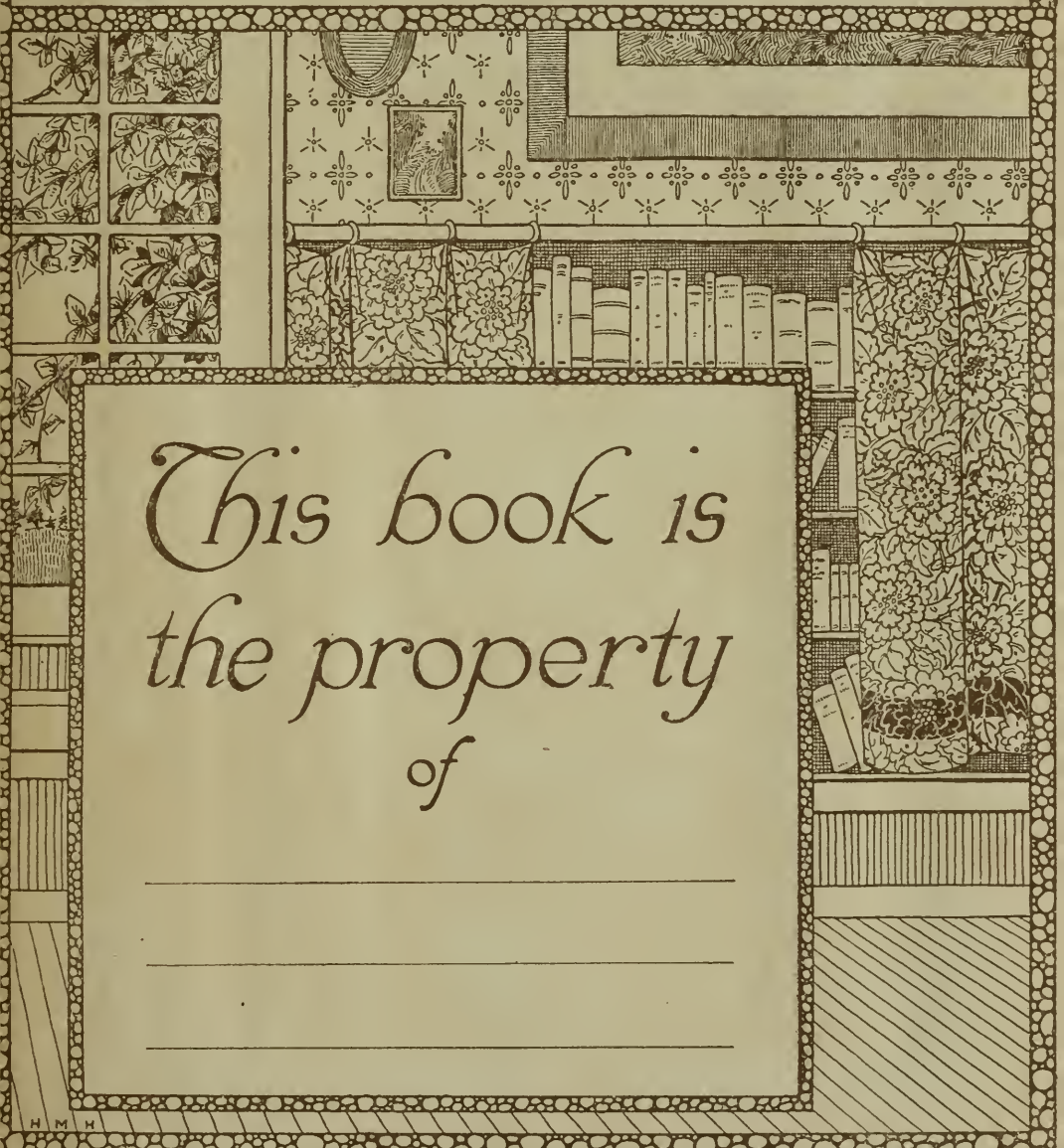
THE AMERICAN EDUCATOR

PRACTICAL HELP IN HOME AND SCHOOL

AMERICAN

Education commences at the mother's knee, and every word spoken within the hearing of little children tends towards the formation of character. —*Ballou*

EDUCATOR



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Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it.

—Samuel Johnson

THE AMERICAN EDUCATOR

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LIVIUS, the common designation of Livius Andronicus (about 290-about 205 B. C.), was the earliest epic and dramatic Roman poet of note. By birth he was a Greek, but he became a prisoner in the Tarentine wars, and Pyrrhus carried him to Rome. He was sold as a slave to a man named Livius, and to this fact is due the name by which he was known after Livius freed him. The young man learned Latin and became a teacher and a writer of tragedies, hymns and comedies. Only fragments of these have been preserved.

