 12 inches long, and the lesser weever, *T. vipera*, called also the adder-pike, or sting-fish, which attains a length of 5 inches. They inflict wounds with the spines of their first dorsal fin, which are much dreaded. Their flesh is esteemed.

**Weevil** (wê'vil), the name applied to beetles of the family Curculionidae, distinguished by the prolongation of the head, so as to form a sort of snout or proboscis. Many of the weevils are dangerous enemies to the agriculturist, destroying grain, fruit, flowers, leaves, and stems. The larvæ of the corn-weevil (*Calandra granaria*) is very destructive to grain, that of the pea-weevil (*Bruchus pisi*) to peas. See *Corn-weevil* and *Pea-beetle*.

**Weft**. See *Weaving*.

**Weigelia** (wi-gé'il-a), a genus of shrubs of the order Caprifoliaceæ (honeysuckles), natives of China and Japan, now cultivated in gardens for the beauty of their flowers.



Corn-weevil (*Calandra granaria*).

a, Insect natural size. b, Insect magnified. c, Larva. d, Egg (both magnified).

## Weighing Machine

**Weighing Machine.** See *Balance*.

**Weight** (wāt), the measure of the force by which any body, or a given portion of any substance, gravitates or is attracted to the earth; in a more popular sense, the quantity of matter in a body as estimated by the balance, or expressed numerically with reference to some standard unit. In determining weight in cases where very great precision is desired, due account must be taken of temperature, elevation, and latitude. Hence in fixing exact standards of weight a particular temperature and pressure of air must be specified; thus the standard brass pound is directed to be used when the Fahrenheit thermometer stands at 62° and the barometer at 30°. See also *Gravity*, and next article.

## Weights and Measures,

the standard used in accurately weighing and measuring quantities, of especial importance in buying and selling, scientific operations, etc. The origin of the English measures is the grain of corn. Thirty-two grains of wheat, well dried, and gathered from the middle of the ear, were to make what was called one pennyweight; 20 pennyweights were called one ounce; and 20 ounces, one pound. Subsequently, it was thought better to divide the pennyweight into 24 equal parts, to be called *grains*. William the Conqueror introduced into England what was called *troy weight* (which see). The English were dissatisfied with this weight, because the pound did not weigh so much as the pound at that time in use in England; consequently a mean weight was established, making the pound equal to 16 ounces. (See *Avoirdupois*.) But the troy pound was not entirely displaced by the pound avoirdupois; on the contrary it was retained in medical practice, and for the weighing of gold, silver, jewels, and such liquors as were sold by weight. There are 7000 grains in one pound avoirdupois, and 5760 grains in one pound troy; hence the troy pound is to the avoirdupois pound as 14 to 17, or as 1 to 1.215. The troy pound was retained as the British standard by an act passed in 1824; and in order that the standard pound, in case of damage or destruction, might be restored, by reference to a natural standard, it was ascertained that a cubic inch of distilled water, at a temperature of 62° Fahr., weighed, in air, 252.458 grains; and it was directed that the standard pound should be restored by the making

## Weights and Measures

of a new standard troy pound, weighing 5760 of such grains. In Britain the unit of lineal measure is the yard, all other denominations being either multiples or aliquot parts of the yard. The length of the imperial standard yard, according to the act of parliament passed in 1824, was the straight line or distance between the centers of the two points in the gold studs in the brass rod in the custody of the clerk of the House of Commons, entitled, *standard yard*, 1760. By the same act, the brass rod, when used, must be at the temperature of 62° of Fahrenheit's thermometer. It was enacted at this time that if this standard should be lost or destroyed, the length of the yard should be determined by reference to the length of a pendulum vibrating seconds of mean time in a vacuum in the latitude of London, at sea-level. When the standard yard was actually destroyed, however, by the fire which consumed the two Houses of Parliament in 1834, the commissioners appointed to restore the standard decided that it was better to do so by means of authentic copies of the old standard that were in existence. This was accordingly done, and five new official copies were made, one of which, to be regarded as the national standard, is preserved at the exchequer in a stone coffin in a window-seat of a groined room. The national standard yard is thus the distance between two fine transverse lines on a square rod of gun-metal 38 inches long. In France the *mètre* is the standard or unit of lineal measure; the *are*, or 100 square mètres, the unit of surface measure; and the *stère*, or cube of a *mètre*, the unit of solid measure. The system of measure, called the *decimal* or *metric* system, based upon these standards, is now largely adopted. For all sorts of liquids, corn, and dry goods, the British standard measure is declared by the act of 1824 to be the imperial gallon, which should contain 10 lbs. avoirdupois weight of distilled water weighed in air at the temperature of 62° Fahr., the barometer being at 30 inches. The official measurement of this quantity of water measured under the specified conditions gave as the result 277.274 cubic inches, which, though since ascertained to be slightly in excess of the true measurement (277.123 cubic inches), is still the legal capacity of the gallon. The United States has adopted the weights and measures prevalent in Britain and the two countries are alike in this respect. Prior to 1824 there existed a bewildering irregularity in the weights and measures used, but

since then they have been in great measure regulated by statute, and entire uniformity has been introduced. By the statutes the imperial standard yard, pound, and gallon are fixed, and all local measures of capacity abolished. The legal stone is fixed at 14 lbs. avoirdupois. All articles sold by weight must be sold by avoirdupois, except gold, silver, platinum, and precious stones, which, as noted above, are still to be sold by troy weight. While the system described is in common use in all English-speaking countries, the French metrical system has extended widely beyond the borders of France, and is now in use to some extent in nearly all civilized countries. In the United States and Great Britain it is largely used in scientific measurement. Besides the articles on *Avoirdupois*, *Troy Weight*, etc., see *Ounce*, *Pound*, *Bushel*, *Decimal System*, etc.

**Wei-hai-wei** (wā-hi-wā'), a small territory in the province of Shantung, China, extending 16 miles along the bay of the same name; area about 285 sq. miles; pop. about 150,000. A Chinese fleet was destroyed in the bay during the war with Japan in 1895. The territory, with the walled city of Wei-hai-wei, was leased to Great Britain by China in 1898.

**Weimar** (vī'mār), the capital of the grand-duchy of Saxe-Weimar, stands on the left bank of the Ilm, and in a beautiful valley surrounded by hills, but is not well built, and notwithstanding the presence of the court has a dull and lifeless appearance. Its public edifices most deserving of notice are the ducal palace, the so-called Red and Yellow Castles, now united and occupied by several public departments; the public library, containing an extensive collection; the museum; the theater; the Stadtkirche, with an altar-piece, one of the finest works of Lucas Cranach. Weimar is closely associated with the names of Schiller and Goethe; and here in this old-world town the German National Assembly met in the early part of 1919 to form a republic at the close of the European war, 1914-18, Berlin being a storm-center for radical movements. Pop. (1910) 34,582.

**Weimar, SAXE.** See *Saxe-Weimar*.

**Weinheim** (vīn'hīm), a town in South Germany, in Baden, on the Weschnitz, 10 miles N. of Mannheim, with manufactures of machinery, silks, woollens, etc. Pop. 12,600.

**Weir**, (wēr), a dam erected across a river to stop and raise the water, either for the purpose of taking fish, of

conveying a stream to a mill, or of maintaining the water at the level required for navigating it, or for purposes of irrigation.

**Weir**, HARRISON, an English artist, was born at Lewes, Sussex, in 1824, and educated at an academy in Camberwell. Having learned the trade of a wood-engraver he turned his attention to painting. His first exhibited picture was in oil, entitled *The Dead Shot*. In 1847 he was elected a member of the new Society of Painters in Water Colors. He became chiefly noted for his pictures of country life, animals, fruits, flowers, and landscapes. As an illustrator of books and periodicals he is well known. He was the author of *The Poetry of Nature*; *Everyday Life in the Country*; *Animal Stories*; *Old and New*; and *The Cat*. He died Jan. 4, 1906.

**Weismann** (vīs'mān), AUGUST, biologist, was born at Frankfurt-on-the-Main in 1834; studied medicine, and in 1860 became physician to the Archduke Stephen of Austria. He attracted great attention by his *Essays on Heredity* (translated 1902), in which he denied hereditary transmission of other than race characters. With this he advanced a theory of generation that was accepted by many biologists. Others strongly opposed it and it was sustained by him in several volumes. It is known in biology as Weismannism. It maintains that the nucleus of every germ cell contains a *germ-plasm* which is not derived from the body, but is transmitted from germ to germ. Thus it is unaffected by the hereditary characteristics of the body, but contains and reproduces those of the race only. Biological science is divided between the friends and foes of this hypothesis. Died 1914.

**Weissenburg**, or WISSEMBURG, a town of France, department of Bas Rhin, at the foot of the Vosges mountains on the Lauter river. It passed to France in 1697, to Germany in 1871, and was restored to France with Alsace-Lorraine by the treaty of 1919. Here occurred the first important engagement of the Franco-German war, 1870-71. Pop. 6946.

**Weissenfels** (vī'sén-fels), a town of Prussia, in the government of Merseburg, in the province of Saxony, on the Saale, with manufactures of porcelain, shoes, woollen fabrics, gold and silver articles, etc. It has a church containing the remains of Gustavus Adolphus. Pop. 30,964.

**Weld.** See *Dyer's-weed*.



## Welding

**Welding** (weld'ing), the union produced between the surfaces of pieces of malleable metal when heated almost to fusion and hammered.

**Welland** a town of Ontario, Canada, on Welland canal. The canal, connecting Lakes Erie and Ontario, is 26 miles long. An appropriation of \$50,000,000 was made for enlargement of the canal and a new harbor at Ten Mile creek. Pop. 10,000.

**Welles** (wels), GIBSON, an American naval officer and political leader, born in Glastonbury, Conn., July 1, 1802. He studied law and in 1826 became editor and proprietor of the Hartford Times, favoring Andrew Jackson's election to the presidency. From 1827 to 1835 he was a member of the Connecticut legislature. He became identified with the Republican party in 1857, and was chairman of the Connecticut delegation in the Convention that nominated Lincoln. He was secretary of the navy, 1861-69. He died February 11, 1878.

**Welles**, THOMAS, colonial governor, born in England 1508; came to America about 1636, and settled in Hartford, Conn. He was commissioner of the United Colonies in 1649 and 1654, and governor in 1655 and 1658.

**Wellesley**, a town of Norfolk county, w. by s. of Boston. It is the seat of Wellesley College, founded in 1875, for the higher education of women, which in 1913 had an enrollment of 1480 students, 133 instructors and a library of 74,000 volumes. Pop. of town 5413.

**Wellesley**, PROVINCE OF. See *Pennang*.

**Wellesley** (wels'li), RICHARD COLLEY WESLEY, MARQUESS, eldest brother of the Duke of Wellington, was born at Dublin in 1760. He was appointed governor-general of India in 1797. He became lord-lieutenant of Ireland, in 1821. He resigned in 1823, but in the Grey ministry he again became lord-lieutenant of Ireland (1833-35). He died in 1842.

**Wellhausen** (vel'how-sen), JULIUS, a distinguished German theologian and critic, born 1844. Among his works are *Test der Bücher Samuelis*, *Die Pharisäer und Sadducäer*.

**Welfare Work**, the term applied to various activities undertaken by large corporations and other employers for the benefit of their employees. These range from lunch rooms and locker rooms to extensive medical and sanitary systems, and the provisions for old age pensions, compensation for industrial accidents, etc.

## Wellington

**Wellingborough** (wel'ing-bur-ō), a town of Northamptonshire, on the river Nene, 10 miles northeast of Northampton. It has a handsome parish church, a grammar school, and a corn exchange, accommodating also a literary institute. The principal industries are the manufacture of boots and shoes, and the smelting of iron. Pop. 19,758.

**Wellington**, a city, county seat of Sumner Co., Kansas, on Slate Creek, 30 miles s. by w. of Wichita. It has flour mills and grain elevators, and is the division point for the Santa Fé Railroad. Pop. 7034.

**Wellington** (wel'ing-tun), a town of England, in Shropshire, 11 miles east of Shrewsbury, with manufactures of nails, farm implements, brass and iron ware, etc. Pop. 7820.

**Wellington**, a town of England, in Somerset, with manufactures of druggets and serges. From this place the Duke of Wellington took his title. Pop. 7634.

**Wellington**, the capital of New Zealand, is situated on Port Nicholson, an islet of Cook's Strait, on the southwest extremity of the provincial district of Wellington, North Island. Its harbor is 6 miles long and 5 wide. It has two wharfs and a patent slip. The principal buildings are the Government House, the Houses of Legislature, the Government Buildings, Wellington College, a Roman Catholic college, etc. It has several daily and weekly newspapers, botanic gardens, tramways, etc., and is lighted by electricity. Pop. 64,372.—The provincial district of Wellington has an area of 11,250 sq. miles. It has an equable and healthy climate, but is subject to earthquake shocks. It is intersected by several mountain ranges, but there are many fine agricultural and pastoral districts. Gold was found in 1831. The chief rivers are the Manawatu and Wanganui.

**Wellington**, ARTHUR WELLESLEY, DUKE OF, born in 1769, was the third son of the first Earl of Mornington, and was educated at Eton, at Brighton, and finally at the Military College of Angers. In 1787 he received a commission as ensign in the 73d Foot, and after a rapid series of changes and promotions, attained by purchase in 1793 the command as lieutenant-colonel of the 33d Regiment. During 1794 and 1795 he served with his regiment under the Duke of York in Flanders. In 1796 his regiment was despatched to Bengal, Colonel Wellesley landing at Calcutta in Feb., 1797, at a critical moment for the

British power in India. War had just been declared against Tippee Saib, and an army of 80,000, of which Colonel Wellesley's regiment formed part, marched against him. An engagement took place at Mallavelly (Mysore) on the 27th, in which Wellesley, who commanded the left wing, turned the right of the enemy. He was subsequently employed to dislodge the enemy from their posts in front of Seringapatam, and after the capture of that capital he was appointed, in 1799, to the administration of Mysore, his brother being at this time governor-general. (See Wellesley.) In 1802 he attained the rank of major-general, and in the following year he was appointed to the command of a force destined to restore the Peishwa of the Mahrattas, driven from his capital by Holkar. After this operation had been successfully performed the other Peishwa chiefs, Scindia and the Rajah of Berar, showed hostile designs against the British, and Wellesley was appointed to the chief military and political command in the operations against them. After an active campaign, in which he took Ahmednuggur and Arunghabad, he encountered a powerful Mahratta army, assisted by French officers, at Assaye, on September 23, and entirely defeated it. The parallel successes of General Lake, and the defeat of the Rajah of Berar by Wellesley at Argaum on November 29 compelled the submission of the Mahrattas, and peace was restored on conditions drawn up by the successful general. Early in 1805, his health failing, Wellesley obtained leave to return home, and arrived in England in September. He had before leaving Madras received his appointment as Knight Commander of the Bath. From November to February he was engaged as brigadier-general in Lord Cathcart's expedition to the continent, which was without result. In January, 1806, he succeeded Lord Cornwallis as colonel of his own regiment, the 33d. On April 10, 1806, he married Lady Catherine Pakenham, third daughter of the Earl of Longford. He was shortly afterwards elected M.P. for Rye, and in April, 1807, was appointed secretary of state for Ireland. In August he received the command of a division in the expedition to Copenhagen under Lord Cathcart and Admiral Gambier, and took Kloga on April 29, the only land operation of importance. On April 28, 1808, he attained the rank of lieutenant-general and in June received the command of a force destined to operate in the north of Spain and Portugal. He was subsequently su-

perseded; but before giving up the command he gained the battle of Vimeir over Junot, the campaign being brought to a close with the convention of Cintra, by which the French agreed to evacuate Portugal. In 1809 Wellesley was appointed to take the chief command in the Peninsula, which had been overrun by the French. The famous passage of the Douro, and the defeat of Soult which followed, fittingly opened this masterly campaign. For the victory at Talavera (July 28), the first of a long list that subsequently took place in the Peninsula, the government raised the command-in-chief to the peerage as Viscount Wellington. Towards the end of 1810 Wellington fought the battle of Busaco, which was followed by the famous fortification and defense of the lines of Torres Vedras. A little later (1. 1811) occurred the victory of Fuentes de Onore. In the following year he took Ciudad Rodrigo and Badajoz by storm, and fought the battle of Salamanca, accounted one of his most famous victories. On August 12, 1812, Wellington entered Madrid. For his brilliant conduct of the campaign thus far he received the thanks of parliament, was raised to the dignity of marquis, and a sum of £100,000 was voted to purchase him an estate. Next followed the battle of Vittoria (June 21, 1813), for which decisive victory Wellington was given the baton of field-marshal; then battles in the Pyrenees, the capture of San Sebastian, and the crossing of the Bidasoa into France. In 1814 the battle of Orthez was gained, and in the same year the battle of Toulouse, in which Soult's best troops were routed, and the hopes of France in the Peninsula utterly annihilated. The way was now open for the British troops to the heart of France. In six weeks, with scarcely 100,000 men, Wellington had marched 600 miles, gained two decisive battles, invested two fortresses, and driven 120,000 veteran troops from Spain. Napoleon abdicated on April 12, and a few days later the war was brought to a close by the signing of conventions with Soult and Berthier. In May the triumphant general was created Marquis of Douro and Duke of Wellington, with an annuity of £10,000, commuted afterwards for £400,000. He received the thanks of both Houses of Parliament. In July he went as ambassador to France, and succeeded Lord Castlereagh as British representative in the Congress of Vienna. In April he took the command of the army assembled in the Netherlands to oppose Napo-

leon. (See *France and Waterloo*.) On his return to England after the restoration of peace he received a vote of £200,000 for the purchase of the estate of Strathfieldsaye, to be held on presenting a colored flag at Windsor on the 18th of June each year. With the return of peace he resumed the career of politics. He accepted the post of master-general of the ordnance with a seat in the cabinet of Lord Liverpool in January, 1819. In 1822 he represented Great Britain in the Congress of Vienna. In 1826 he was appointed high-constable of the Tower. On January 22, 1827, he succeeded the Duke of York as commander-in-chief of the forces. On January 8, 1828, he accepted the premiership, resigning the command of the forces to Lord Hill. In January, 1829, he was appointed governor of Dover Castle and lord warden of the Cinque Ports. In 1830 repeated motions for parliamentary reform were defeated, but the growing discontent throughout the country on this subject and a defeat in parliament caused the resignation of the government in November. His opposition to reform made the duke so unpopular that he was assaulted by a mob on June 18, 1832, and his life endangered. He accepted office under Sir Robert Peel in 1834-41, and again in 1846, when he helped to carry the repeal of the corn-laws, which till then he had opposed. In 1842 he resumed the command of the forces on the death of Lord Hill. He died at Walmer Castle, September 14, 1852.

**Wellman**, WALTER, journalist and explorer, was born at Mentor, Ohio, November 3, 1858. He established a weekly newspaper at the age of 14; at 21 established the Cincinnati *Evening Post*, and has been a correspondent of the Chicago *Herald* and *Record-Herald* since 1884. In 1892 he marked with a monument the supposed landing place of Columbus in Watling Island; in 1894 and 1898 headed Arctic exploring expeditions; in 1906 built a large airship at Paris, and attempted an aerial flight to the north pole in 1907 and again in 1909, both proving failures. In 1910 he attempted a flight from the United States to Europe, starting at Atlantic City, N. J. He failed in this effort, but made a flight over the ocean of 1000 miles, the greatest airship flight made to that time.

**Wells** (welz), a city of England, in Somersetshire, contains one of the most magnificent cathedrals in England, 415 feet long, with a transept measuring 155 feet, and three towers. Pop. 4655.

**Wells**, DAVID A., economist, born in Springfield, Massachusetts, in 1828. He was graduated from Williams College in 1847. Among other publications his essay on *Our Burden and Our Strength*, issued in 1864, had a large circulation. In 1867 he visited Europe, under government commission, and investigated industries competitive with those of the United States. His experience resulted in his acceptance of free-trade doctrines. He was a prolific writer of pamphlets on economic subjects. He died in 1898.

**Wells**, HERBERT GEORGE, a British novelist, born at Bromley, Kent, in 1866. He wrote a *Test Book of Biology* in 1893, and followed this by a series of highly imaginative stories, entitled *The Time Machine*, *The War of the Worlds*, *When the Sleeper Wakes* and various others, among the latest being *The New Machiavelli*.

**Wells**, HORACE, dentist, born at Hartford, Vermont, in 1815. He appears to have been the first to employ anæsthetics successfully, by inhaling nitrous oxide gas to destroy pain in dental operations. He tried it first on himself in 1844. Dr. Morton, of Boston, substituted ether for nitrous oxide in 1846. Wells lost his reason in 1848, probably as a result of inhaling chloroform, and committed suicide.

**Wellston**, a city of St. Louis Co., Missouri, in the vicinity of St. Louis city. Pop. 7312.

**Wellston** (wels'tun), a town of Jackson Co., Ohio, 32 miles s. e. of Chillicothe. There are coal mines in the vicinity, and it has iron, steel and cement works. Pop. 6875.

**Wellsville** (wels'vil), a city of Columbiana Co., Ohio, on the Ohio River, 48 miles w. n. w. of Pittsburgh. It has iron and tin-plate works, boiler, tanks, sewer-pipe and pottery works, etc. Pop. 7769.

**Welsbach Light**, an invention of Carl Auer von Welsbach, an Austrian, in 1884. In Europe it is known as the Auer light. It is based upon the discovery that certain materials become incandescent at a low temperature. The process followed is to saturate a combustible filament in the form of a network with a solution of a salt of a refractory earth, such as zirconium. It is then dried out and burned, the combustible element disappearing and leaving a frame of refractory material, which becomes incandescent at a low temperature. The filament is called a mantle and is exceedingly fragile. It gives a brilliant light

and has come into very wide use for stores and dwellings.

**Welwitschia** (wel-wich'-l-a), a remarkable plant growing in Southern Africa in dry regions near the western coast, between lat. 14° and 23° s. It presents a stem or rhizome forming a woody mass rising to a foot at most above the ground, and having a diameter of from 4 to 5 inches to as many feet, this mass bearing the two original cotyledonary leaves, which, when they reach their full development of 6 feet in length or so, become dry and split up into shreds but do not fall off. Every year several short flower-stalks are developed at the base of these leaves, but no other leaves are produced. There seems to be but one species, *W. mirabilis*. It is placed among the Gueta-ceæ.

**Wen**, an encysted tumor occurring on the scalp or other parts of the body. They are formed by the accumulation of sebum in a hair follicle, or in the recesses of the sebaceous gland of the hair sac, causing distension of the sac. An encysted tumor, in its commencement, is always exceedingly small, and perfectly indolent; and it is often many years before it attains any great size.

**Wenceslaus** (wen'-ses-las), or WENZEL, an Emperor of Germany and King of Bohemia; born in 1361; was the son of Charles IV, whom he succeeded in 1378. He favored the Hussites, but was unable to save the life of Huss. He died in 1409.

**Wen-chow** (wen'-chow), a Chinese treaty port, in Cheukiang, at the head of a bay. Pop. 100,000.

**Wends**, the name of a section of the Slavonic race, now dwelling mostly in that part of Germany known as Lusatia, partly in Prussia, partly in the Kingdom of Saxony. In the sixth century the Wends were a powerful people, extending along the Baltic from the Elbe to the Vistula, and southwards to the frontiers of Bohemia. They comprised a variety of tribes. The favorite occupation of the Wends was, and still is, agriculture. There are several dialects of the Wend language still extant.

**Wener** (ven'-er), the largest lake of Sweden, and after those of Ladoga and Onega the largest in Europe, situated in the southwest of the kingdom. It is 147 feet above sea-level, and of very irregular shape. Its greatest length, northeast to southwest, is about 100 miles; and its breadth may average about 30 miles; area, 2308

square miles. Its chief feeder is the Klar. By a canal it communicates with Lake Wetter, but its only proper outlet is at its southwestern extremity, where its superfluous waters are received by the river Gotha. In winter it is frozen for several months, and crossed by sledges. It abounds with fish.

**Wenlock** (wen'-lok), a municipal borough of England, in Shropshire, 12 miles southeast of Shrewsbury. It comprises Much Wenlock, Broseley, Madeley, Coalbrookdale, etc. There are large iron and other industries. Pop. 15,244.

**Wenlock Group**, in geology, that subdivision of the Silurian system lying immediately below the Ludlow rocks, and so called from being typically developed at Wenlock. See *Geology*.

**Wentletrap**. See *Scalaria*.

**Wentworth** (went'-wurth), Sir THOMAS, Earl of Strafford. See *Strafford*.

**Werdau** (ver'dou), a town of Saxony, on the river Pleisse, 25 miles w. s. w. of Chemnitz, with extensive manufactures of yarn and worsted, machinery, etc. Pop. (1905) 19,473.

**Werden** (ver'den), a manufacturing town of Rhenish Prussia, 15 miles northeast of Düsseldorf. Coal mining is carried on in the vicinity. Pop. (1905) 11,029.

**Werewolf** (wer'-wulf), a man-wolf, a man transformed into a wolf according to a superstition prevalent in ancient and medieval times. It was generally thought that such beings had the form of a man by day, and that of a wolf by night.

**Werff** (werf), ADRIAAN VAN DER, a Dutch painter, born near Rotterdam in 1659; died there in 1722. He was a pupil of Van der Neer, and among his celebrated paintings are the *Judgment of Solomon*, *Christ Carried to the Sepulcher*, *Eccs Homo*, *Abraham with Sarah and Hagar*, and *Magdalen in the Wilderness*. Van der Werff was particularly noted for his small historical pieces, which are most exquisitely finished, and still in high request.—His brother and pupil, PIETER VAN DER WERFF (born in 1665), painted portraits and domestic pieces, and was a very able artist. Died in 1718.

**Wergild**, WERGILD. See *Anglo-Saxon*.

**Werner** (ver'-ner), ABRAHAM GOTTLÖB, a German mineralogist, born in 1750; died in 1817. In 1776 he was appointed inspector and teacher



of mineralogy and mining in the Mining Academy at Freiberg, in which position he remained for the rest of his life. Werner was the first to separate geology from mineralogy, and to place the former on the basis of observation and experience. The great geological theory with which his name is connected is that which attributes the phenomena exhibited by the crust of the earth to the action of water, and is known as the Wernerian or Neptunian theory, in distinction to the Huttonian or Plutonic, in which fire plays the chief part.

**Wernigerode** (ver'ni-ge-rō-dē), a town of Prussia, in the province of Saxony, 43 miles southwest of Magdeburg, at the foot of the Harz Mountains. It has several interesting ancient Gothic buildings, a residence of the Counts Stolberg-Wernigerode, with a library of about 120,000 volumes, etc. Pop. (1905) 13,137.

**Werra.** See *Weser*.

**Wesel** (vā'zī), a river port and strongly fortified town in Rhenish Prussia, at the confluence of the Rhine and the Lippe, 30 miles N. N. W. of Düsseldorf. It contains the old Gothic church of St. Willibrord, recently restored, a fine old Gothic town house, and many quaint buildings. The manufactures comprise woollens, chemicals, leather, etc. Pop. (1905) 23,237.

**Weser** (vā'zēr), a river of Germany, formed by the junction of the Fulda and Werra at Münden, flows generally in a northwest direction, and, after a very circuitous course, traverses the city of Bremen, and then falls by a wide mouth, very much encumbered with sand-banks, into the German Ocean. Its length, including the Werra, is about 430 miles. The navigation for vessels of large size ceases about 10 miles below Bremen. See *Bremen*.

**Wesley** (wes'li), CHARLES, younger brother of John Wesley, was born at Epworth, England, in 1708, and was educated at Westminster School and Christ Church, Oxford. He accompanied his brother to Georgia as an ordained clergyman, but after his return to England he became, in 1738, a preacher in the Methodist connection, and materially assisted the success of the movement by his numerous hymns, large collections from which have been frequently published. He died in 1788. Two of his sons, Charles and Samuel, were celebrated for musical genius.

**Wesley**, JOHN, the founder of Wesleyan Methodism, was born at Epworth, Lincolnshire (his father

being rector of the parish), June 17, 1703, and educated at the Charterhouse, and at Christ Church, Oxford. He took his degree of B.A. in 1724, was ordained deacon in 1725, became a fellow of Lincoln College, and lecturer and moderator in classics in 1726; and took priest's orders in 1728. He now gathered together a number of pupils and companions who met regularly for religious purposes, and by their strict and methodical habits acquired the name of Methodists. Among these companions were Hervey, Whitefield, and Law, the author of the *Serious Call to the Unconverted*. In 1735 Wesley accepted an invitation from General Oglethorpe to go out to America to preach to the colonists of Georgia. After a stay of two years he returned to England (Feb., 1738), and in the following May an important event took place in his inner religious life, namely, his conversion. In June he paid a visit to Herrnhut, the Moravian settlement, returning to England in September. Early in the following year (1739) he began open-air preaching, in which he was closely associated with Whitefield, from whom, however, he soon separated, but without a permanent personal breach. Having now the sole control of the religious body which adhered to him, he devoted his entire life without intermission to the work of its organization, in which he showed much practical skill and admirable method. His labors as an itinerant preacher were incessant. He would ride from 40 to 60 miles in a day. He read or wrote during his journeys, and frequently preached four or five times a day. He married in 1750 Mrs. Vezelle, a widow with four children, but the union was unfortunate, and they finally separated. He died March 2, 1791. He held strongly to the principle of episcopacy, and never formally separated from the Church of England. His collected works were published after his death in thirty-two volumes, octavo. He contributed to the collection of hymns, the greater part of which were written by his brother Charles. See *Methodists*.

**Wesleyan Methodists.** See *Methodists*.

**Wessex** (wes'seks), that is, WEST SAXONS, one of the most important of the Anglo-Saxon kingdoms in England during the sixth, seventh, and eighth centuries, and the early part of the ninth, and that in which the other kingdoms were ultimately merged in the reign of Egbert in 827. It included the counties of Devon, Dorset, Somerset

Wills, Haats, Berks and a part of Cornwall.

**West**, BENJAMIN, painter, born in Delaware Co., Pennsylvania, October 10, 1738. He showed great precocity in his aptitude for painting, and at the age of eighteen established himself as a portrait-painter at Philadelphia. In July, 1760, he visited Italy, and settling in Rome, painted *Cimon and Iphigenia*, and *Angelica and Medora*. He visited England in 1763, and was so well patronized that he determined to make it his future residence. He painted *Hector and Andromache*, *The Return of the Prodigal Son*, and a historical painting of *Agrippina*, the last for the Archbishop of York, who introduced him to George III, who became his steadfast patron, and gave him commissions to the extent of about £1000 a year for upwards of thirty years. He painted a series of historical works for Windsor, and for the oratory there a series on the progress of revealed religion. On the death of Reynolds, in 1792, he was elected president of the Royal Academy. He afterwards painted a number of religious and historical pictures of large size, among them being *Christ Healing the Sick* (in the National Gallery), the *Crucifixion*, *Ascension*, and *Death on the Pale Horse*. The *Death of General Wolfe at Quebec* and *The Battle of La Hogue* are accounted the best of his historical pieces. 'The 400 historical pictures which he painted show skill in composition and considerable inventive power, but they have no real vitality. Tame in style and monotonous in color, they now possess little interest. Many of his works have been engraved. He died in London March 11, 1820, and was buried in St. Paul's Cathedral.

**West African Colonies** or **BARBAIN**, the Gold Coast, Lagos, Gambia, and Sierra Leone (which see).

**West Allis**, a city of Milwaukee Co., Wisconsin, a few miles from Milwaukee. Its manufactures include engines, chains, belts, steam pumps, etc. Pop. 6645.

**West Bay City** (formerly Wenona), a former city of Bay Co., Michigan, on the Saginaw River, near its mouth, and opposite Bay City. It has shipbuilding and coal-mining industries, and manufactures lumber, beet-sugar, chicory, chemicals, etc. Pop. (1900) 13,119; it is now incorporated with Bay City.

**West Berwick**, a borough in Cumberland Co., Pennsylvania, in an agricultural and manu-

facturing region. It is closely associated with Berwick, its banking point. Pop. 5512.

**Westboro** (west'bur-ō), a town of Worcester Co., Massachusetts, 33 miles from Boston, on the Boston and Albany Railroad. Its manufactures include iron and brass beds, trellises, tape, leather, straw and leather goods, underwear, etc. Pop. 5446.

**Westbrook** (west'bruk), a city of Cumberland Co., Maine, 5 miles N. W. of Portland. There are paper, cotton and silk mills, foundries and other industries. Pop. 8500.

**West Bromwich**, a municipal borough of England, in Staffordshire. It is in a rich iron and coal region and has extensive iron works and manufactures of metal goods. Pop. 68,345.

**West Chester** (west'ches-ter), a borough, capital of Chester Co., Pennsylvania, is situated 30½ miles W. of Philadelphia. It stands in a rich farming region, a rolling country, about 450 feet above tide-water, and has a notable courthouse, a botanical garden, and is the seat of a State normal school and other educational institutions. It has large grain and dairying industries, and manufactures of dairy supplies, wheels, tags, paper, etc. Pop. 11,767.

**Westcott** (west'kot), EDWARD NOYES, novelist, was born at Syracuse, New York, in 1847. He is known for one work, *David Harum: a Story of American Life*, of which the humor and skillful character drawing gave it a very wide circulation. He died March 31, 1898, before its publication.

**Westerly** (west'er-li), a village in Westerly township (town), Washington Co., Rhode Island, on the Pawcatuck River, 44 miles S. W. of Providence. Cottons and woollens are largely manufactured, also thread and printing presses, and a highly superior quality of granite is largely quarried. Pop. of town, 8696.

**Western Australia**, a British colony which includes all that portion of the Australian continent situated westward of 129° E. lon. This territory measures 1490 miles from N. to S., and 850 miles from E. to W. The total estimated area is 975,920 sq. miles, thus making it the largest of the Australian colonies. The really occupied portion, apart from scattered settlements round the coasts, is almost entirely in the southwest, and is about 600 miles in length, and 150 miles in average breadth. The remainder is almost wholly desert or sand-

covered plain, with large areas destitute of vegetation. A region of mountains border the western coast line, with other more interior ranges. Western Australia was first settled in 1820 as the Swan River Settlement, and for many years the population was very small. In 1850 it was made a convict station, and remained such till the abolition of transportation in 1868. Since that time it has been making gradual progress. Perth is the capital, on Swan River. Besides this river there are, in the southwest, the Blackwood, Murray, Murchison, etc., further north, the Gascoyne, Ashburton, Fortescue, De Grey, Fitzroy, etc., none of them navigable at all seasons. The southwest has vast forests, which supply valuable timber for exportation, especially that known as jarrah (which see). Other trees are the lofty eucalyptus or blue gum, sandalwood, karri, etc. Copper and lead are found in abundance and are slightly worked. The other chief minerals are gold, coal, zinc, and iron; the gold deposits being widespread and the product of much value. The pearl fisheries are rising in value. The Kimberley and northern districts contain boundless pastures, and there are lands suitable for the growth of sugar, tobacco, wheat, etc. In the Kimberley district considerable quantities of gold are now obtained from quartz reefs. In other parts are soils and climates admirably adapted for the cultivation of silk, olives, the vine, etc. Fruits are abundantly general. The live stock includes sheep, cattle, horses, pigs, goats, and a few thousands of camels. Sheep are largely kept and the wool clip is large and valuable. The principal exports are wool, pearls and shells, timber, and sandalwood. The chief imports from Great Britain are apparel and haberdashery, ale, iron, cottons, telegraph wire, etc. In 1901 the colony became a State of the commonwealth of Australia, its population at that date being 184,124. Pop. (1914) 325,019.

**Western Empire**, a portion of the consisting of Italy, Roman empire, Gaul, Britain and Africa, which Valentinian I reserved for himself when in 364 he shared the imperial authority with his brother Valens, who reigned in Constantinople as Emperor of the East, and whose territories comprised the eastern half of the Roman Empire. This partition of the Roman Empire became final in 395, when Theodosius the Great divided the Roman world between his sons, Honorius, who became Emperor of Rome and the West, and Arcadius, who

became Emperor of Constantinople and the East. The Western Empire terminated in 476.

**Western Reserve**, a tract of land in the N. E. of what is now the State of Ohio, once forming part of the claims of Connecticut in the Northwest Territory. When, by the treaty of 1783, Great Britain relinquished the territory S. of the Great Lakes and E. of the Mississippi, disputes arose among the States of Virginia, New York, Massachusetts, and Connecticut as to the right of occupancy in that locality. The difficulty was finally settled by the cession of the whole to the Federal government, but Connecticut reserved a tract of nearly 4,000,000 acres on Lake Erie. The State finally disposed of this in small lots to colonists, and so accumulated a very large school fund.

**Westfield** (west'fēld), a town (township), of Hampden Co., Massachusetts, on Westfield River, 9 miles W. of Springfield. It contains a State Normal School, Westfield Athenaeum, and other institutions. The manufactures are extensive and include whips, cigars, paper, steam heaters, machinery, thread, etc. The town was settled in 1658. Pop. 16,044.

**Westfield**, a town of Union Co., New Jersey, 7 miles W. by S. of Elizabeth. It is chiefly a residence place for New York business men. Pop. 6420.

**West Haven**, a borough of New Haven Co., Connecticut, separated from New Haven by the West River. It has manufactures of buckles, pianos, safes, etc. Within its limits is Savin Rock, on Long Island Sound, a popular resort. Pop. 8543 (included in pop. of Orange).

**West Hoboken**, a town of Hudson Co., New Jersey, near the Hudson River, contiguous with Hoboken and Jersey City. Its manufactured products include embroideries, silks, braids, pearl buttons, artificial flowers, etc. The town was set off from Bergen in 1861. Pop. 35,403.

**Westhoughton** (-hō'ten), a township in Lancashire, 5 miles W. S. W. of Bolton, with manufactures of silk and cotton, and coal mining. Pop. 15,046.

**West India Apricot**. See *Mamee-tree*.

**West Indies** (-in'dēz), also called the **ANTILLES**, the extensive archipelago which lies between North and South America, stretching from Florida to the shores of Venezuela. It is divided into the Bahamas, the group

stretching from near the coast of Florida in a southeasterly direction; the Greater Antilles, comprising the four largest islands of the group, Cuba, Hayti, Porto Rico and Jamaica; and the Lesser Antilles, stretching like a great bow, with its convexity towards the east, from Porto Rico to Trinidad, near the coast of Venezuela. Almost the whole archipelago lies within the torrid zone. The total area does not exceed 95,000 square miles, of which the Greater Antilles occupy nearly 83,000 square miles. The climate is tropical, but modified by the surrounding oceans and the elevated surface of many of the islands, and the islands abound in tropical productions, as sugar, cotton, coffee, tobacco, maize, etc.; oranges, lemons, limes, pomegranates, citrons, pineapples, etc.; manioc, yams, potatoes, etc. Except Hayti and Cuba (which are independent), Porto Rico, Santa Cruz, St. Thomas, and St. Johns (which now belong to the United States, the latter three purchased recently from Denmark), and a few islands off the coast of S. America, the W. I. Islands are in the possession of European powers. The chief British possessions are: Jamaica, Barbados, St. Lucia, St. Vincent, Trinidad, Tobago, Antigua, St. Kitt's, Dominica, Virgin Islands and the Bahamas.—*Dutch*: St. Eustatius, Saba, St. Martin (partly French), Bonaire or Buen Ayre, Curaçao, and Oruba or Aruba.—*French*: Martinique, Descada, Guadeloupe, Marie Galante, St. Martin (partly Dutch), St. Bartholomew, and Les Saintes. See the various islands and groups.

### Westinghouse

(west'ing-hons), GEORGE, inventor, capitalist and manufacturer, was born at Central Bridge, New York, in 1846. He entered the machine shop of his father and at the age of 15 designed a rotary engine. He served in the Union army in 1863-64. He is best known by the famous air-brake that bears his name, so generally used in railroad traffic. He originated other devices, including electrical machinery, railroad signals, etc., and was an extensive manufacturer of electrical goods, his enormous manufacturing establishment, that of the Westinghouse Mfg. Co., being at Pittsburgh, Pa. He died, March 12, 1914.

### Westlake

(west'lak), WILLIAM, born in Cornwall, England, in 1831; removed to Milwaukee, Wis., early in life; later learned the glass-smith's trade; was employed by Capt. John Ericsson to make models for his first hot-air engine. His inventions embrace the Westlake car heater, the globe

lantern, the oil cook stove, the stove board, etc. He died December 28, 1900.

### Westmacott

(west'ma - kot), SIR RICHARD, sculptor, born in London in 1775. In 1793 he went to Rome to study under Canova, and made such progress that he gained the pope's annual gold medal for sculpture. He also obtained a first prize for sculpture at Florence. In 1798 he returned to England, and rose rapidly in his profession. Many of the monuments in St. Paul's are from his chisel. He designed also the Achilles in Hyde Park, the statue of Lord Erskine in Lincoln's Inn Old Hall, that of Nelson in the Liverpool Exchange, besides statues of Addison, Pitt, etc. He was elected an associate of the Royal Academy in 1805, a full member in 1816, and in 1827 succeeded Flaxman as lecturer on sculpture. In 1837 the dignity of knighthood was conferred on him. He died in 1856.

### Westmeath

(west'meth), a county in Ireland, in the province of Leinster, with an area of 708 sq. miles. The surface is hilly in the north, but elsewhere undulates gently. The drainage is shared between the Shannon and the Boyne. The former, with its expansion Lough Ree, forms the western boundary of the county; other rivers are the Brosna and the Inny; and there are a number of lakes. The principal grain crop is oats, but the larger part of the available surface is devoted to grazing. Important means of communication are furnished by the Shannon, the Royal Canal, and a branch of the Grand Canal. The county town is Mullingar. Pop. of county, 61,629.

### Westminster

(west'min-ster), a city of Middlesex, England, seat of government and the residence of royalty, is now so united with London that in appearance they form one city, and in ordinary speech are mentioned as one, though they have their separate jurisdictions. Temple Bar (now removed) separated the two cities. Within the city and liberties are Westminster Hall, Abbey, and School, Buckingham Palace, the Houses of Parliament, St. James' Palace, the Whitehall Banqueting House, etc. Pop. 160,277. (See London.)

### Westminster Abbey

the coronation church of the sovereigns of England, and one of the chief ornaments of London, is a magnificent Gothic pile, situated near the Thames, and adjoining the Houses of Parliament. In 1065 a church was built here in the Norman style by Edward the Confessor. Part of this structure still



remains in the pyx-house and the south side of the cloisters; but the main building, as it now stands, was begun in 1220 by Henry III (who built the choir and transepts), and was practically completed by Edward I. Various additions, however, were made (including the nave and aisles, the west front, and the Jerusalem Chamber) down to the time of Henry VII, who built the chapel which bears his name, while the upper parts of the two western towers were designed by Sir Christopher Wren. The extreme length of the church, including Henry VII's chapel, is 531 feet; breadth of transepts, 203 feet; height of the roof, 102 feet; height of towers, 225 feet. The coronation ceremony takes place in the choir, where the coronation stone brought by Edward I from Scotland is situated beside the coronation-chairs of the English sovereigns. Westminster Abbey is distinguished as the burial-place of numerous English kings from Edward the Confessor to George II; the north transept is occupied chiefly by monuments to warriors and statesmen; while in the south transept is situated the 'Poets' Corner,' the burial and memorial place of most of England's great writers from Chaucer to Robert Browning. See London.

### Westminster Assembly of Divines

a celebrated assembly held at Westminster for the settlement of a general creed and form of worship throughout Great Britain. By an ordinance passed June 12, 1643, 121 clergymen, with ten lords and twenty commoners as lay assessors, were nominated as constituents of the assembly. The assembly began its sittings in July, 1643, in Westminster Abbey, but in the meantime a royal proclamation had been issued forbidding the assembly to meet, which had the effect of inducing the greater part of the Episcopal members to absent themselves. The majority of those who remained were Presbyterians, but there was a strong minority of Independents. A deputation was now sent along with commissioners from the English parliament to the General Assembly of the Scottish Church and the Scottish Convention of Estates, soliciting their coöperation in the proceedings of the Westminster Assembly, and accordingly in September four Scottish clergymen, with two laymen, were admitted to seats and votes by an act of the English legislature. The assembly continued to hold its sittings till February, 1649. Among the results of its deliberations were the *Directory of Public Worship*,

the *Confession of Faith*, and the *Larger and Shorter Catechisms*, which remain practically the standards of the Presbyterians to the present day. At the Restoration the whole proceedings of the Westminster Assembly were annulled as invalid.

**Westminster Hall**, the hall of the old palace of Westminster, was erected by Richard II (1397-99) on the foundations of a structure built by William Rufus. It has a fine porch, and its hammer-beam roof of carved timber is considered the most notable of its kind; length of the building, 290 feet, breadth 68 feet, and height 110 feet. This building is closely associated with many stirring events in English history; but it is chiefly remarkable as the place where were held such great State trials as those of the Chancellor More, Lady Jane Grey, the Earl of Strafford, King Charles I, and Warren Hastings, and as the center of the highest English courts of law till these were removed to the new buildings recently erected for their accommodation. The hall now serves as a fine vestibule to the Houses of Parliament.

**Westminster School**, or the Royal School of St. Peter's, Westminster, one of the great public schools of England, was founded in 1560, and was reorganized in 1868. There are forty foundationers, the number of vacancies yearly being ten.

**Westmoreland** (west'mör-land), a county in England, bounded by Cumberland, Lancashire, Morecambe Bay, Yorkshire, and Durham; area, 783 square miles. The surface, with the exception of a small portion in the south sloping to Morecambe Bay, is very mountainous. Much of the celebrated lake scenery of England is within the limits or on the borders of this county, the chief lakes being Ulleswater, Grasmere, Rydal Water, and Windermere. The principal rivers are the Eden, Lune, and Kent. The minerals include graphite, roofing slate, marble, and small quantities of coal, lead, and copper. Appleby is the chief town. Pop. 63,575.

**Westmount**, a town of Quebec province, Canada. Pop. 14,579.

**West New York**, a town of Hudson Co., New Jersey, adjacent to West Hoboken. It has silk mills. Pop. 13,560.

**Weston-super-Mare** (mā'rē; that is, Weston-on-Sea), a seaport and watering-place

## West Orange

in England in the county of Somerset, on the Bristol Channel, 19 miles southwest of Bristol. It is recommended as a place of resort both in winter and summer. A fine esplanade, pier, etc., are here. Pop. 23,235.

**West Orange**, a town of Essex Co., New Jersey, adjoining the city of Orange. It contains Ilwellyn Park, a beautiful residential tract on the s. e. slope of Orange Mountain; also a large country club. Hats, etc., are made here. Pop. 10,980.

**Westphalia** (west'fa-li-a), the name given at different periods to (1) one of the circles of the old German Empire; (2) one of Napoleon's kingdoms (1807-13), conferred upon his brother Jerome; and (3) now to a province of Prussia. The latter is bounded by Rhenish Prussia, Holland, Hanover, Brunswick, Hesse and Nassau. Its area is 7771 square miles. The surface in the south and northeast is generally mountainous; the northwest spreads out into extensive and often marshy plains, and belongs to the basin of the Ems; the northeast and a small part of the east to the basin of the Weser; the remainder, constituting the far larger portion of the whole, belongs to the basin of the Rhine, whose chief tributaries are the Ruhr and Lippe. Besides iron and coal in abundance the minerals include copper, lead, zinc and salt; and the manufactures are varied and important. The province is divided into the three governments of Münster, Minden and Arnsberg. Münster is the capital. Pop. (1905) 3,618,090.

**Westphalia**, **PEACE OF**, the name given to the peace concluded in 1648 at Münster and Osnabrück, by which an end was put to the Thirty Years' war (which see). By this peace the sovereignty of the members of the empire was acknowledged. The concessions that had been made to the Protestants since the religious peace in 1555 were confirmed. The elector-palatine had the palatinate of the Rhine and the electorate restored to him; Alsace was ceded to France; Sweden received Western Pomerania, Bremen, Verden, Wismar and a sum equal to £750,000; Brandenburg, Mecklenburg, Hanover and Brunswick were compensated by the secularization of numerous ecclesiastical foundations. The independence of the United Provinces was recognized by Spain.

**West Pittston**, a borough of Luzerne Co., Pennsylvania, on the North Branch of the Susquehanna River, opposite Pittston, and

## West Virginia

on the Lackawanna and Lehigh Valley Railroads. Pop. 6848.

**West Point**, a village of New York, on the Hudson river, about 50 miles above New York City. It is notable as the seat of the United States Military Academy, and is a favorite summer resort. A fortress was built here during the Revolutionary war, and the treason of Benedict Arnold consisted in his endeavor to deliver this to the British. The site of the academy commands one of the finest river views in the world.

**West Troy**, the official post-office designation of the town of Watervliet (which see).

**Westport** (west'pört), a seaport in Ireland, County Mayo, at the mouth of a small river in Clew Bay, 10 miles s. s. w. of Castlebar. Pop. 3892.

**West Springfield**, a town (township) in Hampden Co., Massachusetts, with a village of the same name, on the Connecticut River, opposite Springfield. It has some manufactures. Pop. of town, 9224.

**West Tampa**, a city of Hillsboro Co., Florida, in West Tampa precinct. Pop. 8258.

**West Virginia**, a State of the American Union, bounded n. and e. by Pennsylvania and Maryland, e. and s. by Virginia, and w. by Ohio and Kentucky; area 24,170 sq. miles. The surface is very largely mountainous and hilly, being traversed in the east and center by parallel ranges of the Allegheny Mountains. About two-thirds of the area is covered with forests. The soil of the ridges is fertile, and the summits of many of the mountains are level, forming natural meadows or glades. Blue grass is indigenous and grazing excellent, especially in the valley of the Great Kanawha. The forests are chiefly made up of hardwood trees of valuable kinds, making the lumber interest very important; coal is a highly valuable product, nearly the whole State lying within the Allegheny coal system. The coal is bituminous and is estimated to underlie 16,000 square miles. Petroleum is also abundant and is extensively produced, and natural gas is found in some sections. Other minerals include salt, largely produced; iron-ore, glass-sand, kaolin, limestone and grinding stone. The minerals and mineral springs are practically inexhaustible. The live-stock interests of the State are large, especially sheep, West Virginia being famous for its wool. The agricultural staples include corn, wheat, oats and

tobacco, and orchard fruits are extensively cultivated. Manufactures are as yet little developed, except in the towns on the Ohio river, but the State has enormous water-power, all its streams having a rapid descent. This will undoubtedly be utilized. The leading industries are those of steel and iron, glass, flour, salt, lumber and wood products, coke, pottery, firebrick, leather, cigars and tobacco. Wheeling is the largest and most important city; and the manufacturing center, nearly all the industries named flourishing here. Pop. 1,221,119.

**Westward-Ho**, a sea-bathing place of England, in the county of Devon, on Barnstaple Bay, about 8 miles N. W. of Bideford. Westward-Ho College is a military school, and there is an excellent golfing links.

**Wetter** (vet'ter), a lake in Sweden, about 24 miles southeast of Lake Wener; greatest length, 80 miles; medium breadth, about 15 miles. Its height above the level of the Baltic is nearly 300 feet, but its depth is in some parts above 400 feet. The Wetter forms part of the canal connection between the Cattegat and the Baltic. The chief town on its shores is Jönköping.

**Wetterhorn** (vet'ter-hörn), a mountain of Switzerland, in the Bernese Oberland, with three peaks respectively 12,149, 12,166 and 12,107 feet high.

**Wetzlar** (vets'lär), a town in Rhenish Prussia, at the junction of the Lahn and Dill. It was anciently a free imperial town, and was the seat of the imperial German court of justice from 1698 to 1806. Pop. (1905) 12,276.

**Wexford** (weks'furd), a maritime county in Ireland, on the Irish Sea and St. George's Channel; area 901 sq. miles. The chief inlet on the east coast is Wexford Harbor, which, though spacious, is of intricate navigation and obstructed by a bar. The surface of the interior is hilly, rising into a ridge on the northwest, declining into a level peninsula to the southeast. The chief rivers are the Slaney and Barrow. The prevailing soil is stiff clay, generally well cultivated, and producing oats, wheat, barley, and potatoes. The fisheries are extensive. Pop. 104,104.

— **WEXFORD**, the county town, is a seaport on the river Slaney, where it enters Wexford Harbor. The herring and salmon fisheries employ many persons; malt is manufactured, and distilling, brewing, and shipbuilding are carried on. The chief trade is in exporting grain, cattle, poultry, butter, etc. Pop. 11,168.

**Wexiö** (vek'si-eu), a cathedral city of Southern Sweden, with an old cathedral. Pop. 7366.

**Weyler**, VALERIANO Y NICOLAU, a Spanish general, born at Barcelona in 1840. He was a military attaché of Spain at Washington during the American Civil war and served in the army under Sheridan. He took part in the Carlist war, has a high reputation as a soldier, was made governor of the Canary Islands in 1879 and captain-general of the Philippine Islands in 1889. He afterwards held high offices in Spain and in 1896 was sent to Cuba to suppress the insurrection. His ruthless cruelty to the natives excited such indignation in the United States that he was recalled in the autumn of 1897.

**Weyman** (wa'man), STANLEY JOHN, an English novelist, born at Ludlow in 1855. His novel of romance and adventure, *A Gentleman of France* (1893), became highly popular, and was followed by a number of others in the same vein.

**Weymouth and Melcombe-**

**Regis**, a seaport of England, in Dorsetshire, on a semicircular bay, 7 miles south-southwest of Dorchester, Weymouth being on one side, Melcombe-Regis on the other of the small river Wey, over which is a bridge. There is a considerable coasting trade, the chief export being Portland stone. Melcombe-Regis attracts numerous visitors. There is a fine esplanade, about 1 mile in length. Pop. 22,325.

**Weymouth** (wa'muth), a seaport in Norfolk Co., Massachusetts, on Boston Harbor, 11 miles S. E. of Boston. It has manufactures of boots and shoes, isinglass, fireworks, etc., and a considerable trade. Pop. 12,895.

**Whale** (wāl), the common name given to the larger mammals of the order Cetacea (which see). They are characterized by having fin-like anterior limbs, the posterior limbs being absent, but having their place supplied by a large horizontal caudal fin or tail. Their abode is in the sea or the great rivers, and they resemble the fishes so closely in external appearance that not only non-scientists, but even some of the earlier zoölogists regarded them as belonging to that class. The whales are usually divided into two families, the Balanidae and the Physeteridae or Cato-dontidae. The Balanidae, or whalebone whales, are distinguished by the absence of teeth, by the presence of baleen or whalebone in the mouth. The typical representative of this family is the com-

mon South Greenland whale (*Balaena mysticetus*), so valuable on account of the oil and whalebone which it furnishes. (See *Whalebone*.) It is principally found in the Arctic seas, but it is also found in considerable numbers in many other parts of the world. Its length is usually about 60 feet, and its greatest circumference from 30 to 40 feet. Allied to the Greenland whale is the ror-



Greenland Whale (*Balaena mysticetus*).

qual. It measures as much as 85 feet in length, and from 30 to 35 feet in circumference. (See *Rorqual*.) Of the *Physetridæ* or *Catodontidæ*, the best known species is the sperm-whale or cachalot (*Physeter* or *Catodon macrocephalus*), which averages from 50 to 70 feet in length. (See *Sperm-whale*.) Some species of the *Delphinidæ* or dolphin family are also known as whales. (See *Beluga*, *Casing-whale*.) Whale fishing for the sake of the oil and whalebone has been an important industry since the twelfth century. It was for long prosecuted with great energy by the Dutch, English, French, and Americans, but of recent times it has greatly decreased, chiefly on account of the scarcity of whales. The British whaling fleet now numbers barely a dozen vessels, mostly belonging to Dundee and Peterhead. The American whale fishery is chiefly prosecuted by New Bedford vessels, but is fast dwindling away. The instruments used in the capture of the whale are the harpoon and the lance. The harpoon is an iron weapon about 3 feet in length, terminating in an arrow-shaped head. This is attached to a line, and is thrown at the whale by hand, so as to transfix it, or is discharged from a small swivel cannon placed in a boat. The lance is a spear of iron about 6 feet in length, terminating in a thin sharp steel head. These, with the necessary lines, boats, etc., are all the apparatus required for capturing the whale. In modern whale fishing guns, with explosive bullets, are brought into

use, and the danger of the fishery is greatly reduced. When captured the animal is cut up, the blubber balled and the oil extracted, and the whalebone dried. In recent years there has been an increase in the amount of whale products in America, with a corresponding increase in prosperity.

**Whaleback**, the name of a form of steam vessel invented by Capt. Alexander McDougall, of West Superior, Wisconsin, in 1874, for use on the Great Lakes. In 1888 the first whaleback barge was built of 437 tons registry and 1400 tons capacity. The name whaleback was suggested by the resemblance of the visible portions of the vessel, when afloat, to the back of a whale. A whaleback crossed the Atlantic in 1891. Vessels of this kind are now in common use.

**Whalebone** (wāl'bōn), or **BALÆN**, a well-known elastic horny substance which hangs down in thin parallel plates from the sides of the upper jaw of the family of whales called *Balenidæ*. These plates or laminae vary in size from a few inches to 12 feet in length; the breadth of the largest at the thick end, where they are attached to the jaw, is about a foot, and the average thickness is from four to five tenths of an inch. From its flexibility, strength, elasticity, and lightness, whalebone is employed for many purposes, as for ribs to umbrellas and parasols, for stiffening corsets, etc. In commerce it is often called *whale-sh*.

**Whale-louse** (*Oydmus cetti*, order *Læmodipoda*), a genus of small crustaceans, so named from living a parasitic life on whales and other cetaceans.

**Whampoa** (hwām-pō'a), a port of China, on an island of the same name, 12 miles E. of Canton, with commodious docks, etc., for the cleansing and repair of vessels.

**Wharton** (hwar'tun), ANNA HOLLINGSWORTH, author, born in Cumberland Co., Pennsylvania. She became a resident of Philadelphia and wrote *Through Colonial Doorways*, *A Last Century Maid*, *Heirlooms in Miniature*, and other works dealing with Colonial life.

**Wharton**, EDITH, American author, born in New York City in 1862. Her fiction includes: *The Valley of Decision* (1902), *The Descent of Man and Other Stories* (1904), *The House of Mirth* (1905), *The Fruit of the Tree* (1907) and *Ethan Frome* (1912).

**Wharton**, FRANCIS, jurist, was born at Philadelphia in 1820;



died in 1889. He became professor of logic and rhetoric of Kenyon College, Ohio, in 1856; was afterwards ordained as a rector in the Episcopal Church, and became professor in the Episcopal divinity school at Cambridge, Mass.; also professor of international law in the Boston Law School, and in 1885 solicitor for the State Department at Washington. He wrote *A Treatise on the Criminal Law of the United States*, *A Treatise on Medical Jurisprudence*, *The Conflict of Laws*, etc.

**Wharton**, JOSEPH, manufacturer, was born at Philadelphia in 1826; died in 1909. He engaged in the white-lead manufacture, was manager of the Lehigh Zinc Co., 1853-63, aided in founding the Bethlehem Iron Co., and established extensive nickel works at Camden, New Jersey. He founded the Wharton School of Finance and Economics, University of Pennsylvania, and endowed a chair of history and economics at Swarthmore College.

**Wharton**, THOMAS WHARTON, MARQUIS OF, born 1640; died 1715; is the reputed author of the celebrated political ballad *Lillibullero*, and was severely castigated by Swift.—His son, PHILIP WHARTON (1699-1731), was created a duke in 1720. Like his father, he lived a very profligate life, and is now chiefly remembered as the subject of Pope's satire, as his father was of Swift's.

**Whately** (hwät'il), RICHARD, Archbishop of Dublin, was born in London in 1787; died in 1863. He received his education at a private school at Bristol, and at Oriel College, Oxford. He graduated B.A. in 1808, and in 1810 won the English essay prize. In 1819 he made his first appearance as an author by publishing his famous *Historic Doubts Relative to Napoleon Bonaparte*. In 1822 Whately was appointed Bampton lecturer at Oxford, and delivered eight lectures *On the Use and Abuse of Party Feeling in Matters of Religion*. He held the living of Halesworth in Suffolk in 1822-25, and was then appointed principal of St. Alban's Hall, Oxford. In the latter year he published *Essays on Some of the Peculiarities of the Christian Religion*. A second series of essays *On Some Difficulties in the Writings of St. Paul and Other Parts of the New Testament*, came out in 1828; and a third series, *The Errors of Romanism Traced to Their Origin in Human Nature*, in 1830. In 1827 was published *The Elements of Logic*, and the scarcely less popular *Elements of Rhetoric* in 1828. Both of

these works were written originally for the *Encyclopædia Metropolitana*. He occupied the chair of political economy at Oxford in 1830-31, and afterwards published *Introductory Lectures on Political Economy*. In 1831 he was appointed archbishop of Dublin, a position in which he did much for national education and other worthy objects in Ireland, including the foundation and endowment of a chair of political economy in Trinity College. Besides the works mentioned he wrote or edited many others.

**Wheat** (hwët; *Triticum sativum*), the most important species of grain cultivated in Europe, and a very important crop in America, India, Australia, etc. It grows readily in almost every climate; but its natural home seems to be a temperate climate, and the soils best adapted for its culture are rich clays and heavy loams. Of cultivated wheats there are many varieties, the differences, however, being mostly due to soil, climate, and mode of cultivation. Three primary varieties may be mentioned: (a) *T. hybernum* (*muticum*), winter or unbearded wheat; (b) *T. aestivum* (*aristatum*), summer or bearded wheat; (c) *T. speita* (*adhærens*), spelt or German wheat, which is of much less value than the others, but grows on poorer soils and more elevated localities. White wheat and red wheat are names applied according to the color of the grain, the red sorts being generally hardier than the white, but of inferior quality, and the yield is less. Winter wheat is sown in the autumn, with the view of being harvested the following year; summer wheat is sown in the spring of the year in which it is reaped. The native country of the cultivated wheat has usually been considered to be the central parts of Asia, and it has been reported as growing wild in Kurdistan, Mesopotamia and elsewhere, but this lacks proof. It has been cultivated from a very early period, probably as early as 3000 B.C. in China. It was one of the principal crops in ancient Egypt and Palestine, and has been found in the lake dwellings of prehistoric Europe. It is now cultivated in all the temperate parts of the continents, is grown to a considerable extent in northern India, and is very extensively cultivated in the United States, Canada and wide regions of South America. Wheat of very fine quality is produced in Australia. It does not thrive in the torrid zone, except in elevated situations, though it does well in subtropical regions. A hardy plant, it can endure very severe

winters if covered with snow. For its successful cultivation it must have a mean temperature of not less than 55° F. for three or four months of the year. As it is an annual plant, its capacity for enduring cold is of importance, since this permits it to be sown in the autumn, so as to have a good start in the following spring. Its cultivation does not extend as far north as that of oats, rye or barley, its northern limit in Europe being about 60° N. latitude. The quality of the grain varies in different soils and climates, and certain varieties are distinguished by difference of quality and of external appearance. The varieties of wheat are, from its long cultivation, very numerous, many of these varieties being in high esteem in certain districts, though little known beyond them. The relative proportions of straw and grain differ greatly in different varieties, the proportion of grain to that of straw when dried for stacking varying from 20 to 47 per cent. The value of wheat depends mainly upon the quantity of fine flour which it yields, the best wheat yielding 76 to 80 per cent., at times as much as 80 per cent., while inferior wheat may be under or little over 60 per cent. In general the smoother and thinner the grain is in skin the more fine flour it yields. The greater part of the husk is separated in milling and is known as bran.

Wheat being the most esteemed of the cereals, especially for bread-making, the increase in its growth has kept pace with the development of the art of agriculture and the increase in wealth in many countries. Yet, only within recent times has it become a common article of food among the laboring classes in any country and it is still little eaten by these classes in many countries. On the other hand its use is growing in some of the rice-eating countries, as in China. In England, down to the beginning of the eighteenth century, only the wealthier classes used wheaten bread as a common article of food, house servants being provided with rye, oats or barley, and in northern England and Scotland the use of wheaten bread was very rare for half a century later. At the present day the use of wheat is spreading rapidly throughout the world as the most desirable and palatable bread-making cereal. For many years past the United States has been the greatest of wheat producers, growing annually enough to supply Europe largely with wheat flour from its surplus, while retaining an abundance for home use. The rapid increase in its population, however, has greatly dimin-

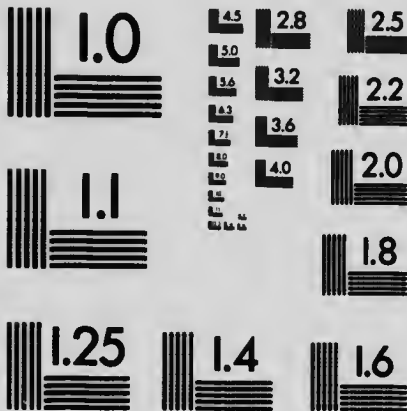
ished the quantity it can spare to send abroad and the extra supply needed in Europe is now largely obtained from other countries. Chief among these may be named Argentina and Canada, both of these countries possessing large areas fitted for wheat cultivation. Though they have come somewhat recently into the market for wheat supply, their annual harvest is rapidly increasing and their surplus for exportation growing. Wheat is not native to America, its first introduction being by the Spaniards about 1630. It was planted in New England and Virginia shortly after their settlement, the spread of its cultivation keeping pace with that of settlement and its production becoming phenomenal in the middle west within a comparatively recent period. Of late years a variety of wheat adapted to dry climates has been introduced, with the result that a large area of semiarid land, unadapted to the former varieties, is becoming a wheat-raising territory of some importance. This is not well fitted for bread-making, and is known as macaroni wheat, from its chief use. At the present time the United States and European Russia are about equal in product, each having an annual yield of about 700,000,000 bushels. France and British India come next with about half this quantity and Austria-Hungary with about 250,000,000. Other countries with over 100,000,000 bushels each are Canada, Argentina, Germany, Italy, Roumania and Spain. The principal diseases to which the wheat plant is subject, some of them the source of great loss to farmers, are due to the presence of parasitic fungi, the chief of these diseases being known as rust, smut, bunt, and mildew. The plant is attacked also by a number of insect pests, such as threadworms, wireworms and others of what are known as corn insects. The Hessian fly has long been a destructive enemy of wheat in American fields, first known as a scourge in the years 1786 and 1789, and claimed to have been introduced from Germany by the Hessian mercenaries in the British army. In some years it has caused enormous loss. The eggs are laid on the leaves, and the larvæ bore into the stem, suck the juices and kill the plant.

**Wheat-eat** (*Sesicōla ænanthe*), a bird of the order Insectivores belonging to the dentirostral section of the order, and to the family of the Sylviadæ or warblers. Its average length is 6½ inches, and its color gray above, breast brown, and under parts white. It is a native of northern Europe and Asia, and is found in Alaska and Greenland.



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**Wheat-eel**, a disease in wheat called also *ear-cockle* and *purples*. See *Ear-cockle*.

**Wheat-fly**, a name common to insects of the genus *Cecidomyia*, applied especially in England to *C. tritici*, sometimes also called the *wheat-midge*. It is a two-winged gnat about the tenth of an inch long, and appears about the end of June. The females lay their eggs in clusters among the chaffy flowers of the wheat, where they produce little footless maggots, whose ravages destroy the flowers of the plant, and render it shriveled and worthless. The American wheat-fly (*C. destructor*) is described and figured under *Hessian-fly*.

**Wheaton** (hwē'tun), HENRY, jurist and diplomatist, born at Providence, Rhode Island, in Nov., 1785; died in March, 1848. He studied law, edited the *National Advocate* in New York, and held official positions, becoming minister to Germany in 1837. He gained a wide reputation for his able works on legal subjects, especially his *Elements of International Law*, a standard authority, and *History of the Law of Nations in Europe and America*, a work of the greatest merit. Among his other works is a *History of the Northmen*.

**Wheatstone** (hwē't'stun), SIR CHARLES, scientific investigator and discoverer, born at Gloucester in 1802; died at Paris in 1875. Before he was of age he commenced business for himself in London as a maker of musical instruments, and in 1823 attracted the attention of men of science by the publication in Thomson's *Annals of Philosophy* of a paper entitled *New Experiments on Sound*. This was followed by a number of other papers, some of them describing inventions of his own, all of which are remarkable for their ingenuity and delicacy of mechanical construction. In 1834 Wheatstone was appointed professor of experimental philosophy in King's College, London, but he seldom lectured. In 1836 he exhibited at King's College experiments showing the velocity of electricity, which suggested to him the idea of applying his apparatus to telegraphing and in 1837, in conjunction with W. F. Cooke, he took out the first patent for the electric telegraph. He was a fellow of the Royal Society from the year 1836, and in 1868 he received the honor of knighthood. He was the author of numerous papers, chiefly contributed to the *Philosophical Magazine* and the *Journal of the Royal Institution*.

**Wheel**, an instrument of torture formerly employed in France and Germany, on which the criminal was placed with his face upwards and his legs and arms extended along the spokes. On the wheel being moved round the executioner broke the wretch's limbs by successive blows with a hammer or iron bar, and after a more or less protracted interval put an end to the sufferings of his victim by two or three severe blows, called *coups de grâce* (mercy strokes), on the chest or stomach, or by strangling him. In Germany its use lingered down till the beginning of the nineteenth century.

**Wheel** (hwēl), PERSIAN. See *Persian Wheel*.

**Wheel and Axle**, one of the mechanical powers, which consists of a wheel round the circumference of which a string may be wound, having a small weight attached to its free end, and an axle whose cir-



Wheel and Axle.

cumference, being smaller than that of the wheel, will sustain a heavier weight at the end of the string which is wound upon it in the opposite direction to that of the string on the wheel.

**Wheeler** (hwē'ler), WILLIAM ALMON, vice-president of the United States, was born at Malone, New York, in 1819; died in 1887. He was for a time state senator, and was member of Congress 1861-63 and 1869-77. He opposed an increase of salary and returned the extra pay allotted him under the salary bill. He was the author of the 'Wheeler Compromise' of the Louisiana difficulties of 1875, and in 1876 was nominated by the Republican party for vice-president and elected under the decision of the Electoral Commission, serving through the Hayes administration.

**Wheeler**, JOSEPH, soldier and legislator, born at Augusta, Georgia, in 1836. He was graduated at West Point, and was appointed a brevet second-lieutenant of dragoons in 1859. He resigned April 22, 1861, entering the Confederate service as lieutenant of

artillery; his promotion was rapid; from 1862 until the close of the war he commanded the cavalry corps of the Army of the West. During the war he was three times wounded and had sixteen horses shot under him. After 1881 till the Spanish war he was a member of Congress. He served with distinction in that war and subsequently served in the Philippines, and in 1900 was made a brigadier general in the regular army. He died June 25, 1906.

**Wheeling** (hwē'ing), the largest city seat of Ohio Co., on the Ohio River, 92 miles below Pittsburgh, with several branches of three railroad systems and many miles of trolley lines. There are large manufacturing interests producing iron, steel, tinplate, pipe, nails, machinery, tin cans, glass, enameled ware, stoves and other tobacco products, pottery, leather, etc. Wheeling is the center of a large coal industry, adjoining Belmont County, Ohio, the largest coal-producing county in that State, with mines employing 15,000 men. Natural gas is obtainable at low rates. Pop. 41,641.

**Wheel-window**, in Gothic architecture, a circular window with radiating mullions resembling the spokes of a wheel. See *Rose-window*.

**Whelk** (hwelk), a general name applied to various species of gastropodous molluscs. The large or common whelk (*Buccinum undatum*) is found on the coast of Europe, and is distinguished by the shell having its canal notched, and the mouth or aperture of large size. The whelks are typically carnivorous molluscs, and possess long odontophores or tongues provided with siliceous or flinty teeth. These animals are largely used for food and bait.

**Wherry** (hwer'i), a light, shallow boat used in England, with seats for passengers, and plying on rivers.

**Whetslate**. See *Hone*.

**Whewell** (hū'el), WILLIAM, philosopher, was born at Lancaster, England, in 1794, and received his early education at the free grammar school of his native town, afterwards at Haversham Grammar School, whence he went to Trinity College, Cambridge. In due course he became fellow and tutor of his college. In 1828 he was elected professor of mineralogy. In 1832 he resigned this chair for that of moral philosophy, which he held till 1855, when he became vice-chancellor of the university. In 1841 he was nominated to

the mastership of Trinity, and in this position labored earnestly and successfully to obtain for the natural and moral sciences a better recognized position among the studies of the university. He became fellow of the Royal Society in 1820, and was one of the first members of the British Association, of which he was president in 1841. He died in 1866. Among Whewell's multifarious writings may be mentioned the *Bridgewater treatise, Astronomy and General Physics, Considered with Reference to Natural Theology* (1833); *History of the Inductive Sciences* (1837); *Philosophy of the Inductive Sciences* (1840); *History of Scientific Ideas; Elements of Morality, including Polity* (1845); *On Liberal Education in General; Lectures on the History of Moral Philosophy in England* (1852); *Platonic Dialogues* (1859-61); and *Lectures on Political Economy* (1863).

**Whey**. See *Milk*.

**Whidah-bird** (hwid'a), a name given to weaver-birds of the genus *Vidua*, inhabiting Western Africa, and found in abundance in the kingdom of Dahomey, near Whidah. In size the Whidah-bird resembles a linnet or canary, and during the breeding season the male is supplied with long, drooping tail-feathers, giving it a graceful appearance.

**Whig** (hwig), in English history, the name which was from the time of Charles II to within little more than a generation ago applied to the political party that advocates such changes in the constitution as tend in the direction of democracy. The term is of Scottish origin, and various explanations of it are given. It was originally applied to the Covenanters of the southwest of Scotland. From Scotland the word was brought to England, where it was used as the distinguishing appellation of the political party opposed to the *Tories*. The term *Liberals* is now generally applied to the representatives of the party formerly known as Whigs. The Whig party in the United States stood opposed to the Democratic party from about 1835 to 1856, when the Northern wing of the Whigs merged in the new Republican party. See *Tory*.

**Whin** (hwln). See *Furze*.

**Whin-chat**, a passerine bird of the genus *Saxicola* or *Pratinella*, the *S.* or *P. rubetra*. It is common in Northern Europe during summer, frequenting broom and furze, on the highest twigs of which it perches, and

occasionally sings very sweetly. It is closely allied to the stone-chat (which see).

**Whipper-in**, in fox hunting, one who keeps the hounds from wandering, and whips them in, if necessary, to the line of scent. In politics, one who enforces party discipline among the supporters of the government or opposition, and urges their attendance.

**Whipple** (bwip'ei), EDWIN PERCY, essayist, was born at Gloucester, Massachusetts, in 1819; died in 1886. He contributed essays and critical articles to the reviews and magazines of his time, a collection of his articles, *Essays and Reviews*, being published in 1849. Other works were *Essays on Subjects Connected with Literature and Life*, and *Character and Characteristic Men*. He was esteemed as a lecturer, and published a volume of lectures on *Literature of the Age of Elizabeth*.

**Whip-poor-Will**, the popular name of an American bird, the *Chordeiles*, *Antrostomus*, or *Caprimulgus vociferus*, allied to the European goat-sucker or night-jar, and so called from its cry. It is very common in the eastern parts of the United States; is about 10 inches long, and feeds on flying moths and other insects. Its note is heard in the evening, or early in the morning. During the day these birds retire into the darkest woods.

**Whip Snake**, the name given a species distinguished by its very slender back and tail, which has been compared to the thong of a whip, and long and narrow head, which ends in a protruding rostral shield or in a flexible snout. They are arboreal in habit, usually green in color, and feed on birds and lizards.

**Whirlpool** (hweri'pöi), a circular eddy or current in a river or the sea produced by the configuration of the channel, by meeting currents, by winds meeting tides, etc., as those of Charybdis, the Maelstrom, and Corryvreckan.

**Whirlwig**, WHIRLWIG-BEETLE (*Gyrinus natator*), a beetle which abounds in fresh water in the United States; may be seen circling round on its surface with great rapidity. Its eyes are divided by a narrow band, so that, although it has only two, it is made to look as if it had four.

**Whirlwind** (hweri'wind), a violent wind moving in a spiral form, as if moving round an axis, this axis having at the same time a progressive motion. Whirlwinds are produced

chiefly by the meeting of currents of air which run in different directions. When they occur on land they give a whirling motion to dust, sand, etc., and sometimes even to bodies of great weight and bulk, carrying them either upwards or downwards, and scattering them about in all directions. At sea they often give rise to water-spouts. They are most frequent and violent in tropical countries, and are common in an exaggerated form in the Central United States, where they are known under the name of Tornadoes.

**Whiskey** (hwis'ki; a corruption of the Gaelic word *uisge*, water, whiskey being called in Gaelic *uisge-beatha*, which signifies *water of life*), the name applied to an ardent spirit distilled generally from barley, but sometimes from wheat, rye, sugar, molasses, etc. There are two chief varieties of whiskey, viz., malt-whiskey and grain-whiskey. The former variety is of finer quality, and made chiefly from malted barley and sometimes from rye. The latter is made from sugar, molasses, potatoes, Indian corn, barley, oats, etc. See *Distillation*.

**Whispering Gallery, Whispering Dome**, a gallery or dome of an elliptical or circular form, in which faint sounds conveyed around the interior wall may be readily heard, while the same are inaudible elsewhere in the interior.

**Whist** (hwist), a well-known game at cards, first clearly described by Edmond Hoyle in his *Short Treatise on the Game of Whist* (1743). The game is played with the full pack of fifty-two cards by four persons, two being partners against the other two, each player receiving thirteen cards dealt out one by one in rotation. The last card dealt is turned face up, and is called the trump card; it gives a special power to the suit to which it belongs. The cards rank as follows: ace (highest), king, queen, knave, and the others according to their number of pips. Play is commenced by the person on the left hand of the dealer laying down a card face up on the table, the other players following in succession with cards of the same suit if they have them. When all have played the player who has laid the highest card takes the four cards laid down, which constitute a trick. The winner of the trick then leads, as the first of a new trick, the winner of which becomes the leader, and so on. When a player cannot play a card of the same suit, he may play one of the trump suit, and

## Whistler

take the trick, or lay one of a different suit, which gives him no chance of winning the trick. When the hand is played out the score is taken as follows: the partners who conjointly gain the majority of tricks score one point for every trick taken above six. The ace, king, queen and knave of the trump suit are called honors, and count one each for the side who holds them; if one side hold three honors, they count two by honors, as the opposite side can have but one; if one side hold all the honors, four by honors is counted; should the honors be equally divided neither side counts, the honors being then said to cancel each other. In *long whist*, an unpolished form of the game, ten of these points made a game. In *short whist*, the game now generally played, the number has been reduced to five or seven, and in this form it is common to count by tricks alone, honors not being counted. A rubber consists of a series of three games, and is won by the side that secures two of them. Should one party gain two games in succession, the third of the rubber is not played.

**Whistler** (hwist'ler), JAMES ABBOTT McNEIL, artist, born at Lowell, Massachusetts, in 1834. He studied art in Paris and in 1855 went to England, where he spent the remainder of his life. His paintings attracted great attention and found ardent admirers and severe critics. His etchings are universally praised, and he is now looked upon as the greatest painter of his age. One of the most admired of them is a portrait of his mother. He is the author of the cuttingly satirical *Gentle Art of Making Enemies*. He died July 17, 1903.

**Whiston** (hwis'tun), WILLIAM, an English divine and mathematician, born in 1667; died in 1752. He studied at Clare Hall, Cambridge, where, having taken his degree in 1690, he was chosen a fellow of his college, and became an academical tutor. Entering into holy orders he was appointed in 1694 chaplain to the Bishop of Norwich. In 1696 he published a *Theory of the Earth* on the principles of the Newtonian philosophy; in 1698 became rector of Lowestoft; and in 1701 was appointed deputy-professor of mathematics at Cambridge by Sir Isaac Newton, who shortly afterwards resigned the professorship in his favor. He was expelled from the university in 1710 for Arian opinions, and the following year was deprived of his professorship. He then removed to the metropolis, and published his *Primitive Christianity*,

which caused him to be prosecuted as a heretic, though the proceedings were ultimately terminated by an act of grace (1715). Towards the close of his life he became a Baptist. Among his latest labors were his *Memoirs of My Own Life* (1749-50). Besides numerous original productions he published a well-known translation of the works of Josephus.

**White** (hwit), ANDREW DICKSON, educator, born in 1832 at Homer, Cortland county, New York, was graduated from Yale in 1853. He filled the position of President of Cornell University, was minister to Germany 1879-81, and was appointed ambassador there in 1897. Among his numerous works are *Outline of Lectures on History*, *The New Germany*, and *The Warfare of Science with Theology*. Died Nov. 4, 1918.

**White**, EDWARD DOUGLASS, jurist, born in Lafourche parish, Louisiana, in 1845. He served through the Civil war in the Confederate army and was admitted to the bar of Louisiana in 1868. He was elected to the State senate in 1874, appointed a justice of the Louisiana Supreme Court in 1878, and was United States Senator from Louisiana 1891-94. In the latter year he was appointed an associate justice of the Supreme Court of the United States. In this position he showed great learning and efficiency, and on December 11, 1910, he was appointed by President Taft Chief Justice of the Supreme Court of the United States.

**White**, GILBERT, naturalist, born in 1720 at Selborne, England; died in 1793. He was educated at Oriel College, Oxford, of which he became a fellow in 1744. He declined all church preferment, but in his later years served as curate in his native village, in the beautiful rural scenery of which he spent the greater part of his days, occupying his leisure hours mainly with the study of natural history, in which he was a most assiduous and accurate observer. His *Natural History of Selborne* was published in 1789, and has retained a deserved and unimpaired popularity to the present day. Mr. White was also the author of letters on the antiquities of Selborne.

**White**, HENRY KIRKE, poet, born at Nottingham, England, in 1785. He was the son of a butcher, but being of a delicate constitution he was put to the trade of stocking weaving. From his infancy he manifested great love of learning, and at the age of fourteen produced some notable specimens of poetry. He published, in 1803, a poem called *Clifton Grove*; and after his death



his *Remains*, consisting of poems, letters, etc., were edited by Southey. He died in 1800.

**White,** RICHARD GRANT, author, was born in New York city, May 22, 1821. His literary tendencies drew him from law, and his musical, dramatic and art criticisms gave him prominence. He occupied a place among the most learned Shakespearean scholars. He died in 1885.

**White,** WILLIAM, Protestant Episcopal bishop, was born in Philadelphia, in 1748. He was ordained priest in 1772, and subsequently became rector of Christ Church and St. Peter's Church, Philadelphia. During the Revolution Dr. White sided zealously with the colonies. In 1786 he was elected Bishop of Pennsylvania, being consecrated in Lambeth palace, England, in 1787. He lived to see the Episcopal Church thoroughly organized in the United States, he consecrating eleven bishops. He died in 1836.

**White,** WILLIAM HALL, an English novelist who, under the pen name of 'Mark Rutherford,' has written *The Revolution in Fanner's Lane*, *Clara Hapgood*, etc., also *Spinoza's Ethics*.

**White Ants.** See *Termites*.

**White-bait,** a name for the young of the herring. It abounds in the Thames during the spring and summer, and is much prized by the Londoners. The English cabinet used to assemble at Greenwich previous to the prorogation of parliament in autumn to partake of a white-bait dinner.

**Whiteboys,** an illegal association formed in Ireland about 1760. The association consisted of starving day laborers, evicted farmers, and others in a like condition, who used to assemble at nights to destroy the property of harsh landlords or their agents, the Protestant clergy, and tithe collectors, or any others that had made themselves obnoxious in the locality. In many cases they did not confine their acts of aggression merely to plunder and destruction, but even went the length of murder.

**White Cross,** an organization similar in many respects to the famous Red Cross, from which it differs chiefly in the fact that it is distinctly American. It was founded in 1898 by Mrs. Jane Creighton, of Portland, Oregon, who became its first president. The motto of the organization is Truth, Charity and Philanthropy, and its purposes include not only the

caring for the wounded and sick American soldiers and sailors, but the aiding of the widows and orphans of those who are killed in battle or die of disease or accident.

**White Elephant,** an elephant affected with albinism. Such animals appear to have been known to the ancients. They are highly esteemed by some Eastern potentates, and are considered sacred in Siam. A specimen purchased by the late P. T. Barnum from King Theebaw, of Burma, was brought to the United States in 1884, but the genuineness of this is very doubtful. It is generally reported that when the King of Siam desires to ruin anyone he makes him a present of a white elephant. The sacred elephant has an enormous appetite, and, being sacred, it is a crime to let it die, so that the gift generally entails financial ruin on the recipient.

**Whitefield** (hwit'feld), GEORGE, founder of the Calvinistic Methodists, was born in 1714 at Gloucester, England. At the age of eighteen he entered as servitor at Pembroke College, Oxford, where he became acquainted with the Wesleys, and joined the small society which procured them the name of Methodists. (See *Methodists and Wesley*.) He was ordained deacon in 1736, and soon became very popular as a preacher. In 1738 he went to the American settlement of Georgia, where his ministrations gave great satisfaction to the colonists. In the following year he returned to England to procure subscriptions for building an orphan house in the settlement. Having taken priests' orders, he repaired to London, where the churches in which he preached proved incapable of holding the crowds who assembled to hear him. He now adopted preaching in the open air, and visited various parts of the country, addressing vast audiences. In 1739 he again embarked for America, and made a tour through several of the colonies, preaching with great effect to immense crowds. He returned to England in the following year, where for a time differences between him and Wesley deprived him of many followers. After visiting many parts of England, Scotland, and Wales he again returned to America, and remained there nearly four years. Soon after his return he was introduced to the Countess of Huntingdon, who made him one of her chaplains. A visit to Ireland and two more voyages to America followed, and for several years his labors were unremitting. At length, on his seventh

## Whitefish

visit to America, he died at Newburyport, Mass., in 1770.

**Whitefish**, a fish of the salmon family (*Coregonus albus*), found abundantly in the Great Lakes, and in some American rivers. It is 15 to 20 inches long, bluish-gray above and white below. It is caught in large numbers and is esteemed as a food fish.

**Whitehall** (hwit'hāl), a locality in Westminster, where are the admiralty office, and that of the commander-in-chief (the Horse Guards), etc. (See *London*.) On the bank of the Thames was a palace called Whitehall, built before the middle of the thirteenth century. In 1530 it became the residence of the court, but in 1697 was destroyed by fire, excepting the Banqueting Hall, added by James I, according to a design of Inigo Jones, in 1619.

**Whitehaven** (hwit'hāvn), a parliamentary borough and seaport of England, in Cumberland, situated on a bay of the Irish Sea, has a good harbor and dock, and enjoys a considerable shipping trade. Iron ship-building is carried on, and there are blast-furnaces and iron and brass foundries. Pop. 19,048.

**Whitehorse**, a river port of the Yukon Territory, Canada, situated on the Yukon River at the foot of Whitehorse Rapids, the head of navigation of the Yukon River 456 miles from Dawson City and 110 miles from Skagway, Alaska. It is in the center of the copper belt, at the head of the trail connecting the Shushana gold district of Alaska with the steamer and rail service. Pop. (1911) 727.

**White-lead**. See *Ceruse*.

**White Lady, The**, a figure in German, English and Scotch folklore, a supernatural visitant supposed to haunt certain places and to be seen on particular occasions. It dates from the sixteenth century, being first seen at Rosenberg, in Bohemia.

**White Mountains**, a group of mountains in New Hampshire, belonging to the Alleghenies. They have fine scenery and are a favorite summer resort. The culminating point is Mount Washington, 6288 feet.

**White Oak**, a species of oak, the *Quercus alba*, a native of the United States and of parts of Canada.

**White Pine**, the *Pinus Strobus*, one of the most valuable and interesting species of pines, common to the northern parts of the United States

## White-throat

and Canada. It is widely used in carpentry. See *Pine*.

**White Plains**, a village, county seat of Westchester Co., New York, 10 miles north of New York City, the birthplace of the State of New York, and scene of the Battle of White Plains, 1776. It is chiefly a residential village, containing many beautiful homes. Pop. 20,000.

**White River**, (1) a river of Arkansas, with a course of 800 miles. It joins the Mississippi above the influx of the Arkansas river, and has several important affluents. Together with its tributaries it affords 500 miles of boat navigation. (2) A river in Indiana, formed by the confluence of the East and West Forks, emptying into the Wabash near Mount Carmel.

**White Sea**, a large gulf of the Arctic Ocean, penetrating into Northern Russia to the distance of between 300 and 400 miles. It has an area of about 47,000 square miles, with a coast-line of 1000 miles. It is navigable only from the middle of May to the end of September.

**White Slave Traffic**, the term applied to the business of organized vice, which is now attracting widespread attention. The report of the Chicago Vice Commission throws light on the financial aspect of prostitution, and conditions in Chicago may be taken as typical of conditions in every important city. According to conservative estimates, the annual profits from prostitution in Chicago are \$10,000,000 and the number of persons devoting their time exclusively to the business of organized vice about 5000. In the opinion of John D. Rockefeller, Jr., who has developed a Bureau of Social Hygiene, the prostitutes are in the majority of cases 'merely tools in the hands of men.' Economic conditions, it is believed, render easy the procuring of girls.

**White Swelling**, the popular name for all severe diseases of the joints resulting from chronic inflammation in the bones, cartilages, or membranes constituting the joint. Among the diseases known under this name are: (a) acute or chronic inflammation of the synovial membrane; (b) pulpy thickening of the synovial membrane; (c) ulceration of the cartilages; (d) scrofulous diseases of the joints beginning in the bones.

**White-throat**, a small singing bird of the family of warblers. The common white-throat (*Sylvia undata*) attains a length of 5

inches, frequents gardens and hedges, and is a regular summer visitor to Northern Europe.

**Whitgift** (hwit'gift), JOHN, Archbishop of Canterbury, was born at Grimsby in 1530, and completed his education at Cambridge under Ridley and Bradford. He imbibed from his uncle, Abbot Whitgift, opinions that inclined him later to the side of the Reformation; but by a cautious reserve he escaped persecution during the reign of Queen Mary, and on the accession of Elizabeth was ordained priest. He held successively many posts at Cambridge, including the mastership of Pembroke Hall and Trinity College, and the regius professorship of divinity. In 1577 he was appointed bishop of Worcester, and on the death of Grindal (1583) was raised to the primacy. He had always been a rigid disciplinarian; but he now became an inquisitor, insisted on new articles of subscription, suspended the clergy who refused them, and in every way acted as the intolerant ecclesiastic. He took a leading part in the conference at Hampton Court under James I, and died soon after, in 1604.

**Whiting** (hwit'ing; *Merlangus merlangus*), a well-known fish belonging to the cod tribe. It abounds in the seas of Northern Europe generally, and exceeds all the other fishes of its tribe in its delicacy and lightness as an article of food. The American whiting is known as the hake.

**Whiting**, a town of Lake Co., Indiana, near Lake Michigan, 17 miles S.E. of Chicago. Its industries include wire-fence, paints, lumber, etc. Pop. 6587.

**Whiting-pout**, a British fish of the cod family (*Morhua lusca*). See *Bib*.

**Whitlock** (hwit'lock), BRAND, American author and statesman, born in Urbana, Ohio, March 4, 1869. He engaged in newspaper work, studied law, was admitted to the Illinois bar in 1894 and to the Ohio in 1897. In 1905 he was elected mayor of Toledo as Independent against four other candidates, served four terms and refused the fifth. In December, 1913, he was appointed by President Wilson U. S. minister to Belgium. His published works include *The Turn of the Balance* (1907), *Forty Years of It* (1914), etc.

**Whitlow** (hwit'lo), in surgery, is an inflammation affecting the skin, tendons, or one or more of the finger bones, and generally terminating in an abscess. There is a similar disorder which attacks the toes. Whitlows differ much in their depth and extent. The usual exciting causes of whitlows are

pricks, contusions, etc. They often occur without any apparent cause, but are always preceded by the entrance of bacteria through a wound.

**Whitman** (hwit'man), a village of Plymouth Co., Massachusetts, 21 miles S. of Boston. Its manufactures include boots and shoes, leather-board, tacks, etc. Pop. 7292.

**Whitman**, CHARLES SEYMOUR, American jurist and statesman, born at Norwich, Connecticut, August 28, 1868. He was admitted to the bar in 1894 and began the practice of law. In 1901 he was appointed assistant corporation counsel of New York City; in 1904 president of the Board of City Magistrates; in 1907 judge of the Court of General Sessions; in 1910 district attorney of New York City; and in 1914 he was elected governor of New York on the Republican ticket.

**Whitman**, MARCUS, pioneer, born at Rushville, New York, in 1802. He emigrated to the Pacific coast in 1836, to serve as a missionary, and in 1843 made a visit to the East, riding over 3000 miles on horseback through the Rocky Mountain region in winter, and suffering great hardships. His purpose was said to have been to acquaint the government with the value of the Oregon country, but later criticism seemed to show that it was not political. He was killed by Indians in 1847.

**Whitman**, WALT, poet; was born at West Hills, Long Island, New York, in 1819. In his earlier years he was an errand boy and printer, and subsequently a school teacher, editor, and general writer for the press. He was founder of the *Long Islander* and editor of the *Brooklyn Eagle*. Previous to the Civil war he took an extended Southern trip. During the war Whitman gave devoted service in the hospitals of Virginia and Washington. This irretrievably ruined his great physical health. In 1873 he was stricken with paralysis at Washington and went to Camden, N. J., where he lived till his death, March 26, 1892. He had been a clerk in the period from the war to 1874. The first edition of his poetic volume, *Leaves of Grass*, then quite small, was issued in 1855. There have been numerous subsequent editions, each one with added pages, the last in December, 1891, under his own supervision. His entire published works now appear in ten volumes—*Leaves of Grass*, containing all the poems, and *Prose Works*, including *Specimen Days and Collect*. He discarded rhyme and metrical uniformity in his poems, and while possessed of great poetical ability failed to gain wide popularity, largely because he insisted on introduc-

## Whitney

ing in his poems sexual subjects tabooed in ordinary polite society.

**Whitney** (hwit'ni), ADELINE DUT-  
TON (Train), author, born  
in Boston, Massachusetts, in 1824. Wrote  
*Faith Gartney's Girlhood*, *The Gay-  
worthys*, *Leslie Goldthwaite's Life*, *As-  
cutney Street*, etc. She died in 1906.

**Whitney**, ELLI, inventor, born at  
Westborough, Massachu-  
setts, in 1765, and educated at Yale College,  
where he was graduated in 1792. Going  
then to Georgia as a teacher, he invented  
the machine since known as the cotton  
gin, its purpose being to separate the cot-  
ton from the seed, thus greatly cheapen-  
ing the production of this important  
fiber. Returning to the North he started  
business in conjunction with a man  
named Miller as a manufacturer of cot-  
ton gins. But his invention was pirated  
and the profits of the business, together  
with \$50,000 voted to him by the State of  
South Carolina, were swallowed up in his  
lawsuits in defense of his rights. He  
subsequently went into the manufacture  
of firearms, for which he received a gov-  
ernment contract, and in this way made  
a fortune. He died in 1825.

**Whitney**, WILLIAM DWIGHT, a dis-  
tinguished philologist, born  
in 1827, at Northampton, Massachusetts,  
studied at Williams College, Williams-  
town, and at Yale College, giving spe-  
cial attention to Sanskrit language and  
literature. He also studied Sanskrit in  
Germany from 1850 to 1853, returning  
in the latter year to America. The first-  
fruits of his studies in Sanskrit was an  
edition of the *Atharva-Veda* in conjunc-  
tion with Roth (1856). He had previ-  
ously (1854) been made professor of  
Sanskrit and of comparative philology at  
Yale College. Among his independent  
works may be mentioned *Language and  
the Study of Language* (1867), *Oriental  
and Linguistic Studies* (1872-74), *Life  
and Growth of Language* (1875), *Sans-  
krit Grammar* (a highly important  
work), *German Grammar*, etc. He was  
editor of the great *Century Dictionary  
of the English Language*. He died in  
1904. His brother, JOSIAH DWIGHT  
WHITNEY, became in 1865 professor of  
geology in Harvard University and pub-  
lished a number of works on geology.

**Whitstable** (hwit'stā-bl), a seaport  
of England, county of

Kent, 6 miles by rail w. N. w. of Canter-  
bury, of which it is the port. It has ex-  
tensive oyster fisheries. Pop. 7984.