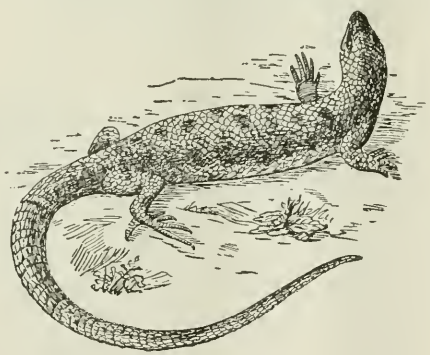
LIVO'NIA, one of the so-called Baltic provinces of Russia, bounded on the north by Esthonia and on the south by Courland. It has an area of 18,158 square miles, and in 1915 its population was estimated at 1,778,500. Riga is the capital and largest city; Oesel, Moon and Rundo islands are geographically a part of the province. In the northern part of Livonia the majority of the people are Esths, and in the southern part Letts predominate (see LETTS). There is also a strong German element which forms the upper class. In 1917, on the downfall of the czarist régime, Livonia set up an independent government, but early in 1918 this was overthrown by the Germans, who, after imposing on Russia the Treaty of Brest-Litovsk, sought to erect German principalities in the Baltic provinces. When Germany itself surrendered to the entente in November, 1918, the German forces were withdrawn from Livonia, but the people were not left undisturbed. A Russian Bolshevik army was sent against them to force the establishment of a Soviet government, and for months afterward there was serious fighting between Esths and Letts on the one hand and the "Red Guards" on the other. See RUSSIA; WORLD WAR.

LIVRE, *le'vr'*, a former French coin about equal in value to the franc, which superseded it in 1795. The livre was also an ancient unit of weight, equal to about 17¼ ounces avoirdupois.

LIV'Y, (59 B. C.-A. D. 17) whose name in full was TITUS LIVIUS, was a celebrated Roman historian. Nothing is known of his life except that he was born at Patavium (Padua), that he went to Rome, secured the favor of Augustus and became a person of some consequence at court; that he was married and had at least two children, and that he died in his native town. His history of Rome consisted of 140 or 142 books, of which we have only thirty-five. Of all the books except two, however, we possess short epitomes or tables of contents. Livy did not claim to be a critical historian; his purpose was to glorify his country.

Livy has been accorded first place among historians of the Augustan Age in the ancient Roman world. While not always accurate in his statements he aimed at the truth and endeavored from the facts presented to draw lessons for the benefit of his countrymen. He touched lightly the social evils of the times, and made no attempt to prove or disprove much that was legendary.

LIZ'ARD, the popular English name of numerous reptiles, which have usually two pairs of limbs and a long body terminating



LIZARD

in a tail. The lizards number about two thousand species and accommodate themselves to all conditions except cold. In the tropics they are numerous and large. Some lizards feed on vegetables, but for the most part they live upon small birds and insects. Lizards lay their eggs in the sand and abandon them. The chief families are the skinks, the geckos, iguanas and the chameleons.

Poison glands are wanting in all lizards excepting in the Gila monster of Arizona and Mexico, which is capable of inflicting a dangerous bite.

Related Subjects. Consult the following titles for additional information:

Basilisk	Horned Toad
Gila Monster	Monitor

LLAMA, *lah'mah*, the only beast of burden in South America before the introduction of horses and mules. It is a cud-chewing animal, closely allied to the camel, and has the same mild, docile traits. The llama

LLAMA

has the general appearance of a long-necked sheep, standing about three feet at the shoulder. Of the four known species, the guanaco and the vicuña are found in a wild condition, while the llama and the alpaca have long been domesticated. The llama can travel about fourteen miles a day across the mountain passes. In Peru and Bolivia it is man's main dependence for transportation of burdens.

LLANOS, *lah'noze*, the Spanish name given to the vast plains situated in the northern part of South America, particularly in Columbia and the basin of the Orinoco. During the dry season the vegetation is burned by the sun, while in the rainy period the regions are flooded with water. Between these two seasons they are covered with thick grass and ranged by vast herds of cattle and horses. Farther south, such plains are called *pampas*. See PLAIN.

LLOYD GEORGE, DAVID. See GEORGE, DAVID LLOYD.

LLOYDS, the world's most famous marine insurance association, whose headquarters are in London. It derived its name from Lloyd's Coffee House, where the members were at first accustomed to meet. Members are admitted by subscription. Lloyds now accepts many kinds of insurance risks, as a singer's voice or a dancer's foot; it will even insure a great merchant against inclement weather on a sale day.