**Whitsuntide** (hwit'sun-tid). See  
Pentecost.

**Whittier** (hwit't-er), JOHN GREEN-  
LEAF, poet, was born of

## Whitworth

Quaker parents in 1807 at Haverhill,  
Massachusetts, and educated at the acad-  
emy of his native place. In his younger  
days he worked on his father's farm and  
learned the shoemaking trade, but early  
began to write for the press, and in  
1831 published his first work, *Legends  
of New England*, in prose and verse. He  
carried on the farm himself for five years  
and in 1835-36 he was a member of the  
legislature of Massachusetts. After hav-  
ing edited several other papers he went to  
Philadelphia to edit the *Pennsylvania  
Freeman*, an antislavery paper, the of-  
fice of which was burned by a mob in  
1839. In the following year he returned  
to his native state, settling in Amesbury,  
where (or at Danvers, Mass.) he after-  
wards chiefly resided. Among the nu-  
merous volumes of poetry which he  
from time to time gave to the world the  
following may be mentioned: *Moll  
Pitcher*, *Lays of My Home*, *The Voices  
of Freedom*, *Songs of Labor*, *Snow  
Bound*, *In War-time*, *National Lyrics*,  
*Ballads of New England*, *The King's  
Missive*, *Poems of Nature*, *St. Gregory's  
Guest*, etc. At *Sundown* was published  
after his death. Whittier's poems are  
distinguished by their freshness, their  
quiet power, and intense feeling. His  
nature poetry is faithful and beautiful,  
and his *Barclay of Ury* and *Barbara  
Frietchie* rank high among ballads of  
moral heroism. *My Psalm* is considered  
a masterpiece in the realm of spiritual  
thought. He died September 7, 1892.

**Whittlesey** (hwit'l-se), an old town  
of England, in the  
county of Cambridge, 6 miles east by  
south of Peterborough. Pop. 4207.  
About 4 miles southwest of the town was  
the shallow lake, Whittlesey Mere, now  
drained and the land reclaimed.

**Whittredge** (hwit'rej), WORTHING-  
TON, painter, born at  
Springfield, Ohio, in 1820. Among his  
best-known works are *The Old Hunting  
Grounds*, *The Pilgrimage to Saint Roche*,  
*The Rocky Mountains* and *The Old  
House by the Sea*. He died in 1910.

**Whitworth** (hwit'wurth), SIR JO-  
SEPH, an English engi-  
neer, was born in 1803; died in 1887.  
After working as a journeyman in Man-  
chester and London, he started business  
in the former city in 1833 as a manu-  
facturer of engineers' tools, thus found-  
ing the firm of which he was long the  
head. He subsequently turned his at-  
tention to a uniform system of screw-  
threads, which was soon very generally  
adopted. This was followed by standard  
gauges, which have been universally ac-  
cepted for engineering work. In 1854-55



he began his experiments with firearms, which led to the production of the Whitworth rifle, and later brought him into competition with Armstrong as a manufacturer of rifled ordnance. He was also the originator of the fluid-pressed steel, used in the manufacture of cannon and ships' plates. He was created a baronet in 1809. The Whitworth scholarships, for the cultivation of theoretical and practical skill in mechanical and engineering arts, were founded by him in 1809. He was the author of *Guns and Steel* (1873).

**Whooping-cough.** See *Hooping-cough*.

**Whorl** (hwurl), in botany, a ring of organs all on the same plane.

**Whortleberry** (hwur'ti-ber-i; (*Vaccinium*), a genus of shrubby plants, the type of the nat. order *Vacciniaceae*, with alternate leaves, pink or red bell-like flowers, and berries of a dark purple, bluish, or red colour. The common whortleberry, bilberry, or blueberry (*V. myrtillus*) is a hardy plant which grows in forests, heaths, and on elevated mountains. In some of the pine forests of Scotland the plant attains the height of 3 feet. The berries have a pleasant, sweet taste, and are used for making jelly. The berries of the red whortleberry (*V. vitis-idaea*) are of a bright red color, and possess acid and astringent properties; from their similarity to cranberries they are sold as such in various parts of Scotland. (See *Cranberry*.) Whortleberries are generally known in the United States as huckleberries and blueberries and grow abundantly in mountain soil.

**Whydah** (hwí'da), a town of West Africa in the kingdom of Dahomey, on the Bight of Benin. Pop. about 20,000.

**Whydah-bird.** See *Whidah-bird*.

**Whympet** (hwim'fer), EDWARD, traveler and artist, born in London in 1840. He is best known as a mountain-climber, and was the first to ascend the Matterhorn and Chimborazo. He published *Scramble Among the Alps*, *Travels Among the Great Andes of the Equator*, etc. He died in 1911.

**Whyte-Melville**, GEORGE JOHN, novelist, born in Fifeshire, Scotland, in 1821. He entered the army, and fought in the Crimean war. He first made himself known as a novelist in 1853, when he published *Digby Grand*. This was followed by *General Bounce*, *Kate Coventry*, *Market Harborough*, *The Gladiators*, *Sarchedon*,

*Satanella*, *Holmby House*, *Bones and I*, etc. He was killed in the hunting-field in 1878.

**Wiborg.** See *Viborg*.

**Wichita** (wich'i-ta), a city of Kansas, situated at the junction of the Arkansas and the Little Arkansas River, in south central Kansas at the junction of seven different lines. Wichita's history dates back only to 1872. It is the leading manufacturing and distributing center of the Southwest. It has packing houses, railroad shops, flouring mills, woodworking establishments, and other large enterprises. It is the largest implement and machinery distributing point in its territory. It has a number of educational institutions. Pop. 67,847.

**Wichita Falls**, capital of Wichita Co., Texas, on the Wichita River, about 95 miles n. w. of Fort Worth. It has grain and lumber interests. Pop. 8200.

**Wick** (wik), a seaport of Scotland, capital of the county of Caithness, at the head of the Bay of Wick, on the left bank of the river Wick, over which is a bridge connecting it with its suburb Pulteney-Town. It is the headquarters of the herring fishery of Scotland. Pop. 7911.

**Wickliffe** (wik'lif), WYCLIFFE, WICLIFF, WYKLYF, etc., JOHN, religious reformer, was born about 1320 at Hipswell, near Richmond, in Yorkshire. He was educated at Oxford; was



John Wickliffe.

selected master of Bailliol College, and in 1361 was appointed rector of Pyllingham, or Fillingham, in Lincolnshire. He afterwards became doctor of theology and teacher of divinity in the university;

and for some time held the living of Ludgershall, in Buckinghamshire. Disputes existed at this period between Edward III and the papal court relative to the homage and tribute exacted from John, and the English parliament had resolved to support the sovereign in his refusal to submit to the vassalage. Wickliffe came forward on behalf of the patriotic view and wrote several tracts, which procured him the patronage of John of Gaunt, duke of Lancaster. In 1374 he was one of the commissioners sent by the king to Bruges to confer with the nuncio of Gregory XI respecting the statutes of provisors and praemunire. Shortly before Edward gave him the valuable rectory of Lutterworth, in Leicestershire, which he held till his death. Here he labored zealously and unweariedly as a preacher and pastor, though he lived at times also in Oxford or London. In some of his utterances he is said to have styled the pope Antichrist, charging him with simony, covetousness, ambition, and tyranny. His opinions began to spread, and the church grew alarmed. Courtenay, bishop of London, summoned him to appear before a convocation at St. Paul's. Wickliffe appeared there on February 19, 1377, attended by his friends, John of Gaunt (then the virtual ruler of England), Lord Percy, the earl-marshal, and others. Hot words passed between the bishop and the duke; blows followed; and the meeting broke up in confusion. In May following the pope addressed three bulls to the king, the primate, and the University of Oxford, commanding them to take proceedings against Wickliffe, who in answer to the prelate's summons appeared in the chapel of Lambeth. Proceedings were, however, stopped by order of the queen-mother, and Wickliffe was dismissed with simply an injunction to refrain from preaching the obnoxious doctrines. About this time he was engaged in translating the Bible from the *Vulgate* with the assistance of some of his friends. In 1381 he publicly challenged the doctrine of transubstantiation, and his heresies were condemned by the theologians of Oxford, as well as by a provincial council called by Archbishop Courtenay and held at the Blackfriars, London, in 1382. Wickliffe was proclaimed a heretic, his works were condemned to be burned, and some of his followers were imprisoned; but he was allowed to retire unmolested to his rectory of Lutterworth. A stroke of paralysis terminated his life on the 31st of December, 1384. About thirty years after his death his doctrines were condemned

by the Council of Constance, and in 1428 his remains were dug up, burned, and the ashes cast into the Swift. The influence of his doctrines spread widely on the Continent, and may easily be traced in the history of the Reformation. Wickliffe was the author of an enormous number of writings in Latin and English, and he ranks undoubtedly as the father of English prose. Many of his writings still remain in MS., and it was not until 1850 that the whole of his Bible appeared.

**Wicklow** (wī'k'lo), a maritime county of Ireland, in the province of Leinster, bordering on the Irish Sea; area 781 sq. miles. The coast is mostly precipitous. The surface is diversified and picturesque, rising into mountain-groups, the loftiest of which is Lugnaquilla, 3039 feet high, and intersected by deep and romantic valleys. Its minerals include a little gold in the streams, lead and copper ores, and pyrites in considerable quantities. The principal rivers are the Slaney, Vartrey, and Avoca. It is mainly a pastoral county. Pop. 60,824.—**WICKLOW**, the county town, is at the head of a small bay and is a sea-bathing resort. Pop. 3288.

**Widdin**, or VIDIN (vī'den), a town of Bulgaria, on the right bank of the Danube. Ships can reach the town at high-water, and there is a considerable trade, chiefly in corn, wine and salt. Widdin was formerly strongly fortified. Pop. 14,551.

**Widgeon**, or WIGEON (wī'jən), a species of natatorial bird allied to the *Anatides* or ducks; the *Marasca penelope*. It breeds in the Arctic regions, and is common in northern Europe in winter. The American widgeon is the *Marasca Americodna*. It is most abundant in the Carolinas and is often called *bald-pate*, from the white on the top of the head.

**Widnes** (wid'nes), a thriving manufacturing town of England, in the county of Lancashire, on the Mersey (here crossed by a magnificent iron-bridge), 13 miles E. S. E. of Liverpool by rail. There are extensive chemical works, copper-smelting works, rolling-mills, iron-foundries, etc. Pop. 31,544.

**Widow-bird**. See *Whidah-bird*.

**Wieland** (vī'lant), CHRISTOPH MARIAN, a German romancier and poet, born in 1733; died in 1813. He was educated at the University of Tübingen, and appointed professor of philosophy at Erfurt; and three years after to Weimar as Duchess Anna

**Amalie.** Here, or in the immediate neighborhood, he resided till his death, being a member of the circle to which Goethe, Schiller, and Herder belonged. The early period of his literary life was devoted to pietistic or at least serious poetry such as *The Nature of Things* (1752), *Twelve Moral Letters in Verse Anti-Ovid* (1752), *The Trial of Abraham's Faith* (1753); in the second period he produced the romances *Agathon* (1766), and *Don Sylvio de Rosalva* (1764), the poem *Musarion* (1768), and a prose translation of Shakespeare in eight vols. (1762-66); while in the third and ripest period were written the romantic epic of *Oberon* (1781); *History of the Abderites* (1781); *The Republic of Fools, London* (1801); *The Secret History of Peregrinus Proteus* (1791), etc. He also published translations of Horace, Lucian, and the *Letters of Cicero*.

**Wieliczka** (vyei-ich'ká), a town in Austria, Galicia, situated 8 miles southeast of Cracow, and noted for its extensive salt mines. Pop. 6012.

**Wiener-Neustadt** (vê-nêr-nol'stât), a town of Austria, 25 miles s. of Vienna. It was almost entirely destroyed by fire in 1834, but a number of interesting mediæval buildings yet remain. There are important manufactures of locomotives, machinery, pottery, leather, etc. Pop. 28,458.

**Wiesbaden** (vêshâ-dên), a town in Prussia, province of Hesse-Nassau, finely situated at the foot of Mt. Taunus, in the valley of the Salz-bach, about 2 miles from the Rhine. It is noted for its medicinal saline springs (the temperature of the Kochbrunnen being 156° F.), and it attracts annually upwards of 60,000 visitors. The chief buildings are the Kurssaal, a new town-house, an old and a new palace, library, museum, English church, and other churches, theater, etc. Pop. (1910) 109,033.

**Wife.** See *Marriage*.

**Wig,** an artificial covering of hair for the head, used generally to conceal baldness, but formerly worn as a fashionable means of decoration. Formally curled wigs are still worn professionally by judges and lawyers in Great Britain, and wigs are commonly used in making up for the stage.

**Wigan** (wig'an), a municipal and parliamentary borough of Lancashire, England, on the Douglas, 21 miles northeast of Liverpool. Wigan stands in the center of an extensive coal field, and its manufactures, which are impor-

tant, consist chiefly of calicoes, fustians, and other cotton goods, linens, checks, cotton twist, etc., besides iron-foundries, iron-forges, railway-wagon works, iron-rolling mills, large breweries, chemical works, and corn and paper mills. Pop. (1911) 65,528.

**Wiggin** (wig'in), KATE DOUGLAS, author, was born at Philadelphia in 1857. The daughter of R. N. Smith, she married Mr. Wiggin in 1890, and in 1891, after his death, C. N. Riggs. She engaged in kindergarten work on the Pacific coast, and wrote a series of highly popular juvenile tales, including *Timothy's Quest*, *The Story of Pansy*, *The Birds' Christmas Carol*, etc.

**Wight** (wit), ISLE OF, an island off the south coast of England, in the county of Hants, separated from the mainland by Spithead and the Solent; 23 miles in length, 13 miles broad; area, 147 sq. miles. A range of chalk downs, which cross the island from east to west and form excellent sheep-walks, separate it into two districts somewhat different in character. The general appearance is picturesque, and the geology of the island is interesting. The air is remarkably mild, and the district known as the Undercliff, lying along the south coast, and completely sheltered from the north, has long been a resort for invalids. The chief towns are Newport (the capital), Ryde, Cowes, Ventnor, Bembridge, Freshwater, Yarmouth and the fashionable health resorts of Sandown and Shanklin. Near Cowes is Osborne House, a favorite residence of the late Queen Victoria. Carisbrooke Castle is an interesting ruin. Pop. 88,193.

**Wigtownshire** (wig'tun-shire), the south-westernmost county of Scotland; area, 491 sq. miles. The coast is indented by numerous deep and spacious bays, of which Wigtown Bay, Luce Bay and Loch Ryan are the most important. The chief rivers are the Cree and Biadenoch, both partially navigable. It is mostly a dairying country. Pop. 32,685. Stranraer is the largest town and Wigtown the capital.

**Wigwam** (wig'wam), an Indian cabin or hut, so called in the United States and Canada. These huts are generally of a conical shape, formed of bark or mats laid over stakes planted in the ground and converging at top, where is an opening for the escape of the smoke.

**Wilberforce** (wil'ber-fôrs), SAMUEL, an English prelate, son of William Wilberforce, the philanthropist, was born at Clapham in 1805; was graduated from Oriel College, Oxford; was

appointed curate of Checkendon (1828) and became dean of Westminster and bishop of Oxford in 1845. He was the leader of the High Church party, and the author of *Note-book of a Country Clergyman* (1833), *Eucharistice* (1839), *A History of the Protestant Episcopal Church in America* (1844), a volume of *University Sermons*, and numerous other works. He was killed by a fall from his horse in 1878.



Wigwags of North American Indians.

**Wilberforce**, WILLIAM, a celebrated English philanthropist, was born at Hull in 1759; died in 1833. After completing his education at St. John's College, Cambridge, he was, in 1780, elected member of parliament for his native town; and in 1784 was returned by the county of York. In 1786 he made the acquaintance of Clarkson (see *Clarkson, Thomas*), who gained his sympathies on behalf of the agitation against the slave trade. In 1791 he moved for leave to bring in a bill to prevent further importation of African negroes into the British colonies. Year after year he pressed this measure, but was always defeated till 1807, when it was passed during the short administration of Fox. He then devoted his energies to bring about the total abolition of slavery, and three days before his death he was informed that the House of Commons had passed a bill which extinguished slavery in the British colonies.

**Wilcox** (wil'koks), ELLA WHEELER, an American journalist and writer of popular verse (1858-1919), born at Johnstown Center, Wisconsin. Her poems won world-wide fame for her. She published *Poems of Passion*, *Poems of Pleasure*, etc. Died Oct. 30, 1919.

**Wilde** (wild), OSCAR, poet and dramatist, born at Dublin, Ireland, in 1856, son of Sir William Wilde, an eminent Irish surgeon and writer on

medical subjects. His mother was a poetess. He was a pupil of Ruskin, and after his college days became noted for eccentricities in dress and manner. He wrote ably, producing *Poems, 'The House of Pomegranates*, *Lady Windermere's Fan*, a play, *Dorian Gray*, a novel, and various other works. In 1896 he was sentenced in London to two years' imprisonment for vicious practices. He died November 30, 1900.

**Wilhelmina** (wil-hel-mē'na), H. E. LENE PAULINE MARIE, Queen of the Netherlands, only child of William III by his second wife, was born at The Hague, August 31, 1880. Her mother was regent until August 31, 1898, in which year she was crowned. In 1901 she married Duke Henry of Mecklenburg-Schwerin. The people of the Netherlands were very anxious for an heir to the throne, and this anxiety was satisfied by the birth of a daughter in 1900.

**Wilhelmshaven** (vil-helms-hā'ven), a great naval station belonging to Germany, on the W. side of the Jade, an inlet of the North Sea. The entrances to the harbors are sheltered by long moles, the whole town is strongly fortified, and there are numerous docks, building-ships, etc. Pop. (1905) 26,012. See *Jade*.

**Wilhelmshöhe**. See *Cassel*.

**Wilkes** (wilks), CHARLES, naval officer, born in New York City, April 3, 1798; entered the navy in 1816 and became a lieutenant in 1820. In 1838 he commanded an exploring expedition sent by the United States government to the Antarctic regions. Here he discovered what he claimed to be an Antarctic continent, sailing far along its coast. He completed a voyage around the world, returning in 1842 and publishing an account of his explorations. In 1861, while in command of the *San Jacinto*, he intercepted the British steamer *Trent* and took as prisoners J. M. Mason and J. Slidell, Confederate commissioners to Europe, an event that produced a great sensation and threats of war in England. In 1862 he was promoted commodore, after which he commanded a squadron in the West Indies. In July, 1866, he was made a rear-admiral. He died February 8, 1877.

**Wilkes**, JOHN, political agitator, born in London in 1727; died in 1797. He was the son of a rich distiller, and was educated for some time at Leyden. He was returned to parliament as a member for Aylesbury (1757), and attained considerable notoriety by the



publication of a paper entitled the *North Briton*, in No. 45 of which (1763) he commented severely on the king's speech to parliament. The home secretary in consequence issued a general warrant, upon which Wilkes, with others, was apprehended and committed to the Tower, but released by Chief Justice Pratt, who declared the prosecution illegal. On the next meeting of parliament, however, a special law was passed to sanction his prosecution, and in 1764 he was expelled from the House of Commons. As he had by this time withdrawn to France and did not appear to receive sentence, he was outlawed. He returned, however, to England at the election of 1768, and was sent to parliament as representative of Middlesex, but was expelled from the House and committed to prison. Three times after this he was reelected within a few months by the same constituency, but the House of Commons persisted in keeping him out, giving rise to a formidable agitation in favor of 'Wilkes and liberty.' He was released from prison in 1770, having been elected alderman of London, and he was next appointed sheriff of Middlesex, lord-mayor of London, and again (1774) member of parliament for Middlesex. On this occasion he was allowed to take his seat, and in 1782 the resolutions respecting the Middlesex election were expunged from the journals of the House of Commons. He published many speeches and pamphlets, and his correspondence was published after his death.

**Wilkes-Barre** (wilks'ba-re), a city, capital of Luzerne Co., Pennsylvania, on the east bank of the north branch of the Susquehanna River, about 140 miles northwest of Philadelphia. It is the center of rich anthracite coal field, and has manufactures of machinery, locomotives, cars, mining engines and tools, iron castings, wire ropes, lace, silks, tinware, lumber, cutlery, brewery products, axles, springs, adding machines, tobacco, etc. Pop. 67,105; within 8-mile radius, 245,000.

**Wilkie** (wil'kē), SIR DAVID, one of the most famous painters of the British school, was son of the minister of Cultra, near Cnpar, Fifeshire, born there in 1785; died at sea off Gibraltar in 1811, while returning from a visit to Palestine. He received his early art training at the Trustees' Academy, Edinburgh; entered the schools of the Royal Academy, London, in 1805; first exhibited there (1806) *The Village Politicians*, which at once established his reputation; was elected an associate of the Academy in 1809, and in 1811 became an

academician. In 1825, owing to ill health, he made an extended tour through Italy, Germany, and Spain. In the latter country his style as a painter underwent a marked change when he came under the influence of Velasquez and Murillo. Returning after three years to England, he was appointed (1830) painter in ordinary to the king, and was knighted in 1836. His pictures, such as the *Blind Fiddler*, *Rent Day*, *Cut Finger*, *Rabbit on the Wall*, etc., are well known as engravings. These belong for the most part to his early and best period, when his method was characterized by subdued coloring and minute and spirited drawing. His later and less successful style is distinguishable by a breadth of treatment which sometimes shows looseness in drawing, and deals chiefly with historical subjects.

**Wilkins**, MARY ELEANOR, novelist, born at Randolph, Massachusetts, in 1862. She produced graphic stories of New England life, and published *A Humble Romance*, *The Wind in the Rose Bush*, *Dr. Gordon*, *Pembroke*, *Jerome*, etc. She married Dr. O. M. Freeman in 1902.

**Wilkinsburg**, a borough in Allegheny county, Pennsylvania, 7 miles E. of Pittsburgh, many of whose business people reside here. Pop. 18,924.

**Wilkinson** (wil'kin-sun), JAMES (1757-1825), an American soldier and adventurer, born at Benedict, Maryland. After studying medicine, he entered the army under Washington, at Cambridge, and joined Benedict Arnold on his expedition into Canada in 1776. He served with distinction in the Saratoga campaign (q. v.). After the surrender of Burgoyne, Wilkinson was made the bearer of the news to Congress. He was appointed brigadier-general by brevet and became secretary of the board of war. He removed to Lexington, Kentucky, and seeing possibilities for enriching himself at the expense of his country, attempted treasonably to detach Kentucky from the Union and ally it with Spain. He applied for reinstatement in the army and was commissioned a lieutenant-colonel, serving in the western department under General Wayne (q. v.). He did good service in the Indian wars and was made brigadier-general in 1792, becoming commander-in-chief of the army on the death of Wayne, 1796. He was governor of Louisiana 1805-06, and became implicated in the conspiracy of Burr (q. v.), being court-martialed in 1811 but acquitted. In 1813 he was made a major-general, but being unsuccessful in the northern department he was retired from the service.

**Wilkinson** (wii'kin-sun), SIR JOHN GARDNER, a distinguished English archaeologist, born in 1797; died in 1876. He was educated at Harrow and Exeter College, Oxford, and afterwards resided twelve years in Egypt. As the result of his investigations there he published the *Manners and Customs of the Ancient Egyptians* (five vols. 1837-41). His other works are: *A Handbook for Travelers in Modern Egypt* (1847), *A Popular Account of the Ancient Egyptians, Dalmatia and Montenegro* (1848), and *The Egyptians under the Pharaohs* (1857).

**Will**, THE, is usually described as one of the three faculties by means of which the human mind finds expression, the other two being thought (or intellect) and feeling (or emotion). It is the faculty by which a choice is made between two courses of action, as distinct from the exercise of this power, which is more fitly described as volition. This faculty of the will, in the maturity of its complex power, is usually conceived as having been educated by a process of sensation; pleasure and pain giving rise to the motives by which the active determining energy is set in motion. Yet the exact relation between will and motive, the question whether the motive governs the will or the will determines the motive, has never been authoritatively settled. Thus the 'freedom' of the will has, until now, been maintained as a metaphysical and theological belief in opposition to the doctrine of 'necessity.' Aristotle in his *Ethics* incidentally asserted the freedom of the will; with this the Stoics and Epicureans agreed; as did also Justin Martyr, Origen, and St. Augustine; while its later adherents were Reid, Stewart, Kant, and Hamilton. On the contrary, among the early Christians, the Gnostics denied the freedom of the human will; so also did Spinoza; while the more modern advocates of the doctrine of 'necessity' were Hobbes, Hume, Jonathan Edwards, and John Stuart Mill.

**Will**, or TESTAMENT, in law, the legal declaration of a man's intentions as to what he wills to be performed after his death in relation to his property. In England, as also in its colonies and most of the United States, no will, whether of real or personal estate, is valid unless it be in writing, and signed at the foot or end by the testator, or by some person in his presence, and by his direction. Such signature must be made and the document acknowledged as his will by the testator in the presence of two or more witnesses at the same time, and such

witnesses must attest and subscribe the will in the presence of the testator.

**Willard** (wil'ard), FRANCES ELIZABETH, born near Rochester, New York, in 1839. Was the author of a number of works and lectured on her travels in Europe, Egypt and Palestine. She was best known in connection with temperance work, and for her active labors in this cause. She became president of the Woman's Christian Temperance Union in 1879; founded the World's Woman's Christian Temperance Union in 1883 and was its president from 1888 until her death, February 18, 1898.

**Willenhall** (wii'en-hal), a town of England, in West Staffordshire, 12 miles N. W. from Birmingham. There are brass and iron foundries, but the staple industry is in locks and padlocks. Pop. 18,858.

**Willesden** (wilz'dn), a parish in Middlesex and suburb of London, 7 miles N. W. of St. Paul's. It is also a local government district and contains parts of Kilburn, Kensal Green, etc., and an important railway junction. Pop. 154,267.

**Willet** (wil'et; *Symphemia semipalmata*), a bird of the snipe family found in America. It is a fine game bird, and its flesh and eggs are prized for food. Called also *stone curlew*.

**William I** (wil'yam), surnamed the Conqueror, King of England and Duke of Normandy, born in 1027, was the natural son of Robert, duke of Normandy, by Arlotta, the daughter of a tanner of Falaise. His father having no legitimate son, William became the heir at his death, and ruled Normandy with great vigor and ability. The opportunity of gaining a wider dominion presented itself on the death of his second cousin, Edward the Confessor, king of England, whose crown he claimed. To enforce this claim he invaded England, and the victory of Hastings, in which his rival Harold was killed, ensured his success (1066). On his return to Normandy, however, the English, being treated by the Norman leaders like a conquered people, broke out in revolt, but William speedily returned and suppressed the insurrection. The resistance of two powerful English nobles, Edwin and Morcar, who had formed an alliance with the kings of Scotland and Denmark, and with the prince of North Wales, soon after drew William to the north, where he obliged Malcolm, king of Scotland, to do homage for Cumberland. In 1069 another insurrection broke out in the north, and at the same time the English resumed arms

## William II

in the eastern and southern counties, only, however, to be suppressed with merciless rigor. He now established the administration of law and justice on a firm basis throughout England, conferred numerous grants of land on his own followers, and introduced the feudal constitution of Normandy in regard to tenure and services. He also expelled numbers of the English Church dignitaries and replaced them by Normans. Towards the end of his reign he instituted that general survey of the landed property of the kingdom, the record of which still exists under the title of *Domesday Book*. Although the English had been completely subdued, William had to suppress several formidable revolts by his own vassals, while in 1080 he was at open war with his son Robert. In 1087 he went to war with France, whose king had encouraged a rebellion of Norman nobles. He entered the French territory, and committed great ravages, but, by a fall from his horse at Mantes, received an injury which caused his death at the abbey of St. Gervais, near Rouen (1087).

**William II**, surnamed *Rufus*, from his red hair, third son of the preceding, was born in Normandy in 1056, and crowned at Westminster in 1087 on the death of his father. The Norman barons were discontented with this arrangement, and sought to make his eldest brother, Robert, king of England, but this project was defeated by William, who secured the aid of Lanfranc, archbishop of Canterbury, and the English nobles. Having repressed the conspiracy, he forced the Norman barons to withdraw to Normandy and confiscated their English estates. On the death of Lanfranc he also seized the estates connected with the vacant bishoprics and abbeys. In 1090 he sent an army into Normandy, while he himself crossed the Channel the following year. A reconciliation was effected between the two brothers, and in 1096 Robert mortgaged Normandy to his brother for a sum sufficient to enable him to join a crusade to the Holy Land. A characteristic incident in William's reign was his contention with Anselm, archbishop of Canterbury, regarding church property and the sovereignty of the pope. (See *Anselm*.) In 1100 he met his death while hunting in the New Forest, by an arrow shot accidentally or otherwise from the bow of a French gentleman named Walter Tyrrel.

**William III**, Stadtholder of Holland and King of England, son of William II of Nassau,

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prince of Orange, and Henrietta Mary Stuart, daughter of Charles I of England, was born at The Hague on the 4th of November, 1650. During his early life all power was in the hands of the grand pensionary John De Witt, but when France and England, in 1672, declared war against the Netherlands, there was a popular revolt, in which Cornelius and John De Witt were murdered, while William was declared captain-general, grand-admiral, and stadtholder of the United Provinces. In the campaign which followed he opened the sluices in the dykes and inundated the country round Amsterdam, thus causing the French to retire, while peace was soon made with England. In subsequent campaigns he lost the battle of Senefé (1674) and St. Omer (1677), but was still able to keep the enemy in check.



William III.

In 1677 he was married, and the Peace of Nijmegen followed in 1678. For some years subsequent to this the policy of William was directed to curb the power of Louis XIV, and to this end he brought about the League of Augshurg in 1686. As his wife was heir-presumptive to the English throne he had kept close watch upon the policy of his father-in-law, James II, and in 1688 he issued a declaration recapitulating the unconstitutional acts of the English king, and promising to secure a free parliament to the people. Being invited over to England by some of the leading men he arrived suddenly at Torbay, November 5, 1688, with a fleet of 500 sail, and with 14,000 troops. Upon landing, a great part of the nobility declared in his favor, and in December

## William IV

James fled with his family to France, after which William made his entry into London. The throne was now declared vacant, the Declaration of Rights was passed, and on February 13, 1689, Mary was proclaimed queen and William king. Scotland soon afterwards followed England's example (with a partial resistance under Dundee); but in Ireland, whither Louis XIV sent James with an army, the majority of the Catholics maintained the cause of the deposed king, until they were defeated at the Boyne (1690) and at Aughrim (1691). In the war with France William was less successful; but although he was defeated at Steinkirk (1692) and Neerwinden (1693) Louis was finally compelled to acknowledge him king of England at the Peace of Ryswick in 1697. In 1701 James II died, and Louis XIV acknowledged his son as king of England. England, Holland, and the empire had already combined against Louis, and the war of the Spanish Succession was just on the point of commencing when William died, March 8, 1702, from the effects of a fall from his horse, his wife having already died childless in 1694.

**William IV**, King of Great Britain, son of George III, born in 1765; died in 1837. He served in the navy, rising successively to all the grades of naval command, till in 1801 he was made admiral of the fleet. In 1789 he had received the title of Duke of Clarence, and in June, 1830, he succeeded his brother George IV to the throne. The great legislative events which render his reign memorable are the passage of the reform act, the abolition of slavery in the colonies, and the reform of the poor-laws. He married (1818) Adelaide, sister of the Duke of Saxe-Meiningen, by whom he had no surviving children, but by his connection with Mrs. Jordan, the actress, he had a large family.

**William I**, first German Emperor, Prussia, second son of Frederick William III, was born March 22, 1797. At an early age he began the study of military affairs; took part in the campaigns of 1813-14 under Blücher; married in 1829 Princess Augusta of Saxe-Weimar; became heir-presumptive to the throne of Prussia on his father's death in 1840; was commander of the forces which suppressed the revolutionary movement (1849) in Baden; was created regent in 1858; and on the death of the king, his brother, in 1861, succeeded to the throne of Prussia. During his reign Prussia defeated Denmark (1864), annexing the

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duchies of Schleswig-Holstein; quarreled with Austria, and engaged in a campaign which ended in the victory of Sadowa (1866); and went with the rest of Germany to war with France in 1870 (see *Germany and France*). In this war the operations of the Prussian generals were under the personal supervision of the king. The results of this war were so favorable for Germany that the German States combined in raising William to the imperial dignity, and he was proclaimed emperor of Germany at Versailles January 18, 1871, during the siege of Paris. He died March 4, 1888.

**William II**, ninth king of Prussia, and third emperor of Germany, was born at Berlin, January 27, 1859, eldest son of the crown prince (afterward emperor) Frederick and Princess Victoria of England. After a careful training at home, the education of the young prince was completed in the gymnasium at Cassel, and he also received a thorough military training and full instruction in the arts of government and administration. An accident at birth caused a weakening of his left arm which became permanent, and in addition he has a serious affection of the ear, which so far has defied treatment. Yet, despite these afflictions, his ardent temperament led him to become a skilful horseman and a tireless hunter, as well as an enthusiastic yachtsman, and he is deeply interested in all kinds of army evolution. He married Augusta Victoria of Schleswig-Holstein-Augustenburg in 1881, and, after the brief reign of his father, succeeded to the imperial dignity on June 15, 1888. Since his accession he has shown himself a ruler of exuberant energy and has made himself felt as a vigorous power alike in his home government and in international European affairs. An exaggerated idea of the imperial dignity, embracing the exploded conception of the divine right of kings, was shown in the speeches of his early rule, and the intense energy with which he pushed forward the organization of the army and navy led to apprehensions of warlike purposes, while his later career has given warrant for the alarm to which his early actions and expression of views gave rise. His independence of action and decision of opinion soon led to strained relations with Prince Bismark, who had long been dominant in political affairs, the autocratic premier finding his authority greatly diminished by the resolute assertiveness of the strong-willed young emperor. A decided break came when William established a system of partial state-



socialism, of which Bismarck strongly disapproved. This quickly led to the retirement of the able chancellor, and his replacement by Count Caprivi, a man more ready to yield to the emperor's views, or more in accord with them. Since that date several changes have taken place in the chancellorship. The foreign policy of the new regime led to a strengthening of the triple alliance between Germany, Austria and Italy, a weakening of the older bond between Germany and Russia, and to a colonial expansion indicated by Germany's taking an active part in the partition of Africa between the European powers. A large area of territory in the west, a second in the southeast, and a third in the Guinea region of that continent were won by Germany in consequence. In 1890 the island of Heligoland, in the German Sea, was ceded by England to Germany, in return for which England was granted certain advantages in Africa. In the negotiation of the treaty of peace between Turkey and Greece at the end of the war of 1897, William took a very prominent part, insisting that provision for payment of the defaulted interest due by Greece to foreign bondholders (mainly German) should form part of the terms of settlement. The treaty was made to accord with the emperor's views. In his internal administration, William has actively sought to establish a more pronounced personal government, a purpose in which he has met with strong parliamentary opposition. He has made himself a leader in European policies, and Germany, under his control, has advanced greatly in strength and political importance. He has also taken steps to placate the workmen by establishing a system of old-age insurance under State auspices, and inaugurating other legislation in their favor. The great growth of Socialism has proved a disturbing element, and he has sought to repress it. William's plans for an increase of the army and navy, with the necessary additional taxation, on several occasions brought him into conflict with the Reichstag and long continued a source of alarm in Europe, especially in Great Britain. The result was a contest between these countries in the building of war vessels, the British government striving strenuously to maintain its supremacy and the German government increasing the strength of its navy at a disturbing rate. A conflict between William and the Reichstag took place in December, 1906, when that body opposed the emperor's views of maintaining a large garrison in German Southwest Africa, the result

being that he ordered the dissolution of the parliament and a new election. He opened himself to drastic parliamentary criticism in 1910, in a speech at Königsberg, in which he reminded his hearers that his grandfather, William I, believed himself the chosen instrument of God and in possession of the crown by God's grace alone. The following words, with which he concluded, indicated that he entertained a similar opinion: 'Considering myself as the instrument of the Master, regardless of passing views and opinions, I go my way, which is solely devoted to the prosperity and peaceful development of the Fatherland.' These words were sharply controverted in the press and by the Socialists.

With the growing power of the German army, William's attitude became more warlike and on several occasions brought Europe on the brink of war.

By 1914 Germany was amply prepared for a war of conquest which should add enormously to German territory by the conquest of the whole of middle Europe from the North Sea to the Mediterranean. The assassination of Archduke Francis Ferdinand of Austria at Sarajevo served as an excuse, and William's uncompromising attitude in the negotiations which preceded the outbreak of war made any peaceful solution impossible. Throughout the course of the World war he urged on his armies by promises of world-wide conquest, permitting and abetting the most inhuman practices, such as unrestricted submarine warfare, bombing of unfortified cities and the use of poison gas. Upon the final defeat of Germany William took refuge in Holland. He abdicated both as Emperor of Germany and King of Prussia in November, 1918.

**William the Lion.** See *Scotland (History)*.

**William the Silent,** Count of Nassau and Prince of Orange, eldest son of William count of Nassau, was born in 1533, and was educated in the Roman Catholic faith. He had large estates in the Netherlands, and held high offices under Charles V and his son Philip II; but the reckless persecution of the Protestants roused him against the Spaniards, and when the Duke of Alva with a Spanish force was sent to subdue the Netherlands (1567), he retired to Germany. He now declared himself a Protestant, and personally led an army into Brabant against Alva, but failed to bring about an engagement. In 1572 the estates appointed the prince stadtholder of Holland, Zealand, Friesland and Utrecht, with power to prosecute the

war against Spain. In 1574 the prince's brothers, Louis and Henry, were defeated and killed in a battle at Mookerheide, but this disaster was to some extent compensated by the raising of the siege of Leyden. In 1576 the brutality of the Spanish soldiers was such that William was able to negotiate the pacification of Ghent, a treaty in which the provinces bound themselves to expel the Spaniards from the Netherlands. In the troublous times which followed the prince acted with great discretion, and it was by his political prudence that the five northern provinces joined in the Union of Utrecht (1579), and thus laid the foundations of the republic of the United Netherlands. To check this growing power Philip set a price of 25,000 gold crowns upon the head of the prince, with the result that his life was attempted in 1582 at Antwerp, and he was ultimately assassinated at Delft in 1584 by a fanatic named Balthasar Gerard.

## William and Mary College,

an educational, non-sectarian institution in Williamsburg, Virginia; founded in 1693. Thomas Jefferson and other eminent Virginians were educated here.

**Williams, FRANCIS HOWARD**, an American dramatic writer, born in Philadelphia, in 1844. Among his plays are: *The Princess Elizabeth*, *A Lyric Drama*, *A Reformer in Ruffles*, *At the Rise of the Curtain*, etc.; also *The Flute Player and Other Poems*, *The Burden Bearer*, *An Epic of Lincoln*, etc.—His son, FRANCIS CHURCHILL WILLIAMS, is the author of *The Captain*, a novel, and several other stories and sketches.

**Williams, JOHN**, missionary, was born near London in 1796, and served as an ironmonger's apprentice. Having been ordained a minister in 1816, he sailed for the South Seas under the auspices of the London Missionary Society; achieved a remarkable success in civilizing the islanders; and after his return to England, in 1834, he published the account of his labors in *A Narrative of Missionary Enterprise in the South Sea Islands* (1837). Returning to Polynesia in 1838 he was murdered by the natives of Erromanga in 1839.

**Williams, JOHN SHARP**, senator, born at Memphis, Tennessee, in 1854. He engaged in law practice in 1877, was elected to Congress from Mississippi in 1893, and was long the Democratic leader in the House. He was elected to the Senate in 1908 for the term 1911-17.

**Williams, SIR MONIER**. See *Monier-Williams*.

**Williams, ROGER**, a Baptist divine of Rhode Island, North America, was born of Welsh or Cornish parents about 1590; died in 1683. He was sent as a scholar to the Charter-house, afterwards he studied either at Oxford or Cambridge. He is said to have taken orders in the English Church, but because of his religious belief he emigrated in 1631 to New England. When his extreme views regarding the jurisdiction of the civil magistrate caused him to be banished from the colony of Massachusetts he repaired to Rhode Island and founded a settlement, which he called Providence. Here he proclaimed complete religious tolerance, thus making Rhode Island a haven for those persecuted by the Puritans. He was an earnest friend of the Indians. He was twice in England in connection with a charter for the colony, and there made the acquaintance of Milton and other prominent Puritans. He published *A Key into the Language of the Indians of America* (1643); *The Bloody Tenent of Persecution for the Cause of Conscience* (1644); *The Bloody Tenent yet More Bloody* (1652), etc.

**Williams, TALCOTT**, an American journalist, born of American parents in Turkey, July 20, 1849. From 1881 till 1912 he was on the staff of the *Philadelphia Press*. He then became head of the school of journalism founded by the late Joseph Pulitzer as an adjunct of Columbia University.

**Williamsport** (wilyumz-port), a city, the county seat of Lycoming Co., Pennsylvania, on the west branch of the Susquehanna River, 94 miles N. by W. of Harrisburg. It is attractively laid out, with several parks, and a city hall, government buildings, Masonic temple, cathedral, and other notable buildings. It was formerly the greatest lumber market in Eastern United States. The mountains to the north are heavily timbered and there are rich coal mines in the vicinity. There are large lumber mills, steel works, rubber factories, furniture factories, machine shops, tanneries and a large silk mill. This city is the seat of Dickinson Seminary. Pop. 31,860.

**Williamstown**, a town of Williams-town township (town), Berkshire Co., Massachusetts, on the Hoosac River, 5 miles N. W. of North Adams. It lies in a fertile valley, noted for beautiful scenery, and is a summer resort. The town has bleaching and finishing works and manufactures of

## Williamstown

corduroy and cotton goods. Williams College, founded 1793, is situated here. Pop. 5000.

**Williamstown**, a seaport in Victoria, on the southwest shore of Hobson Bay, immediately opposite Sandridge (Port Melbourne), and 9 miles by rail from Melbourne. The piers are commodious, and there are shipbuilding yards, patent slips, the Alfred graving dock, and government workshops. There is a lighthouse on the peninsula on which the town is built, and a lightship further down the bay. Pop. 14,083.

**Willimantic** (wll-i-man'tik), a city of Windham Co., Connecticut, is on the Willimantic River, 16 miles N. W. of Norwich. It contains a State normal training school. The river affords abundant water-power, and the manufactures are extensive, especially of cotton thread, of which it is the greatest producer in the country. There are also large silk, silk-twist, and cotton mills, plumbers' supplies and steam-heating works, etc. Pop. 11,230.

**Willis** (wil'is), NATHANIEL PARKER, author, born at Portland, Maine, in 1807; died in 1867. He was educated at Boston, Andover and Yale College; employed by S. P. Goodrich (Peter Parley) to edit *The Legendary* (1828) and *The Token* (1829); established the *American Monthly Magazine*, which was merged in the *New York Mirror*; traveled in France, Italy, Greece, European Turkey, Asia Minor and finally England; returned to America in 1837, and afterwards edited *The Home Journal*. His numerous published writings include: *Pencilings by the Way* (1835), *Inklings of Adventure* (1836), *Loiterings of Travel* (1839), *People I Have Met* (1850), *Famous Persons and Places* (1845), *Outdoors at Idlewild* (1854), and *The Convalescent, His Rambles and Adventures* (1859).

**Willow** (wil'ō), the common name of different species of plants belonging to the genus *Salix*, the type of the natural order Salicaceæ. The species of willows are numerous, about 160 having been described, 35 belonging to the United States. They are either trees or bushes, and grow naturally in a moist soil. On account of the flexible nature of their shoots, and the toughness of their woody fiber, willows have always been used as materials for baskets, hoops, crates, etc. The wood is soft, and is used for wooden shoes, pegs, and the like; it is also much employed in the manufacture of charcoal, and the bark of all the species contains the tanning principle.

## Wilmington

The Huntingdon or white willow (*Salix alba*) and the Bedford willow (*S. Russelliana*) are large trees, yielding a light soft timber, valuable for resisting the influence of moisture or damp. The weeping willow (*S. Babylonica*) is a native of China, and is a fine ornamental tree. The willow has for long been considered as symbolical of mourning.

**Willow-herb.** See *Epilobium*.

**Willow-moth**, a species of mouse-colored moth (*Cara-drina cubicularis*), the hinder wings of which are pure white. The larvæ feed on grains of wheat.

**Willow-oak**, an American tree of the genus *Quercus*, the *Q. Phellos*. The wood is of loose, coarse texture, and is little used.

**Willow-wren**, *Sylvia trochilus*, one of the warblers, and a summer visitant in Britain, with a pleasing song. The general color is dull, olive-green above, the chin, throat and breast yellowish-white, and the belly pure white.

**Wilmerding**, a borough in Allegheny Co., Pennsylvania, 13 m. E. S. E. of Pittsburgh. P. 6133.

**Wilmersdorf**, a town of Prussia, 3 m. S. W. of Berlin. Pop. (1910) 102,716.

**Wilmington** (wil'ming-tun), a city and port of entry, capital of Newcastle Co., Delaware, is situated on the Delaware River and Brandywine and Christiana Creeks, 27 miles S. W. of Philadelphia. It is the commercial and manufacturing emporium of the State, and has large and flourishing industries, especially in powder-making, vulcanized fiber and glazed kid. There are also large shipyards, iron and steel works, and manufactures of cars, car-wheels, bridges, boilers, paper, leather, etc. Among its institutions are a government building, court-house, State insane asylum, normal school and other industrial institutions. Old Swedes' Church built in 1698, marks the site of the oldest Swedish settlement in the Delaware valley. Pop. 87,411.

**Wilmington** a city, port of entry and capital of New Hanover Co., North Carolina, is situated on the east bank of Cape Fear River about 25 miles from its mouth, and is the largest commercial town in the State. Its notable public buildings include a Federal building, city hall, union station, etc. The river has a depth of 26 feet at mean low water and extensive port facilities including 11 large terminals erected during the past two years.

Wilmington has a large export trade in cotton and lumber. It has extensive manufactures, including large lumber



mills, metal works, machine shops, veneer mills, handles and heading factories, turpentine distilleries, etc. Pop. 25,748. **Wilna.** See *Vilna*.

**Wilmot Proviso.** The war between Mexico and the United States terminated in the acquisition of a vast territory by the latter. Mr. Wilmot, of Pennsylvania, in 1846, offered in Congress what became historic as the 'Wilmot Proviso,' that 'No part of the territory thus acquired should be open to the introduction of slavery.' This proviso brought heated discussion of the slave question, and civil war and a dissolution of the Union were threatened in consequence. The proviso failed of passage.

**Wilson,** a town, capital of Wilson Co., North Carolina, about 44 miles E. by S. of Raleigh. Cotton goods, cottonseed-oil, etc., are manufactured. Pop. 6717.

**Wilson** (wii'sun), **ALEXANDER**, an American ornithologist, was born at Paisley, Scotland, in 1766. He emigrated to America in 1794; assisted in editing the American edition of *Rees's Cyclopædia*; also worked at his

trade as a weaver and taught a school at Kingsessing, near Philadelphia. Becoming interested in ornithology, he resolved to write and illustrate a work on American birds, and for this purpose traveled on foot through Western New York, then a wilderness, observing its birds. He told the story of his excursion in a lively and graphic work called *The Foresters*. The result of his labor was the *American Ornithology* (seven vols., 1808-13), a work which was completed by Ord, with a continuation by Lucien Bonaparte. It was the pioneer of the magnificent works of Audubon and Charles Bonaparte. He died in 1813, worn out by his great labor on this work.

**Wilson, SIR DANIEL**, archaeologist, was born at Edinburgh in 1816; educated at the university there; became secretary to the Royal Society of Antiquaries; was appointed (1853) professor of history and English literature in University College, Toronto, Canada; and in 1880 was elected president. He wrote numerous works, including *Prehistoric Man*, *Caliban*, *the Missing Link*, *The Lost Atlantis*, *Anthropology*, *Left-Handedness*, etc. He died in 1892.

**Wilson, HENRY**, statesman, was born in Farmington, New Hampshire, in 1812. In 1840, as the 'Natick cobbler,' he addressed political meetings, being elected in that year to the Massachusetts Legislature. In 1855 he was elected United States Senator. His speeches bear the impress of clear-sighted statesmanship. Mr. Wilson was an ardent antislavery man, and was the author of the bill by which slavery was abolished in the District of Columbia (1862). He was reelected to the Senate in 1865, and was chosen vice-president of the United States in Grant's second term (1862). He died in this office November 22, 1875.

**Wilson, HORACE HAYMAN**, orientalist, was born at London, in 1786; died in 1860. He was educated for the medical profession, went out to Bengal as assistant-surgeon in the service of the East India Company; was appointed to an office in the Calcutta mint, of which he afterwards became assay-master and secretary; devoted his leisure to the study of Sanskrit; was elected (1832) Boden professor of Sanskrit at Oxford University; and soon afterwards became librarian at the India House and director of the Royal Asiatic Society. His writings included a *Sanskrit-English Dictionary* (1819), and numerous translations of Sanskrit poems etc.



**Wilson, JAMES**, American jurist and signer of the Declaration of Independence, was born in Scotland in 1742; came to America in 1763 and made his home in Philadelphia; delegate to Congress, 1775-77, 1782-83 and 1785-87; was appointed a justice of the Supreme Court in 1789. Died 1798.

**Wilson, JAMES**, ex-Secretary of Agriculture, was born in Scotland in 1835. He was a member of Congress, 1873-77 and 1883-85. Appointed to the cabinet office by President McKinley, he held that position during the Taft and Roosevelt administrations.

**Wilson, JAMES GRANT**, author, born in New York city in 1832, served in the Civil War. Besides numerous addresses, essays, and articles in periodicals, he published: *Biographical Sketches of Illinois Officers; Life of General Grant; The Presidents of the United States; Thackeray in the United States*, etc. He was the editor of *Appleton's Cyclopædia of American Biography*, and of *Memorial History of the City of New York*, etc. Died May 2, 1914.

**Wilson, JAMES HARRISON**, American soldier and author, born in Illinois in 1837. His conduct throughout the Civil War was such as to win for him the title of brevet major-general of volunteers for gallant and meritorious service during the war. In 1865 he commanded a cavalry expedition into Georgia and Alabama during which he captured Jefferson Davis. He entered the regular army at the close of the war with the rank of lieutenant-colonel, retiring from the service in 1870. Served in the Spanish War and in the China expedition of 1900; represented the United States Army at the Coronation of King Edward VII; in 1901 was placed on the retired list as a brigadier-general United States Army. Among other things he wrote: *China: Travels and Investigations in the Middle Kingdom, A Life of General Grant*, etc.

**Wilson, JOHN**, better known in literature as 'Christopher North,' was born in Paisley, Scotland, in 1785; died in 1854. He was educated at Glasgow University and Magdalen College, Oxford, where he gained the Newdigate prize for an English poem, as also a great reputation for athletics. Leaving Oxford he bought the estate of Elleray, near Windermere, and there formed an acquaintance with Wordsworth, Southey, and Coleridge; contributed to Coleridge's *Friend*, and published a poem called *The Isle of Palms* (1812). Another poem, *The City of the Plague*, appeared in 1816. He now passed the Scots bar,

and settled in Edinburgh. He was one of the original contributors to Blackwood's Magazine, established in 1817, and three years afterwards was appointed to the chair of moral philosophy in Edinburgh University, a position which he held until 1851. Besides his numerous magazine articles, the most characteristic of which were some of the *Noctes Ambrosianæ* and those published subsequently as the *Recreations of Christopher North* (1842), he wrote other tales.

**Wilson, Woodrow**, twenty-eighth president of the United States, educator and author, was born at Staunton, Virginia, December 28, 1856. He was graduated from Princeton in 1879; studied law at the University of Virginia; practiced law in Atlanta (1882-83); received the degree of Ph.D. at Johns Hopkins University (1886); was professor at Bryn Mawr, 1885-88; at Wesleyan, 1888-90; at Princeton, 1890-1910. In 1902 he became president of Princeton University. He wrote *A History of the American People* and others works, and became prominent as a reformer. He was elected governor of New Jersey in 1910. He was chosen on the strength of his irreproachable character and his scientific knowledge of the principles of government, and during his first year in office a number of important reform measures included in his platform were enacted. His successful record as governor brought him the Democratic nomination for President in 1912 and his subsequent election. His term of office was marked by international questions rarely equalled in importance, including the revolutionary outbreaks in Mexico and the great European war, both of these involving the lives and interests of American citizens. President Wilson handled these momentous questions in the cause of peaceful relations, so far as the safety and dignity of the American government permitted. In 1916 he was a second time elected President and began his second term on March 4, 1917. Although a lover of peace and the nominee of a party who had presented him for re-election as 'the man who kept us out of war,' he was forced into the affray to defend the honor of the country and the safety of the lives of Americans on the high seas who were being murdered by Germany's undersea navy. Too, there was the holy cause of invaded Belgium.

President Wilson's notes to Germany and his messages to Congress were acclaimed among all the Allied peoples, who came to look upon him as the leader of the world's thought. His slogan, 'to make the world safe for democracy,' became a powerful rallying cry. On the 3d of

February, 1917, he severed diplomatic relations with Germany and suggested similar action on the part of other nations. The machinations of the agents of Germany in America, as well as other parts of the world, were rapidly bringing that late flourishing empire to scorn and contempt.

President Wilson had settled the difficult Mexican situation, and the withdrawal of American troops from that country was completed by February 5. The torpedoing of American ships continuing, he asked Congress to authorize him to arm merchant ships. The Senate debate on the question was protracted by a few pacifists whom the President styled 'a group of wilful men.' The second session of the 64th Congress ended without passing the bill. President Wilson took matters into his own hands, declared he had full power and went ahead with his program of arming merchant ships. To guard against filibustering in future the Senate, in special session on March 8, passed the famous Cloture rule. See *Cloture*. The great railroad dispute, which threatened a nation-wide strike in March, was settled by President Wilson, who insisted that the demands of the men for a basic eight-hour day must go into effect. Later he took over control of the railroads.

On the assembling of the 65th Congress, summoned by the President in extra session, he called for a declaration of war on Germany and provision for full co-operation with the Allies. The Senate passed the war resolution by a vote of 32 to 6; the House by a vote of 373 to 50. The great peace President became a great war President. He ordered the immediate expansion of the army and navy to full war strength and advocated an Army Draft Bill, which was passed by Congress in May. (See *Conscription*.) Although determined to bring all the resources of the country to bear on the struggle, if need be, he kept in view the possibility of peace and refrained from war with Austria-Hungary in the hope that through that country he might reach the people of Germany and persuade them to overthrow the war lords. But the dual monarchy was plainly under the thumb of the Prussian militarists and on December 3, 1917, President Wilson asked Congress for a declaration of war on Austria-Hungary. As indicating the unanimity of the nation, the House of Representatives passed the war resolution with but one dissenting vote, registered by London, a New York Socialist. The Senate adopted the resolution unanimously.

Through the Russian debacle he en-

deavored to help in the upbuilding of the new republic, first sending a special diplomatic mission headed by Elihu Root, and later, when the Bolsheviks had taken control, assuring the Soviet of American sympathy in the crucial days of March, 1918.

On November 11, 1918, he announced in Congress: 'The armistice was signed this morning. Everything for which America fought has been accomplished. The war thus comes to an end.' Less than a month later he sailed for France, to take part in the peace conference. In this he broke all precedents, being the first President of the United States to visit Europe while holding office. He had laid down fourteen principles, which had been adopted in part by the Allied nations as well as by the Germans, specifying the terms on which peace should be made. These embodied: (1) Open covenants of peace, openly arrived at, and no secret treaties; (2) freedom of the seas in peace and war; (3) removal of economic barriers; (4) reduction of armaments; (5) colonial claims to be adjusted with due regard for the interests of the populations concerned; (6) friendly treatment of Russia; (7) Belgium to be evacuated; (8) the wrong done to France in the matter of Alsace-Lorraine should be righted; (9) readjustment of frontiers of Italy along lines of nationality; (10) the peoples of Austria-Hungary to be accorded the freest opportunity of autonomous development; (11) international guarantees of the territorial integrity of the Balkan states; (12) Turkish portion of Ottoman empire to remain, but other nationalities to be assured opportunity of autonomous development, and Dardanelles to be opened free under international guarantees; (13) a Polish state to be erected; (14) league of nations to be formed, to defend integrity of great and small states alike.

On January 25, 1919, the peace conference unanimously adopted a resolution to create a league of nations. This was one of President Wilson's pet projects, and it was in the face of considerable opposition that he carried the idea into action. (See *Treaty*.) He signed the treaty with Germany, June 28, 1919, and returning to the United States toured the country, urging ratification of the treaty. The strain was too much for him and he was stricken in Pueblo, Colorado, Sept. 25, being compelled to cancel all engagements and return to Washington. For several months he was confined to his room while the Senate wrangled with the treaty and finally refused to ratify it without reservations. It was in his sick-room that he received Albert, King of the Belgians, and the young Prince of Wales.

**Wilts**, or **WILTSHIRE**, a S. W. county of England, bounded by Gloucester, Somerset, Dorset, Hants and Berks; area, 864,087 acres. The north is flat and fertile; in the south is Salisbury Plain, which was one of the great cantonments in the World war, 1914-18. Chief rivers, Kennet and Upper and Lower Avon. Sheep and cattle are raised. Manufactures include cutlery and steel goods. Capital, Devizes. Pop. 486,822.

**Wimbledon** (wim'bi-dun), a town of England, county of Surrey, 7 miles southwest of London, at the northeast extremity of Wimbledon Common. Up to 1889 it was well known in connection with the shooting competitions of the National Rifle Association. There are remains of an ancient British earthwork. Pop. 54,876.

**Wimborne Minster** (wim'burn), a town in Dorsetshire, England, on the river Allen, near its confluence with the Stour. The principal building is the minster, a fine cruciform structure in various styles. Pop. 3711.

**Wincey** (win'si), a strong and durable cloth, plain or twilled, composed of a cotton warp and a woolen weft.

**Winch**, a kind of hoisting machine or windlass, in which an axle is turned by means of a crank-handle, and a rope or chain is thus wound round it so as to raise a weight.

**Winchell** (winch'el), ALEXANDER, geologist, born at North East, New York, in 1824; died in 1891. He held professorships in the University of Michigan and elsewhere and for a number of years served as State geologist of Michigan. He wrote *Sketches of Creation, Geology of the Stars, Preadamites, World-Life*, and various other works.

**Winchendon** a town (township) in Worcester Co., Massachusetts. It contains several villages, with manufactures of cottons, toys, woodenware, hardware, leather, etc. Pop. of town, 5678.

**Winchester** (win'ches-ter), an ancient city of England, in Hampshire, on the Itchen, 12 miles N. E. of Southampton. The most important edifice is the cathedral, which was built in the latter half of the eleventh century, but has since been much added to and altered. It is in the form of a cross; length from east to west, 545 feet, width of the transepts 208 feet. Besides being in itself of great architectural importance, it contains numerous monuments of historical interest; as the

tombs of William Rufus, of Edmund, son of King Alfred, and of Isaac Walton; the golden shrine of St. Swithun; bronze figures of James I and Charles I, etc. The other important buildings and institutions are St. Mary's College, founded in 1387, the town hall, the old castle, a corn exchange. In the fourteenth century Winchester was the principal seat of the woollen manufactures in England and had a large foreign trade. Pop. (1911) 40,532.

**Winchester**, a city, county seat of Clark Co., Kentucky. 18 miles E. of Lexington. It is the seat of Kentucky Wesleyan College. The industries are stock-raising, farming, planing and flour mills, etc. Pop. 9743.

**Winchester**, a city, county seat of Frederick Co., Va., 32 miles S. W. of Harper's Ferry. It lies in the Valley of Virginia and has several educational institutions, also extensive manufactures of gloves, leather, woollen goods, paper, lumber, flour, etc. National and Confederate cemeteries are located here. During the Civil war in its vicinity were fought several battles, it being repeatedly occupied by both contestants. Pop. 5864.

**Winchester**, a village and township of Middlesex Co., Massachusetts, 8 miles N. W. of Boston. It has a State aviary, a home for aged people, etc., and manufactures of leather, machinery and watch hands. George Bancroft and Theodore Parker were born here. Pop. of town, 9309.

**Winckelmann** (vink'el-man), JOHANN JOACHIM, critic and historian of ancient classical art, was born at Stendal, Prussia, in 1717. He was educated at Berlin and Halle; became a Roman Catholic, received a pension from the papal nuncio at Dresden (1755), and visited Rome, where he was appointed librarian to Cardinal Alban. In 1768 he was murdered and robbed in an inn at Trieste. His chief work is *Anmerkungen über die Baukunst der Alten* (1762).

**Wind**, a current in the atmosphere, as coming from a particular point. The principal cause of currents of air is the disturbance of the equilibrium of the atmosphere by the unequal distribution of heat. When one part of the earth's surface is more heated than another, the heat is communicated to the air above that part, in consequence of which the air expands, becomes lighter, and rises up, while colder air rushes in to supply its place, and thus produces wind. It is thus that the sea-breeze is produced every afternoon at places near the coast,

especially in intertropical countries, the ground having been heated by the sun's rays to a higher temperature than the sea; while about twelve hours later, the reverse effect—a land-breeze—occurs, the ground having fallen at night to a lower temperature than the sea. As the heat of the sun is greatest in the equatorial regions, the general tendency there is for the heavier columns of air to displace the lighter, and for the air at the earth's surface to move from the poles toward the equator. The only supply for the air thus constantly abstracted from the higher latitudes must be produced by a counter-current in the upper regions of the atmosphere, carrying back the air from the equator towards the poles. These are known respectively as the *Trade* and the *Anti-Trade* winds. Besides the unequal distribution of heat already mentioned, there are various other causes which give rise to currents of air in the atmosphere, such as the condensation of the aqueous vapors which are constantly rising from the surfaces of rivers and seas, and the agency of electricity. Winds have been divided into *fixed* or *constant*, as the trade-winds; *periodical*, as the monsoons; and *variable* winds. (See *Trade-winds*, *Monsoon*.) There are also local winds, which receive particular names; as, the *Indian* wind, the *sirocco*, the *simoom*, the *harmattan*, the *mistral*, *typhon*, etc. The velocity and force of the wind vary considerably, as shown by the anemometer. Thus a light wind traveling at the rate of 5 miles an hour exercises a pressure of 2 oz. on the square foot; a light breeze of 10 miles an hour has a pressure of 3 oz.; a good steady breeze of 20 miles, 2 lbs.; a storm of 60 miles, 18 lbs.; a violent hurricane of 100 miles, 50 lbs., a pressure which sweeps everything before it. Whirling winds, known in the United States as tornadoes, are at times of enormous violence, the air movement being at the speed of many hundreds of miles an hour. See *Cyclone*.

**Windber**, a borough of Somerset Co., N. E. of Somerset. It has coal-mining and other industries. Pop. 8013.

**Windermere** (win'der-mër), or WIN-ANDERMERE, the largest sheet of water in England, and renowned on account of the beauty of its scenery, is partly in Westmoreland and partly in Lancashire. It is about 11 miles long, and averages 1 mile in breadth; its principal feeders are the Brathay and the Rothay, and it has numerous islets.

**Windgalls** (wind'gals), are puffy swellings about the fet-

lock joints of animals, especially the horse, a result of over-work on hard roads. They are not accompanied with pain or lameness and cause no serious trouble. A long rest may cure them in young horses.

**Windham** (wind'am), WILLIAM, an English statesman, born in London in 1750; died in 1810. After being educated at Eton, Glasgow, and Oxford, he was returned to parliament (1784) as member for Norwich. Opposed at first to Pitt's administration he joined in Burke's condemnation of the French Revolution, and advocated the war against France; became secretary of war in 1794, and remained in this position until the retirement of Pitt in 1801; took office in the Grenville administration (1801) and brought forward a bill to limit the term of service in the army, as also to increase the pay and pensions of officers and men; retired from office (1805) and strenuously opposed the Copenhagen and Walcheren expeditions. He was the friend of Dr. Johnson and Colburn, and combined the varied qualities of scholar, orator, statesman, athlete, and sportsman.

**Wind-instrument**, an instrument of music, played by means of artificially-produced currents of wind, as the organ, harmonium, etc., or by the human breath, as the flute, horn, etc. See *Instrument* and *Instrumental Music*.

**Windlass** (wind'las), a modification of the wheel and axle used for raising weights. The simple form of the windlass used in ships for raising the anchors, consists of a strong beam of wood placed horizontally and supported at its ends by iron supports which turn in collars or bushes inserted in what are



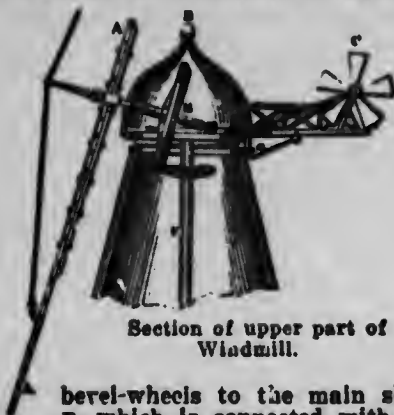
Ship's Windlass.

termed the *windlass bits*. This large axle is pierced with holes directed toward its center, in which long levers or handspikes are inserted for turning it round when the anchor is to be weighed or any purchase is required. It is furnished with *pevils* to prevent it from



turning backwards when the pressure on the handspikes is intermitted.

**Windmill**, a mill which receives its motion from the impact of wind upon sails, and which is used for grinding corn, pumping water, etc. In structure the windmill is a conical or pyramidal tower, and from the position of the sails in relation to the wind-shaft it is described as either *vertical* or *horizontal*. In the former, a section of which is here given, the wind is made to act upon sails or vanes *AA* attached by means of rectangular frames to the axle or *windshaft* of the mill. This axis is placed nearly horizontal, so that the sails by the pressure of the wind revolve in a nearly vertical plane, thus giving a rotary motion to the driving wheel *x* fixed in the wind-shaft. The movement thus produced is transferred by means of



Section of upper part of Windmill.

bevel-wheels to the main shaft *F*, which is connected with the specific machinery of the mill. As the sails to be effective must always face the wind, this is accomplished in modern mills by a self-adjusting cap *B*, moved by a fan or flyer *C* attached to the projecting framework at the back of the cap. By means of a pinion on its axis, motion is given to the inclined shaft and to the wheel *D* on the vertical spindle of the pinion *C*; this latter pinion engages the cogs on the outside of the fixed rim of the cap, and by these means the sails are kept constantly to the wind, when the wind causes the fan *C* to revolve. In the *horizontal* windmill, which is considered inferior to the other, the wind-shaft is vertical, so that the sails revolve on a horizontal plane. In most of the windmills used in America the sails consist of narrow boards arranged in a circular framework at a constant angle to catch the wind. Windmills, while widely replaced by the steam engine, are still largely used in the United States and Holland.

**Windom**, WILLIAM, statesman, born in Belmont Co., Ohio, in 1827; died in 1891. He was elected to Congress from Minnesota in 1853 and to the senate in 1870; was Secretary of the Navy under Garfield, in 1881, and Secretary of the Treasury under Harrison, in 1889.

**Window** (win'dō), an opening in the wall of a building to admit light and air into the interior. In dwelling houses in ancient times the windows were narrow slits, and it was not until about the end of the twelfth century that glass was used to any great extent in private houses in England. Windows, properly so called, were almost unknown in the religious edifices of the Egyptians, Greeks, and Romans, the light being admitted at the roof, but they constitute an essential and distinguishing feature of the Gothic style. In modern houses windows are made capable of being opened and shut by means of casements or sashes. In Britain a window tax was imposed in 1695, and in 1851, when the tax was abolished, each house having more than seven windows was taxed. No such tax was ever imposed in the United States.



West Window, Evreux Cathedral.

**Windpipe**. See *Trachea*.

**Windsor** (win'znr), or NEW WINDSOR, a municipal and parliamentary borough in England, county of Berks, beautifully situated on the Thames, 22 miles w. from London, and connected by a bridge with Eton. There are several churches and chapels, barracks, an infirmary, etc. The only manufacture of importance is that of tapestry. Pop. 19,840. Windsor owes its chief importance to its castle, which stands east of the town on a height overlooking the river Thames, and is the principal royal residence in the kingdom. It was begun, or at least enlarged, by Henry I, and has been altered and added to by almost every sovereign since. The castle stands in the Home Park or 'Little Park,' which is 4 miles in circumference, and this again is connected with the Great Park, which is 18 miles in circuit, and contains an avenue of trees 3 miles in length. The chief features of interest in the castle are the

old state apartments; St. George's Chapel, where the Knights of the Garter are installed, and the vaults of which contain the remains of Henry VI, Edward IV, Henry VIII, Charles I, George III, George IV, and William IV; the Round Tower or ancient keep; and the present state apartments occupied by the sovereign.

**Windsor**, a town and port of entry, capital of Hants Co., Nova Scotia, on an arm of Minas Bay, 45 miles N. W. of Halifax. It is the seat of King's College, founded in 1788. There are here extensive mines of limestone, gypsum and other useful minerals. Windsor was settled about 1745 and incorporated in 1878. Pop. 3398.

**Windsor**, a city in Ontario, Canada, on the Detroit River and Grand Trunk, Canadian Pacific, and other railways. It is in a fruit region, and has salt, chemical, and other important industries. Pop. 20,000.

**Windward Islands** (wind'ward), one of the divisions of the Lesser Antilles in the West Indies, so called in opposition to another division of the same, called the *Leeward Islands*. The term is vaguely used, but generally includes Martinique, St. Lucia, St. Vincent, Grenada, Barbados, and Tobago.

**Wine** (win), the term specifically applied to the fermented juice of the grape or fruit of the vine, though it may also be applied to the fermented juice of any fruit. (See *Vine*.) Wines are distinguished practically by their color, hardness or softness on the palate, their flavor, and their being still or effervescent. The differences in the quality of wines depend partly upon differences in the vines, but more on the differences of the soils in which they are planted, in the exposure of the vineyards, in the treatment of the grapes, and the mode of manufacturing the wines. When the grapes are fully ripe, they generally yield the most perfect wine as to strength and flavor. The juice is expressed from the grapes by means of presses of all varieties of construction, from the simple lever and wedge press to the machine with hydraulic power. It is usual to separate the juice as it is expressed into first, second, and third 'runs,' the first pressing being the best quality, and the amount of all the juice is usually about 70 per cent. of the weight of the grapes. The juice of the grape when newly expressed, and before it has begun to ferment, is of a sweet taste, and is called *must*. The fermenting process requires much time and attention, and if it be

arrested while part of the sugar is unchanged a *fruity* wine is the result. If the process, however, is completed, and all the sugar converted into alcohol, a *dry* wine is obtained. When an *effervescent* wine, like champagne, is desired the fermenting liquid is bottled, and the process of fermentation completed in the bottle, where the carbonic acid gas remains to give it a sparkling effervescent quality. When the wine is *red* in color it shows that the skins of the grape have remained in the vat during fermentation, while in *white* wines the skins have been removed before that process is begun. The leading character of wine must be referred to the alcohol which it contains, and upon which its intoxicating powers principally depend. The amount of alcohol in the stronger ports and sherries is from 16 to 25 per cent.; in hock, claret, and other light wines from 7 to 12 per cent. Wine containing more than 13 per cent. of alcohol may be assumed to be fortified with brandy or other spirit. The most celebrated ancient wines were those of Lesbos and Chios among the Greeks, and the Falernian and Cecuban among the Romans. The principal modern wines are Port, Sherry, Claret, Champagne, Madeira, Hock, Marsala, etc. The varieties of wine produced are almost endless and differ in every constituent according to the locality, season, and age. The principal wine-producing countries are France, Germany, Spain, Portugal, Italy, Sicily, Greece, Cape Colony, Australia, and the United States. Much the greater quantity of wine consumed in the United States is the product of that country, chiefly of California.

**Wine-measure**, an old English measure by which wines and other spirits were sold. In this measure the gallon contained 231 cubic inches.

**Winfield** (win'feld), a city, county seat of Cowley Co., Kansas, 50 miles S. S. E. of Wichita. Here are an institution for the feeble-minded, two colleges, a Chautauqua Assembly, flour mills, produce plants, etc. Pop. 6700.

**Winged Bull**, an architectural decoration of frequent occurrence in ancient Assyrian temples, where winged human-headed bulls and lions of colossal size usually guarded the portals. They were evidently typical of the union of the greatest intellectual and physical powers.

**Winged Lion**, the symbol of the evangelist St. Mark, which was adopted as the heraldic device of the Venetian Republic. A celebrated bronze figure of the winged lion

of St. Mark surmounting a magnificent red granite column, formed out of a single block, stands in the piazzetta of St. Mark at Venice.

**Wing-shell.** See *Pinna*.

**Winnipeg** (win'i-peg), a lake of Canada, province of Manitoba; length, about 250 miles; breadth, from 5 to 70 miles. It receives the surplus waters of lakes Winnipegosis and Manitoba, besides the river Winnipeg, but its chief tributaries are the Saskatchewan and the Red River. Its surplus water is discharged by the Nelson River into Hudson Bay. The river of the same name, which flows into Lake Winnipeg, rises in the Lake of the Woods, and has a length of about 250 miles. Its navigation is interrupted by falls.

**Winnipeg**, capital of the province of Manitoba, Canada, stands at the confluence of the Assiniboine and the Red rivers, 40 miles s. of Lake Winnipeg. It occupies a central position on the Canadian Pacific Railway, 1424 miles by rail w. n. w. of Montreal, and 512 miles n. n. w. of Minneapolis. The locality of the city is that of the old Red River colony of Lord Selkirk, founded in 1812. In fact, five fur traders' forts have stood within the city limits: Fort Rouge, a French outpost (1736); Fort Gibraltar, built by Montreal traders (1804-15); Fort Douglas, the Lord Selkirk stronghold (1813-15); Old Fort Garry, of the Hudson Bay Company (1821-35), and New Fort Garry (1835-82). The transfer of Rupert's Land to Canada in 1870 led to the founding of the Manitoba province, and at that date Winnipeg began as a village, half a mile north of Fort Garry. It owes its sudden expansion into an important city largely to its position on the Canadian Pacific, while it is also benefited by railway connection with the United States and by several other railways which radiate from it. The site of the city is on a prairie, part of it being originally swampy, though it is now well drained. It extends on both sides of the Assiniboine, and on the west side of the Red River, the east side of which is occupied by its suburb of St. Boniface, settled in 1817 by Lord Selkirk's German De Meuron soldiers. The growth of Winnipeg has been remarkably rapid. In 1871, the population of the village was only 241, but it grew so rapidly that in 1873 it was incorporated as a city, in the face of vigorous opposition by the Hudson Bay Company. Canadian immigration now became rapid, and in 1881 it had 7985 inhabitants. Its central position on the

Canadian Pacific now gave it a great boom, wild land speculation setting in, and the population doubling in a few months. This 'boom', however, checked the development of the city, a business collapse following, which caused much loss and rapidly diminished the population. But prosperity soon returned and in 1886 it had 20,238 population. Being on the eastern edge of the prairie region, which extends for a thousand miles to the Rocky Mountains, and lying westward of the great Laurentian formation extending to Montreal, it is admirably situated as an important railway center. The first railway to reach it was the Pembina branch of the Canadian Pacific, in 1878. This branch connects with the railway system of the United States. The Canadian Pacific main line soon after traversed the city and several branches radiated from this center. These advantages and its location on navigable rivers made it the commercial focus of the vast agricultural territory of the Canadian Northwest, a fact to which it is largely owing its rapid development. In 1891 it had a population of 25,642, and in 1901 of 42,340, but since the latter date, the settlement of the wheat-growing territory of the Northwest has given it a phenomenal growth, its population reaching 136,035 in 1911. The city is handsomely laid out, with numerous interesting edifices, including the city hall, the parliament buildings, the grain exchange, governor's residence, courthouse, University of Manitoba (a well endowed institution with four affiliated colleges), St. John's Episcopal College, Manitoba Medical College and St. Boniface (Roman Catholic) College. Among the business interests of the city, the vast bazaar known as the Hudson Bay Company's stores stands preëminent. There are also great flour mills and grain elevators, the repair shops of the Canadian Pacific Railway, and manufactures of agricultural implements, cottons, sewing silk and dairy implements.

**Winona** (wi-nó'ná), a city county seat of Winona Co., Minnesota, situated on the west bank of the Mississippi. It is one of the largest grain-shipping points in the United States, and an active manufacturing city, producing agricultural implements, carriages and wagons, flour, patent medicines, malt liquors, etc. Here is a State normal school and other educational institutions. Pop. 22,000.

**Winsey**, or WINCEY, a cloth consisting of woolen warp and cotton weft, or of wool mixed with a portion of cotton. Heavy winseys are used

for skirtings, light winseys for men's shirts.

**Winslow** (winz'lo), EDWARD, governor of Plymouth colony, Massachusetts, was born in 1595 at Droitwich, England, sailed in the Mayflower, was governor or assistant governor after 1624, and returned on three occasions to England to further the interests of the colony. In doing this he published *Good News From New England* (1624), *Hyprocrisie Unmasked* (1646), and *New England's Salamander* (1647), all these being valuable descriptions of the young colony. He was appointed by Cromwell chief commissioner of an expedition against the West Indies and died at sea in 1655.—JOSIAH, his son, born in 1629; died in 1680; was assistant governor from 1657 to 1673, and afterwards governor until his death. He was appointed general-in-chief of the United Colonies in 1675, and in the same year the first public school was founded under his auspices.—JOHN, Josiah's grandson, born in 1702; died in 1774; carried out, under orders from the British authorities, the removal of the Acadians.

**Winslow**, FORBES BENIGNUS, physician, born at London in 1810; died in 1874. He was educated in Scotland and Manchester; studied medicine at New York and London Universities passed the College of Surgeons in 1835; and in 1849 was graduated M.D. from Aberdeen. He devoted himself chiefly to the investigation of mental disease, and published *Anatomy of Suicide* (1840), *Insanity in Criminal Cases* (1843), *Obscure Diseases of the Brain* (1860), etc.

**Winslow**, JOHN, naval officer, born at Wilmington, North Carolina, in 1811; died in 1873. He entered the navy about 1827, and in 1862 served under Captain Foote on the Mississippi River. In 1863 was put in command of the *Kearrage*, a 7-gun steamer, and sent to the coast of Europe to watch the Confederate cruisers. Here on June 19, 1864, he met the privateer *Alabama*, and sunk it after a short fight, its crew being rescued. He was appointed commodore in 1865 and rear-admiral in 1870.

**Winsor**, JUSTIN, historian, born at Boston, Massachusetts, in 1831; died in 1897. He was superintendent of the Boston Public Library, and librarian of Harvard University. He was the highest authority on the early history of North America. His works are *Memorial History of Boston*, and *The Native and Critical History of America*.

**Winsted** (win'sted), a borough and one of the capitals of Litchfield Co., Connecticut, at the outlet of Long Lake, 28 miles N. W. of Hartford. It has a county hospital, children's home, and varied manufactures. Pop. 7754.

**Winston**, JOHN CLARK, publisher, political reformer, was born at Darlington, Indiana, in 1856. He was graduated at Haverford College in 1881; entered the publishing business in Philadelphia, and in 1884 organized and became president of The John C. Winston Company. In 1920 he became Director of Public Works of Philadelphia.

**Winston-Salem**, a city, county seat of Forsyth County, North Carolina. Winston and Salem were formerly separate, but were consolidated into one city in 1913. Salem was established in 1766; Winston in 1849. The city is located within fifty miles of the main range of the Blue Ridge Mountains and is an important railroad and industrial center, with varied manufactures. It is the principal trading center of a wide area. Pop. 30,000.

**Wint**, PETER DE, painter, was born at Stone, Staffordshire, England, in 1784; died in 1849. He descended from a Dutch family settled in New York, studied Mezzotint engraving, but soon took up oil and water-color painting. He became notable for his beautiful water-color illustrations of English landscape, architecture and country life. His favorite fields of work were in Lincoln, Yorkshire and Derbyshire, though he also painted scenes on the Thames and the Trent, in Wales and elsewhere. He exhibited mainly in the rooms of the Water-color Society. He is well represented both in the National Gallery and at South Kensington. Among his celebrated pictures are *The Cricketers*, *Lincoln Cathedral*, *The Hay Harvest*, *Richmond Hill*, *Cows in Winter*, *A Cornfield* and *A Woody Landscape*, the last two oil paintings.

**Winter** (win'ter), the coldest season of the year, in the northern hemisphere comprising the months of December, January and February. The astronomical winter begins on the shortest day (December 22) and ends with the vernal equinox (March 21).

**Winter**, JOHN STRANGO. See *Stanward*, Mrs. Arthur.

**Winter**, WILLIAM, author and dramatic critic, was born at Gloucester, Massachusetts, in 1836. He studied law, but soon forsook it for a career in literature, which he had begun in early life. In 1854 appeared his first dramatic criticism, a field in which he



## Winter-cress

has since continued, gaining high reputation as a critic. He has written much under his own and other names, largely in poetry and on stage subjects, and has edited many of Shakespeare's and other plays, also the *Poems of George Arnold*, the *Poems and Stories of John Brougham*, etc. He died June 30, 1917.

**Winter-cress**, the common name of two cruciferous plants of the genus *Barbarea*. *Barbarea vulgaris*, called also *yellow rocket*, grows on the banks of ditches and rivers, and about hedges and walls. It is bitter and sharp to the taste, and is sometimes used as a salad.

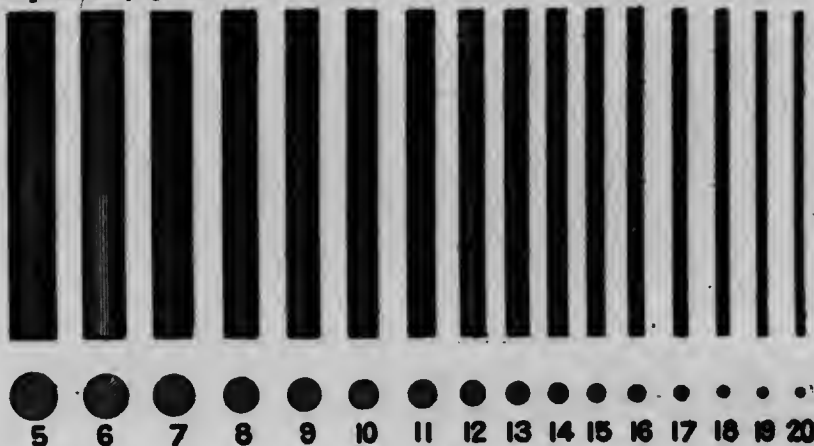
**Wintergreen**, a name of several plants, one of them being the partridge-berry (which see). The name is also given to a genus of perennial plants (*Pyrola*), order Pyro-

northeast of Zürich. The principal industries are cotton spinning, silk weaving, iron foundries, machine making, etc. Pop. 22,335.

**Winthrop**, a town (township) of Suffolk Co., Massachusetts, 5 miles N. E. of Boston. It forms a peninsula in Massachusetts Bay, and is a favorite summer resort. Pop. 10,132.

**Winton**, a borough of Lackawanna Co., Pennsylvania, 18 miles N. E. of Scranton. It is in a coal-mining district. Pop. 5280.

**Wire**, any metallic substance drawn to an even thread or slender rod of uniform diameter by being passed between grooved rollers or drawn through holes in a plate of steel, etc. Wire is usually cylindrical, but it is also made of various other forms. The metals most commonly drawn into wire are gold,



Sizes of Plain Wire.

laceæ, having short stems, broad evergreen leaves, and usually racemose white or pink flowers. *P. rotundifolia* possesses astringent properties and was formerly used in medicine.

**Winter-moth**, a moth (*Cheimonobia brumata*), the larvæ of which are exceedingly injurious to apple, pear, cherry, and plum trees. The moths appear in their perfect state in the beginning of winter.

**Winter's-bark** (*Drimys Winteri*), a plant of the nat. order Magnoliaceæ, a native of South America. It is an evergreen shrub, the bark of which has an agreeable, pungent, aromatic taste, and tonic properties.

**Winter Solstice.** See *Solstice*.

**Winterthur** (vin'tér-tör), a busy town of Switzerland, canton of Zürich, on the Eulach, 12 miles

silver, copper, aluminum, iron and steel; but the finest wire is made from platinum. Copper and iron wire is extensively used for telegraph and telephone. For fences great quantities of plain and barbed wire are produced. During the European war barbed wire was extensively employed as a protection against infantry attack by the enemy. *Wiredrawing* is the name for the process of making wire. An important use of wire in engineering is for the manufacture of *wire rope*. This is composed of strands of metal wire twisted together. These wire ropes have displaced fiberropes in many branches of industry. They are employed for suspension bridges, for hoisting machines, telegraph cables, ship's hawsers, etc. Endless wire ropes or cables are employed on traction railways in some instances.

**Wire-glass**, window glass in which a screen of woven wire

is imbedded. The molten glass is poured on an iron platform and the netted wire, heated red hot, is pressed into it. The result is an unbreakable sheet of glass.

**Wireless Telegraphy,** the sending of telegraphic messages through open space, without the use of conducting wires. Three different methods have been made use of in wireless telegraphy, which may be classed as conduction, induction and wave methods. In the first method currents are sent through the earth from an electrode to another at the sending station. In induction, use is made of the property which alternating currents possess of exciting similar currents in neighboring conductors, the aim being to get as intense a current as possible in the secondary circuit. Mr. W. H. Preece, England, by combining the two, signaled in this way as far as 40 miles. The third and the only method which has proved practically available is by the use of electro-magnetic waves. Guglielmo Marconi, an Italian, after long experiment, patented in 1897 a method entirely independent of wires, the electric waves being sent, presumably, through the ether, by the aid of a transmitting apparatus, and being detected by a coherer, a glass tube filled with metallic filings, into the end of which the terminals of a relay circuit enter. The wave falls on conducting material and, the spark gap being replaced by a coherer, the metallic filings magnetically cling together, closing the relay circuit, so that a signal is made. On breaking the current, a slight tap on the coherer or other means breaks the cohesion of the filings and the relay circuit is broken. In this way a rapid succession of signals can be sent. In 1899 Marconi conducted in England an exhaustive series of successful experiments, sending messages across the English Channel from the South Foreland to the French coast near Boulogne, and extending his results until much longer distances were covered. The process of development was continued until, to the world's astonishment, signals were sent across the Atlantic and, finally, commercial messages were transmitted over this distance.

Marconi's system is based on the property supposed to be exerted by the vibrations or waves of electric currents passing through a wire of setting up similar vibrations in the ether of space. These waves extend in every direction from the point of departure and by ingenious and very delicate receiving instruments, their presence in space is in-

dicated and they are taken up in sufficient strength to repeat their pulsations, and in this way reproduce the signals sent from the transmitter. One difficulty hitherto has been that a message may be received by hundreds of receiving instruments in all directions, thus preventing secrecy. Many efforts have been made to overcome this defect, but as yet with only partial success. The distance to which messages can be sent has so far depended largely on the height to which the wires extend above the earth's surface, lofty poles being erected at the stations. The height of these has been gradually increased until the Eiffel Tower at Paris has been utilized as a sending station. The strength of the electric waves has been similarly increased to add to their space-penetrating capacity. The record of wireless telegraphy has been in this way improved until now it has come into daily competition with other means of news sending. Methods of tuning the instruments have been adopted which limit the influence of the currents to properly tuned receivers and in this way some degree of secrecy is attained. Though the honor of inventing the art of wireless telegraphy is generally ascribed to Marconi, this is to give him more credit than he deserves. The principles involved were discovered by others and the utmost done by him was to invent a practical method of applying them. There are other systems of wireless telegraphy of later invention than that of Marconi, through a different application of the same principles, but none so far that seems likely to supplant the Marconi process. Messages have been sent to enormous distances, far surpassing the width of the Atlantic, as from Nova Scotia and Ireland to Argentina, a distance of 5600 miles. Under exceptional conditions a distance of 8500 miles was at length attained, and communication between Japan and the United States was established in 1915. For overland messages the limit of distance is less than oversea. Trans-Atlantic passenger vessels are now fitted out with wireless apparatus, by means of which almost constant communication can be kept up between passing vessels and between ships and shore. The efficiency of the wireless process as a very useful appliance on shipboard has been frequently demonstrated by indicating the locality of sinking ships and calling others to their aid. Relief has been brought in this way to vessels in distress and many lives saved. An important example is that of the sinking of the Titanic in 1912. By means of wireless

messages from ship to ship the width of the Pacific has been practically covered, as ships enroute from America to Australia or Asia can be kept in touch with Honolulu through almost the entire journey. Law in the United States now requires that all ocean passage-steamers carrying 50 or more passengers on routes of 200 miles or over, must be equipped with efficient wireless apparatus and operators. The distance reached must be at least 100 miles. The Canadian law provides that every sea-going and coasting passenger ship of over 400 tons gross, registered in Canada, and every sea-going and coasting freight ship of over 1200 tons gross, shall be equipped with a wireless apparatus. Wireless messages have been successfully sent from aeroplanes, balloons and submarine vessels, and the naval vessels of all nations are kept in communication by this method. Wireless press messages between America and Europe are also matters of daily performances. Great Britain proposes to send wireless messages around the world by a system of relays.

**Wireless Telephony.** The system of electrical transmission employed in wireless telegraphy has recently been applied successfully in telephony, through the invention of suitable apparatus, and it is possible to telephone many miles without wires. Distances reached in this manner have rapidly and remarkably increased, and in September, 1915, a message sent from Arlington, Va., to California was distinctly heard in Hawaii.

**Wire-worms,** the name given to grubs of the click beetle (*Elatér* or *Agriotes*). They are perhaps the most injurious of farm pests, destroying root, grain and fodder crops. Their name is given from their likeness in shape and toughness to a piece of wire. They are of yellowish color,  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in length, with three pairs of legs and a suctorial appendage below the tail. Among the natural enemies of these worms, moles, plovers, pheasants and rooks are the most important.

**Wirt, WILLIAM,** lawyer, born at Bladensburg, Maryland, in 1772; was admitted to the bar in 1792, and in 1806 settled in Richmond, Va., where he became a prominent lawyer. He distinguished himself at the trial of Aaron Burr, in 1807, as one of the counsel for the prosecution. He held many State offices, was appointed United States District Attorney in 1816, and Attorney-General in 1817, holding the latter office till 1829, through three administrations. He was nominated for President in 1832

by the Anti-Masonic party and received the electoral vote of Vermont. He died February 28, 1834.

**Wisbech,** OR **WISBEACH** (wis'bèch), a town of Cambridgeshire, England, on the Nene, on the island of Ely, 40 miles N. of Cambridge. Vessels of nearly 500 tons can ascend to Nene, and the place has some trade and manufactures. It was long famous for its woad and this is still made here for dyeing. A castle was founded here by William the Conqueror in 1071, was several times rebuilt, but was demolished in 1816. Pop. (1911) 10,828.

**Wisby** (vis'bè), a seaport famous in medieval times on the Swedish island of Gothland, 130 miles S. of Stockholm. It was one of the most important commercial cities in Europe during the tenth and eleventh centuries and a principal factor of the Hanseatic League in the fourteenth and fifteenth. It was captured and plundered by Valdimar III of Denmark, in 1361, and this proved fatal to its prosperity. Its remains attest its early grandeur. Pop. 6066.

**Wisconsin** (wis-kon'sin), a river which rises on the northern border of Wisconsin, runs southward, becomes navigable at Portage city, and enters the Mississippi 4 miles below Prairie-du-Chien after a course of nearly 600 miles. It is remarkable for its rapids and falls.

**Wisconsin,** one of the northern United States, bounded north by Lake Superior, northeast by Michigan, east by Lake Michigan, south by Illinois, and west by Iowa and Minnesota, the Mississippi river separating it from the latter States; area, 53,066 sq. miles. It consists of an undulating plateau, varying from 600 to 1500 feet above the sea-level, with high bluffs along the rivers and lakes, elsewhere diversified with prairie and woodland. Besides Michigan and Superior there are numerous small lakes; the chief rivers, which drain into the Mississippi, are the St. Croix, Chippewa and Wisconsin. In winter the weather is severe, but on the whole the climate is dry and healthy. The northern part of the State is heavily timbered, but is fast becoming settled. The State ranks high in agricultural value, the soil outside the wooded country being good and producing large crop, such as wheat, corn, rye, oats, barley, potatoes, hay and beet sugar. Fruit growing is an important industry, and cheese and butter making have very greatly increased. So has tobacco-growing, which is profitable, the leaf commanding a high price for wrappers.

In the north the lumber business is large. Horses are kept in large numbers and sheep are numerous, the wool clip being valuable. The mineral wealth is great, especially of iron ore, of which the yield is enormous. An excellent hydraulic cement comes from the vicinity of Milwaukee. Galena, limestone, lead and zinc are mined. The lakes and streams abound with fish, especially trout and black bass. The manufactures in the cities are chiefly furniture, agricultural implements, carriages, saddlery, woolen goods, leather, brooms, nails, paper, steel rails, etc. At Milwaukee are some of the largest beer brewing corporations in the world. There are a number of universities and colleges, the Wisconsin University, Madison, being liberally subsidized by the State. Wisconsin was admitted to the Union in 1848. The inhabitants to a large extent are German in origin. Milwaukee is the chief town, and Madison the capital. Pop. (1910) 2,333,860.

**Wisconsin**, UNIVERSITY OF, a State co-educational institution, located at Madison, Wisconsin, widely known throughout the country because of its active extension work in all parts of the State. The University comprises a College of Letters and Science, Graduate, Engineering, Law, Agriculture, Medicine and Library Schools; and a flourishing Summer School is maintained. The extension division consists of the department of correspondence study, instruction by lectures, debating and public discussion, and general information and welfare work. For the purposes of this extension study the State is divided into fourteen districts, with university headquarters in each. The College of Agriculture maintains an experiment station, long and short courses in agriculture, farmers' institutes, and courses in home economics. The campus of the University at Madison covers 926 acres on Lake Mendota and contain some 26 buildings. The students in 1912 numbered 5748.

**Wisdom** (wiz'dum), BOOK OF, called by the Septuagint the *Wisdom of Solomon*, one of the apocryphal books of the Old Testament.

**Wise** (wiz), HENRY A., statesman, was born on the eastern shore of Virginia in 1808, and died in 1876. He was sent as Minister to Brazil in 1844, and was elected Governor of Virginia in 1855, after a most energetic campaign.

**Wishart** (wish'art), GEORGE, one of the first martyrs to the Protestant religion in Scotland, was born in Kincardineshire early in the sixteenth century; traveled in Europe where he accepted the Reformed doc-

trines; returned to Scotland and began to teach, but was prosecuted for heresy; fled to England in 1538, and remained in Cambridge for six years; returned to Scotland in 1543, and preached in the chief towns, for which offense, at the order of Cardinal Beaton, he was arrested in the house of Cockburn of Ormiston, tried by a clerical assembly in St. Andrews, and burned at the stake there in 1546.

**Wishaw** (wish'p), a police burgh, Scotland, Lanarkshire, 15 miles S. E. of Glasgow. It has several large coal-mines, iron, steel, and nail works, fireclay brick-works, railway-wagon works, and a distillery. Pop. 20,873.

**Wismar** (vës'mär), a seaport town in Mecklenburg-Schwerin, North Germany, situated at the head of a bay in the Baltic, 18 miles N. E. of Schwerin. It has some manufactures, an excellent harbor, and a considerable trade in coal, timber, iron, etc. Pop. (1905) 21,902.

**Wissembourg**. See *Weissenburg*.

**Wistaria** (wis-tä'ri-a), a genus of plants, nat. order Leguminosæ. The species are deciduous, twining, and climbing shrubs, natives of Japan, China and North America. When in flower, they form some of the handsomest ornaments of the garden. *W. frutescens* is a species belonging to the United States.

**Wister**, ANNIS LEE (Furness), born at Philadelphia in 1830, married Dr. Caspar Wister. She translated into English numerous novels from the German of E. Marlitt and others, which became very popular. She died in 1908.

**Wister**, OWEN, novelist, born at Philadelphia in 1860. He was graduated from Harvard, became a lawyer, and gained wide repute by *The Virginian*, a novel of cowboy life. *Lady Baltimore* gained equal popularity. He has written various other stories and sketches.

**Witchcraft** (wich'kraft), a supernatural power which persons were formerly supposed to obtain by entering into compact with the devil, who engaged that they should want for nothing, and be able to assume whatever shape they pleased, to visit and torment their enemies, and accomplish their infernal purposes. As soon as the bargain was concluded the devil was said to deliver to the witch an imp or familiar spirit, to be ready at call, and to do whatever it was directed. By the aid of this imp and the devil together the



## Witch-hazel

witch, who was almost always an old woman, was enabled to transport herself through the air on a broomstick, and to transform herself into various shapes, particularly those of cats and hares; to inflict diseases on whomsoever she pleased, and to punish her enemies in a variety of ways. The belief in witchcraft is very ancient. It was a common belief in Europe till the sixteenth century, and maintained its ground with tolerable firmness till the middle of the seventeenth century. Indeed it is not altogether extinct even at the present day. Numbers of reputed witches were condemned to be burned, so that in England alone it is computed that no fewer than 30,000 of them suffered at the stake. The last victim was executed in 1722 in Scotland, and in the United Kingdom prosecution for witchcraft was abolished in 1736 by act of parliament. In the United States a few executions for witchcraft took place in the early colonial period, the Salem witchcraft delusion becoming historical. In France executions for witchcraft were prohibited by an edict of Louis XIV as early as 1670.

**Witch-hazel.** See *Wych-hazel*.

**Witenagemot** (wit'e-na-ge-mot'; literally, 'meeting of the wise men'), among the Anglo-Saxons, the great national council or parliament, consisting of the king, princes, nobles or ealdormen, the large landholders, the principal ecclesiastics, etc. The meetings of this council were frequent; they formed the highest court of judicature in the kingdom; they were summoned by the king in any political emergency; their concurrence was necessary to give validity to laws, and treaties with foreign states were submitted to their approval. They had even power to elect the king. See *Anglo-Saxons*.

**Wither** (with'er), GEORGE, an English poet, was born in Hampshire in 1588; died in 1667. He was educated at Magdalen College, Oxford; afterwards entered himself a student of Lincoln's Inn; and in 1613 published his satires entitled *Abuses Stript and Whipt*, the severity of which led to his confinement in the Marshalsea. Having been released he took an active part on the side of the Parliament when the Civil war broke out, and sold an estate to raise a troop of horse. Under the Long Parliament he enjoyed various lucrative employments.

**Witherspoon** (with'er-spön), JOHN, signer of the Declaration of Independence, was born in Gifford, Scotland, in 1722. In 1768 he be-

came president of Princeton College. He identified himself with the cause of the colonists and was elected to the Continental Congress. His patriotic work was arduous and of supreme importance. He died in 1794.

**Witness** (wit'nes), in law, (a) one who signs his name as evidence of the genuineness of another signature; (b) a person who gives testimony or evidence under oath or affirmation in a judicial proceeding. See *Evidence*.

**Witt, Dr.** See *Dr Witt*.

**Witte**, SERGEI YULIEVITCH, a Russian statesman, was born in 1840 at Tiflis, his father being a government official of German extraction and his mother a member of one of the oldest Russian noble families. After leaving the Odessa University he devoted some time to journalism, but in 1877 entered the railroad service, in which he showed the highest efficiency during the war with Turkey (1877-78). In 1879 he was called to St. Petersburg to be made railway manager, and was promoted rapidly until in 1892 he became Minister of Communications and soon afterwards of Finance. In the latter charge he introduced many reforms, increased the revenue, negotiated large loans abroad, and concluded important commercial treaties. In 1903 he was made President of the Committee of Ministers and a member of that of the empire. In 1905 he was the chief Russian plenipotentiary in the negotiations at Portsmouth, New Hampshire, yielding the treaty of peace between Russia and Japan. Died in 1915.

**Witten** (vit'en), a town of Prussia, in the province of Westphalia, 32 miles w. n. w. of Arnsberg, on the Ruhr. The chief industries are connected with iron and steel, lead, chemicals, plate-glass, fire-brick, etc. Pop. 35,841.

**Wittenberg** (vit'en-burg), a town in Prussia, province of Saxony, on the right bank of the Elbe, 45 miles southeast of Magdeburg. It was while Luther was a professor in Wittenberg that he nailed his ninety-five theses to the door of the Schlosskirche. The university of which he was professor was united to Halle in 1817. The principal buildings are the Schlosskirche, in which both Luther and Melancthon are buried; the Stadtkirche, where Luther and Melancthon preached; the remains of the Augustine monastery, with Luther's apartments; the houses of Melancthon and Cranach; the town hall, the gymnasium, etc. Pop. 20,332.

**Wittenberge** (vit'en-ber-ge), an industrial town of Prussia.

sia district of Potsdam, at the junction of the Stepenitz with the Elbe. Pop. 18,501.

**Witwatersrand** (wit-wa'térz-rant; Range'), a ridge of land in the Transvaal, South Africa, about 100 miles long E. to W., in lat. 26° S. This is the greatest gold-yielding region in the world. Gold was discovered here in 1886, and was the proximate cause of the Boer war. The output has increased until it is nearly double that of the United States.

**Woad** (wôd), a cruciferous plant of the genus *Isatis*, the *I. tinctoria*, formerly cultivated to a great extent in Britain on account of the blue dye extracted from its pulped and fermented leaves. It is now, however, nearly superseded by indigo, which gives a stronger and finer blue. The ancient Britons are said to have colored their bodies with the dye procured from the woad plant. *Wild woad*, *weld*, or *wold* is the *Reseda luteola*, a British plant, which yields a beautiful yellow dye. See *Dyer's-weed*.

**Woburn** (wô'burn), a city of Middlesex Co., Massachusetts, 10 miles N. W. of Boston. It has the largest leather-making establishments in New England; also has large manufactures of shoes, glue, chemicals. Pop. 15,308.

**Wodan**, or WODEN (wô'dén), the name of the deity called by the Norse Odin. *Wednesday* derives its name from him, and his name is also seen in several place-names, as *Wednesbury*, etc. See *Odin*.

**Woiwode**, WAYWODE (wâ'wôd) an old Slavonic name for a general, afterwards used as a title of civil rank and authority. The princes of Wallachia and Moldavia were called Woiwodes, and this title was also applied at an early period to the Polish kings.

**Wolcott** (wol'kot), JOHN, an English writer, generally known by his nom de plume of 'Peter Pindar,' was born in 1738; died in 1819. He studied medicine; resided some time in Jamaica, where he took clerical orders; and afterwards established himself in Cornwall, where he discovered the artistic genius of the painter Opie. He published a number of satirical poems, and in particular turned his humor upon George III. Between 1778 and 1808 he is said to have put forth some sixty satirical productions in verse, most of them now forgotten.

**Wold**, or WELD. See *Dyer's-weed*.

**Wolf** (wulf), a quadruped belonging to the digitigrade carnivora, and very closely related to the dog. The common European wolf (*Canis lupus*) is yellowish or fulvous gray; the hair is harsh and strong, the ears erect and pointed, the tail straight, or nearly so, and there is a blackish band or streak on the forelegs about the carpus. The height at the shoulder is from 27 to 29 inches. The wolf is swift of foot, crafty, and rapacious; a destructive enemy to the sheep-cote and farm-yard; it associates in packs to hunt the larger quadrupeds, such as the deer, the elk, etc. When hard pressed with hunger these packs have been known to attack isolated travelers, and even to enter villages and carry off children. In general, however, wolves are cowardly and stealthy. Wolves are still plentiful in some parts of Europe, as in districts of



Common Wolf (*Canis lupus*).

France, Spain, Italy, Germany, Turkey and Russia; they probably ceased to exist in England about the end of the fifteenth century; the last of them in Scotland is said to have been killed by Cameron of Lochiel in 1680, while in Ireland they are known to have existed until at least the beginning of the eighteenth century. The wolf of North America is generally considered to be the same species as the European wolf, though individuals vary much in color and otherwise. The little prairie-wolf or coyote (*C. ochropus*), abounding on the plains of the western part of the United States, is a burrowing animal. The Tasmanian wolf is a marsupial.

**Wolf** (volf), FRIEDRICH AUGUST, a German critic and scholar, born in 1759; died in 1824. His fame as a critic rests upon his *Prolegomena to Homer* (1795), in which he endeavors to show that the *Odyssey* and *Iliad* in their present form are not the work of one hand, but of several. This opinion he further defended in his *Letters to Heyne* (1797). See *Homer*.

**Wolfe** (wulf), CHARLES, the author of the *Ode on the Burial of Sir John Moore*, was born in Dublin in 1791; died in 1823. He was educated at Trinity College, Dublin, and it was while there that the poem which has secured his fame was published in the *Newry Telegraph* (1817). He was also the author of several other poems, and his *Remains* were published at Dublin (two vols., 1825).

**Wolfe**, JAMES, an English general, was born at Westerham, Kent, in 1727; entered the army and proceeded with his regiment to the Low Countries; took part in the battles of Dettingen, Fontenoy, Falkirk, Culloden and Lauffeldt, being wounded in the last. After distinguished service against the French in America he was entrusted (1759) with an army of 8000 men with which to assault Quebec. During the night this small force scaled the Heights of Abraham, which commanded the town, and in the battle which took place next day the British were victorious; but General Wolfe was wounded in the engagement, and died in the moment of victory, his opponent, Montcalm, being also mortally wounded.

**Wolfenbüttel** (vol'fën-büt-l), a town in Brunswick, Germany, on the Oker, 7 miles south of Brunswick. It has a castle, town house, arsenal; a library of about 300,000 volumes, besides MSS.; a statue of Lessing, who was long librarian to the duke; a gymnasium, etc. Pop. 17,878.

**Wolfian Bodies** (wulf'i-an; after *Wolff*, the discoverer), in physiology, a term applied to certain bodies in the vertebrate embryo, preceding the two kidneys, whose functions they perform. As the fœtus advances they gradually disappear, their place being supplied by the true kidneys, except in fishes, in which they are permanent.

**Wolf-fish.** See *Sea-wolf*.

**Wolfram** (wulf'ram), a native tungstate of iron and manganese. Its color is generally a brownish or grayish black. It occurs massive and crystallized, and in concentric lamellar concretions, and is the ore from which the metal tungsten is usually obtained.

**Wolfram von Eschenbach.**

See *Eschenbach*.

**Wolf's-bane**, a poisonous plant of the genus *Aconitum* (*A. Napellus*). It is a native of Alpine pastures in Switzerland, and found in a wild state in one or two parts of England. See *Aconite*.

**Wollaston** (wul'as-tun), WILLIAM HYDE, a distinguished chemist, born in London in 1776; died in 1828. He was educated at Cambridge, took the degree of M.D., practiced as a physician in London, but finally devoted himself to scientific research. He was the inventor of the goniometer, an instrument for measuring the angles of crystals, and the discoverer of palladium and rhodium, and of the malleability of platinum.

**Wollin** (vol'in), an island of Prussia at the mouth of the Oder, on the north side of the Great Haff; length, 20 miles; breadth, from 8 to 10 miles. Fishing and cattle rearing are the chief employments of the people. Pop. about 15,000.

**Wolseley** (wulz'li), SIR GARNET JOSEPH, VISCOUNT WOLSELEY, a British general, was born near Dublin in 1833; died in 1913. He entered the army as ensign in 1852; took part in the second Burmese war (1852-53), where he was severely wounded; served with distinction in the Crimea, and was wounded at the siege of Sebastopol; engaged in the siege and capture of Lucknow during the Indian mutiny of 1857-58; and was employed in 1860 in the Chinese war. He was despatched to Canada in 1861, and again in 1867, having received command of the Red River expedition, which he carried to a successful issue. Three years afterwards Wolseley (now K.C.M.G. and major-general) was appointed to the command of an expedition to punish the King of Ashantee, and after a brief campaign he entered Coomassie (Feb., 1874) and received the submission of the king, being rewarded by a grant of £25,000 and the dignity of K.C.B. After the defeat of a British force by the Zulus in South Africa, in 1879, he was despatched as high commissioner, but before his arrival the Zulus had been defeated at Ulundi, and little remained for him to do. His next command was in Egypt, in 1882, where his forces successfully stormed the lines of Tel-el-Kehir and captured Arabi Pasha. For this he received the thanks of parliament and was created a baron, his army rank being also raised to that of general. His next appointment was as adjutant-general of the forces. When the Mahdi subdued the Soudan, and held General Gordon prisoner in Khartoum, Wolseley was despatched in 1884 with a relief expedition. He concentrated his forces at Korti, and sent a column across the desert to Khartoum, but before its arrival the place had fallen. On his return to England he was created a vis-

count. In 1888 he was made ranger of Greenwich Park. From 1895 to 1900 he was commander-in-chief, being succeeded in the latter year by Lord Roberts. He is the author of the *Soldier's Pocket Book* (1890), etc.

**Wolsey** (wul'si), THOMAS, CARDINAL, said to have been the son of a butcher, was born at Ipswich, England, in 1471. He was educated at Magdalen College, Oxford, where he took his degrees as a scholar of distinction. After quitting the university he was appointed to the parish of Lymington, in Somerset. Then he became a private chaplain to the Archbishop of Canterbury, one of the governors of Calais, chaplain to Henry VII, and latterly Dean of Lincoln. When Henry VIII became king the advancement of Wolsey was rapid. Successively he was appointed Canon of Windsor, Dean of York, Bishop of Lincoln, Archbishop of York, and his nomination as cardinal in 1515 and pope's legate in 1518 completed his ecclesiastical dignities. In 1515 he was also appointed lord-chancellor of the kingdom. He was twice a candidate for the papacy, and his power in England, as also his revenues, were only equaled by those of the crown. Part of his immense revenues he expended in display, and part more landably for the advancement of learning. He projected on a magnificent scale the College of Christ Church, at Oxford; founded several lectures, and built the palace at Hampton Court, which he presented to the king. This rapid preferment by the king was largely the result of a remarkable series of diplomatic victories, in which Wolsey had been the means of enabling Henry to hold the balance between Francis I and the Emperor Charles V. His success in the region of politics terminated in the splendors of the Field of the Cloth of Gold (1520). In his ambitious career the cardinal had made many enemies, who were held in check so long as he retained the favor of his royal master. This favor Wolsey lost when he failed to obtain from Pope Clement a decision granting the king's divorce from Catharine of Aragon. Thenceforth the enemies of the fallen prelate harried him unmercifully. He was banished from court, stripped of his dignities, found guilty of a præmunire, and sentenced to imprisonment. Finally, after a brief respite, during which he was restored to some of his offices, and had returned to his see of York, he was arrested at Caewood Castle on a charge of high treason, and on his way to London as a prisoner he died in 1530 of dysentery at Leicester Abbey.

**Wolstonecraft**, MARY. See Godwin, Mary.  
**Wolverene**. See Glutton.

**Wolverhampton** (wul-ver-hamp'tun), a municipal and parliamentary borough of England, county of Stafford, 13 miles N. W. of Birmingham. It contains the collegiate church of St. Peter, a Roman Catholic chapel designed by Pugin, an exchange, a market hall, art gallery, town hall, etc. It is situated in the heart of the Midland mining district, has extensive beds of coal and ironstone in its vicinity, is the largest manufacturing town in Stafford, and is known as the capital of the Black Country. The chief industries are the smelting of iron ore, and manufactures in brass, tin, steel papier-mâché, iron, galvanized iron, and chemicals. Pop. 95,333.

**Woman's Christian Temperance Union**, an American organization, founded in 1874, actively engaged in the crusade against intoxicating liquors. With headquarters at Evanston, Illinois (former home of Frances E. Willard), there are branches in every state of the Union and in the territories and insular possessions of the United States. In 1919 steps were taken to provide a center at Washington, D. C. The W. C. T. U. played a large part in the passage of the prohibition (q. v.) amendment to the constitution. As well as combating the liquor traffic, the Society has interested itself in social welfare, with special reference to women and children. The *Union Signal* is the official organ.—THE WORLD'S W. C. T. U. is an outgrowth of the American and British temperance unions.

**Woman Suffrage**. See Women's Rights.

**Wombat** (wom'bat; *Phascogale* wombat), a marsupial animal, a native of Australia and Tasmania. It is about 3 feet in length, and has coarse, almost bristly fur, of a general gray tint, mottled with black and white. It burrows, feeds on roots, and its flesh is said in flavor to resemble pork.

**Women's Rights**, the term applied to the demand made, on behalf of women, for a legal, political, educational and social status equal to that of men, on the basis of natural right and also of the right to a voice in public affairs as property holders and taxpayers. The first distinctive claim for equality in the employment, education and political liberty of women



was that made in 1792 by Mary Wollstonecraft, in her *Vindication of the Rights of Women*. For the pioneers in a public movement in that direction, we must seek the United States, where a band of resolute women met in 1848 at Seneca Falls, New York, the first Women's Rights Convention ever held, at which the claim of suffrage for woman on equal terms with man was first definitely made, Elizabeth Cady Stanton being the prime mover in the demand. The movement was not confined to suffrage, but covered other fields of inequality between man and woman, and since that date the fight has gone on aill along the line. The demand for property and educational rights has made more rapid progress than that for suffrage and in these directions there is little left to gain. At present, many colleges and universities admit women to a full course of instruction in all departments, most of those founded since 1840 receiving women on equal terms with men. Women have also colleges of their own, where full courses of instruction may be had, and also medical colleges as advanced in their courses as those confined to men. Full courses of study in legal science may also be obtained and courses in medicine have for years been open to women. In most of the States the legal profession is open to women, though few have as yet embarked in it. In regard to property rights, the same equality has been widely established, women retaining the control of their own property after marriage, instead of letting it fall to their husbands, as under the older system. In this respect there is now little distinction between the rights of men and women. For many years past the fight for equal rights of suffrage has been vigorously waged, and the progress of women in this direction has become notable, especially within the present century. In the United States, women now possess the right of suffrage in thirteen States: in Wyoming (1869), Colorado (1893), Utah (1896), Idaho (1896), Washington (1910), California (1911), Arizona, Kansas and Oregon (1912), Illinois (1913), Montana and Nevada (1914), New York (1917). Also Alaska Territory (1913). In 1917 Indiana, Ohio and Rhode Island gave women the right to vote for Presidential electors and North Dakota gave them municipal suffrage, this to be extended to Presidential electors in 1920. School suffrage for women prevails in some form in thirty-one States, tax-paying suffrage for women tax-payers in Montana, Louisiana and Michigan. Outside the United States woman suffrage has

been successful in a number of countries. These include Australia and New Zealand, where full suffrage exists, also Norway, Finland, Iceland, Denmark and Isle of Man. In Great Britain women can vote for all public officials except members of parliament.

Suffrage for women exists in all the provinces of Canada except Quebec. They also have municipal suffrage on the same terms as men in the British Isles and in Sweden. In some other countries woman suffrage has made progress. In Great Britain, before the European war, the demand for full suffrage took a new stage, proceeding from quiet demand to militant insistence. The House of Commons was assailed by bands of suffragists, many of whom willingly suffered imprisonment as martyrs to the cause. Punishment for their acts only inspired them to more vigorous attempts, the assault upon the Parliament being succeeded by attacks on private property, the assailants resorting to window breaking, etc. Many thinking women defended these methods on the ground that the struggle amounted to actual warfare and was due to the fact that women had been insulted and brutally treated while seeking the vote by peaceful measures. During the European war (which see), 1914-18, these militant methods were desisted from, and women suffragists loyally supported the government. Their reward came at the beginning of 1918 when the electoral reform bill gave the vote to some 6,000,000 women in Parliamentary elections and added 5,000,000 to the total of women voting in local governments. At the December, 1918, elections, Countess Markievicz, who ran on the Sinn Fein (Irish Republic) ticket in Dublin, was the first woman member of the House of Commons, but refused to take her seat in the British House. Lady (Nancy Langhorne) Astor, formerly of Virginia, U. S. A., was elected as the result of a by-election in Plymouth in 1919, and was the first woman member to take her seat.

In the United States milder methods were employed, though in 1917 a method of picketing the White House at Washington was adopted and caused so much disturbance that those taking part in it were imprisoned, as their sisters in England had been. Demands for the passage of the Susan B. Anthony amendment became irresistible, and in January, 1918, it passed the House. Submitted to the Senate, it was discussed there for many months, President Wilson's personal plea for adoption having but little effect. It was not till June 4, 1919, that the Senate, by a vote of 56 to 25, passed the bill, pro-

viding for woman suffrage, if ratified by three-fourths of the legislatures of the several States. The two sections of the amendment read: (1) the right of citizens of the United States shall not be denied or abridged by the United States, or by any State, on account of sex; (2) Congress shall have power by appropriate legislation, to enforce the provisions of this article.

The first States to ratify the amendment were Illinois, Wisconsin, Michigan, on the same day, June 10. By the end of 1910, twenty-two States had ratified, as follows: Kansas, Ohio, New York, Pennsylvania, Massachusetts, Texas, Iowa, Missouri, Arkansas, Montana, Nebraska, Minnesota, New Hampshire, Utah, California, Maine, North Dakota, South Dakota, and Colorado, the last named on December 12.

**Wonders of the World.** In ancient times seven of these were enumerated. These were the Pyramids of Egypt, the Mausoleum of Artemisia, the temple of Diana at Ephesus, the Hanging Gardens of Babylon, the Colossus of Rhodes, the Statue of Jupiter Olympus and the Pharos of Alexandria.

**Woo-Chang** (wū-chang), a city of China, province of Hu-Pé, on the Yang-tse-kiang, opposite the city of Hankow. Pop. estimated at over 500,000.

**Wood.** See Timber.

**Wood** (wūd), ANTHONY, antiquary, born at Oxford in 1632; died in 1695. He was educated at Merton College, Oxford, where he took his degrees, and spent his life in examining and sifting the records of the university. The result of his laborious researches was published as *Historia et Antiquitates Universitatis Oxoniensis* (1674), this being a Latin translation of Wood's English treatise under the authority of the university. He was also the author of *Athenæ Oxonienses* (1691-92).

**Wood**, ELLEN, or PRICE, an English novelist, better known as Mrs. Henry Wood, born at Worcester in 1820; died in 1887. Among her many novels may be noted *East Lynne*, which has had an enormous success both as a book and a drama; *The Channings*, *St. Martin's Eve*, *A Life's Secret*, *Roland Yorke*, *Dene Hollow* and the *Johnnie Ludlow Stories*, reprinted from the *Argosy*.

**Wood**, FERNANDO, congressman, was born at Philadelphia about 1812. He became a merchant in New York, was elected to Congress by the

Democrats in 1841, and in 1854 was elected mayor of New York, where he introduced various reforms. In 1861, when the southern states were seceding, he recommended that New York should secede and become a free city. He was re-elected to Congress in 1868, and remained a member until his death, February 13, 1881.

**Wood**, GEORGE B., an eminent physician, born at Greenwich, New Jersey, in 1797; died in 1879. He was graduated in medicine from the University of Pennsylvania in 1818, became a professor in the Philadelphia College of Pharmacy, and in 1835 in the University of Pennsylvania, where he remained until 1860. He did much to advance the interests of the University, and in 1865 endowed there an auxiliary faculty of medicine. His medical works included a *Treatise on the Practice of Medicine*, a *Treatise on Therapeutics and Pharmacology*, a *Pharmacopœia*, and great part of the *United States Dispensatory*. All these were admirable works and highly useful in the study of medicine.

**Wood**, HORATIO C., physician, was born at Philadelphia in 1841. He was graduated from the University of Pennsylvania in 1862, and was appointed to professorships of medical botany and nervous diseases. He wrote much on medical and other subjects, his writings being *Essay on Thermic Fever, or Sunstroke*; *The Fresh Water Algae of North America*, *A Study of Fever*, *A Treatise in Therapeutics*, and many papers on medicine, botany, and other branches of science.

**Wood**, JAMES FREDERIC, an American archbishop, was born in Philadelphia in 1813, educated in England, and became a bank cashier in Cincinnati. He joined the Roman Catholic Church in 1836, studied at Rome and became a priest, was made bishop of Philadelphia in 1860, and archbishop in 1875. He died June 20, 1883.

**Wood**, REV. JOHN GEORGE, naturalist, born in London in 1827; died suddenly at Coventry in 1889. He was an enthusiast in natural history, and published a large number of books on zoölogy and kindred subjects, which had great popularity.

**Wood**, LEONARD, physician and soldier, was born at Winchester, New Hampshire, in 1860. He was graduated from Harvard Medical School in 1884, and was appointed Assistant Surgeon in 1886, with rank of captain in 1891. He received a medal of honor for services against Geronimo in 1888. In 1898 he became colonel of Roosevelt's

'Rough Rider' regiment and took part in the Spanish war, in which he was promoted brigadier-general. In 1899 he was appointed governor of Cuba, in which island he had much to do with stamping out yellow fever. He was made brigadier-general in the regular army in 1901, major-general in 1903; commanded in the Philippines 1906-08, and in Dec., 1909, was appointed chief of staff of the army.

**Wood Ant**, a common species of ant, found in woods, where it makes a great heap of vegetable fragments, beneath which it has numerous chambers and passages. It has the power of ejecting an acid secretion as a defense against enemies.

**Woodbine** (wud'bin), a name given to the honeysuckle and also some other climbers, such as some kinds of ivy, the Virginia creeper, etc. Specially applied to *Cissus quinquefolia*, a vigorous climbing plant, supporting itself by means of its radiating tendrils.

**Woodbury**, DANIEL R., statesman, born at Francetown, New Hampshire, in 1789; died in 1851. He was admitted to the bar in 1812, was appointed judge of the Superior Court in 1817, and was elected governor of New Hampshire in 1823. He was a member of the United States Senate 1827-31, was appointed secretary of the navy by President Jackson in 1831 and secretary of the treasury in 1834, holding that position until 1841, when he was re-elected senator. In 1845 he succeeded Joseph Strong as a justice of the Supreme Court of the United States. A collection of his *Political, Judicial and Literary Writings* was published in 1852.

**Woodchuck**, the popular name of a species of the marmot tribe, the *Arctomys monax*, or ground-hog, common in the United States and Canada. It is of a heavy form, from 15 to 18 inches long, blackish or grizzled above and chestnut-red below. It excavates burrows in which it passes the winter in a dormant state.

**Woodcock**, a bird of the genus *Scelopax*, the *S. rusticola*, same genus as the snipe. It is widely distributed, being found in all parts of Europe, the north of Asia, and as far east as Japan. The bird is about 13 inches in length, the female being somewhat larger than the male. Its food is chiefly worms. The American woodcock (*Scelopax* or *Philohela minor*) is a smaller bird, but very similar in plumage and habits.

**Wood Engraving.** See *Engraving*.

**Wood-grouse.** See *Capercaillie*.

**Woodhouselee.** See *Tytler*.

**Wood-lark**, a small species of lark, the *Alauda arvensis*, not unfrequent in some parts of England, but rare in Scotland. Its song is more melodious than that of the skylark, but it does not consist of so great a variety of notes, nor is it so loud.

**Woodlice.** See *Slater*.

**Wood-nymph**, in ancient mythology, a dryad. In sociology this name is given to the beautiful lepidopterous insects of the genus *Andryssa*.

**Wood-oil**, a balsamic substance (an oleo-resin) obtained from several species of *Dipterocarpus* growing in Pegu, Assam, and some of the islands of the Indian Archipelago. It is used medicinally, as a varnish, in lithographic ink, etc.

**Woodpecker**, a name for the birds belonging to the family *Picidae*, and the order *Scansores* or climbers. They are characterized by their long, straight, angular beak, adapted for splitting the bark of trees; by their slender tongue, with its spines at the tip curved backwards to enable them to extract insects from crevices; and by their stiff tail, which acts as a prop to support them while climbing. The noise they make in tapping the bark of a tree to discover where an insect is lodged can be heard at a considerable distance. Pious major, medius, minor, and viridis, the green woodpecker, are European species. In America the most characteristic species are *P. principalis* or the ivory-billed woodpecker, *P. auratus* or gold-winged woodpecker, and the Californian woodpecker (*Melanerpes formicivorus*).

**Wood-pigeon.** See *Ring-dove*.

**Wood-pulp**, the fibrous product of which paper is made. This branch of manufacture has grown to enormous proportions, to supply the great demand for printing paper of recent years. Spruce, hemlock, and poplar are commonly employed and other trees and plants are coming into use, such as white fir, balsam, pine, cottonwood, etc., the wood being simply ground up finely and made into paper, or treated with chemical substances to yield a better product suitable for book purposes. The total use of wood for this purpose in the United States in 1910 was over 4,000,000 cords. The great consumption of pulp wood in

## Woodruff

the United States has led to a large demand from the extensive coniferous forests of Canada, to facilitate which the tariff has been taken off from Canadian wood-pulp. Wood-pulp has been applied to other purposes than papermaking, bricks, and even car-wheels, being made from it, while among its other products artificial silk may be named, the fine pulp being forced through minute holes in a plate and yielding threads of a smooth, silk-like finish and considerable strength. It can be woven into silk-like fabrics.

**Woodruff** (wud'ruf), *Woodsia*, the common name of plants of the genus *Asperula*, nat. order Rubiacem. The sweet woodruff (*A. odorata*), with its whorled leaves and white blossom, is found plentifully in Britain in woods and shady places. The dried leaves are used to scent clothes and also to preserve them from the attacks of insects. The root of the dyer's woodruff (*A. tinctoria*) is used instead of madder.

**Woods,** LAKE OF THE. See *Lake of the Woods*.

**Woods,** KATHARINE PEARSON, novelist, born at Wheeling, West Virginia, in 1850. Her socialist novel, *Metserott Shoemaker*, attracted much attention; others were *The Mark of the Beast*, *From Dusk to Dawn*, etc.

**Woodsia** (wud'si-a), a widely distributed genus of polypodiaceous ferns. *W. hyperborea*, the flower-cup fern, is a very small species, much resembling *W. porrifolia*, forming tufts on rocks.

**Wood-sorrel**, the common name of *Oxalis Acetosella*, well known for the acidity of its leaves, and formerly used in medical practice as an antiscorbutic and a refrigerant.

**Woodstock,** a city and port of entry of Ontario, Canada, county seat of Oxford Co., on the Thames River, 30 miles E. N. E. of London. It is a place of considerable trade, and has various manufactures. Is a favorite summer resort. Pop. 9321.

**Wood-swallow**, a name given in Australia to a genus of birds (*Artamus*), family *Alcedinidae* or chattering. One species (*A. sordidus*) is remarkable for its habit of hanging suspended from dead branches in clusters resembling swarms of bees.

**W. M. Worth,** SAMUEL, journalist and poet, born at Scituate, Massachusetts, in 1785; died in 1842. He was an editor on various papers, wrote *The Champions of Freedom*, and several dramatic works, but is chiefly known for his popular poem, *The Old Oaken Bucket*.

## Woolen Manufacture

**Woo-Hoo**, or WUHU (wü-hü), a treaty port of China, province of Ngan-Hooi, on the Yang-tze-kiang, about 50 miles above Nanking. Opened to trade in 1857 it has recently become of considerable commercial importance, the chief exports being rice, silk, feathers, hides and tea, and the chief import is opium. Pop. about 115,000.

**Wool** (wul), that soft species of hair which grow on sheep and some other animals, as the alpaca, some species of goats, etc., which in fineness sometimes approaches to fur. Wool is divided into two classes—*short* or *carding* wool, seldom reaching over a length of 8 or 4 inches, and *long* or *combing* wool, varying in length from 4 to 8 inches, each class being subdivided into a variety of sorts, according to their fineness and soundness of the staple. Wool which unites a high degree of fineness and softness with considerable length of staple, bears a high price. English-bred sheep produce a good, strong, combing wool, that of the Scotch breeds being somewhat harsher and coarser. The finest carding wools were formerly exclusively obtained from Spain, the native country of the merino sheep, and at a later period extensively from Germany, where that breed had been successfully introduced and cultivated. Immense flocks of merinos are now reared in the United States, Australia, South America, and Europe, the annual wool product of the United States, Russia and Argentina being about 325,000,000 pounds for each country, while that of Australia is about 750,000,000 pounds. The total European product is about 800,000,000 pounds; total world product 2,700,000,000 pounds.

**Woolen Manufacture.** The use of wool as an article of clothing dates from the earliest times, and no doubt it was made into cloth earlier than either flax or cotton. Among the ancient Jews wool was the staple material of clothing; and the woolen fabrics of ancient Greece and Rome attained special excellence. In time the Roman manufactures were carried to the countries in which Roman colonies had been established. In England the making of woolen cloth seems to have been introduced by the Romans, but it did not rise into importance as a national employment until much later. The woolen cloths of England were for a considerable time confined to the coarser fabrics of domestic manufacture, finer cloths being imported from the Continent, particularly from Brabant. At various times also the trade was



hampered by many illiberal laws for its regulation, for prohibiting exportation, etc. In the early part of the eighteenth century Yorkshire began to assume an important position in woolen manufactures, and that county is now the chief seat of both the English worsteds and woollens. Scotland, especially the south, is famous for the sort of cloth called tweeds. The industry was introduced into the United States in the early colonial period as a household manufacture. It has now grown into one of the leading textile industries.

In making woolen cloth the essential processes, as carried on in modern factories, are:—(1) the *stapling* of the raw wool. In this process the stapler or sorter works at a table covered with wire netting, through which the dirt falls while the various qualities of wool are being separated. The wool is then ready to be put through the (2) *scouring* machine, where it passes on an endless apron into an oblong vat, which contains a steaming soapy solution. Here it is carried forward gently by means of rakes until it is thoroughly soaked and cleansed. After this it is taken to the (3) *drying* framework of wire netting, under which are situated steam-heated pipes. A fan-blast drives the heated air upwards through the wet wool, which lies on the wire netting, until it is all equally dried. When necessary this is the point in the process when it is 'dyed in the wool.' It is then ready for the (4) *willeying* or *teasing* machine, which consists of a revolving drum furnished with hooked teeth, close above which are set cylinders with hooked teeth moving in a contrary direction. The wool is fed in upon the drum, which whirls with great speed; and between the two sets of teeth working in opposite directions it is disentangled, torn, and cast out in fine, free fibers. With some classes of wool it is also necessary, at this stage, to remove suds and burrs by steeping them in a solution of sulphuric acid, or passing them through a hurring machine, by which the burrs are extracted. The wool is now dry and brittle; and before submitting it to the process (5) of *carding*, it is sprinkled with oil and well beaten with staves in order to give it suppleness. This process of carding is accomplished by a series of three delicate and complex machines called a scribbler, a intermediate, and a finisher. These machines have various intricate cylinders and rollers, studded with teeth and working in opposite directions, over which the wool is passed until it is torn, interblended, and finally delivered from

the finisher in a continuous flat lap. It is then cut into strips and passed (6) to the *condensing* machine, which rubs the strip into a soft, loose cord or silver technically called a 'siubbing.' The wool is now ready for (7) *spinning* into yarn, and this is accomplished in a wool-spinning mule, which draws and twists the silver into the required thinness, the process being essentially the same as in cotton-spinning. (See *Cotton-spinning*.) The wool, which has thus been brought into the form of yarn, is now fit for (8) *weaving* into woolen cloth. (See *Weaving*.) When it is taken out of the loom the cloth is washed, to free it from oil and other impurities, and also beaten while it lies in the water by wooden hammers moved by machinery, while it is again dyed if found necessary. After it has been scoured in water mixed with fuller's earth, the cloth undergoes a process of (9) *teuseling* and *shearing* (see *Teasel*), in which the pile or nap is first raised, and then cut to the proper length by machines. When this is done it is (10) steamed and pressed between polished iron plates in a hydraulic press.

In the manufacture of worsted yarn the long-staple wool fibers are brought as far as possible into a parallel condition by processes called *gilling* and *combing*. The wool, in a damp condition, is passed through a series of 'gill boxes,' in which steel gills or combs separate and straighten the fibers until, from the last box, it issues in a long sliver. In this condition it is run through a delicate combing machine; after a process of roving the thread is spun into yarn. Merinos, Thibets, empress and Henrietta cloths, alpacas and other kinds of dress goods are made from worsted yarns. The camel hair, cow hair and calf hair goods are of cheaper grades: most of these contain a considerable proportion of shoddy, the lower grades of wool and woolen waste. These belong more to the woolen than the worsted trade.

**Woolner** (wul'ner), THOMAS, sculptor, was born at Hadleigh, Suffolk, in 1825; educated at Ipswich; placed at the age of thirteen in the studio of William Behnes; exhibited his first notable life-size group, *The Death of Boadicea* (1844); and followed up this success with *Puck, Titania*, and *Eros and Euphrosyne*. Besides his well-known statues of Carlyle, Tennyson, Gladstone, Newman, Darwin, Kingsley, etc., his more celebrated works are: *Elaine with the Shield of Sir Lancelot*, *Ophelia*, *In Memoriam*, *Virgilia Bemoaning the Banishment of Coriolanus*.

and *Achilles and Pallas Shouting from the Trenches*. He was elected an A.R.A. 1871; R.A. in 1876. He has also achieved considerable success as a poet in the volumes entitled *My Beautiful Lady* (1863), *Pygmalion* (1884), *Silenus* (1884), and *Tiresias* (1886). He died in 1892.

**Woolsack** (wul'sak), a large square bag of wool, without hack or arms, covered with red cloth, which forms the seat of the lord chancellor of England in his capacity of speaker of the House of Lords.

**Woolsey**, THEODORE DWIGHT, an eminent scholar, born at New York, October 31, 1801; died July 1, 1889. He was graduated from Yale College in 1820, studied law and theology, and was professor of Greek at Yale 1831-46, and then its president until 1871. From 1871 to 1881 he was president of the American revisers of the New Testament. He prepared editions of several of the Greek classic authors, and wrote *Introduction to the Study of International Law*, *The Religion of the Past and the Future*, and other works.

**Woolson**, CONSTANCE FENIMORE, novelist and poet, born at Claremont, New Hampshire, in 1838; died in 1894. Her works embrace *Castle Nowhere*, *Rodman the Keeper*, *Jupiter Lights*, *For the Major*, etc.

**Wool-tree**. See *Eriodendron*.

**Woolwich** (wul'ich), a town and parliamentary borough of England, county of London on the Thames, 8 miles below London Bridge. It stretches about 3 miles along the river, and owes its importance to the great arsenal, which has a circumference of 4 miles, and consists of gun and carriage factories, laboratory, barracks, ordnance departments, etc. At North Woolwich, on the opposite side of the river, many houses and extensive factories have recently sprung up. Pop. 121,408.

**Woonsocket** (wön-sok'et), a city of Providence Co., Rhode Island, on the Blackstone River, about 40 miles s.w. of Boston. It is claimed to be the largest producer of woolen goods of any city in the United States, and has extensive cotton mills, employing over 4000 hands. There are also rubber shoe, yarn and machinery works, etc. Pop. 38,125.

**Woorali Poison**. See *Curari*.

**Wooster** (wüs'ter), a manufacturing city, capital of Wayne Co., Ohio. It is the seat of the University of Wooster, founded in 1870, and of the

Ohio Agricultural Experiment Station. Plows, whips, furniture, coach-pads, foundry and lumber products are manufactured. Pop. 6136.

**Wootz** (wö'tz), a superior steel from the East Indies, imported into Europe and America for making the finest classes of edge-tools.

**Worcester** (wus'ter), capital of Worcestershire, and one of the most ancient cities in England, lies on the eastern bank of the Severn, 114 miles n. w. of London. Its most notable building is a Gothic cathedral, originally built in 680 and rebuilt in the beginning of the thirteenth century. Constructed in the form of a double cross, with a central tower, it has been added to at various periods, and a very complete restoration was made in 1857. Among other buildings are the shire hall, the guildhall, corn exchange, museum of natural history, etc. Worcester is the chief seat of the English leather glove trade, has celebrated porcelain works, with foundries, carriage factories, and other works. Pop. 47,987. The county is bounded n. by Shropshire and Staffordshire, e. by Warwickshire, s. by Gloucestershire and w. by Herefordshire; area, 751 sq. miles, about half of which is in permanent pasture. The surface is a broad plain varied by the Malvern Hills in the s. w., several valleys, of which the Severn is the most notable, and having as its chief rivers the Severn, Stour, Teme and Avon. Wheat is extensively grown, while hop gardens are numerous. Coal and iron are worked; there are large manufactures of iron, steel, and hardware; and salt is obtained abundantly from the salt springs at Droitwich. The carpets of Kidderminster are famous, as are also gloves and porcelain. Worcester, and there are important glass manufactures at Dudley and Stourbridge. Pop. 526,143.

**Worcester**, a city, and one of the shore towns of Worcester Co., Massachusetts, lies on the Blackstone River, 44 miles west of Boston. It is the second city of the State, and has many notable edifices, including the city hall, public library, State armory, Clark University, Polytechnic Institute, Holy Cross College, American Antiquarian Society, Odd Fellows' Home, and an Art Museum with endowment of \$4,000,000. Its industries are large and varied, its wire works being the largest in the world. There are also great loom and envelope works, woolen and mohair mills, large carpet works, boot and shoe factories, and many other industries. Worcester was permanently settled in 1713; incorpo-

## Worcester

rated as a city in 1848. Pop. (1913) 166,205.

**Worcester,** EDWARD SOMERSET, MARQUIS OF, one of the earliest inventors of a steam engine, was born about 1601; died in 1667. He was engaged in the service of Charles I during the civil war, and was imprisoned in the Tower from 1652-55. He afterwards published *Scantlings of One Hundred Inventions*, in which he gave a description of his steam engine.

**Worcester,** ELWOOD, American clergyman, and author, born in Massillon, Ohio, in 1836. Since 1904 he has been rector of Emmanuel Church, Boston. Soon after 1904 he inaugurated a movement for the treatment of nervous diseases which attracted widespread interest. His books include *Religion and Medicine* (1907), and *The Living Word* (1908).

**Worcester,** JOSEPH EMERSON, a distinguished lexicographer, born at Bedford, New Hampshire, in 1784. His first work was a *Geographical Dictionary, or Universal Gazetteer*. It was followed by *Gazetteer of the United States*, *Elements of Geography*, *Sketches of the Earth and its Inhabitants* and *Elements of History*. In 1830 he published a *Comprehensive Pronouncing and Explanatory English Dictionary*. In 1860 he published the great quarto *Dictionary of the English Language* (illustrated). He died October 27, 1865.

**Worden,** JOHN, naval officer born at Sing Sing, New York, in 1818; died in 1897. He entered the navy as a midshipman in 1834, and at the beginning of the Civil war was taken prisoner by the Confederates, being exchanged after seven months. His most eminent service in the war was as captain of the *Monitor* in its famous fight with the *Merrimac* in Hampton Roads. He commanded the iron-clad *Montauk* in its operations against Fort Sumter, was made commodore in 1868 and rear-admiral in 1872, and retired in 1886.

**Wordsworth** (wards'wurth), CHRISTOPHER, youngest brother of William Wordsworth, was born at Cockermouth in 1774; died in 1846. He was the author of *Ecclesiastical Biography* and other works.

**Wordsworth,** WILLIAM, a celebrated English poet, son of an attorney, was born at Cockermouth, Cumberland, April 7, 1770; died April 23, 1850. In 1787 he was sent to St. John's College, Cambridge. He left the university after taking his degree, but without having otherwise distinguished himself, and lived aimlessly in Lon-

## Wordsworth

don and elsewhere. He crossed to France in 1791, and exhibited vehement sympathy with the revolution, remaining in France for nearly a year. After his return, disregarding all entreaties to enter upon a professional career, he published his *Evening Walk and Descriptive Sketches* (1793). Two years afterwards he received a legacy of £900 from Ralsley Calvert, a friend whom he had nursed in his last illness. With this sum and the consecrated helpfulness of his sister Dorothy he contrived to keep house for eight years, while he gave himself to poetic effort as his high 'office upon earth.' For the first two years they lived at Racedown in Dorset, where the poet, among other experiments, began his tragedy of *The Borderers*. In this retreat they were visited (1797) by Coleridge, who had already recognized an original poetic genius in the author of *Descriptive Sketches*. Coleridge was at this time living at Nether Stowey, in Somerset, and during this visit he induced the Wordsworths to go into residence at Alfoxden, in his immediate neighborhood. Here the two poets held daily intercourse, and after a twelvemonth they published *Lyrical Ballads* (1798) in literary copartnership. Although this volume was received with almost complete public indifference, yet Wordsworth felt that he had found his mission, and after a winter spent in Germany he and his sister settled at Grasmere (1799), where he proposed to write a great philosophical poem on man, nature, and society. Thenceforth his life was marked by few incidents. Those worth noting are his marriage in 1802 with his cousin Mary Hutchinson; a removal from Grasmere to Allan Bank in 1808; his appointment in 1813 to an inspectorship of stamps, and his removal to Rydal Mount; several journeys into Scotland and to the continent; his acceptance of a D.C.L. degree conferred upon him in 1839 by the University of Oxford; and his accession in 1843 to the laureateship on the death of Southey. Wordsworth's great philosophic poem, which, in his own phrase, was to be the Gothic cathedral of his labor, received only a fragmentary accomplishment in *The Prelude*, *The Excursion*, and *The Recluse*. Yet enough was achieved in his smaller poems to justify his own conception of himself as a 'dedicated spirit,' and to set him apart among the greatest of England's poets. A complete edition of his poetical works has been published by Professor Knight, his prose writings have been collected and published by Dr. Grosart, his Memoirs were published in 1851 by his

nephew, and an interesting account of the poet and his sister Dorothy is found in her *Diary of a Tour in the Highlands*.

**Work** (wurk), in mechanics, the act of producing a change of configuration in a system in opposition to a force which resists that change. According to physicists a unit of work is taken as a weight of one pound lifted one foot. See *Foot-pound*, *Unit*, *Energy*.

**Workhouse**, a house in which paupers are maintained at the public expense, those who are able-bodied being compelled to work. Under the old poor-laws of England, there was a workhouse in each parish, partaking of the character of a bridewell, where indigent, vagrant, and idle people were set to work, and supplied with food and clothing, or what is termed *indoor relief*. These workhouses were described as, generally speaking, nurseries of idleness, ignorance, and vice; but a new system was introduced in 1834, parishes being now united for the better management of workhouses, which gave rise to the poor-law unions, with their workhouses. In these establishments the pauper inmates are employed according to their capacity and ability. Religious and secular instruction is supplied, while habits of industry, cleanliness, and order are enforced. Similar institutions exist in the United States. See *Poor*.

**Workington** (wur'king-tun), a market-town and seaport of England, county of Cumberland, near the mouth of the Derwent, about 6 miles N. of Whitehaven. Its industrial establishments comprise large iron-smelting works and works for steel rails, iron-plates, ship-building, etc. Pop. 25,099.

**Workmen's Compensation**

**Laws.** Laws relating to the compensation of workmen for injuries sustained have been passed by many states. In nearly all the states of the Union the laws of employers' liability have been modernized, but only in a few states do these acts apply to all servants and are therefore 'compensation acts.'

**Worksop** (wurk'snp), a market town of England, in Nottinghamshire, 26 miles N. of Nottingham. It has a beautiful Norman church, iron-foundries and saw-mills. Pop. 20,387.

**World** (wurld), in its widest sense signifies the universe, the total of all existing things. In its narrower sense it means the earth, its figure, dimensions, mass, and all else related to it. It is often spoken of also as the total of human beings, 'the world of man'; also of a specific group, as 'the literary world.'

**World Scouts**, an outgrowth from the Boy Scouts idea, the chief difference being that it is divested of all military significance, and based on the principle that all mankind constitute one family, and that in a strict sense there are no foreigners. It originated with Sir Francis Vane, who was concerned with General Baden-Powell in organizing the Boy Scouts. Not relishing the military aspect of the latter, he devised this new idea. It has had wonderful success, its membership going up to 50,000 in a few months, and spreading over Europe, though not yet to the United States. The rules of helpfulness, etc., are similar to those of the Boy Scouts (which see). The American Boy Scouts are essentially non-military.

**Worms** (wurms), a term loosely applied to many small longish creeping animals, entirely wanting feet or having but very short ones, including such various forms as the earthworm, the larvæ or grubs of certain insects, intestinal parasites, as the tapeworm, thread-worm, etc. In zoölogical classifications it is used as equivalent to Vermes or to Annelida. In medicine it is applied to the parasitic animals which exist chiefly in the intestines, and to the disease due to the presence of such parasites. Several kinds of worms may infest the human body, but those with which children are so commonly annoyed are the small worms known as threadworms. Vermifuges or anthelmintics are names given to medicines that cure worms, such as extract of male-fern root for tapeworms, santonin for threadworms. See *Wormseed*, *Wormwood*, *Tapeworm* and *Nematelmia*.

**Worms**, (würms), one of the most ancient cities of Germany, is in the Grand-duchy of Hesse, on the Rhine, 25 miles S. of Mainz, and 20 miles N. W. of Heidelberg. The chief buildings of interest are the Romanesque cathedral (twelfth century), a magnificent structure with four round towers and two large domes; the Liebfrauenkirche and church of St. Martin; the town house; and the monument to Luther, consisting of a colossal statue on a raised platform surrounded by figures of precursors of or persons directly connected with the Reformation. At Worms was held the famous diet in 1521, at which Luther defended his doctrines before the Emperor Charles and an august assemblage. Pop. (1910) 46,819.

**Wormseed**, a seed which has the property of expelling worms from the intestinal tube or other open cavities of the body. It is brought



## Wormwood

from the Levant, and is the produce of a species of *Artemisia* (*A. Santonica*), which is a native of Tartary and Persia. In the United States the name is generally given to the seed of *Oenopodium anthelminticum*. See *Santonin* and *Erysimum*.

**Wormwood** (wurm'wud), the common name of several plants of the genus *Artemisia*. Common wormwood (*A. Absinthium*), a well-known plant, is celebrated for its intensely bitter tonic and stimulating qualities, which have caused it to be an ingredient in various medicinal preparations, and even in the preparation of liqueurs. It is also useful in destroying worms in children.

**Worsted** (wur'sted), a variety of woolen yarn or thread, spun from long-staple wool which has been combed, and which in the spinning is twisted harder than ordinary. It is knit or woven into stockings, carpets, etc. The name is derived from Worsted, a village in Norfolk where it is supposed to have been first manufactured. See *Woolen Manufacture*.

**Wort.** See *Brewing*.

**Worth**, WILLIAM JENKINS, soldier, born at Hudson, New York, in 1794; died in 1849. He entered the army as a private in the war of 1812, became aid-de-camp to Generals Lewis and Scott, and fought at Chippewa and Lundy's Lane, being severely wounded at the latter battle. Promoted major in 1832 and colonel in 1838. He took command of the Florida war in 1841 and brought it to a successful termination. He served under General Taylor in the Mexican war, and distinguished himself at the storming of Monterey. He was afterwards placed in command of the Southwest.

**Worthing** (wur'thing), a watering-place in England, county of Sussex, about 10 miles west of Brighton. It is a fashionable resort, having an esplanade, libraries, a literary institution, reading-room, etc. There is also an extensive mackerel fishery. Pop. 30,308.

**Worthington**, HENRY ROSSITER, inventor, born at New York in 1817. He engaged in mercantile business, but in 1840 began a series of experiments with steam for the propulsion of canal boats. Soon afterward he devised a small steam pump to be used in the maintenance of the water supply in the engine boiler, and in 1841 patented an independent feed pump which developed into the direct-acting steam pump that he patented in 1849. Subse-

quently he built, in Savannah, Ga., the first direct-acting compound engine ever used in water-works; erected a large plant for the manufacturing of pumping machinery; invented the duplex pump, and devised various improvements in steam and hydraulic machinery. He died December 17, 1880.

**Wotton** (wot'ten), SIR HENRY, a diplomatist and miscellaneous writer, born in 1568; died in 1639. He was educated at Winchester and Oxford; resided on the Continent for some years, and on returning to England was employed as secretary to Essex. On the fall of that nobleman from power (1600) Wotton fled to Florence, where he was employed by the grand-duke to reveal to King James of Scotland a plot against his life. When the Scottish king ascended the throne of England he showed his gratitude by making Wotton a knight, employing him abroad as an ambassador, and ultimately (1625) appointing him provost of Eton. His ability as a writer is shown in *Reliquiae Wottonianae*, published in 1651, with Izaak Walton's *Life of Wotton*.

**Wound**, in surgical phrase, a break or loss of continuity in any of the soft parts of the body occasioned by external violence, and attended with a greater or less amount of bleeding. Wounds have been classified as follows: (a) *Cuts, incisions, or incised wounds*, which are produced by sharp-edged instruments. (b) *Stabs or punctured wounds*, made by the thrusts of pointed weapons. (c) *Contused wounds*, produced by the violent application of hard, blunt, obtuse bodies to the soft parts. (d) *Lacerated wounds*, in which there is tearing or laceration, as by some rough instrument. (e) All those common injuries called *gunshot wounds*. (f) *Poisoned wounds*, those complicated with the introduction of some poison or venom into the part. Recent success in accelerating the growth of tissues seems likely to revolutionize the treatment of wounds.

**Wouverman** (vou'vèr-mán), PHILIP, Dutch painter, born in 1620; died in 1668. He was the son of Paul Wouverman, a historical painter, who taught him the rudiments of the art. The subjects in which he excelled were huntings, hawkings, encampments of armies, farriers' shops, and all such scenes as admitted the treatment of horses and other animals.

**Wrack** (rak), or SEA-WRACK, a popular name for sea-weed cast ashore by the waves, but sometimes applied specifically to the genus *Fucus*. See *Fucaceae*.

## Wrack

**Wrangler** (rang'gier), in Cambridge University, the name given to those who have attained the first class in the public examination for honors in mathematics, commonly called the *mathematical tripos*. The student taking absolutely the first place is called the *senior wrangler*.

**Wrasse** (ras), the name of various species of fish belonging to the family Labridæ. They are prickly-spined, hard-boned fishes, with large double and fleshy lips. Several species are natives of the British seas, as the bailan wrasse, or old wife (*Labrus tinca* or *maculatus*), which attains a length of about 18 inches.

**Wren** (ren), a name given to certain birds closely allied to the warblers, distinguished by their small size, slender beak, short, rounded wings, mottled plumage, and the habit of holding the tail erect. The wren proper (*Troglodytes vulgaris*) is, with the exception of the golden-crested wren, the smallest bird in Europe, averaging about 4 inches in length. It is a well-known bird, and has rather a bold loud song. The American house-wren (*T. domesticus*) is a very familiar bird, and a general favorite in the United States.

**Wren, SIR CHRISTOPHER**, an English architect, born in 1631; died in 1732. He was educated at Wadham College, Oxford; became a fellow of All Souls in 1653; was appointed professor of astronomy at Gresham College in 1657, and three years afterwards was elected Savilian professor of astronomy at Oxford. He had been appointed by Charles II to restore old St. Paul's, but after the great fire (1666) it became necessary to rebuild the cathedral. In preparing his plans he was considerably hampered by the ecclesiastical authority, but with the king's permission he modified and improved the design as the building proceeded. Thus, the division of the exterior into two orders of columns, and the present dome and drum on which it stands were alterations on the original plan. The cathedral was begun in 1675, and the architect saw the last stone laid by his son thirty-five years afterwards. Among the other notable buildings which Wren designed are: the modern part of the palace at Hampton Court, the library of Trinity College, Cambridge, the hospitals of Chelsea and Greenwich, the churches of St. Stephen's, Walbrook; St. Mary-le-bow; St. Michael, Cornhill; St. Bride, Fleet Street; as also the campanile of Christ Church, Oxford. In 1680 he was chosen president of the Royal Society, appointed in

1708 surveyor of the royal works, and from 1685 to 1700 represented various boroughs in parliament. Over the north doorway of St. Paul's is a memorial tablet on which are the well-known words: *Si monumentum requiris, circumspice*. See *Paul's, St.*

**Wrench**, an instrument consisting essentially of a bar of metal having jaws adapted to catch upon the head of a bolt or a nut to turn it; a screw-key. Some wrenches have a va-



WRENCHES.

1, Screw-wrench. 2, Tap-wrench. 3, Angle-wrench. 4, Tube-wrench. 5, Monkey-wrench for hexagonal and square nuts.

riety of jaws to suit different sizes and shapes of nuts and bolts, and others, as the monkey-wrench, have an adjustable inner jaw.

**Wrexham** (reks'am), a municipal and parliamentary borough of North Wales, county of Denbigh, 12 miles south of Chester. Its church of St. Giles, built about 1470, is one of the finest old Gothic buildings in North Wales. The town has large breweries, tanneries, paper-mills, etc., and the district has numerous coal, lead, and iron mines. Pop. 20,498.

**Wright, CARROLL DAVIDSON**, statistician, was born at Dumbarton, New Hampshire, in 1840. He served in the Civil war, rising from private to colonel, was chief of the Massachusetts bureau of statistics 1873-88, and United States Commissioner of Labor after 1885. In 1902 he became president of Clark College. He published *Industrial Evolution of the United States*, *Outline of Practical Sociology*, etc. He died in 1909.

**Wright** (rit), HORATIO GOUVERNEUR, general, born at Clinton, Connecticut, in 1820; died in 1899. He was graduated from West Point in 1841, and after some service in the army was promoted major in 1861. He served through the Civil war, was made brigadier-general of volunteers, commanded a division at the Wilderness and a corps at Spotsylvania and Cold Harbor, and was promoted major-general in the United States army in 1865. He was chief of engineers at the time of his retirement in 1884.

**Wright**, ORVILLE, born at Dayton, Ohio, in 1871, and WILBUR, born near Millville, Indiana, in 1867, brother aeronauts, the first to succeed in inventing heavier-than-air flying machines capable of bearing the weight of a man in the air. The earliest successful test of their machines was made at Kitty Hawk, North Carolina, in 1903, and the first successful long distance flight near Dayton in 1905. Wilbur Wright died in 1912.

**Wright**, SILAS (1795-1847), an American statesman, born at Amherst, Mass. Graduating from Middleburg College, Vt., in 1815, he studied law and settled in Canton, N. Y. He was United States senator 1833-44, and governor of New York 1845-47. He vigorously opposed the Anti-Renters. See *Anti-Rent War*.

**Wrist**. See *Hand*.

**Writ** (rit), in law, a mandatory precept, issued by the authority and in the name of the sovereign or the State, for the purpose of compelling the defendant to do something therein mentioned. It is issued by a court or other competent jurisdiction, and is returnable to the same. It is to be under seal, and attested by the proper officer, and is directed to the sheriff, or other officer legally authorized to execute the same.

**Writer's Cramp**, a spasmodic affection in which the patient loses complete control over the muscles of the thumb and the fore and middle fingers, so that all attempts to write regularly, and in the severer cases even legibly, are unsuccessful. It is a tetanic contraction of the muscles of the hand and forearm. It may be due to cold, rheumatism, exhaustion of the muscles by long-continued strain, or infection by bacteria. It is treated differently, according to its cause, such as by heat, antirheumatic remedies, rest, bacterial vaccines, massage, etc. Called also *Scrivener's Palsy*.

**Writers to the Signet**. See *Signet*.

**Writing** (rit'ing), one of the oldest arts, is usually divided into *ideographic writing*, in which signs represent ideas, and into *phonetic writing*, in which signs represent sounds. Ideographic writing, in its earliest form, is supposed to have been an attempt to convey ideas by copying objects direct from nature, and this form of it has thus acquired the name of *picture-writing*. After this came symbolical writing, in which abbreviated pictures were used

as arbitrary symbols, first of things, and still later of sounds and words. This indicates the transition into phonetic writing, in which the signs may either represent a whole syllable (*syllabic writing*), or only a single sound, in which case they are called *alphabetic*. These signs differ in form and use in the various alphabets. Thus the Chinese signs are read in columns from top to bottom, the Mexican picture writing from bottom to top, the Hebrew writing from right to left, and Latin, Greek, and all European languages as well as Sanskrit from left to right.



Wood Writing Tablet.

(See *Alphabet*.) In the Chinese system of writing there is no alphabet, the characters being syllabic and strictly ideographic.

Writing was introduced to the western nations by the Phœnicians, and the Phœnician system is supposed to have been based on the Egyptian. The cuneiform writing, another ancient system, invented by the Accadian inhabitants of Chaldea, was also adapted to several languages, as the Assyrian, the Persian, etc., in a variety of ways, ideographic, syllabic, and alphabetic (see

*Cuneiform Writing*). Also of independent origin is the Chinese system. The Egyptians had three distinct kinds of writing, the hieroglyphic, the hieratic, and the enchorial or demotic (see *Hieroglyphic*), and it was from the second that the Phœnician and other Semitic systems of writing are thought to have been derived. The leading Semitic forms are the Samaritan or ancient Hebrew, the Chaldee or East Aramaic, the Syriac or West Aramaic, the Kufic or early Arabic, and the Neshki or modern Arabic. At what time writing was introduced into ancient Greece is not

types, became common in inscriptions from the thirteenth to the fifteenth centuries, and were employed in church books from the time of St. Louis. In England a variety of styles called Saxon prevailed in the early middle ages. A mixed style was formed of a combination of Roman, Lombardic and Saxon characters; the Norman style came in with William the Conqueror; and the English court hand, an adaptation of Saxon, prevailed from the sixteenth century to the reign of George II. There have been various attempts made to introduce systems of *phonetic writing*, in



Buffalo Skin Writing.

known with certainty, but probably between the tenth and the seventh century B.C. From Greece it passed to Sicily and Italy, and thence it was spread as Christianity spread. Like the Semites, the Greeks originally wrote from right to left. In mediæval manuscripts a variety of styles were adopted in different epochs and countries. Capitals were not then used as now to distinguish prominent words, but whole manuscripts were written in large or small capitals. Uncial letters, which prevailed from the seventh to the tenth centuries, were rounded capitals with few hair-strokes. Gothic characters, which were merely fanciful deviations from the Roman

which each sound should be represented by one invariable sign. Systems of shorthand writing are generally phonetic. See *Shorthand*.

**Wryneck** (ri'nek), a bird allied to and resembling the woodpeckers. One species, the common wryneck (*Yuna torquilla*), is a summer visitant of the north of Europe. It is remarkable for its long tongue, its power of protruding and retracting it, and the writhing, snake-like motion which it can impart to its neck without moving the rest of the body. It feeds chiefly on insects.

**Wuhu.** See *Woo-Hoo*.



**Wundt** (vünt), **WILHELM MAX**, a German physiologist and psychologist, born at Neckarau in Baden, August 16, 1832. The list of his works is long and comprehensive, including physiology, psychology, logic and ethics. He believes that the straight road to ethics lies through studying the history of the race and its psychology. His comprehensive *System der Philosophie* is widely known.

**Württemberg** (vür-tem-berk), or **WURTEMBERG**, a kingdom of the German Empire, between Bavaria, Baden, Hohenzollern, and the Lake of Constance, which separates it from Switzerland; area, 7531 sq. miles; pop. 2,435,000. Except a few tracts in the south, the surface is hilly and even mountainous. In the west the Schwarzwald, or Black Forest (which see), forms part of the boundary, and the Alb or Rauhe Alp, forming part of the Franconian Jura, covers an extensive tract. The country belongs in large part to the basin of the Rhine, being drained northwards into that river by the Neckar, while the Danube flows across the southern districts. A part of the Lake of Constance is also included in Württemberg. The climate is decidedly temperate. In the lower and more favorable districts the fig and melon ripen in the open air, and the vine, cultivated on an extensive scale, produces several first-class wines; maize, wheat, hops, tobacco, and apples, which are employed in cider making, are largely cultivated. About a third of the country is under forests which consist chiefly of oaks, beeches, and pine. Of minerals, by far the most valuable are iron and salt, both of which are worked by the government; the others are limestone, gypsum, alabaster, slate, millstones, and potter's clay. The manufactures consist chiefly of cotton, woolen, and linen goods, paper, wooden clocks, toys, musical instruments, and chemical products. The government is an hereditary constitutional monarchy, the executive power being lodged in the sovereign, and the legislative jointly in the sovereign and a parliament, composed of an upper and a lower chamber. In the Bundesrath Württemberg is represented by four members, and in the Reichstag by seventeen. Education is generally diffused, and the center of the educational system is the University of Tübingen. Besides Stuttgart (the capital), the chief towns are Ulm, Heilbronn, and Esslingen. The history of the state is of little general interest. In the war of 1866 Württemberg sided with Austria against Prussia. It became a member of the German Empire on its foundation in 1871.

**Würzburg** (vürts'burk), a town in the northwest of Bavaria, on the Main, 60 miles S. E. of Frankfurt. Its old fortifications have been demolished, and the site laid out in fine promenades, but it is still overlooked by the fortress of Marienberg, on a lofty hill outside the city. The most important edifices are the Romanesque cathedral, erected in the tenth century, with an interior highly enriched but much deteriorated by plaster decoration of the eighteenth century; the university, with various new buildings; the Julius hospital and school of medicine, and the royal palace (1720-44). The university library has 200,000 volumes, and in other respects the university, especially in the medical faculty, is well equipped. The manufactures are varied in character. Pop. (1910) 84,496.

**Wurzen** (vürt'sén), an old town of Germany, in Saxony, on the Mulde, with a cathedral, ancient castle, and important industries. Pop. 17,212.

**Wu-Ting-fang**, born in Hsin-hiu dist., Kwang-tung, China. He was educated in Chinese learning at Canton, in English at Hong-Kong, and studied law in London, being admitted to the English bar. He returned to China in 1877, and practiced law at Hong-Kong till 1882, when he was appointed deputy for foreign affairs at Tientsin. Here he was made chief director of the Kai Ping Railway and built the first railroad in China. In 1891 he was appointed director of the Tientsin University, was on the peace embassy to Japan in 1896, and aided in negotiating a treaty of Commerce with Japan. He was minister to the United States 1897-1902 and again 1907-11, and there wrote and lectured on Chinese subjects. He was active in the revolution in China of 1911-12, and was appointed Minister of Justice in the cabinet of the provisional government, and re-appointed minister to the United States in 1912.

**Wyandots** (wí'an-dots; in Canada called *Hurons*), an Indian tribe in North America belonging to the Iroquois family. In the beginning of the seventeenth century they were settled on the eastern shore of Lake Huron, but in a tribal war (1636) they were nearly exterminated. Part of the dispersed tribe settled at Ancien Lorette in Lower Canada, where their descendants still remain.

**Wyandotte** (wí'an-dot), a city of Wayne Co., Michigan, on the Detroit River, 12 miles S. S. W. of Detroit. It has ship and boat yards, and manufactures of chemicals, salt,

## Wyandotte

trunks, fur-robots, coats, malt liquors, auto trucks, stoves, etc. Pop. 8287.

**Wyandotte**, Kansas, is a part of Kansas City.

**Wyandotte Cave**, situated 5 miles N. of Leavenworth, Indiana, has been explored for over 20 miles, and rivals the Mammoth Cave in the size of some of its chambers and in its stalagmites and stalactites, surpassing the Mammoth Cave in the number and beauty of these. It is notable for its large chambers.

**Wyatt** (wi'at), SIR THOMAS, the first writer of sonnets in the English language, born in 1503; died in 1542. His poetical works were published in 1557.

**Wyant** (wi'ant), ALEXANDER H., landscape painter, was born at Port Washington, Ohio, in 1836. He studied at Karlsruhe, Germany, under Hans Gude, and made attractive studies in Ireland of the lakes of Killarney. His studies of autumn effects in American forests, and views of nature in the Adirondacks and along the Ohio river, have made his fame more than continental. He died November 29, 1892.

**Wycherley** (wich'er-li), WILLIAM, an English dramatist, born about 1640 at Clive, near Shrewsbury; died in 1715. His early years were spent in France, afterwards he was educated at Oxford, and entered himself at the Temple; while in 1670 he became known as a fashionable man about town and the author of *Love in a Wood*. This comedy was followed by the *Gentleman Dancing Master*, the *Country Wife*, and the *Plain Dealer*. In 1680 he married the Countess of Drogheda, a young, rich widow, who at her death left him a lawsuit, the expenses connected with which brought him to the Fleet Prison. Here he remained for seven years, until released and pensioned by James II. Wycherley is the typical dramatist of the Restoration group, in which all the brilliancy and dissoluteness of that school are very prominent.

**Wych-hazel** (wich'hā-zl), the common name of plants of the genus *Hamamelis*, the type of the nat. order Hamamelidaceae. They are small trees, with alternate leaves on short petioles, and yellow flowers disposed in clusters in the axils of the leaves, and surrounded by a three-leaved involucre. They are natives of North America, Persia, or China, and are very different from the true hazel. The Virginian wych-hazel is medicinally important. See *Hazeline*.

**Wycliffe**. See *Wickliffe*.

## Wyoming

**Wycombe** (wik'um), HIGH or CHIPPING, a municipal borough of England, in Buckinghamshire, on the Wye, 34 miles N. W. of London. Its chief building is the Church of All Saints, built about 1273 A.D., and its chief manufactures are paper and lace. Pop. 24,558.

**Wye** (wi), a river of South Wales, which rises on Plynlimmon, in Montgomeryshire, passes through Radnorshire, Brecknockshire and Herefordshire, and falls into the Severn, after a course of 130 miles, near Chepstow, in Monmouthshire. Above the latter place it is only navigable by barges.

**Wykeham** (wik'am), WILLIAM OF, an English architect, prelate and statesman; founder of New College, Oxford. Born, 1324; died, 1404. He was bishop of Winchester and Lord Chancellor. Winchester Cathedral was rebuilt by him.

**Wyndham** (win'dam), SIR CHARLES, an English actor (1837-1919), born in Liverpool, educated at Neuwied, Germany; St. Andrews and Dublin universities. He studied medicine and served as surgeon in the Federal army during the American Civil war, and was present at the engagements of Chancellorsville, Fredericksburg and Gettysburg. His first stage appearance was in America with John Wilkes Booth (q. v.), the assassin of Lincoln. He made his first appearance in England in 1865. He made his greatest reputation as Charles Surface in the *School for Scandal*. His revival of *David Garrick and Wild Oats* were conspicuous successes on both sides of the Atlantic. He managed the Criterion Theatre in London for 20 years and built Wyndham's and the New theatres.

**Wyntoun** (win'tun), ANDREW, an ancient rhyming chronicler of Scotland, born about 1350; died, 1420. Author of *The Orygynale Cronykil*.

**Wyoming** (wi-'m'ing), one of the United States (admitted June, 1890). It is almost rectangular in shape, bounded S. by Utah and Colorado, N. by Montana; E. by Nebraska and South Dakota, and W. by Utah, Idaho and Montana; area, 97,575 square miles. The surface is to a large extent mountainous, the main chain of the Rocky Mountains extending from northwest to southeast. It is broken by deep river cañons and flat topped hills or buttes, which rise from the plain or valley like walled cities or mounds. Near are large elevated plateaus or parks, of which the principal is the great Yellowstone Park. The river system includes the Platte River with its tributaries in the south-

east, the Green River in the southwest, and the Yellowstone, Big Horn and Powder rivers in the north. The mountainous districts abound in forests, and the soil of the valleys is a fertile loam very suitable for agriculture, but needing irrigation in great part of the State. It is claimed that 10,000,000 acres may be reclaimed in this way, and irrigation is being actively applied, there being more than 4500 miles of irrigating ditches.

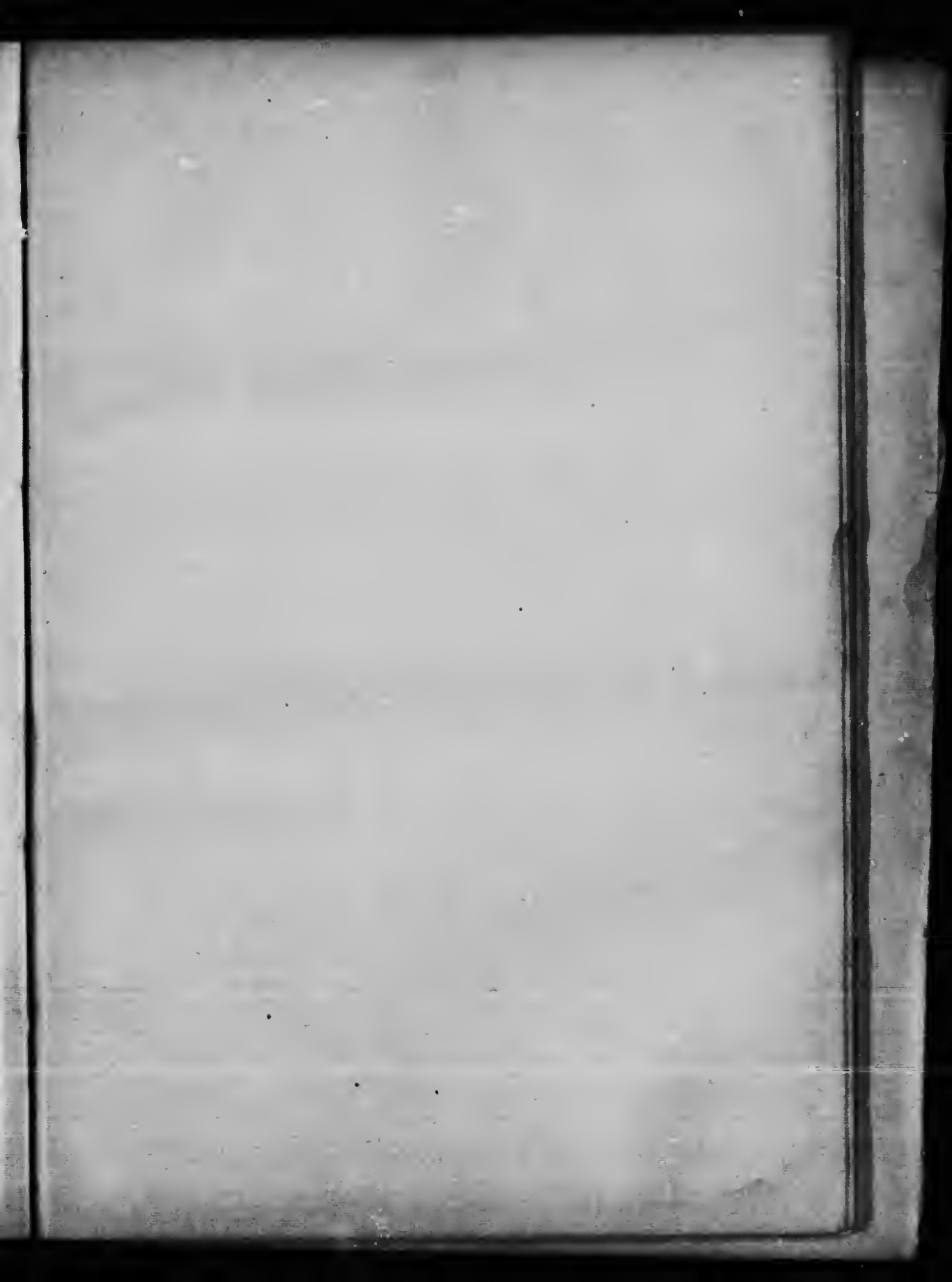
Wheat, oats and barley are the chief crops, and large tracts are used for stock-raising, which is the chief industry. Wyoming is rich in mineral resources. Good coal is abundant and there are vast beds of iron ore, while gold and silver are plentiful. Other minerals are gypsum, salt, soda, sulphur, copper, lead and tin. Petroleum seems abundant in the central and southern sections. Of the larger animals grizzly and black bears and several species of deer are still abundant, but the buffalo, of which there used to be immense herds on the plains, have become extinct. The manufactures consist of the sawing of lumber and railroad ties, milling of quartz, and railroad repair and machine work in the railroad towns. Acquired as part of the Louisiana Purchase, this territory was organized in 1808, and is now being slowly developed, chiefly through means of the Union Pacific Railway, by which it is traversed. In the northwest the Yellowstone district has been set apart by the government as a great national park. See *Yellowstone National Park*. The capital is Cheyenne City. The State is rapidly increasing in population. Pop. (1910) 145,965.

## Wyville Thomson Ridge.

See *Atlantic Ocean*.

**Wyoming Valley**, in Luzerne Co., Pennsylvania, famous as the scene of a massacre of the American settlers by a band of Tories and Indians July 4, 1778. Nearly all the American fighting men were away in the Continental army and after a brief resistance the remaining men took refuge in Forty Fort, where most of the families of the valley had gathered. The Tories, under Colonel Butler, offered unexpectedly easy terms of surrender, and the settlers went back to their homes, while the invaders were supposed to be leaving the valley. Against the commands of their white leaders the Indians remained, and, on the night of July 4, began massacring the inhabitants and burning the houses. All who could escape made their way into the Wilkes-Barre Mountains and the swampy land beyond, where many of the women and children died. When peace was established the surviving settlers returned. A memorial marble monument is erected in the valley.

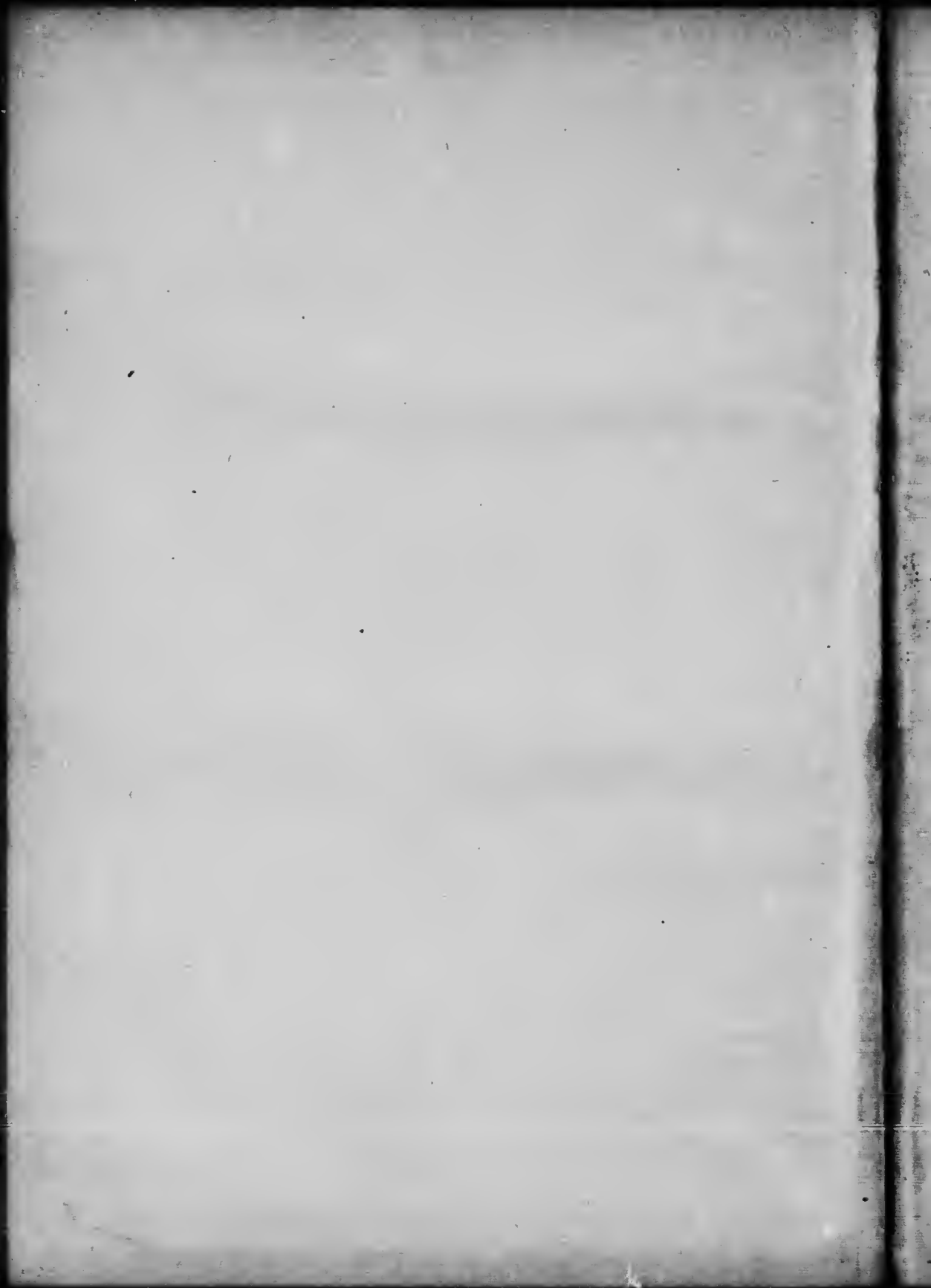
**Wythe** (with), GEORGE, an American patriot, born in Elizabeth City Co., Virginia, in 1726; died in 1806. He was elected to the Continental Congress in 1775, signed the Declaration of Independence in 1776, became in 1777 a judge of the High Court of Chancery, and served as chancellor of Virginia for twenty years. He was professor of law at William and Mary college 1779-89, and a delegate to the Constitutional Convention of 1787.











# X

**X**, the twenty-fourth letter of the English alphabet. Except when used at the beginning of a word, *x* in English is a double consonant, and has usually the sound of *ks*, as in *was*, *las*, *axis*, etc.; but when terminating a syllable, especially an initial syllable, if the syllable following it is open or accented, it often takes the sound of *gz*, as in *luxury*, *exhaust*, *exalt*, *exotic*, etc. At the beginning of a word it has precisely the sound of *z*.

**X-Rays** or *Roentgen Rays* (rönt'kën) or *Roentgen Radiation*, discovered by Wilhelm Conrad Röntgen of the University of Würzburg, Germany, and announced by him in December, 1895. Prof. Röntgen named them *X-Rays* ('unknown quantity'), since their exact nature was unknown when they were discovered. They are invisible rays transmitted through the ether in a manner similar to light. They consist of very short, irregular, non-harmonic, electromagnetic pulses in the ether and are capable of passing through all substances in a remarkable manner, approximately in inverse proportion to the atomic mass of the material. They produce fluorescence and phosphorescence in many crystalline substances such as barium-platinocyanide, calcium tungstate, willemite, calc spar, fluor spar, rock salt, calcium sulphide, etc., giving a method of making their presence visible. They reduce the silver haloids of photographic emulsions; color crystals, gems and glasses; ionize air and other gases; excite secondary Roentgen Rays in all substances absorbing them; precipitate mercurous chloride from aqueous solutions of mercuric chloride and ammonium oxalate; reduce vitality of cell life (and in large amounts destroy it); and increase the velocity of a few chemical reactions. They are produced by passing uni-directional, electric current of from twenty to one hundred thousand volts pressure through a specially constructed high vacuum tube, within which, cathode rays radiating from the surface of a concave cathode are focussed upon and bombard a target of refractory material such

as tungsten, iridium, or platinum, from which focus spot the Roentgen Rays radiate in all directions according to the law of inverse squares. They are used in medicine and surgery to photograph the skeleton and all the internal organs of the human body as an aid in diagnosis, also as a therapeutic agent to destroy diseased tissue with and without the aid of surgery. Cancers and tumors of certain kinds and a number of skin diseases are made to disappear by their use.

**Xanthippe** (zan-thip'ë). See *Socrates*.

**Xanthorrhœa** (zan-tho-rë'a). See *Grass-tree*.

**Xanthoxylum** (zan-thoks'i-lum). See *Prickly Ash*.

**Xanthus** (zan'thus), an ancient city of Asia Minor, in Lycia, on the river Xanthus, about 8 miles above its mouth. Its ruins were discovered in 1838 by Sir C. Fellows; and have yielded a large collection of marbles, now in the British Museum. The river rises in Mount Taurus, and falls into the Mediterranean a little to the west of Patara.

**Xavier**, ST. FRANCIS (zav'i-ër; Spanish pron. hâv-i-er'), surnamed the apostle of the Indies, was born in 1506 at the castle Xavier in Navarre. He fell under the personal influence of Ignatius Loyola, and became one of the first members of Loyola's Society of Jesus. Under the auspices of John, King of Portugal, he went to the East Indies as a missionary in 1541. In 1549 he made his way to Japan. He was about to extend his field of labor to China, when he died in 1552. Canonized in 1621.

**Xenia** (zë'ni-a), a city, capital of Greene Co., Ohio, on the Little Miami River, 65 miles N. E. of Cincinnati. It is the seat of Zenia Theological Seminary and the Ohio Soldiers' and Sailors' Home. Wilberforce University, formerly here, is now at Wilberforce, 3 miles away. It has saw, planing and paper mills, marble and granite works; cordage, twine, shoes and other industries. Pop. 8706.



**Xenocrates** (ze-nok'ra-tēs), of Chalcedon, a Greek philosopher, and disciple of Plato, born 396 B.C.; and from 339 until his death, 314 B.C., head of the famous Academy at Athens. Metaphysics and ethics were his chief subjects, but of his numerous works only the titles are now known.

**Xenophanes** (ze-nof'a-nēs), of Colophon, a Greek philosopher, born probably about 330 B.C.; for some time settled at Elea, and regarded as the founder of the Eleatic school of philosophy. The character of his teaching has been much debated. He must have been at least seventy-two when he died. See *Eleatic School*.

**Xenophon** (zen'o-fon), a Greek historian and essayist, born at Athens about 430 B.C.; became early a disciple of Socrates. In 401 B.C., partly from curiosity, and in no military capacity, he joined the Greek mercenaries attached to the force led by Cyrus the Younger against his brother Artaxerxes II. After the defeat and death of Cyrus on the field of Cunaxa, the chief Greek officers were treacherously assassinated by the victorious satrap. Xenophon now came to the front, and mainly conducted the famous retreat of the 10,000 through wild and mountainous regions, often harassed by the guerrilla attacks of barbarous tribes, until after a five months' march they reached Trebizond on the Black Sea, February, 400 B.C. The expedition and its sequel form the subject of his best-known work, the *Anabasis*. Xenophon fought on the side of the Lacedæmonians in the subsequent war between Sparta and Persia, and rose from poverty to competence through the ransom which he received from a wealthy Persian nobleman whom he had captured. With Agesilaus, under whom he had already served, he fought at Coronela (394 B.C.) against his own countrymen, and was on this account formally banished from Athens. For more than twenty years he seems to have lived the life of a country gentleman at Scyllus in Ellis, where he is supposed to have written most of his works. After the defeat of the Spartans at Leuctra (371 B.C.), Xenophon was driven from Ellis, and is said to have retired to Corinth. He was certainly alive in 357 B.C. Xenophon's principal works, besides the *Anabasis*, are his *Cyropædia*, a political and educational romance based on the history of Cyrus the Great; the *Hellenica*, a history of Greece where Thucydides leaves off, including the period from 411 to 362 B.C.; and the *Memorabilia*, recollections of Socrates.

**Xeres.** See *Jeres*.

**Xerxes I** (zerk'sēs), King of Persia, famous for his unsuccessful attempt to conquer Greece, was the son of Darius and of Atossa, daughter of Cyrus. He began to reign 485 B.C., and continued his father's preparations for another Persian invasion of Greece. The army which he collected is estimated to have exceeded a million of men, with a fleet of 1200 sail. Xerxes crossed the Hellespont on a bridge of boats (480 B.C.), and met with no resistance until he reached the Pass of Thermopylae. After Leonidas had fallen there with his Spartans (see *Leonidas*), Xerxes pressed forward and burned Athens, which had been forsaken by almost all its inhabitants. He watched from the mainland the naval battle of Salamis (September, 480 B.C.), and fled ignominiously after the overwhelming defeat of his fleet. Xerxes was assassinated 465 B.C. He has been supposed to be the Ahasuerus of the *Book of Esther*.

**Ximenes** (hi-mā'nes), FRANCISCO, a Spanish cardinal, born in 1437; died in 1517. In 1492 he was appointed confessor to Queen Isabella of Castile, and in 1495 Archbishop of Toledo, distinguishing himself as a reformer of ecclesiastical and monastic abuses. In 1507 he was made a cardinal, and in 1516 King Ferdinand died, leaving Ximenes regent during his grandson Charles' absence in the Netherlands. In 1517 Charles returned to Spain, and, prompted by jealousy, dismissed him. Ximenes died soon afterwards. He founded and endowed the University of Alcalá de Henares.

**Xingu** (shing-gō'), a river of Brazil, one of the chief tributaries of the Amazon, rises near lat. 15° S., lon. 59° W., and after flowing north for 1300 miles joins the Amazon 240 miles W. of Pará. It is navigable for 100 miles.

**Xiphias.** See *Sword-fish*.

**Xiphodon** (zi'fō-don), a genus of fossil mammals closely allied to *Anoplotherium*.

**Xyloc'opa.** See *Carpenter-bee*.

**Xylography** (zi-log'ra-fi), a name sometimes given to wood-engraving.

**Xylology** (zi-lol'ō-jī), the science of wood-structure, of the identification of woods and the detection of substitutes. The chief value of the work of the xylogist at present is in discovering new woods with properties and structural characters similar to certain kinds which are being rapidly exhausted.

# Y

**Y**, the twenty-fifth letter of the English alphabet, was taken from the Latin, the Latin having borrowed it from the Greek T or upsilon. In modern English it is both a consonant and a vowel. At the beginning of syllables and followed by a vowel it is a consonant; in the middle and at the end of words it is a vowel. **Y**, or **Iy** (both pronounced I), the western arm of the *Zuider Zee* on which Amsterdam is situated.

**Yablonoi.** See *Stanovoi Mountains*.

**Yacht** (yot), a light and elegantly fitted up vessel, used either for pleasure trips or racing, or as a vessel of state to convey kings, princes, etc., from one place to another by sea. There are two distinct species of yacht: the mere racer, with enormous spars and sails and deeply-ballasted hull, with fine lines, but sacrificing everything to speed; and the elegant, commodious, well-proportioned traveling yacht, often with steam-propelling machinery, fit for a voyage round the world. A type of yacht much used in America is that with a center-board or sort of movable keel. (See *Center-board*.) The practice of yachting as well as the word yacht was derived from the Dutch. The word yacht is found in use in English in Elizabeth's time, and James I had a yacht built for his son Henry early in the seventeenth century, but it was not till long after that yachting became a favorite pastime with the rich. The first yachting club in the British Kingdom was organized at Cork Harbor in 1720. The first yacht club in the United States was established at New York in 1844. In each country the yachts are now numbered by the thousand. In 1851 the *America*, built in New York, carried off a cup given by the Yacht Squadron at Cowes, and her victory led to considerable modifications of the build of British yachts. In subsequent international contests the American yachts have held their own, and the cup has never recrossed the Atlantic.

**Yak**, the *Boz* or *Poephagus grunniens*, a fine large species of ox, with

cylindric horns, curving outward, long pendent silky hair fringing its sides, a bushy mane of fine hair, and long, silky, horse-like tail; inhabiting, both in the wild and the domesticated state, Tibet and the higher plateaus of the Himalayas; called *grunniens* (grunting) from its very peculiar voice, which sounds much like the grunt of a pig. It is the ordinary domestic animal of the inhabitants of those regions, supplying milk, food, and raiment, as well as being used as a beast of burden and to draw the plow. The tail of the yak is in great request for various ornamental purposes, and forms an article of commerce.

**Yakub Khan** (yā-kōh'), MAHOMED, Amir of Afghanistan.

See *Afghanistan*.

**Yakutsk** (yā-kōtsk'), a province of Eastern Siberia, includes nearly the whole of the basin of the Lena, between which river and its tributary, the Vitim, rich gold mines are worked. Area, 1,533,397 sq. miles. Pop. 261,731.

**Yale** (yāl), ELIHU, philanthropist, was born at Boston, Massachusetts, in 1648; died in 1721. He went to



Elihu Yale

England while very young, was educated there, and never returned to the

United States, becoming an East India merchant and acquiring great wealth. He gave books and money valued at \$4000 to the Collegiate School at Saybrook, Connecticut, and after the removal of this school to New Haven it was named in consequence Yale College.

**Yale**, LINUS, inventor, born at Salisbury, New York, in 1821; died in 1868. In 1850 he began the study of mechanical problems, and in 1851 patented a safety lock. From this date until his death he was considered an authority in all matters relating to locks, his most notable invention being the double lock, which comprised two locks within a single case and operated by the same or different combinations. The 'Yale lock' is now in almost universal use.

**Yale University** (yāl), one of the oldest of the American universities, was originally a collegiate school established at Saybrook, Connecticut, in 1701. It was removed in 1716 to New Haven, and soon after its name was changed to Yale College, after its patron Elihu Yale (1648-1721). In 1887 its name was changed to Yale University by act of Assembly. It has four faculties—philosophy and arts, theology, law, and medicine—in all of which its governing body grants degrees. The first of these faculties includes, besides the original academical department, a scientific and engineering school—degrees for civil and dynamic engineering being given—and a school of fine arts. The aggregate number of volumes in all the libraries of the college is 600,000, of which 1000 were presented to it in 1730 by Bishop Berkeley. Its museum of natural history was endowed with \$150,000 by George Peabody and the endowment of the university is over \$13,000,000. The numerous buildings cover about nine acres in the heart of the city, the oldest dating from 1752. The teaching staff and members of faculty number over 410, and the average number of students over 8000.

**Yam**, a large esculent tuber or root produced by various plants of the genus *Dioscorea*, order Dioscoreaceae, growing in the warmer regions of both hemispheres. Yams, when roasted or boiled, form a wholesome, palatable, and nutritious food, and are extensively cultivated in many tropical and sub-tropical countries. The Chinese or Japanese yam (*D. Batatas*) contains more nitrogenous and therefore nutritive matter, but less starch, than potatoes. It is hardy in Great Britain and thrives in the United States, but its cultivation is impeded by the great depth to which its roots de-

scend. The tubers of *D. alata*, the West Indian yam, one of the species most widely diffused, sometimes attain a weight of 50 lbs.

**Yama** (yam'a), a Hindu god, the judge of the dead, whose good and bad actions are read to him out of a record, and who according to their merits and demerits are sent to the celestial or to the infernal regions. Hindus offer to him daily oblations of water.

**Yamagata**, ARITOMO, a Japanese marquis and field-marshal; born in 1838. The son of a Samurai chieftain, he received a military education, and in 1868 took part in the suppression of the Shogunate. He became Minister of War in 1873, created a national army out of the feudal retainers, and in 1877 quelled the Satsuma rebellion. He commanded the successful Japanese forces in the Chinese war of 1894-95, and was prominent in the Russo-Japanese war of 1904; was president of the councils of war which formulated the plan of campaign.

**Yang-tze-kiang** (yang-tsé-ké-ang'), one of the two great rivers of China, is formed by two streams rising in Eastern Tibet, in lat. 26° 30' N., lon. 102° E. After flowing east and then south it enters the Chinese province of Yunnan. Pursuing a very tortuous course, much of it through most fertile and densely-populated regions, it reaches the great city of Nanking, 200 miles from the sea, where it widens gradually into the vast estuary which connects it with the Yellow Sea. Its whole course, under various names, is 2900 miles, and the area of its basin is computed to be 548,000 square miles. It is connected by the Grand Canal with the Hoang-ho or Yellow River, and is navigable for vessels of considerable draught for 1200 miles from its mouth. By the Treaty of Tien-tsin the Lower Yang-tze was opened to European trade; and 700 miles from its mouth is the treaty-port of Hangkow, the great commercial city of Mid-China. The highest port on the river at present open to foreign trade is Ichang, 1000 miles from its mouth.

**Yan'ina**. See *Janina*.

**Yankee** (yan'ke), a cant name for Americans belonging to the New England States. During the American Revolution the name was applied by the British to all the insurgents; and during the Civil war it was the common designation of the Federal soldiers by the Confederates. In Britain the term is sometimes improperly applied generally to natives of the United States. The

most common explanation of the term seems also the most plausible, namely, that it is a corrupt pronunciation of *English* or of French *Anglais* formerly current among the American Indians.

**Yankee-Doodle**, a famous air, now regarded as American and national. In reality the air is an old English one, called *Nankey Doodle*, and had some derisive reference to Cromwell. The really national air of the whole United States, however, is 'The Star-Spangled Banner,' which divides public favor as a patriotic song with 'America,' beginning,

'My country, 'tis of thee,  
Sweet land of liberty,' etc.

**Yankton** (yank'tun), a city, county seat of Yankton Co., South Dakota, and up to 1883 the capital of Dakota Territory. It is on the N. bank of the Missouri River, 61 miles N. W. of Sioux City. It contains Yankton College and has flour mills, grain elevators, brewery, brick, tile and cement works, etc. Pop. 4000.

**Yankton Indians**, a tribe in South Dakota, numbering about 7000.

**Yap** (yap), one of the Caroline Islands, owned by Germany till 1914, when it was taken by Japan. It is an important cable station, linking Shanghai with the main trunk line between San Francisco and Celebes. The American island of Guam lies 500 miles to the N. E. Area, 79 sq. miles. Pop. 7000.

**Yard**, a British and American standard measure of length, equal to 3 feet or 36 inches, the foot in general being made practically the unit. As a cloth measure the yard is divided into 4 quarters = 16 nails. A square yard contains 9 square feet, and a cubic yard 27 cubic feet. See *Weights and Measures*.

**Yard**, in ships, a long cylindrical piece of timber, having a rounded taper toward each end, slung crosswise to a mast. All yards are either *square* or *lateen*, the former being suspended across the masts at right angles for spreading square sails, the latter obliquely. Yards have sheave-holes near their extremities for the sheets reeving through. Either end of a yard, or rather that part of it which is outside the sheave-hole, is called the *yard-arm*.

**Yarkand** (yär-känd'), the chief town in the principal oasis of Eastern Turkestan, is situated on the river Yarkand. It is enclosed by a thick mud wall, and its rich gardens are well watered by numerous canals. The in-

habitants, chiefly Persians, are keen traders. Pop. estimated at from 75,000 to 100,000.—The river rises in the Karakorum Mountains, and helps to form the river Tarim, which enters Lob Nor.

**Yarmouth** (yär'muth), or, as it is more strictly called, **GREAT YARMOUTH**, an English seaport, important fishing station, and watering place, is in the county of Norfolk, 20 miles east of Norwich. It is situated on a long and narrow tongue of land running from north to southward between the German Ocean and the estuary of the Yare. The town is connected by a bridge with Little Yarmouth, or South Town, in Suffolk. The parish church of St. Nicholas, founded in 1101, and of late years completely restored, is one of the largest in the kingdom. Yarmouth has a naval lunatic asylum, the only one in the kingdom. It is the great seat of the English herring and mackerel fishery, and also furnishes large quantities of white-fish. The curing of herring as 'Yarmouth bloaters' is an important industry. The coast is dangerous, but Yarmouth Roads, between the shore and a range of sandbanks, offers a safe anchorage. Pop. (1911) 55,188.

**Yarmouth**, a seaport town of Nova Scotia, 205 miles S.W. of Halifax, and the chief shipbuilding place in the province. Pop. 6600.

**Yarn**, any textile fiber prepared for weaving into cloth. See *Thread*.

**Yaroslaf**. See *Jaroslav*.

**Yarr**, a well-known British and European plant, *Spergula arvensis*. See *Spurrey*.

**Yarra-Yarra** (yär-rä-yär-rä), the Australian river on which Melbourne, Victoria, is situated. Its length is about 100 miles. On account of falls it is not navigable above Melbourne. See *Melbourne*.

**Yarrell** (yär'el), **WILLIAM**, an eminent naturalist, was the son of a newspaper agent in London; born there in 1784; died in 1856. He assisted in and succeeded to his father's business. He contributed frequently to the *Transactions* of the Linnean Society, of which he became a fellow, and to natural history periodicals. His two works, the *History of British Fishes* and the *History of British Birds*, are standard authorities.

**Yarriba**. See *Yoruba*.

**Yarrow** (yär'ö), a name given to a pungent plant, *Achillea millefolium*, also known by the name *millefol* (which see).



**Yarrow**, a parish in Selkirkshire, Scotland, chiefly pastoral, celebrated for its poetical and historical associations. The river Yarrow, famous in song, issues from the foot of St. Mary's Loch, and, flowing 14½ miles eastward, falls into the Ettrick, 2 miles s. w. of Selkirk.

**Yataghan** (yat'a-gan; Turk. *yata-gân*), a sort of dagger-like saber with double-curved blade, about 2 feet long, the handle without a cross-guard, much worn in Mohammedan countries.

**Yates** (yats), EDMUND HODGSON, an English novelist, born in 1831; died in 1894. He wrote *Broken to Har-ness*, *Land at Last*, *Dr. Wainwright's Patient*, *The Impending Sword*, *Personal Reminiscences*, etc.

**Yawl** (yawl), a small ship's boat, usually rowed by four or six oars; a jolly-boat; also a sailing boat similar to a cutter, but having a small sail at the stern.

**Yawning** (yawn'ing), an involuntary expansion of the mouth, a reflex muscular action, generally produced by weariness, tedium, or an inclination to sleep, sometimes by hunger, etc. When yawning is troublesome, it may be relieved by long, deep respiration, or drawing in the air at long intervals.

**Yaws** (yaz), a disease occurring in America, Africa, and the West Indies, and almost entirely confined to the African races. It is characterized by cutaneous tumors, numerous and successive, gradually increasing from specks to the size of a raspberry, one at length growing larger than the rest; core a fungous excrescence; fever slight, and probably irritative merely. It is infectious and contagious, and is produced by inoculation with *Treponema pertenius*, which may be carried by the common house fly. It is also called *frambesia*, from the French *framboise*, a raspberry. It is treated by intramuscular or intravenous injections of dioxymido-arsenobenzol, or '606,' a remedy brought forward by Dr. Ehrlich for syphilis, both diseases being caused by varieties of *Treponema*. Milk of goats thus treated is suggested for children affected with the disease.

**Yazoo River** (yaz'ô), a river of Mississippi, 290 miles long, navigable throughout its course, and joining the Mississippi River 5 miles above Vicksburg.

**Yazoo**, a city, capital of Yazoo Co., Mississippi, on the navigable Yazoo River, 45 miles N. N. W. of Jack-

son. It has cotton, oil and lumber interests. Pop. 6796.

**Year** (yêr), the period of time during which the earth makes one complete revolution in its orbit, or the period which elapses between the sun's leaving either equinoctial point, or either tropic, and his return to the same. This is the *tropical* or *solar* year, and the year in the strict and proper sense of the word. This period comprehends what are called the twelve calendar months, and is usually calculated to commence on January 1 and to end December 31. It is not quite uniform, but its mean length is about 365 days, 5 hours, 48 minutes and 51.6 seconds. In popular usage, however, the year consists of 365 days, and every fourth year of 366. See *Leap-year*.—*Anomalistic year*. See under *Anomaly*.—*Civil year*, the ordinary year of 365 days.—*Ecclesiastical year*, from Advent to Advent.—*Gregorian year*, *Julian year*. See *Calendar*.—*Lunar year*, a period consisting of 12 lunar months. The *lunar astronomical year* consists of 12 lunar synodical months, or 354 days, 8 hours, 48 minutes, 36 seconds. The *common lunar year* consists of 12 lunar civil months, or 354 days. The *embolismic* or *intercalary lunar year* consists of 13 lunar civil months, and contains 384 days.—*Sabbatical year*. See *Sabbath*.—*Sidereal year*. See *Sidereal Time*.

**Yeast** (yêst), the yellowish substance, having an acid reaction, produced during the vinous fermentation of saccharine fluids, rising to the surface, when the temperature of the fluid is high, in the form of a frothy, flocculent, viscid matter (*surface yeast*), and falling to the bottom (*sediment yeast*) when the temperature is low. The ordinary yeast of beer consists of an immense number of minute cells, which constitute a plant called the yeast-plant, which multiplies by budding off other cells, or sometimes by spores. Little is known regarding the genesis of the yeast-plant. Pasteur's researches seem to show that the yeast which forms in grape juice is derived chiefly from certain germs abounding about harvest-time on the grapes, and diffused throughout the atmosphere of breweries and wine-cellars, etc. Yeast is not only generally essential to the production of wine from grape and other fruit juices, and to the manufacture of beer, but it is also an agent in producing the fermentation whereby bread is rendered light, porous, and spongy and has super-added leaven. (See *Fermentation*).—*German yeast* is prepared in various ways from common yeast collected, drained,

and pressed till nearly dry. It can be so kept for several months, and is much used by bakers.—*Patent yeast* is yeast collected from a wort of malt and hop, and treated similarly to German yeast.—*Artificial yeast* is a dough of flour and a small quantity of common yeast made into small cakes and dried.

**Yeats** (yáts), WILLIAM BUTLER, an Irish poet, born at Dublin, in 1865. He wrote *The Wanderings of Ossian and Other Poems*, *Countess Cathleen*, *Shadowy Waters*, etc., and various plays of verse since published as *Plays for the Irish Theater* (1912). He was one of the leaders of the Celtic Renaissance, and has written some prose works including *The Celtic Twilight* and *Sygne and the Ireland of His Time*.

**Yeddo.** See *Tokio*.

**Yeisk.** See *Isisk*.

**Yekaterinberg.** See *Ekaterinburg*.

**Yell** (yel), the second largest of the Shetland Islands, separated from the mainland by Yell Sound, and 25 miles N. of Lerwick. It is about 17½ miles in length, and from half a mile to 6 miles in breadth. The surface is chiefly moorland, and fishing is the leading employment. Pop. 2579.

**Yellow** (yel'ô), one of the prismatic colors; the color of that part of the solar spectrum situated between the orange and the green; a bright golden color, the type of which may be found in the field buttercup, which is a pure yellow. United with blue it yields green; with red it produces orange. See *Color* and *Spectrum*.

**Yellow-berries.** See *French Berries*.

**Yellow-bird**, a small singing bird common in the United States, the *Fringilla* or *Chrysomitris tristis*. The summer dress of the male is of a lemon yellow, with the wings, tail, and fore part of the head black. When caged the song of this bird greatly resembles that of the canary.

**Yellow Fever**, popularly known as 'yellow jack,' an infectious disease of tropical and semi-tropical America and the western tropical coast of Africa. It is caused by the injection of the yellow fever bacteria through the bite of the *Stegomyia fasciata* mosquito, which was proved by researches made in Havana, Cuba, in 1899, by Drs. Walter Reed, J. Carroll and A. Agramonte, of the United States Marine Hospital Service. The symptoms begin in from one to six days after the mosquito

bite is inflicted. One attack usually confers lifelong immunity. There are three stages: 1. The febrile stage, beginning with malaise, headache, irritable stomach, chills, high fever; pains in head, back and limbs; scanty urine; a peculiar odor. Slight jaundice occurs, resembling the appearance just prior to the eruptive stage of measles. The white of the eye is colored yellow. The coloring deepens for several days, and may become quite dusky. Albumin appears in the urine on the third day. 2. About the third or fourth day the fever drops to 100° or 99° F. and other symptoms improve. A crisis may then terminate the disease. 3. In the third stage the previous symptoms may reappear in worse form than before. A characteristic is an abnormally slow pulse with a fever, where the pulse rate may decrease while the fever grows higher. The other symptoms are: complete jaundice, black vomit, hemorrhages from mucous membranes, feeble pulse, cold surface, irregular respiration. Prevention of the spread of the disease is accomplished by completely screening the patient so that no mosquito can bite him to carry the germs elsewhere. By this method epidemics of the disease can be prevented and it may in time be eradicated. It is treated by calomel for the bowels, sodium bicarbonate to reduce excessive urinary acidity, no food for three or four days because of the condition of the stomach, febrifuges, heart stimulants and other treatment.

**Yellow-hammer**, YELLOW-AMMER, a passerine bird of the genus *Emberiza*, the *E. citrinella*; called also *yellow-bunting*. The head, cheeks, front of the neck, belly, and lower tail-coverts are of a bright yellow. The upper surface is partly yellow, but chiefly brown, the feathers on the top of the back being blackish in the middle, and the tail feathers are also blackish. The yellow-hammer occurs throughout Europe.

**Yellow Pine**, a North American tree, *Pinus mitis* or *variabilis*. The wood is used largely for domestic purposes in the United States. In Canada and Nova Scotia the name is given to *P. resinosa*, and it is also applied to *P. australis*.

**Yellow River.** See *Hoang-ho*.

**Yellows**, an inflammation of the liver, or a kind of jaundice which affects horses, cattle and sheep, causing yellowness of the eyes. The same name is given to a disease which affects the peach tree.

**Yellow Sea** (Chinese, *Whang-hai*), an arm of the Pacific

Ocean, on the northeast coast of China; length, about 620 miles; greatest breadth, about 400 miles. It is very shallow, and obtains its name from the lemon-yellow color of its water near the land, caused by mud suspended in the water from the inflow of the rivers Hoang-ho and Yang-tse-kiang.

## Yellowstone National Park,

a region of the state of Wyoming, occupying its northwest corner with slight extensions into Montana and Idaho; of remarkable natural beauty and unique for the number and diversity of its geysers and hot springs. It was in 1872 withdrawn from settlement by the United States government to become a park or tract for the recreation of the people. It was originally about 62 miles in length (from N. to S.), and 54 in width, with an area of 3350 sq. miles, but in 1882 a forest preserve of over 2000 square miles was added in the E. and S., making the total area a little over 5500 sq. miles. It is readily accessible by a branch of the Northern Pacific Railway. Its surface is mainly an undulating plain, diversified, however, by great mountain ranges, one of which, the Absaraka, a range separating the waters of the Yellowstone river (which see) from those of the Big Horn, contains some of the grandest scenery in the United States. The whole region exhibits an endless variety of wild volcanic scenery—hot springs, mud volcanoes, geysers, cañons, waterfalls, etc. The geysers are more remarkable than those of Iceland, and the Grand Geyser in Fire-hole Basin is the most magnificent natural fountain in the world. The Yellowstone Lake, one of many, is a magnificent sheet of water, with an area of 150 sq. miles, and an elevation of 7440 feet. The falls of the Yellowstone are of striking beauty. The Mammoth Hot Springs also are notable, from their beautiful terraces and basins of exquisitely colored calcareous deposits. A large part of the park is covered with forest. Stringent legislation protects the game, with the result that elk, deer, antelope and bear, have taken refuge in it and have rapidly increased in numbers.

**Yellowstone River,** a river of the United States, which rises in the Rocky Mountains, about lat. 44° N. and lon. 110° W. After a course of about 25 miles it passes through the lake of the same name, and runs northward through the Yellowstone National Park. Soon after issuing from the lake the river makes at intervals a series of falls (the last being 300 feet high), and traverses

cañons, one of which, the Great Cañon, is 20 miles in length, its steep sides being colored in bright hues and shaped in a great variety of fantastic forms. Running in a northeasterly direction the river ultimately joins the Missouri about lat. 48° N., after a course of some 1100 miles. Steamers can ascend it for 300 miles to the mouth of the Big Horn, which is its largest affluent.

**Yellow-throat,** a small North American singing bird (*Sylvia Marilandica*).

**Yemen** (yem'en), a division of Arabia, occupying the southwest angle of the peninsula, and known as Arabia Felix. Some portions of it are very fertile. Among its principal products is coffee, to a specially prized kind of which Mocha, one of its seaports, has given a name everywhere known. Estimated area, 70,000 square miles; estimated population, about 750,000. (See *Arabia*.) The chief potentate is the Imám of Sana, a tributary of Turkey.

**Yen,** a Japanese money of account, equivalent to \$1.04.

**Yenikalé** (yen-ik'a-lá), STRAIT OF, connecting the Black Sea with the Sea of Azof, is about 20 miles long, and in some parts only 2 miles broad and 2 fathoms deep.

**Yenisei** (yen'i-si), a great river of Asia, rises in Mongolia, flows northward through Siberia, and after a course of about 2500 miles enters the bay of the same name in the Arctic Ocean.

**Yeniseisk** (yen-e-sá'isk), a large province of Eastern Siberia, extending from the Chinese frontier to the Arctic Ocean; area, 986,908 sq. miles. It contains rich auriferous deposits. Pop. 657,900.—The capital, of the same name, is the chief entrepôt for the gold mines of the province and the Siberian fur-trade. Pop. 11,739.

**Yeomanry** (yó'man-ri), a volunteer cavalry force originally embodied in Britain during the wars of the French revolution. They must furnish their own horses, but have an allowance for clothing; the government also supplying arms and ammunition. Unlike the ordinary volunteer force, the yeomanry cavalry may be called out to aid the civil powers in addition to their being liable for service on invasion of the country by a foreign enemy.

**Yeomen of the Guard.** See *Beefeaters*.

**Yeovil** (yó'vil), a municipal borough of England, in Somerset, on the river Yeo or Ivel, 40 miles south of Bristol. It has a fine cruciform church dating from the fifteenth century, and a

noted for its manufacture of gloves. Pop. 13,760.

**Yerkes Observatory**, an institution donated by Charles T. Yerkes, a capitalist of Chicago, to Chicago University. It is located at Williams Bay, Wisconsin, 75 miles above Chicago, and is furnished with a 40-inch lens telescope, one of the largest in the world. It is thoroughly equipped with other astronomical instruments.

**Yesso** (yē'sō), Yezo, or Jesso (officially called Hokkaido), the most northerly of the larger Japan islands, has an area of about 38,300 sq. miles, and a pop. (1904) of 843,717, including about 18,000 Ainu, a docile aboriginal race. The island is mountainous and volcanic, and is rich in minerals, including coal, gold, and silver. Matsmai and Hakodadi (which see) are the chief towns.

**Yew** (ā), an evergreen tree of the genus *Taxus*, nat. order Taxaceae. The common yew is *T. baccata*, indigenous in most parts of Europe. It is a handsome tree, growing to a height of from 30 to 40 feet, with numerous spreading branches, forming a dense head of foliage. Its trunk is thick, and has been known to attain a circumference of 56 feet. Its fruit is a red berry with green seeds. It used to be frequently planted in churchyards, and its tough elastic wood was extensively used in the manufacture of bows. In our own days, on account of the durability of the timber, and of its hard, compact, close grain, it is much used by cabinet-makers and turners. There are several varieties of it, the Irish yew, which has a more



Yew (*Taxus baccata*).

upright growth than the common yew, being esteemed the finest. The American yew (*T. baccata Canadensis*) is a low prostrate shrub, never forming an erect trunk. It is found in Canada and the more northern of the United States, and is commonly called *ground-hemlock*.

**Yezd** (yezd), a city of Persia, province of Farsistan, in an oasis in a sandy plain 190 miles southeast of Isfahan. It is noted for its velvet and other silk manufactures, and contains about 4000 fire worshippers. Pop. estimated at 50,000.

**Ygdrasil**, YODRASILL (ig'dra-sill), in Scandinavian mythology, the giant ash-tree spread over the whole world, the branches of which reach above the heavens, the roots of which reach down to the under world. Ygdrasil typifies existence.

**Yiddish** (yid'ish), JUDISH or JUDMO-GERMAN, jargon spoken by the Jews in Russia and Central Europe and carried by immigrants to America. It is a High German with a large admixture of Hebrew and other languages. It is spoken by over six million people and is the medium of a considerable literature, some of it dating from the 16th century.

**Yoga** (yō'ga; union), in Hindu philosophy, one of the six Darśanas or schools of Brahmanical philosophy, that of Patanjali, the essence of which is meditation. Theoretically at least its devotees can acquire entire command over elementary matter by certain ascetic practices, such as long-continued suppression of the breath, and by endeavoring to unite themselves with the vital spirit which pervades all nature. When the mystical union is effected, the disciple (Yogi) can, according to the belief, traverse all space, become invisible, know the past, present and future.

**Yokohama** (yō-kō-hā'ma), the most important of the Japanese ports from its proximity to Tokio, the capital of the empire, with which it is connected by a railway 18 miles in length. The foreign settlement consists of well-constructed streets with business establishments. The harbor, a part of the bay of Tokio, is good and commodious. Steamers from San Francisco, Vancouver Island, etc., call regularly. The population has grown rapidly within recent years, increasing from 70,019 in 1884 to 394,303 in 1909.

**Yonkers** (yong'kers), a city of Westchester county, New York, on the east bank of the Hudson River, adjoining the northern line of New York City. It is both a residential and manufacturing city, its industries including large carpet, elevator and hat manufactures, also sugar refineries, sash, door and metal-foil factories. The first settlement here was made about 1650. Pop. 88,000.

**Yonne** (yon), a department of Central France, traversed by the river Yonne, which is navigable throughout it. The soil is very fertile, producing large wheat crops, and the vines yield the finest red wines of Lower Burgundy, and the finest of white wines, the well-known Chablis. Auxerre is the capital. Area 2290 sq. miles. Pop. (1910) 332,277.



**York** (yôrk), or **YORKSHIRE**, the largest county of England, faces the North Sea on the N. E. and extends from the Tees river on the N. to the estuary of the Humber in the S.; area 6067 sq. miles. It is divided into the North, South, and West Ridings, each riding having a separate lord-lieutenant. The surface is much diversified, there being a large central valley with a mountainous district in the N. E. and in the E. an elevated chalky district called the Weald. The county contains some of the most fertile tracts in the kingdom, while there are areas of barren moor. The central valley is drained chiefly by the Ouse and its tributaries. The West Riding contains some of the richest coal mines in the Kingdom and there are large deposits of iron in the N. There are a number of large manufacturing centers, including Leeds, Sheffield, Bradford, Huddersfield and others. Hull and York are other notable cities, York being the capital. Pop. (1911) 3,980,451.

**York** (British, *Caer Eborac*, or *Eborac*; Latin, *Eboracum*), a cathedral city and archbishop's see, the capital of Yorkshire, England, 188 miles north of London by rail, is situated at the confluence of the Foss and the Ouse. The city proper, embracing a circuit of nearly 3 miles, was inclosed by walls, restored by Edward I., of which the portions still remaining have been converted into promenades, commanding a prospect of the surrounding country. There are many quaint, old-fashioned houses in the narrow streets of its older portion. The great object of attraction, however, is the minster or cathedral, the finest in England, which dates from the seventh century, but did not begin to assume its present form till the twelfth century, and was not completed till 1472. It is built in the form of a Latin cross with choir, aisles, transepts, a central tower and two western towers; extreme length, 524 feet; breadth, 250; height of central tower, 213 feet. (See cut at *Decorated Style*.) York was the capital of Roman Britain. It was made an archiepiscopal see by Edwin of Northumbria in 624. It still ranks second theologically and politically among English cities, its archbishop having the title of Primate of England (see *Archbishop*), and its chief magistrate takes the title of lord-mayor. It was incorporated by Henry I., and the city boundaries were extended in 1884. The trade is local, and the industries unimportant. Pop. 82,297.

**York**, a city, capital of York Co., Nebraska, on a branch of the Big Blue River, 50 miles W. of Lincoln.

It is in a farming and stock-raising region, and manufactures flour and foundry products. Pop. 6235.

**York**, a city, capital of York Co., Pennsylvania, lies on Codorus Creek, a branch of the Susquehanna, 28 miles S. S. E. of Harrisburg. It is in a rich agricultural region and has a number of educational and charitable institutions. The industries are varied, including bridge and chain works, paper and pulp mills, foundries and machine shops, traction engines, water-wheels, farm implements, and various others. The Continental Congress met at this place in 1777-78 while Philadelphia was occupied by the British army. Pop. 55,000.

**York**, **HOUSE OF**, an English royal house, the rival of that of Lancaster. The House of York was united to the House of Lancaster when Henry VII married the eldest daughter of Edward IV. The emblem of the Yorkists was a white rose. See *England (History)*.

**York Peninsula**, in Queensland, Australia, the region lying on the east side of the Gulf of Carpentaria, and terminating at its north end in Cape York, separated from New Guinea by Torres Strait.

**Yorktown** (yôrk'toun), a village, capital of York Co., Virginia, on the right bank of York river, nearly 10 miles from its mouth and 36 miles N. N. W. of Norfolk. It was the scene of the surrender of Lord Cornwallis to General Washington, October 19, 1781. The surrender is commemorated by a monument. In the Civil war it was fortified by the Confederates, who, having been besieged by General McClellan, evacuated it May 4, 1862. Its population now numbers little over 100.

**Yoruba** (yô'rû-bâ), a country of West Africa, north of the Bight of Benin. It is peopled by a number of confederated tribes, and is now attached to the colony and protectorate of Lagos. Much of the country is fertile and well cultivated, and the inhabitants have made great progress in the industrial arts. They are chiefly pagans, but Mohammedanism has made way among them. Protestant and Roman Catholic missions have long been at work among them. Ibadan is the largest town.

**Yosemite Valley** (yô-sem'l-te), one of the greatest natural wonders of North America, is in Mariposa county, California, about 180 miles E. by S. of San Francisco and midway between the eastern and western bases of the Sierra Nevada. It is a narrow valley at an elevation of 3850 feet

## Yoshihito

above the sea, and is itself nearly level, about 6 miles in length, and varying in width from  $\frac{1}{2}$  mile to a mile. On each side rise enormous domes and almost vertical cliffs of granite, one of them, called the Half Dome, being 4737 feet higher than the river Merced at its base, while there are various others equally notable in aspect. Numerous waterfalls and cascades descend from prodigious heights, the chief being the Yosemite Falls, which drops nearly half a mile. The Bridal Veil Fall is also very picturesque. This valley forms part of the California Yosemite State Park, which is included in the larger Yosemite National Park.

**Yoshihito** (yō-shi-hs'itō), emperor or mikado of Japan, the son of Mutsuhito, born in 1879, proclaimed Crown Prince in 1889. He received a liberal education, and though extremely delicate as a child grew into robust manhood. On the death of Mutsuhito in 1912, Yoshihito succeeded to the throne.

**Youghal** (yū'al or yal), a seaport of Ireland, on the estuary of the Blackwater, county Cork, 18 miles east of Cork. It has manufactures of earthenware and bricks. Pop. 5393.

**Young** (yung), ARTHUR, a distinguished agricultural writer, born in 1741; died in 1820. He became a farmer, and made a series of agricultural tours in England, Ireland, and France, publishing accounts of them, and in 1793 he was appointed secretary to the newly-constituted Board of Agriculture. Of his many writings his *Travels in France*, published in 1792, is the most interesting.

**Young**, BIRGHAM, president of the Mormon Church, was born in Vermont in 1801; died in 1877. In 1831 he became a Mormon, and an active preacher of the Mormon doctrine. He was one of the twelve founders of Nauvoo, and after the murder of the prophet, Joseph Smith, and the flight of the Mormons from Nauvoo, Young became their leader on their long journey westward, was elected their president on their settling in Utah, and when this was made a territory he was appointed its governor by President Polk. In 1852 he announced that polygamy had been commanded in a special revelation to Joseph Smith, and it was accepted generally by the Mormons of Utah. Young was a man of great practical ability. Utah flourished under his rule, and he long withstood successfully the efforts of the United States government to establish its authority there.

**Young**, CHARLES AUGUSTUS, astronomer, born at Hanover, New Hampshire. Dec. 15. 1834; was gradu-

## Young

ated at Dartmouth College in 1853; was a captain in the Civil war, and afterwards held several professorships, becoming professor of astronomy at Princeton College in 1877. He made very important spectroscopic studies and discoveries in solar physics and chemistry. His principal work was *The Sun*. He died January 4, 1908.

**Young**, EDWARD, an English poet, was the son of a dean of Salisbury, and born in 1683. He was educated at Winchester and Oxford, and obtained in 1708 a law fellowship at All Souls. Patronised and pensioned by the profligate Duke of Wharton, he wrote some poems and a couple of plays, one of which, *The Revenge*, long kept possession of the stage. His first great literary success was his production of a series of satires, issued collectively in 1728 as *The Love of Fame, the Universal Passion*. In 1828 he took orders, was made a royal chaplain and rector of Welwyn, Herts, in 1830. Between 1742 and 1744 appeared the work by which chiefly he is remembered, the gloomy but striking *Night Thoughts*. He died in 1765.

**Young**, ELLA FLAGG, an American educator, born in Buffalo, January 15, 1845; was educated at the Chicago High School and Chicago Normal School, and received the degree of Doctor of Philosophy from the University of Chicago in 1900. She began teaching in 1862; was district superintendent of schools in Chicago, 1887-99; professor of education in the University of Chicago, 1899-1905; principal of the Chicago Normal School, 1905-09; superintendent of public schools of Chicago since 1900. She is the author of a number of works.

**Young**, JOHN RUSSELL, journalist, born at Downingtown, Pennsylvania, in 1841; died in 1899. He was a war correspondent of the *New York Tribune* in the Civil war; established the *Morning Post* in Philadelphia and the *Standard* in New York; was European correspondent of the *Herald*; went round the world with General Grant; was appointed minister to China; and in 1897 was made librarian of Congress.

**Young**, SAMUEL BALDWIN MARKS, an American soldier, born in Pittsburgh, Pa., 1840; served in Civil and Spanish-American wars; lieutenant-general, 1903.

**Young**, THOMAS, scientist, was born of a Quaker family at Milverton, in Somersetshire, England, in 1773. He qualified himself for the medical profession, but a fortune left him made him rather languid in his practice as a physician in London. In 1802 he became the colleague of Davy as pro-

essor of natural philosophy at the Royal Institution, having previously made the discovery of the interference of light, the result of researches which, completed by Fresnel, secured the triumph of the undulatory theory. In 1807 appeared his admirable *Lectures on Natural Philosophy*. In 1818 he was appointed secretary to the Board of Longitude, with the charge of supervising the *Nautical Almanack*. Young preceded Champollion in the discovery of the alphabetic character of certain of the Egyptian hieroglyphs. He was a man of universal accomplishments, adding to his scientific and mathematical attainments a knowledge of the classical and the principal modern and oriental languages. He died in 1829.

### Young Men's Christian Associations.

Among the first of these was that founded in London in 1844 by George Williams. The movement extended, and became one not only for the religious but for the general culture and social wellbeing of young men engaged in business. These associations became widely extended, there being in 1916 in the United States alone 700,000 members, with buildings and property valued at \$90,000,000. The European war opened a new field of work for them, and large sums of money were contributed to be used in their special line of activity for soldiers in camp and field.

**Youngstown** (yung's'toun), a city, capital of Mahoning Co., Ohio, on the Mahoning River, 68 miles southeast of Cleveland, in the vicinity of iron ore and coal beds. It contains a Federal building, various homes and hospitals, an opera house, library, etc. It is an important iron manufacturing town, having many large mills and foundries, also manufactures of lumber, cars, roofing materials, powder, motor cars, etc. Pop. 79,066.

### Young Women's Christian

**Associations**, on the same basis as the young men's, were founded in 1857 by the Dowager-Lady Kinnaird, and now exist in various cities of Britain and America. The work of the association among women is fourfold: physical, social, intellectual, and spiritual.

**Ypres** (è-pr; Flemish, *Yperen*), Belgium, a town in the province of West Flanders, in a plain, on both sides of the Yperlee. 28 miles s. s. w. of Bruges, 53 miles by rail. It was almost entirely destroyed by the successive bombardments to which it was subjected in the European war. The first battle of

Ypres took place in October, 1914, when Britain's small professional army with great bravery stopped the German forces in their march on the channel ports and drove them out of the town, which had first been occupied by the enemy on October 3. In the second battle, in the spring of 1915, the Canadians, who had taken the heights before the town, were compelled to retire into Ypres. It was in this battle that the Germans first introduced poison gas. During 1916 the Germans, from their positions on the heights, poured a steady stream of projectiles into the old town. Hardly a building was left standing, and even the beautiful Cloth Hall—a glorious relic of the 13th and 14th centuries, built in the form of an irregular trapezium surmounted by a square tower or belfry—was reduced to a heap of ruins.

In 1917 the third battle of Ypres was fought, with the British and Canadians on the offensive. The Germans were driven back and the famous Passchendaele Ridge and other important heights were gained by the Allied troops. The Canadians, under General Sir Arthur Currie, were given the honor of leading the assault, and gained a brilliant victory. The town of Ypres was full of memories for every Canadian, memories of great sacrifice and of many comrades laid to rest. The trenches which they took over on the ridge were the same trenches where, in the spring of 1915, the Germans had attacked them with poison gas. High officers who led them had played their part in lower ranks in the previous fight. It was of this third battle that Sir Douglas Haig, in his message to General Currie, said: 'I desire to congratulate you personally on the complete and important success with which your command of the Canadian Corps has been inaugurated. The two divisions you employed totally defeated four German divisions, whose losses are reliably estimated at more than double those suffered by the Canadian troops. The skill, bravery, and determination shown in the attack and in maintaining the positions won against repeated heavy counter attacks were in all respects admirable.'

The tide of battle surged back in 1918 in the desperate and reckless attempt of the Germans to reach Calais. The British forces relinquished the heights, but held fast at Ypres, as the French had done at Verdun and the Marne. (See *European War*.) In peace times the principal trade of the town was in cotton and laces. Jansen was bishop of Ypres and is buried in the crypt of the now ruined cathedral of St. Martin. It was formerly one of the most important manufacturing towns of Flanders, and in the

14th century had 200,000 inhabitants and employed 4000 looms. The population in 1813 was 17,000.

**Ypsilanti** (ip-si-lan'ti), a city of Washtenaw county, Michigan, on the Huron River, 29 miles w. by s. of Detroit. It is the seat of the Michigan State Normal School, and has manufactures of paper, cement, agricultural implements, veneers, flour, etc. Pop. 6230.

**Ypsilanti**, a distinguished Greek family prominent in the Greek movement for independence. **DEMETRIUS** was born in 1703; died in 1832. He distinguished himself so highly in the revolution of 1821 as to be made president of the Greek legislative council after the liberation from the Ottoman yoke.

**Ysaye** (t-sā'yē), **EUGENE**, a Belgian violinist, born at Liège in 1858; began to tour in 1878; and first visited the United States in 1894. He is justly regarded as one of the greatest living exponents of classical and virtuosic violin music. He was violin professor at the Brussels Conservatoire from 1886 to 1898 and was manager and conductor of the orchestral concerts.

**Yssel**, or **IJSSEL** (both i'sal), a river of the Netherlands, which leaves the Rhine near Arnhem, and receiving the Old Yssel from Rhenish Prussia, enters the Zuyder Zee after a course of 80 miles.

**Ysselmonde**, **IJSSELMONDE** (i'sal-mon-dē), an island of the Netherlands opposite the mouth of the Yssel.

**Ystad** (ü'stād), a seaport town of South Sweden, on the Baltic, 36 miles southeast of Malmö. It has a safe and spacious harbor, and among its industries is shipbuilding. Pop. 9862.

**Ystradylfodwg**, or **RHONDDA**, a township of South Wales, in Glamorganshire, comprising several villages, the inhabitants of which are chiefly engaged in the collieries. Pop. 152,798.

**Yttria** (it'ri-a), the protoxide of yttrium, a white powder, insoluble in water, but soluble in some acids. When ignited it glows with a pure white light.

**Yttrium** (it'ri-um), an earth metal, one of the elements, the basis of yttria; symbol Y, atomic weight 93. Its texture is scaly, and its color grayish-black.

**Yuan Shi-kai**, president of China, commissioner in Korea before the Japan-Chinese war, and after that war was made vice-president of the army board,

with the control of an army corps. He now became the leading power in modernizing the Chinese army, and by 1904 had a corps of many thousands of well-drilled and well-armed men. Also, as viceroy of Chili province, he was instrumental in introducing the modern system of education into the empire. At an earlier date he had become aware of the plans of the young emperor and his reformer associates to introduce radical reforms and seize the reins of power long held by the empress dowager. He informed her of her danger, in consequence of which she, with the support of the conservatives, made a palace prisoner of Kwang Sen, the emperor. Yuan gained high favor with the empress dowager by this act, but after her death, in 1908, Prince Chun, the regent, dismissed him from his post as Grand Councillor. A hasty flight probably saved his life. After the beginning of the revolution of 1911 Yuan was recalled by the regent and made premier, with dictatorial power, being asked to use every effort to save the Manchu dynasty. He showed great ability in dealing with the difficult situation, arranged an armistice with the revolutionists, but found it impossible to save the empire. The leaders of the revolutionary movement insisted on the dethronement of the child emperor and the establishment of a republic. Yuan was obliged to yield to this demand, and on the abdication of the imperial family in 1912 and the resignation of Sun Yet Sen, the provisional president, he accepted the presidency. An attempt by him to restore the empire at the close of 1915 failed and he continued to hold the presidency until his death in June, 1916.

**Yucatan** (yü-kā-tān'), a peninsula forming the southeastern extremity of Mexico. Before its conquest by the Spaniards it was the seat of a flourishing civilization. It is now for the most part a sparsely cultivated region, whose forests yield excellent timber, cabinet-woods and dye-woods, and which has recently been productive of great quantities of sisal or so called Yucatan hemp. Yucatan is rich in architectural remains of its ancient inhabitants, temples, pyramids, etc., the work of the civilized Mayas. The most imposing of these ruins are those at Uxmal, Labwa, Loltun, and Chichen-itza. Five-sixths of the inhabitants are Indians, preserving the speech of their ancestors, whom the Spaniards dispossessed. In 1861 the peninsula, which since 1824 had formed one state in the Mexican Confederation, was divided into two: Yucatan, area 29,560 square miles, pop. 314,087, capital Merida; and Campeachy, area



18,100 square miles, pop. 84,281, capital Campeachy.

**Yucca** (yuk'a), a genus of American plants, nat. order Liliaceæ.

The species are handsome plants, with white flowers, extremely elegant, but destitute of odor. *Y. gloriosa*, or common Adam's needle, is much prized on account of its panicle of elegant flowers, which attain a height of 10 or 12 feet. It yields a fiber well adapted for paper-making. *Y. filamentosa*, the silk grass, which has panicles of pendulous, cream-colored flowers, is also acclimatized as a garden plant, blossoming in the autumn.



*Yucca gloriosa.*

**Yukon** (yô'kon), one of the largest rivers of America, rises in Canada about lat. 57° 45' N., lon. 130° 45' W., pursues a generally westward course, of which the length is estimated at 2200 miles, the greater portion in Alaska, and enters the Pacific Ocean by several mouths. For three-fourths of its course it is navigable by steamers, and is a channel of supply for the gold regions of the Klondike and parts of interior Alaska.

**Yukon**, a territory of northwest Canada, north of British Columbia, adjoining the territory of Alaska; area 207,076 sq. miles; area lake surface 415,280 acres, population in 1901, 27,219; in 1911, 8512. It lies in the basin of the Yukon River and is largely mountainous. It is traversed by the Lewis, Pelly, White, Stewart and Klondike rivers. There are 142 miles of railways. The gold of Klondike valley gives the territory its chief importance, though copper and coal are also mined. The gold produced from 1897 to 1914 amounted to \$175,000,000. The territory is governed by commissioner and

ten members of a Legislative Council. Dawson City is its chief city of importance; Whitehouse ranks next, situated as it is at the head of navigation on the Yukon River.

**Yule** (yûl), the old English and Scandinavian name for Christmas, still to some extent in use, as in the term *yule-log*.

**Yunnan** (yun-nan'), the most south-westerly province of China, is bounded on the south by Annam, Siam, and Burmah, and on the west by Burmah. It is extremely rich in minerals, especially iron and copper, containing also many varieties of precious stones. At least a third of the cultivated land is said to be under the poppy. The inhabitants are for the most part Chinese; but there is a large number of non-Chinese Mohammedans (called by the Burmese Panthays). In 1869 the Mohammedans rose in rebellion against the Chinese government, and succeeded in establishing an independent government, but it lasted only three or four years. By the convention of Chefoo, in 1876, the establishment of commercial relations between British subjects and Yunnan was conceded by the Chinese government. Estimated area, 146,500 square miles; estimated pop. 12,000,000.—YUNNAN, the capital, is situated in the southeast of the province, and is a busy and prosperous town. Pop. (1907) 45,000.

**Yvetot** (èv-tô), a town of France, 24 miles northwest of Rouen. From the fifteenth to the middle of the sixteenth century the lords of Yvetot bore the title of *king*, and their lands were exempt from service to the French crown; hence Béranger's famous song, *Le roi d'Yvetot*. Pop. (1906) 6214.

**Yvon** (è-von), ADOLPHE, painter, was born at Echeviller, France, in 1817. He studied art with Paul Delaroche. In 1843 he visited Russia, and from there sent pictures to the Salons of 1847-48. He was successful in portraits and battle scenes. He received the grand medal of honor in 1857; also in 1867. His pictures are full of movement, and the painting sober and straightforward, free from affectation. Died September 11, 1893.

# Z

**Z**, the last letter of the English alphabet, is a sibilant consonant, and is merely a vocal or sonant *s*, having precisely the same sound that *s* has in *wise*, *ease*, *please*, etc. (See *S*.) The words in modern English, which begin with *z* are all derived from other languages, mostly from the Greek. When not initial, however, we often find it representing an older *s* in genuine English words, as in *blaze*, *freeze*, *gaze*, *graze*, etc.

**Zaandam** (zān-dām'), or SAARDAM, a town in the province of North Holland, 3 miles northwest of Amsterdam. It is noted chiefly as the place where in 1697 Peter the Great worked for a short time as a ship carpenter. Pop. (1913) 26,172.

**Zabern** (tsā'bērn); French, *Saverne*), a town of Germany, in Alsace, at the foot of the Vosges Mountains, and on the Rhine and Marne Canal. Pop. 8499.

**Zacatecas** (sā-kā-tā'kās), a state of Mexico, belonging to the central tableland, and bounded by the states of Aguas-Calientes, Jalisco, Durango, Coahuila, Nuevo-Leon, and San Luis Potosi. It is very rich in gold and silver, which are extensively mined. Area, 24,757 square miles. Pop. 462,190. —ZACATECAS, the capital, 340 miles northwest of Mexico, is the center of one of the oldest and most productive silver-mining districts in the republic. Pop. (1910) 25,900.

**Zacaton** (zak'a-ton), a grass of wide growth in America, which is recommended by the U. S. Department of Agriculture for the manufacture of paper, to which it seems well adapted.

**Zaffre** (za'fer), an impure oxide of cobalt, used in painting.

**Zagazig** (zā-gā-zēg'), the capital of the Egyptian province of Sharkiyeh, at the junction of the railways from Cairo, Suez, Alexandria, and Damietta, and on the fresh-water canal, 6 miles from Tel-el-Kebir, the scene of Lord Wolseley's victory over Arabi, September, 1882. Pop. 34,900.

**Zaire.** See *Congo*.

**Zambesi** (zam-bā'zē), the most important river in Southeastern Africa, and the largest flowing into the Indian Ocean, has its source in several streams uniting in the far interior. It flows first southeast and then northeast, then curves again to the southeast, and reaches the Indian Ocean by several mouths in the Mozambique Channel opposite Madagascar. The delta of the Zambesi covers an area of about 25,000 square miles, and commences about 90 miles from the coast, a little below the confluence of the main stream with the Shire. The course of the whole river is about 1400 miles, and it drains an area of 600,000 square miles. Its course as a whole is through fertile valleys and wooded plains; but the navigation is interrupted by rapids and cataracts, among the latter being the Victoria Falls, which are among the grandest in the world. The valley of the Zambesi is capable of immense development in the way of trade. The Portuguese government have long exercised sway for three hundred miles from the mouths of the river, and by the international arrangement of 1890 the river from the coast to the confluence of the Shire is recognized as being in Portuguese territory; west of that point it forms the boundary between British and Portuguese territory as far west as Zumbo, 450 miles from the sea; farther west it passes through territory under British influence, its early course being, however, in Portuguese territory. The Zambesi and its affluents are now free to the flags of all nations.

**Zamia** (zā'mi-a), a genus of plants, nat. order Cycadaceæ. The species are found in tropical America, at the Cape of Good Hope, and in Australia, and partly resemble palms, partly tree-ferns. *Kaffir-bread* is a common name for the genus in South Africa, where the central part of the stem pith of *Z. Caffre* is formed into cakes, baked and eaten by the natives.

**Zamora** (thá-mó'rá), a city in Spain, capital of the province of the same name, 182 miles northwest of Madrid, on the right bank of the Douro. Pop. 16,283.

**Zanesville** (zánz'vīl), the county town of Muskingum Co., Ohio, situated on the Muskingum River 142 miles south of Cleveland. Its notable buildings include the court-house, Athenaeum, and the Soldiers' and Sailors' Memorial Hall. It is in a coal and iron country and is largely engaged in manufacture, having three large encaustic and mosaic tile works, woolen, cotton, and hosiery factories, large tube works, glass works, railroad shops, etc. It is an active trade center of a large agricultural district. Pop. 28,026.

**Zangwill** (zang'wīl), ISRAEL, novelist, born of a Jewish family in London in 1864. He was graduated from London University, and became a journalist. He is widely known for his tales of Jewish life, *Children of the Ghetto*, *Ghetto Tragedies*, and *The King of Schnorrers*. He has also written *The Master*, *Without Prejudice*, etc.—His brother LOUIS (born 1869), is the author of *A Drama in Dutch*, *The World and a Man*, etc.

**Zante** (zán'te; ancient, *Zacynthus*), one of the Ionian Islands, is 20 miles long, and about 12 miles broad; area, 277 square miles. The greater part of the interior consists of a fertile and productive plain, almost covered with the dwarf grape which produces the so-called currants; also olives, almonds, oranges, and wine. The staple export is currants. Destructive earthquakes, causing great loss of life and property, occurred in February, March, and April, 1893. Pop. 46,032. ZANTE, the capital, is a considerable seaport on its east side. Pop. 14,650.

**Zanzibar** (zán-si-bār'), a sultanate of East Africa, which formerly comprised the whole coast between Magdishu (Magadoxo), about lat. 2° N., and Cape Delgado, lat. 10° 42' S., with the four islands of Zanzibar, Pemba, Lamn, and Mafia. The continental part of the sultanate has recently become part of British East Africa and German East Africa; while the island and town of Zanzibar, and the island of Pemba, are entirely under British protection. The island (area, 600 sq. miles) is very fertile and well cultivated, being especially suited for the cultivation of cloves, sugar, coffee, cocoa, and various spices, of which there is a considerable export. The population (200,000) is extremely heterogeneous, including Europeans, Arabs, half-

caste Portuguese from the Malabar coast of India, and the Suahilis from the mainland.—ZANZIBAR, the chief town, on the west side of the island, is the center of trade for the eastern seaboard of Africa, and of missionary and exploring work of the interior. At the instance of the British government the slave trade has been abolished and slavery restricted in Zanzibar. Pop. about 35,000.

**Zara** (zā'rá), an Austrian seaport, capital of Dalmatia, lies on the Adriatic, 130 miles southeast of Trieste. It is an old town, with interesting mediæval relics. Its chief industry is the preparation of the well-known liqueur maraschino. Pop. 32,551.

**Zarathustra**. See *Zoroaster*.

**Zarskoje-Selo**. See *Tsarskoye-selo*.

**Zea** (zē'a; ancient *Oeos*), one of the Cyclades, in the Aegean Sea, 14 miles from the coast of Attica; 13 miles long, and 8 broad. It is fertile, producing fruit, wine, honey, and valonia. Pop. 5,19, most of whom belong to Zea, the capital.

**Zealand** (zē'land), or SEELAND, the largest of the Danish islands, separated from Sweden by the Sound and from Fünen by the Great Belt—length, 81 miles, breadth, 65. It produces large crops of corn, and has excellent pasture. It contains the capital of Denmark, Copenhagen.

**Zebra** (zē'bra), the *Equus* or *Asinus zebra*, a quadruped of Southern Africa, nearly as large as a horse, white, striped with numerous brownish-black bands on the head, trunk, and legs, except on the belly and inside of the thighs. The zebra is extremely difficult to approach, from its watchful habits and great swiftness of foot. Only in a few instances has it been domesticated. The name has been sometimes applied to the now extinct quagga and the dauw or Burchell's zebra; but they differ from the zebra in having no stripes on the lower limbs, while those on the body are not so black as the true zebra's. See *Dauw*, *Quagga*.

**Zebu** (zē'bū), a ruminant of the ox tribe, the *Taurus indicus* or *Bos indicus*, called also Brahman bull. This quadruped differs from the common ox in having one, or more rarely two, humps of fat on the shoulders, and in having eighteen caudal vertebrae instead of twenty-one. It is found extensively in India, and also in China, Japan, and Africa. Zebras are used as beasts of draught and burden, and occasionally for

riding. Their flesh is eaten as an article of food, especially the hump, which is esteemed a great delicacy.



Zebu (*Taurus Indicus*).

**Zebu.** See *Cebu*.

**Zebulun** (zeb'û-iun), the tenth son of Jacob, and gave his name to one of the twelve tribes of Israel, and to a region of Palestine. At the first census the tribe numbered 57,400, and 60,500 at the second. The territory of the tribe lay in the fertile hilly country to the north of the plain of Jezreel, and included Nazareth.

**Zechariah** (zek-a-ri'â), or ZACHARIAH, the eleventh of the minor prophets, is supposed to have been born in Babylon, and to have been in the first detachment of the exiles who returned to Jerusalem under Zerubbabel and Joshua. He began to prophesy in the second year of Darius Hystaspes, and with his senior contemporary, the prophet Haggai, contributed powerfully by his appeals to the rebuilding of the temple (Ezra, vi, 14). Chapters i-viii of the prophecies of Zechariah, are generally admitted to be his composition. But the two other sections of the book into which critics and commentators have divided it, chapters ix-xi and xii-xiii, have been ascribed by many to a pre-exilic author, partly because both what is said and is not said in them is regarded as irreconcilable with a post-exilic one.

**Zedekiah** (zed-e-ki'â), the last king of Judah of the line of David. When he was twenty-one years of age Nebuchadnezzar appointed him to succeed his nephew Jehoiachin (whom he carried to Babylon) as king of Judah. He took an oath of allegiance to Nebuchadnezzar, which he afterwards broke by entering into an alliance with Egypt. His conduct in so doing was denounced by the prophet Jeremiah, who, as well as Ezekiel, then in Chaldean, predicted the approaching fall of Jerusalem, which was besieged by Nebuchadnezzar and taken, B.C. 588. Zedekiah, whose sons were killed in his presence, had his eyes

put out, and was carried to Babylon, which city was probably the place of his death.

**Zedoary** (zed'ô-a-ri; *Curcuma Zedoaria*), a plant of the order Zingiberaceæ, distinguished, like ginger, for the stimulating and aromatic properties of the root. It is a native of India and China. The roots of several other species are sold under the same name.

**Zeebrugge** (zê-brug), a port in Belgium which became of great importance during the European war, when it became a base for submarines during the German occupation of Belgium. In April, 1918, it was the scene of a daring raid undertaken by British naval forces, with the co-operation of French destroyers. Six obsolete cruisers, filled with concrete, were conveyed under smoke curtains and sunk or blown up at the entrance of the channel leading to the submarine basin. The raid was undertaken in conjunction with one on Ostend, also in German hands, and here two block ships were run ashore and blown up.

**Zeeland** (zê'land), ZEALAND, or SEELAND, the most westerly province of Holland, has the greater part of its surface below the sea-level, and protected by dikes. The soil is fertile, producing rich crops of wheat, flax, and hemp, and much dairy produce is exported. The capital is Middelburg. Area, 690 square miles. Pop. 227,292.

**Zemindar** (sem-in-dâr'), in India, the title of a class of officials created under the Mogul government of India. They have been regarded, first, as district governors; second, as landed proprietors; and third, as farmers or collectors of the government revenue on land. At the present day, in Bengal, the zemindar has all the rights of a British landed proprietor, subject to the payment of the land-tax, and also to a certain ill-defined tenant-right on the part of tenants who have long held possession of their farms.

**Zenana** (ze-na'na), the name given to the portion of a house reserved exclusively for the females belonging to a family of good caste in India.

**Zend**, an ancient Iranian language, in which are composed the sacred writings of the Zoroastrians. It is a member of the Aryan family of languages, and very closely allied to Sanskrit. See next article.

**Zend-Avesta** (zend-a-vesta), the collective name for the sacred writings of the Guebers or Parsees, ascribed to Zoroaster, and revered as a bible, prayer-book, and sole rule of faith and practice. It consists of several



divisions, of which the oldest is written in the primitive Zend language.

**Zenger** (zeng'er), JOHN PETER (1680-1746), an American newspaper publisher who acquired fame by reason of his attacks on William Crosby (q. v.), governor of New York, and his subsequent trial for libel in 1735. He was ably defended by Andrew Hamilton (q. v.), of Philadelphia, and acquitted, the outcome establishing the liberty of the press. He was a Palatine orphan, who had been bound out to William Bradford to learn the trade of printing. His paper was called the *New York Weekly Journal*.

**Zenith** (sen'ith), the vertical point of the heavens at any place, that is, the point right above a spectator's head, and from which a line drawn perpendicular to the plane of the horizon would, if produced, pass through the earth's center, supposing the earth a perfect sphere. Each point on the surface of the earth has therefore its corresponding zenith. The opposite pole of the celestial horizon is termed *nadir* (see *Nadir*). The zenith distance of a heavenly body is the arc intercepted between the body and the zenith, being the same as the co-altitude of the body.

**Zeno** (zē'nō), emperor of the Eastern Empire from 474 to 491 A.D. He is represented as depraved and incapable. One of the chief events of his reign, which was full of vicissitudes, was the permission given by him to Theodoric to dethrone Odoacer, which led to the establishment of the Ostrogothic kingdom in Italy.

**Zeno**, or **Critium**, in Cyprus, where he was born, founder of the Stoic school of philosophy, flourished in the first half of the third century B.C. Settling in Athens he attached himself to various philosophical sects in succession, until he instituted a doctrine of his own. He taught in the Stoa, a porch adorned with the pictures of Polygnatus, whence his followers were called Stoics, and were sometimes designated 'disciples of the porch.' His writings are all lost. In his ethical system the nature of moral obligation was recognized as unconditional, virtue as the only good, and vice, not pain, as the only evil. Developed by his successors, Stoicism became the creed of the noblest of the Romans until Christianity was generally accepted. (See *Stoics*.) The date of his death is uncertain.

**Zeno**, of **ELEA**, an early Greek philosopher, is supposed to have been born about the beginning of the fifth century B.C. He taught philosophy at Athens, and Pericles is said to have been

one of his pupils. He was a favorite disciple of Parmenides, and is introduced as discussing philosophy with his master in Plato's dialogue of that name. He sought to recommend Parmenides's doctrine of the one by controverting the popular belief in the existence of the many.

**Zenobia** (ze-nō'bi-a), Queen of Palmyra, was the wife of its king Odenathus, and accompanied him both in war and in chase. Gallienus, in return for his services, acknowledged Odenathus as emperor, and when her husband was murdered, 267 A.D., she assumed the sovereignty, conquered Egypt, and called herself Queen of the East. Her ambition provoked the emperor Anreliau to make war on her, and after a stubborn resistance she fell into his power (273 A.D.) and was obliged to grace his triumph. She was allowed to pass the remainder of her life as a Roman matron. Zenobia was a woman of great courage, beauty, and linguistic accomplishments, and her studies were directed by Longinus (which see).

**Zeolite** (zē'ō-lit), a generic name of a number of minerals which fuse under the blowpipe. They are hydrated double silicates, of which the principal bases are aluminum and calcium.

**Zephaniah** (zef-a-ni'a), the name of one of the books of the Bible, the work of the ninth in order of the minor prophets, who lived in the reign of Josiah, and who probably uttered his prophecies some time between 630 and 624 B.C. The subjects of his prophecy are the temporary desolation of Judea, the destruction of the Philistines, Moabites, Ammonites, Assyrians, etc., and the promise that God will effect the restoration and felicity of a righteous remnant.

**Zephyr**, **ZEPHYRUS** (zef'er, zef'i-rus), the west wind and poetically, any soft, mild, gentle breeze. The poets personify Zephyrus, and make him the most mild and gentle of all the sylvan deities.

**Zeppelin** (tsep'pe-lin), **FERRDINAND COUNT**, aviator, was born at Constance, Baden, in 1838. He entered the army, was an officer of cavalry in the Franco-German war, and afterwards rose to the rank of lieutenant-general. He subsequently became an enthusiast in aviation, building dirigible, power-driven air-shops, and making many experimental flights. His first ascent was made at Bern in 1892, and in 1900 he was able to remain an hour in the air. In subsequent years he built a succession of very

large cigar-shaped balloons and made long journeys, but met with serious disasters, several of his great airships being destroyed. A fund contributed largely by the German nation enabled Count Zeppelin to continue his experiments, and he threw himself enthusiastically into the development of his ideas. The results were happy; he produced a number of huge dirigibles which were capable of sustained flights. When the war broke out in 1914 the imagination of the German people was fired by the prospect of a fleet of Zeppelin airships hurling death and destruction upon the enemy. The war-Zeppelin became an actuality. It was armed and carried bombs, but proved inadequate to cope with the anti-aircraft guns and the speedy seaplanes and aeroplanes. Super-Zeppelins were constructed on models prepared by the count a short time before he died. One of these, the L 33, fell into the hands of the British in the fall of 1916 and the wreck covered over an acre of ground. It was 680 feet long, displaced 50 tons weight of air, contained two million cubic feet of gas, and is said to have cost \$1,750,000. The Zeppelin had been the vessel destined by the Germans to strike terror to the heart of England, but the perfecting of the anti-aircraft gun and the speedy armored aeroplane destroyed the effectiveness of the huge Zeppelins. Subsequent German air raids on Great Britain were carried out by the heavier-than-air fliers, which presented less of a target for the gunners on land and in the air. As a weapon of aggressive warfare the Zeppelins proved unsatisfactory. The capture and destruction of many of these airships was a severe blow to Count Zeppelin and the German people, who had placed the most extraordinary hopes in them. In 1863 Ferdinand Zeppelin visited the United States and fought with the Union troops in the Civil war. St. Paul, Minn., claims the distinction of being the town where young Zeppelin made his first ascent in a balloon. Count Zeppelin died March 8, 1917.

**Zerafshan** (zer-af-shan'), a river in Central Asia, which flows westward past Samarkand, and becomes lost in the neighborhood of the Amoo-Daria, west of Bokhara. Its length is from 400 to 500 miles.

**Zerbst** (tserpst), a town in the German duchy of Anhalt, on the Nuthe, 21 miles southeast of Magdeburg, is the seat of various manufactures; iron-founding is carried on; and there are several breweries. Pop. 17,095.

**Zerda** (zer'da), the fennec (q. v.).

**Zerduht.** See *Zoroaster*.

**Zermatl** (zer-mät'), a village famous as a tourist center, in the canton of Valais, Switzerland, at the foot of the Matterhorn. Elevation 5315 feet.

**Zero** (zē'rō), in physics, any convenient point with reference to which quantitatively estimable phenomena of the same kind are compared; such as the point of a graduated instrument at which its scale commences; the neutral point between any ascending and descending scale or series, generally represented by the mark 0. In thermometers the zero of the Centigrade and Réaumur scales is the freezing point of water; in Fahrenheit's scale, 32° below the freezing point of water. (See *Thermometer*.) Absolute zero is -273° C., or 273° C. below the freezing point of water, at which temperature any given body is supposed to contain no heat.

**Zerrahn** (tser-rän'), CARL, German-American musical conductor, born at Malchow, Mecklenburg, in 1826. He settled in Boston in 1848, and was conductor of the Handel and Haydn Society from 1854 to 1895. During this time Boston owed much of its good music to his efforts and enthusiasm.

**Zetland.** See *Shetland*.

**Zeuglodon** (zū'glo-don), an extinct genus of marine mammals, regarded by Huxley as intermediate between the true cetaceans and the carnivorous seals. They belong to the Eocene and Miocene, and *Z. cetoides* of the Middle Eocene of the United States attained a length of 70 feet.

**Zeulenroda** (tsol-len-rō'da), a town of Central Germany, principality of Reuss-Greiz. Pop. 9419.

**Zeus** (zūs), in mythology, the supreme divinity among the Greeks; the ruler of the other gods; generally treated as the equivalent of the Roman Jupiter. He was the son of Cronus and Rhea, brother of Poseidon (Neptune) and Hera (Juno), the latter of whom was also his wife. He expelled his father and the dynasty of the Titans, successfully opposed the attacks of the giants and the conspiracies of the other gods, and became chief power in heaven and earth. See *Jupiter*.

**Zeuss** (tsols), JOHANN KASPAR, born in 1806; died in 1856; a native of Bavaria, may be said to have founded Celtic philology with the publication in 1853 of his great work, the *Grammatica Celtica*. In his later years he was a professor at the Bamberg Lyceum.

**Zeuxis** (suk'sis), a celebrated Greek painter, who flourished about 420-400 B.C., and latterly lived in Ephesus. He belonged to the Asiatic school of painting, the distinguishing characters of which were accurate imitation and the representation of physical beauty. One of his most famous works was a picture of *Helen*. He was a contemporary of the painter Parrhasius.

**Zibet**, *ZIBETH* (sib'et), *Viverra zibetha*, an animal of the same genus as the civet cat. It is found in Eastern Asia, and in some of the larger islands of the Indian Archipelago. It secretes an odoriferous substance which resembles that secreted by the civet. It is often tamed by the natives of the countries where it is found, and it inhabits their houses like a domestic cat. See *Civet*.

**Zif**, *ZIF*, the second month of the Jewish sacred year, extending from the new moon in May (or according to some rabbis in April) to that in June.

**Zilleh** (sè-le'; ancient *Zela*), a town of northeastern Asia Minor, 39 miles southwest of Tokat; with some manufactures, and an annual fair attended by from 40,000 to 50,000 persons. Pop. 20,000.

**Zimapan** (sè-má-pán'), a town of Mexico, state of Hidalgo, with gold, silver, and lead mines. Pop. (commune) 15,000.

**Zimmermann** (tsim'ér-mán), JOHANN GEORG, an eminent physician and miscellaneous writer, was born in 1728 at Brügg, in the Swiss canton of Bern. At the University of Göttingen he studied under and was befriended by Haller, and eventually was appointed public physician to his native town. He became famous in his profession, and published several works on miscellaneous subjects, with one on *Experience in Medicine*, which procured him the appointment of physician for Hanover to George III. The loss of his wife and other domestic calamities brought on an attack of hypochondria, from which a second marriage relieved him, and as a result of his recovery he produced his once celebrated treatise on *Solitude* (1784), by which out of his own country he is alone remembered. In 1786 he attended Frederick the Great in his last illness, about whom he published two works, one of them *Conversations with the King*, which involved him in painful controversy. Eventually he became mentally deranged, and died in 1795. His *Autobiography* was issued in 1791.

**Zinc**, a metal, frequently called *spelter* in commerce; chemical symbol Zn; atomic weight 65. It has a strong metallic luster and a bluish-white color. Its texture is lamellated and crystalline, and its specific gravity about 7. It is hard, being acted on by the file with difficulty, and its toughness is such as to require considerable force to break it when the mass is large. At low or high degrees of heat it is brittle, but between 250° and 300° F. it is both malleable and ductile, and may be rolled or hammered into sheets of considerable thinness and drawn into wire. Its malleability is considerably diminished by the impurities which the zinc of commerce contains. It fuses at 773° F., and when slowly cooled crystallizes in four- or six-sided prisms. Zinc undergoes little change by the action of air and moisture. When fused in open vessels it absorbs oxygen, and forms the white oxide called *flowers of zinc*. Heated strongly in air it takes fire and burns with a beautiful white light, forming oxide of zinc. Zinc is found in the United States; also Britain, Austria, Germany, Belgium, Italy, etc. It does not occur in the native state, but is obtained from its ores, which are chiefly the sulphide, or *zinc-blende*, and the carbonate, or *calamine*. The oxide of zinc (ZnO) is a fine white powder, insoluble in water, but very soluble in acids, which it neutralizes, being a powerful base of the same class as magnesia. It combines also with some of the alkalies. Several of the salts of zinc are employed in medicine and the arts; as the sulphate, which is used in calico printing, and in medicine as an astringent, a caustic, an emetic, and a tonic; the oxide and the carbonate, used as pigments, etc. Sheet-zinc is largely employed for lining water cisterns, baths, etc., for making spouts, pipes, for covering roofs, and several other architectural purposes. Plates of this metal are used as generators of electricity in voltaic batteries, etc.; they are also employed in the production of pictures, etc., in the style of woodcuts. (See *Zincography*.) Zinc is much employed in the manufacture of brass (see *Brass*) and other alloys, and in preparing galvanized iron. See *Galvanized Iron*.

**Zinc-blende**, native sulphide of zinc, consisting essentially of sulphur and zinc, but often containing a considerable proportion of iron. See *Zinc*.

**Zincography** (zing-kog'ra-fi), an art in its essential features similar to lithography, the stone

printing-surface of the latter being replaced by that of a plate of polished zinc. A form of this art called anastatic printing is described under *Anastatic*.

**Zinc-white** ( $ZnO$ ), oxide of zinc, a pigment now largely substituted for white-lead as being less liable to blacken on exposure; but it has not an equal covering power.

**Zingarelli** (dzen-ga-rel'le), NICCOLO ANTONIO, an Italian composer, born in 1752. After much success as a composer, both of operas and of sacred music, in 1804 he was appointed chapel-master of the Sistine chapel in Rome, and on refusing to compose a *Te Deum* on Napoleon I making his son king of Rome, he was arrested and taken to Paris, but was immediately liberated and pensioned by the emperor, who was a great admirer of his music. When he died in 1837 he was director of the Royal College of Music at Naples, and chapel-master of the Neapolitan Cathedral. Among his chief operas were *Montezuma* and *Romeo and Juliet*.

**Zingis Khan.** See *Genghis Khan*.

**Zinzendorf** (tsin'tsen-dorf), NICHOLAS LUDWIG, COUNT von, founder of the community of Moravian Brethren, or Herrnhuters, was born at Dresden in 1700. After studying law at Wittenberg, and several years of foreign travel, he resolved to settle down as a Christian land-owner among a pious tenantry, and while carrying out this intention he worked assiduously in cooperation with congenial friends at creating a revival of religion in the Lutheran Church. Having given an asylum on his estate to some persecuted religionists from Moravia, and built for them the village of Herrnhut, he settled among them, and by degrees established there a common worship, and a missionary and industrial organization based on the family, not on the monastic system. This association became known throughout the world as the Moravian Brethren (which see). To the extension of its influence Zinzendorf devoted his fortune and his energies, visiting in the course of his journeys England and America. He died in 1760.

**Zinziberaceæ** (zin-zi-ber-a'se-e), ZINGIBERACEÆ, a nat. order of plants, of which the genus *Zinziber* (ginger) is the type. The species are all tropical plants, or nearly so, the greater number inhabiting various parts of the East Indies. They are generally of great beauty through the development of their floral envelopes and the rich

colors of their bracts; but they are chiefly valued for the sake of the aromatic and stimulating properties of the rhizome or root, found in ginger, galangal, zedoary, cardamoms, etc.

**Zion** (zi'on), a mount or eminence in Jerusalem, the royal residence of David and his successors. See *Jerusalem*.

**Zionism** (zi'on-izm), a movement which has for its object the establishing of a Jewish state in Palestine. The founder of the modern 'back-to-Zion' movement was Dr. Theodore Herzl of Vienna, who in 1896 proposed that Palestine should be purchased from the Sultan of Turkey, and that a Jewish autonomous state should be founded under Turkish suzerainty. A Zionist congress was held at Basel, Switzerland, in August, 1897. The statement of aims adopted by 200 delegates, representing Jews of all nationalities, began: 'Zionism aims at establishing for the Jewish people a publicly recognized and legally secured home in Palestine.' Israel Zangwill, English author and playwright, took a prominent part in the Zionist movement. The conception of an autonomous Jewish state in Palestine met with little practical encouragement from the Turks. The capture of Jerusalem by the British in the fall of 1917 has given the Zionists new hope. Mr. Arthur J. Balfour, Foreign Minister of Great Britain, indorsed the principle of Zionism officially. He wrote: 'The government view with favor the establishment of Palestine as a national home for the Jewish people and will use their best endeavors to facilitate the achievement of this object.' The Federation of American Zionists comprises 140 societies. The headquarters are in New York.

**Zircon** (zer'kun:  $ZrO_2$ ,  $SiO_2$ ), a mineral, silicate of zirconium, originally found in Ceylon, and forming one of the gems, being met with either colorless or colored—red, brownish, green, etc. Hyacinth and jargon are varieties.

**Zirconia** (zer-kō'ni-a:  $ZrO_2$ ), the oxide of zircon, a hard white solid, 'sticks' of which are sometimes used in the oxyhydrogen flame instead of lime.

**Zirconium**, the metal contained in zircon and certain other rare minerals; symbol Zr; atomic weight 90. It appears to form a link between aluminum and silicon.

**Zirknitz** (tserk'nitz), or ČERAKNICA, a lake of Austria, in Carniola, 30 miles E. N. E. of Trieste, about 5 miles long and between 2 and 3 broad, without surface-outlet. It is remarkable for the occasional disappearance of its



waters for weeks and even months, during which its bottom is often covered with luxuriant herbage.

**Ziska** (zis'ka), **JOHN**, leader of the Hussites, was born about 1800 in Bohemia. He joined as a volunteer the Knights of the Teutonic Order, and fought against the Poles, as also with the Hungarians against the Turks. He is also said to have fought on the English side at the battle of Agincourt. He threw in his lot with the militant reformers who took arms after the martyrdom of Huss and Jerome in Bohemia, and became their leader; established himself at Mount Tabor, which he fortified, and where a town grew up occupied by his followers, who took the name of Taborites. He died in October, 1424.

**Zither, Zithern** (tsit'ér, tsit'érn), a stringed musical instrument consisting of a sounding-box pierced with a large circular sound-hole near the middle, the strings, to the number of thirty-one in the more perfect forms of the instrument, being made of steel, brass, catgut, and silk covered with fine silver or copper wire, and tuned by pegs at one end. Five of the strings are stretched over a fretted keyboard, and are used for playing the melody, the fingers of the left hand stopping the strings on the frets, the right-hand thumb armed with a metal ring striking the strings. These strings, which are tuned in fifths, have a chromatic range from C in the second space on the bass staff to D on the sixth ledger-line above the treble. All the remaining strings, called the accompanying strings, are struck by the first three fingers of the right hand, and being unstopped produce only the single tone to which they are tuned. The instrument is played on a table with the keyboard nearest the performer.

**Zittau** (tsit'ou), a town of Saxony, in the district of Bautzen, on the Mandau, 48 miles E. S. E. of Dresden, is the center of the manufacture of mixed cotton and woolen stuffs in Saxony; manufactures also woolens, cottons, trimmings, etc., and has bleach-fields, dye-works, machine-works, tile-works and potteries, royal institute of glass-painting, etc. There are a number of lignite mines worked in the vicinity. Pop. 34,706.

**Zlatoust** (zla-tō-ōst'), a town of Russia, government of Ufa, among the Ural Mountains, on the banks of the Ai, which supplies with motive power the crown iron-works. It has manufactures of swords, bayonets, firearms and ordnance. Pop. 20,973.

**Znaim** (tsnīm), a town of Moravia, on the Thaya, has manufactures of earthenware, leather, chocolate,

etc. Here in 1800, after the battle of Wagram, an armistice was concluded between Napoleon I and the Archduke Charles. Pop. 16,201.

**Zoan** (zō'an), the Tanis of the Greeks and Romans, an ancient Egyptian city, on the right bank of what was the Tanitic bank of the Nile, now only a canal. It was probably the residence of the Pharaoh of the Exodus, and consequently the scene of the 'marvelous things' that were done 'in the field of Zoan' (Ps. lxxxviii, 12). The temple was one of the grandest in Egypt. Its ruins, buried under mounds, have been explored, and one of the chief curiosities found in them is the Canopus stone, with a trilingual inscription, like that on the Rosetta stone, hieroglyphic, demotic, and Greek, recording a decree of Egyptian princes assembled at Canopus B.C. 254.

**Zoantharia** (zō-an-thā-ri-a), an order of the class Actinozoa, represented by the sea-anemones and by the great bulk of the coral-polyps.

**Zodiao** (zō'di-ak), an imaginary belt or zone in the heavens, extending about 9° on each side of the ecliptic. It is divided into twelve equal parts called signs. It was marked out by the ancients as distinct from the rest of the heavens because the apparent places of the sun, moon, and the planets known to them were always within it. This, however, is not true of all the planets. See *Ecliptic*.

**Zodiacal Light** (zō-dr'a-kal), in astronomy, a luminous tract of an elongated triangular figure, lying nearly on the ecliptic, its base being on the horizon, and its apex at varying altitudes, seen at certain seasons of the year either in the west after sunset or in the east before sunrise. It appears with greatest brilliance within the tropics, where it sometimes rivals the Milky Way. The most plausible hypothesis respecting it is that it consists of a continuous disc, probably of meteors revolving round the sun.

**Zoea** (zō-ē'a), the name given to an embryonic stage in the development of crustacea (which see).

**Zoetrope** (zō-ē-trōp), an optical toy, which exhibits pictures of objects as if endowed with life and activity. It is of interest as a forerunner of the principle perfected in the kinetoscope, which has completely replaced it. Each shows pictures of objects, giving different phases of attitudes and made to run together by passing before the eye in quick succession.

**Zoilus** (zō'il-las), a rhetorician of ancient Greece, born at Amphip

ells, chiefly remembered for the asperity of his criticisms on the poems of Homer. The time at which he lived is uncertain — probably the third century A.C. His name is used proverbially as that of a captious or snarling critic.

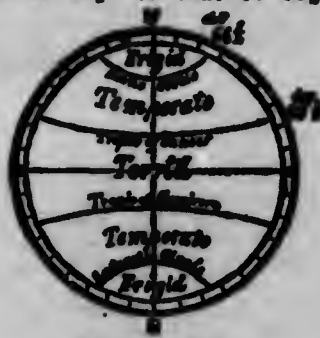
**Zola** (sô'la), EMILE, a French novelist, born in 1840, the son of an Italian engineer. After working for Paris publishers and writing for the press he attempted fiction with some success. He first became generally known by commencing, in 1871, the famous series of novels entitled *Les Rougon Macquart Histoire Naturelle d'une Famille sous le Second Empire*. They were based on a theory that it is the duty of the modern novelist to depict human life, in all grades of society, exactly as it is, omitting and softening nothing, however repulsive and disgusting. Zola carried out this theory so effectually that English translations of several of these novels are not allowed to be sold. One of the series, *L'Assommoir*, portraying the evil consequences of drunkenness, was dramatized by Charles Reade as 'Drink,' and became popular. Among his later and more attractive works are *Le roman expérimental* (1894); *Rome* (1896), and *Paris* (1898). In 1897 he condemned the course adopted by the government in the Dreyfus case and was tried for libel during his absence and sentenced to fine and imprisonment. He escaped his penalty by remaining abroad until after the revision of the Dreyfus trial. He died Sept. 29, 1902.

**Zollverein** (tsol'ver-in), the German customs union, the precursor of the present German Empire, founded in 1827, and afterwards greatly extended through the efforts of the government of Prussia. Its principal object was the establishment of a uniform rate of customs duties throughout the various states joining the union. The territories of the Zollverein now coincide with those of the German Empire, and include also Luxembourg.

**Zombor** (sôm'bôr), or SOMBOR, capital of the Hungarian county of Bács-Bodrog, on a canal which unites the Theiss and Danube, about 120 miles south of Budapest, is the center of the corn and cattle trade of an extensive district. Pop. 29,036.

**Zonaras** (son'a-ras), JOANNES, a Byzantine historian, flourished in the twelfth century. His chief work is the *Chronicon*, a history extending from the creation of the world to A.D. 1118. Of the events of his own time his account is meager; but his works contain valuable fragments from lost writings of earlier historians.

**Zone** (zôn), (1) in geography, one of the five great divisions of the earth, bounded by circles parallel to the equator, and named according to the temperature prevailing in each. The zones are: the *torrid zone*, extending from tropic to tropic, or  $23\frac{1}{2}^{\circ}$  north and  $23\frac{1}{2}^{\circ}$  south of the equator; two *temperate zones*, situated between the tropics and polar circles, or extending from the parallel of  $23\frac{1}{2}^{\circ}$  to that of  $66\frac{1}{2}^{\circ}$  north



Zones of the Earth.

and south, and therefore called the *north temperate* and *south temperate* zone respectively; and two *frigid zones*, situated between the polar circles and the north and south poles. (See *Climate*.) (2) In natural history, the name is given to any well-defined belt within which certain forms of plant or animal life are confined; as the different belts of vegetation which occur as we ascend mountains.

**Zooid** (zô'oid), in biology, an animal organism, not independently developed from a fertilized ovum, but derived from a preceding individual by the process either of fission or gemmation.

**Zoölatry** (zô-ol'a-tri), animal worship; adoration paid by man to any of the lower animals. This cult seems to have passed through three stages: (1) The animal was revered and propitiated as possessing a power greater than that of man. (2) The animal was regarded as an incarnation of some deity or spirit. (3) It was raised to the position of a tribal ancestor.

**Zoölogical Garden** (zô-ô-loj'i-kal), a public garden in which a collection of animals is kept. The gardens of the Zoölogical Society, Regent's Park, London (familarly termed 'the Zoo'), founded in 1828, are probably the finest of the kind in the world. They belong to the Zoölogical Society of London, which was founded in 1826. Of the other chief zoölogical gardens, the Jardin des Plantes in Paris is the oldest, having been founded in 1794. Gardens

of this kind form a popular resort in the larger American cities.

**Zoölogical Stations,** stations or centers which have of late years been established in various parts of the world for the study of zoölogy. The *Stazione Zoölogica* at Naples, founded mainly in Dohrn in 1872, is of an international character. Other institutions of the same kind on a smaller scale have been established in various parts of France, United States, Italy, Russia, etc.

**Zoölogy** (zō-o'-jī; Gr. *zōon*, an animal, and *logos*, discourse), that science which treats of the natural history of animals, or their structure, physiology, classification, habits, and distribution. The term 'natural history' has been frequently used as synonymous with zoölogy; but such a term is obviously of wider signification, and should be used to indicate the whole group of the natural sciences. Zoölogy is a branch of biological science, constituting, in fact, with its neighbor branch, botany, the science of biology. Its study comprehends such branches as the *morphology of animals*, or the science of form or structure, which again includes *comparative anatomy*, by which we investigate external and internal appearances, the positions and relations of organs and parts; the *development of animals*, which treats of the various stages leading from the embryonic to the mature state; the *physiology of animals*, which includes the study of the functions of nutrition, reproduction, and of the nervous system; *classification or taxonomy*, which assigns to the various individuals their proper place in the scale of life. A new department has been added in recent times, sometimes called *etiology*, which investigates the origin and descent of animals, or treats of the evolutionary aspect of zoölogical science. Various systems of classification have been framed by zoölogists. Linnaeus divided the animal kingdom into six classes, viz., Mammalia, Birds, Fishes, Amphibia, Insects, and Worms (Vermes). Cuvier proposed a more scientific arrangement. He divided the animal kingdom into four subkingdoms, viz., Vertebrata, Mollusca, Articulata and Radiata. Modern classifications have been based chiefly on morphological characters, with the addition of the study of cellular embryology, and the facts of heredity and adaptation. They have been very largely influenced by the theory of evolution, which has induced many naturalists to arrange animal forms as nearly as possible on the lines of descent from which they are believed to

have originated. Among those who have modified the classification of Cuvier may be noted Lamarck, Ehrenberg, Owen, Milne-Edwards, Von Siebold, Leuckart, Agassiz, Huxley, Haeckel, Müller, Dohrn, Ray Lankester and others. Professor Huxley recognizes the following subkingdoms: Vertebrata, Mollusca, Molluscoida, Annulosa, Annuloida, Coelenterata, Infusoria and Protozoa. Haeckel's classification gives the broad divisions—Vertebrata, Arthropoda, Echinodermata, Mollusca, Vermes, Zoöphyta and Protozoa. There are more recent systems, some of which are far more elaborate than those given. That of Ray Lankester may be instanced. These systems agree in dividing the animal kingdom into the subkingdoms of Protozoa (single-celled animals) and Metazoa (many-celled animals). The latter include Porifera (sponges), Coelenterata (polyps, medusae, etc.), Echinodermata (star-fish, sea-urchins, etc.), Arthropoda (crustaceans, insects, spiders, etc.), Mollusca (shellfish), and Vertebrata (fishes, batrachia, reptiles, birds and mammals).

**Zoöphyte** (zō-o'-fit; Gr. *zōon*, an animal, and *phyton*, a plant), the name given by Cuvier to any member of his sub-kingdom Radiata. It is now loosely applied to animals of extremely low organization which present many external resemblances to plants.

**Zoospore** (zō-ōs-pōr), a spore occurring in cryptogamic plants,

which, having cilia or long filiform moving processes projecting from its surface, moves spontaneously for a short time after being discharged from the spore-case of the parent plant.



Zoospore

**Zoorita** (thō - rē'ta), GERONIMO, a Spanish historian, born in Estramadura in 1512; died in 1581. He was made a member of the supreme council of Castile in 1543, was afterwards sent as an embassy to Germany, and in 1549 was appointed historiographer of the kingdom. His principal work, *Annals of the Crown of Aragon*, enjoys a high reputation.

**Zorilla** (zō-ril'la), a small mammal of South Africa (*Lotonyx zorrilla*), related to the badgers and the American skunks. Like the latter, it secretes a liquid having a very offensive odor, which it can discharge to a considerable distance. Its glossy fur is black in color, with white bands and spots.

**Zoroaster** (zō-rō-as'ter; Old Persian *Zarathustra*, later Per. *Zerdusht*), one of the great religious teachers of the East, the founder of what was for centuries the national religion of Persia, and is still adhered to by the Parsees. He has been represented by eminent authorities as purely mythical, but it seems more reasonable to believe that he was a real and historical personage. If this view be accepted, he was probably a native of the east of Iran, but there is great uncertainty as to the time in which he appeared as a religious teacher. He is supposed by some to have been a contemporary of Moses, by others his date is assigned to the tenth century before Christ. His doctrines are to be found in the Parsee scriptures called the *Zend-Avesta* (which see), and the *Gāthās*, which is the oldest part of that work, are declared to contain his authentic utterances. The fundamental idea of his doctrine was the existence, since the beginning, of a spirit of good, Ahurō Mazdaō (Ormuzd), and a spirit of evil, Angrō Mainyush (Ahriman). These two are in perpetual conflict, and the soul of man is the great object of the war. Ormuzd created man free, so that if he allows himself to fall under the sway of Ahriman he is held to be justly punishable. When he dies his good and evil deeds will be weighed against each other, and accordingly as the balance is struck will be sent to heaven or to hell. If they are exactly equal, the soul passes into an intermediate state, and remains there until the day of judgment. Ormuzd is to triumph ultimately, and then there will be one undivided kingdom of God in heaven and on earth. The religion of Zoroaster, when it became that of Iran, was expounded by a widely-spread priesthood, and these provided for it a ritual and ceremonial. Minutely elaborated laws for the purification of soul and body were laid down. They included a prohibition of the burning or the burying of the dead bodies of believers, which, by the Parsees in Bombay and elsewhere, are still left to be devoured by vultures. See *Fire-worship*, *Guebres*, *Pars. ex.*

**Zorrilla y Moral** (thō-rel'ya & mō-ral'), DON JOSE, a Spanish dramatist and poet, born at Valladolid in 1817. He was intended for the law, but devoted himself instead to literary pursuits. In 1841 he published *Songs of the Troubadours*; this was followed by a collection of *Historical Legends and Traditions*; several volumes of poems, comedies, etc., all of which were

very popular. He died in 1888.

**Zosimus** (zōs'i-mus), a Greek historian, who held an official post at Constantinople during the first half of the fifth century A.D. He was a pagan, and in his history of the then empire he severely criticised the Christian emperors, representing the substitution of Christianity for paganism as largely responsible for the decline of the empire.

**Zouaves** (swāvs), originally mercenaries belonging to a Kabyle tribe. The Zouaves in the pay of the Dey of Algiers were, when Algeria became a French possession, incorporated with the French army there, preserving their Arab dress. Ultimately the native element was eliminated, and the Zouaves became merely French soldiers in the picturesque Arab costume. As such they distinguished themselves in the Crimea and the Franco-Italian war of 1850.

**Zschokke** (tschok'kē), JOHANN HEINRICH DANIEL, a German author, born at Magdeburg in 1771; died in 1848. He settled in Switzerland, in which country he held an honored position in connection with education and public affairs, and with the press. His autobiography, several of his tales, and the 'Hours of Devotion' (*Stunden der Andacht*), have been translated into English.

**Zschopau** (tschō'pou), a town of Saxony, on a river of same name, 6 miles southeast of Chemnitz; has important manufactures of woollens, cottons, etc. Pop. 6748.

**Zucchero** (dzuk'e-rō), or ZUCCARO (dzuk'ā-rō), TADDEO and FEDERIGO, two brothers, Italian painters of the sixteenth century, were chiefly noted in their own country for their fresco-paintings. Federigo, the younger of the two, came to England in 1574, and received commissions to paint the portraits of high personages, among them those of Queen Elizabeth and Mary Queen of Scots. His portrait of the latter was engraved by Vertue.

**Zug** (tsōk), a central and the smallest undivided canton of Switzerland, bounded by Zürich, Schwyz, Lucerne, and Aargau; area, 92 square miles. The surface, mountainous in the southeast and south, where the Rossberg occupies the frontier, slopes more or less gradually north and west, till it becomes comparatively flat. The only lakes deserving the name are those of Zug and Egeri. The climate, rigorous in the mountainous districts, is mild on the lower south slopes. The chief exports are cattle, fruits, cider, and 'kirch-



wasser.' Area, 92 square miles; pop. 25,026.—Zug, the capital, stands on the north shore of the lake, is 12 miles north-east of Lucerne, with which and with Zurich it is connected by railway. Pop. 6508.—LAKE of Zug, or ZUGERSEE, chiefly in the canton of Zug, 9 miles long north to south, and in breadth from 3 miles to 1 mile. The shores are low in all directions except the south and southeast. In the former direction the Rigi and in the latter the Rosenberg rise in lofty precipices, presenting scenery of a grand description. The lake has a maximum depth of 650 feet. The fishing, principally pike and carp, is productive. Also famous for a peculiar kind of trout locally called *Röschli*.

**Zuider Zee** (zoi'dér-zá; or ZUYDER; South Sea), a gulf of the North Sea, on the coast of Holland; 80 miles long, 40 miles greatest breadth. It was formerly a lake, but was united with the German Ocean by inundations in the twelfth and thirteenth centuries. The islands Texel, Vlieland, Terschelling, Ameland, etc., separate it from the North Sea, with which it communicates by various channels, the principal one being between Helder and Texel. It is very shallow, and to avoid the difficulties of its navigation to Amsterdam the North Sea Canal was constructed. In 1914 the government lent its support to plans for the construction of a dike twenty miles wide across the mouth of the Zuyder Zee, thus reclaiming a large area of fertile land; estimated cost, \$80,000,000.

**Zuinglius.** See *Zwingli*.

**Zululand** (zú'lú-land), a South African territory northeast of Natal, now a British possession; area, 10,461 square miles. It is bounded by the Tugela, which divides it from Natal, by the Indian Ocean, by Tongaland, and on the northwest by the Transvaal. It has a coast line of 210 miles. The southern portion of the country consists chiefly of undulating plains, covered with grass, and thinly wooded. The coast region is flat, marshy, and very unhealthy. The inland region is healthy and rich in tropical productions, containing large forests. The Zulus are a warlike Kaffir tribe, and for a time were formidable to the colonists of Natal, possessing an organized army of considerable numbers. In 1879, under their king Cetewayo, they came into conflict with the British. (See *Cetewayo*.) At first the war was unfortunate for the British (a body of troops having been annihilated at Isandula), but in July, 1879, a general engagement

took place at Ulundi, where the power of the Zulus was quite crushed. The subsequent British reorganization of Zululand did not work successfully, and in 1882 Cetewayo was restored, a strip of country adjacent to Natal being constituted as a 'reserve.' Into this reserve Cetewayo fled in 1883, after being defeated by a hostile Zulu chief, Usibepu, and there he died in 1884. However, Cetewayo's son, Dinisulu, assisted by Transvaal Boers, vanquished Usibepu and drove him into the reserve. Ultimately the Boers took possession of a considerable portion of the country, while the remaining portion of Zululand, with the reserve, was annexed to British Natal in 1887. Zululand is now a province of the Natal state. Pop. estimated at 100,000.

**Zulus** (zú'lú), a branch of the great Bantu division of the African people which is notable for its physical and mental development of its members. They are organized as a pure democracy, their chiefs being elected and holding office during the pleasure of the people. They have a very complete though unwritten code of laws, and as a race are conspicuous for their morality and freedom from drunkenness and crime. See *Zululand*.

**Zumbo** (sum'bú), a town of South Africa, near the confluence of the Loangwa with the Zambesi; lat. 15° 37' 2" S.; lon. 30° 32' E.; 450 miles from the mouth of the Zambesi. It marks the western point of the Portuguese territories on the Zambesi; has an advantageous site; was formerly the seat of an important trade, and contained a number of substantial buildings; but of late trade was neglected, and the town fell into decay.

**Zumpt** (tsúmt), KARL GOTTLÖB, born in 1792; died in 1827; professor of Roman literature in the University of Berlin, produced several excellent editions of Latin classics, and a valuable and elaborate Latin grammar, of which there have been several English translations.

**Zurbaran** (thoor-bá-rán'), FRANCISCO, an eminent Spanish painter, born in Estramadura in 1598; died in 1662. He studied under Juan de Roelas at Seville, producing there many of his best works. Among these his *St. Thomas Aquinas* is held to be one of the most admirable paintings ever produced in Spain. There are some of his works in the galleries of Paris, Berlin, Dresden and Munich. He was eminently successful in his treatment of the Spanish friar, his favorite subject,

and he was remarkable for his richness of coloring, and exquisite representation of velvets, brocades and white draperies. He received the title of painter to Philip III, and was patronized by Philip IV.

**Zürich** (tsü'rik; ancient, *Turicum*), a town of Switzerland, capital of the canton of the same name, is beautifully situated at the northern end of the lake of Zürich, on both sides of the Limmat, and having on the west the Sihl, which joins it immediately below. It has a university and a polytechnic school, both occupying handsome buildings, a Romanesque cathedral of the eleventh-thirteenth centuries, town-hall, public library, etc. Its most considerable industry is that of silk, but its cotton-spinning and manufacture of locomotives and machinery are also important. Its inhabitants are mainly German-speaking Protestants. Pop. (including suburbs), 205,000.—The canton holds the second place in the Swiss confederation as regards population. It is one of the northern cantons, and extends from the lake of the same name to the Rhine, to which its waters are carried by the Thur, Töss, Glatt, and Limmat. It is highly cultivated, and the land held by no fewer than 86,000 proprietors. There are extensive manufactures of silk and cotton goods. Area, 655 square miles. Pop. 431,637.

**Zürich, LAKE OF, or ZÜRICHSEE**, lies chiefly in the canton of Zürich, but partly in Schwyz. Its greatest length is about 27 miles; while its greatest breadth does not exceed 3 miles, and its greatest depth 600 feet. Its scenery is distinguished not so much for grandeur as for beauty. A considerable traffic is carried on upon the lake by means of sailing vessels and a number of steamers. It is well supplied with fish. Its chief feeder is the Linth Canal, communicating with the Wallenstatter-see. It discharges itself at the town of Zürich by the Limmat.

**Zurich, TREATY OF**, signed there November 10, 1859, by the plenipotentiaries of France and Austria, embodied the conditions of the preliminaries of peace agreed to at Villafranca, on the part of Napoleon III and the Emperor of Austria, Francis Joseph, and closed the Franco-Italian war by Austria's abandonment of her right to Lombardy.

**Zutphen** (züt'fen), a fortified town of Holland, in the province of Gelderland, 20 miles by rail south of Deventer, has an active trade, especially in timber and grain. It is notable as

being the scene of the death of Sir Philip Sidney, who was killed before its walls in 1580. Pop. 19,000.

**Zuyder Zee.** See *Zuider Zee*.

**Zvornik** (svor'nèk), a fortified town of Bosnia, on the Drina. Pop. 8500.

**Zweibrücken** (tsv'brük-en; Latin, *Bipontium*; French, *Deux-Ponts*, two-bridges), a town of Bavaria, in the Palatinate, pleasantly situated on the Schwarzbach; has manufactures of velvet, plush, cotton fabrics, machinery, etc. The edition of the classics known by the name of 'Bipont' was published here. Pop. 14,711.

**Zwickau** (tsvik'ou), a town of Saxony, 60 miles w.s.w. of Dresden, with several fine churches, notably St. Mary (1453-1530), restored 1884; the fine Gothic 'Gewandhaus' (1522), now a theater; town-house, government buildings, etc. The railway-station is one of the largest in Germany. Zwickau has manufactures of linen and cotton goods, dyes, and chemical products, etc.; productive coal mines in the vicinity employ over 8000 men. Pop. (1913) 75,542.

**Zwinger** (tswing'er), **THEODORE**, an eminent Swiss scholar and physician, was born at Bale in 1658; died in 1688. He became professor of Greek at Bale, and published *On the Rural Method of Cato and Varro* and a collection of anecdotes entitled *Theater of Human Life*. His son and several of his grandsons were noted for various acquirements.

**Zwingli** (tsving'li), or (as it is often Latinized) **ZUINGLIUS**, **ULRICH**, the Swiss reformer, was born in the canton of St. Gall, where his father was a thriving peasant proprietor. Intended for the church, he studied at various places, during a second residence at Basel becoming the pupil and friend of Thomas Wyttenbach, a reformer before the Reformation, and from him learned the evangelical doctrines which he afterwards promulgated with signal success. His first overt revolt against the Roman Catholic system was when he was a priest at Einsiedeln (1516), which a supposed miracle-working image of the Virgin had made a favorite resort of pilgrims. So effectively did he denounce pilgrimages as superstitious that his sermons were talked of in Rome, and it is said futile offers of promotion were made to coax him into silence. In 1518 he was appointed preacher in the cathedral of Zürich, where he opposed a preacher of indul-

gences. Then followed other denunciations of Roman Catholic practices and doctrines, until Zürich, the authorities of which supported Zwingli, and the people of which adhered to him, became thoroughly Protestant, and adopted a reformed theology, worship, and discipline. Zwingli went further than Luther, whose doctrine of consubstantiation led to what proved on the whole a resultless conference on the subject between him and Luther and Melancthon at Marburg in 1528. In 1531 the Forest Cantons, which adhered to the Roman Catholic faith, made war upon Zürich, whose troops Zwingli accompanied as chaplain. While in the thick of an engagement at Kappel, near Zürich, he was mortally wounded, October 11, 1531.

**Zwirner** (zwîr'ner), ERNST FRIEDRICH, a German architect, born in Silesia in 1802; died in 1861. He was appointed architect of the ancient Cologne Cathedral in 1833, and spent many years in its restoration and completion. His work is considered a highly admirable and successful example of restoration.

**Zwittau** (zwit'a), a town of Austria-Hungary, in the extreme north of Moravia, circle of Olmütz, 40 miles N. of Brünn. It is a seat of the textile industry and has manufactures of tobacco, etc. Pop. 9029.

**Zwolle** (zwol'le), a town of Holland, capital of the province of Overijssel. It is a well-built town, with fine suburbs and a fine church (St. Michael's), with a famous organ. Zwolle communicates with the sea by means of the Willemsvaart Canal. Among its industries are shipbuilding, cotton manufacture, tanning, rope-making, etc. Three miles from the town is the monastery of the Agnetenberg, where Thomas à Kempis spent most of his life. Pop. (1913) 33,836.

**Zwyndrecht** (zwînd'reht), a commune of Belgium, in

East Flanders, 11 miles N. E. of Dendermonde, in the Scheldt. Pop. about 5000.

**Zygæna** (zi-gæ'na), or HAMMER-HEADED SHARK. See *Shark*.

**Zymotio Diseases** (zi-mot'ik), a name applied to epidemic and endemic, contagious diseases, because they are supposed to be produced by some morbid principle acting on the system like a ferment (Greek *syme*). This morbid principle or poison gets into the blood in minute particles or germs, which there increase and multiply, the disease lasting until the poison has become worked out, or has been destroyed. Among these diseases are measles, scarlet fever, smallpox, typhus, typhoid, diphtheria, whooping-cough, croup, erysipelas, etc.

**Zygophyllaceæ** (zi-gô-fil-læ'se-æ), an order of hypogynous exogens, containing about a hundred species of herbaceous plants, trees and shrubs, found in the hottest parts of both hemispheres. There are seven known genera, of which the most important is *Gualacum* (which see). The abundance of species of *Zygophyllum* and some other genera constitutes a most striking feature of the North African and Arabian deserts. The flowers of *Z. fabago* are employed as a substitute for capers, and are known as bean-capers.

**Zythum** (zi'thum), a kind of beer used by the Egyptians; applied also to the beer of the northern nations; a liquor made from malt and wheat.

**Zyrnayovsk** (zir'na-yovsk), a mining town in a rich silver-producing district of Semipalatinsk, near the southern border of Siberia. It lies among the slopes of the Altai Mountains, on a head-stream of the Irtysh River. The Zyrians of the vicinity, a Tartar tribe, are Shamanists, and live by hunting in the forests. Pop. about 5000.