LOAM, *lome*, a soil compounded chiefly of sand, clay, carbonate of lime or chalk and decayed vegetable and animal matter. Loam soils are valuable for raising crops. See SOIL.

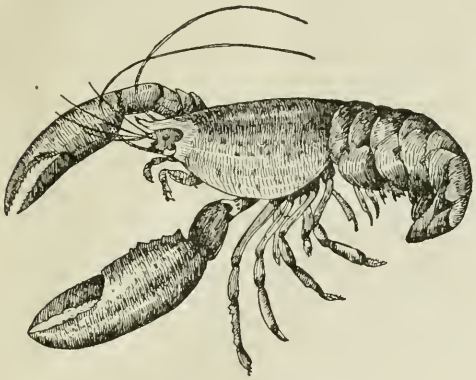
LOBBY AND LOBBYING. As related to government affairs, a lobby comprises persons who are continually found in the lobbies or outer halls of legislative bodies, and who seek to influence the trend of legislation. As a matter of fact, any citizen has the right to protest against the passage of a proposed law; it is also his privilege to promote the passage of a law by all proper means.

A person seeking occasionally to influence legislation cannot be called a lobbyist, but there are persons who make a business of lobbying, and some of these have brought discredit upon enterprises which are often worthy. If a man or woman, for compensation, seeks by argument, influence, wiles or money to control votes of legislators, such a person is purely a lobbyist—within legal rights, if the only weapon used is logic, but subject to severe condemnation and punishment if questionable methods are employed.

LOBE'LIA, an extensive genus of beautiful herbs, which are natives of almost all parts of the world and especially of the warmer portions of America. Several species grow wild in the United States. The most brilliant of these is the cardinal flower that forms so conspicuous a feature in swamps in late summer and autumn. A large, blue-flowered variety is almost as brilliant. Many tropical species are cultivated in hothouses because of their great beauty. All of the plants are more or less poisonous.

LOB'STER, one of the most singularly-formed members of the animal kingdom, called a crustacean by the scientist because it is invested with an outer hard, shell-like surface, or crust. As a crustacean, the lobster is related to the shrimp, crab, barnacle, etc.

The body of the lobster has seven distinct segments, while thirteen minor ones, which



THE LOBSTER

form the thorax and head, are so blended together as not to be easily distinguished. The animal has two pairs of antennae and six pairs of mouth organs. The first pair of legs is long and terminates in large claws, one of which is thick and very heavy and is used for crushing objects. The other claw is shorter, smaller, more or less curved, toothed and pointed at the tip. The claws are really pinchers, which can be closed when fighting or when the animal seizes its prey. The tail is composed of the last segment and has two wide appendages on each side, making a broad incurved organ, which the animal uses in swimming. By straigtening this tail and drawing it forcibly under, the lobster is thrown backward through the water at a rapid rate.

The animal has two large, compound eyes, situated at the end of thick stocks. Its senses of hearing and sight are keen. The female carries her eggs on the under side of the abdomen until they hatch, when the young are driven away and for a time swim about freely near the surface. After about a month they descend to the bottom, where they remain. The lobster lives on the bottom of the sea and rarely rises more than a few feet from it. It walks about on the tips of its legs, extending the large claws forward and pushing itself along by the swimming feet.

Lobsters are highly esteemed for food. They are caught in *pots,* which are traps made of wood, sunk among the rocks in the clear water in which the animals live. The pots have a funnel-shaped opening and are baited with fresh meat, which attracts the lobsters. When they have once entered the trap they are unable to escape. When taken from the water the lobster has a greenish appearance. The brilliant red color of those placed upon the market is produced by boiling.

Nova Scotia produces the most lobsters for the market, averaging sometimes as high as 30,000,000 pounds a year. Maine is second, with 10,000,000 pounds, followed by Prince Edward Island (9,000,000 pounds), New Brunswick (8,000,000 pounds), Quebec (4,000,000 pounds) and Massachusetts (2,000,000 pounds). In Europe France has very large lobster beds.

Related Articles. Consult the following topics for additional information:
Crab Crustacea Shrimp

LOB'WORM, a worm with a round head and a body about the size of a large earthworm. It breathes through thirteen pairs of gill-tufts. The lobworm is used for bait in deep-sea fishing, and at low tide it may be found on every seabeach by the little coils of sand it leaves when burrowing. It is known also as *lugworm* and *lugbait.*

LO'CAL OPTION, a term applied to the principle by which a certain majority of the inhabitants or taxpayers of a certain locality for many years decided whether liquor might be sold in their communities.

The local option principle was applied to villages, to cities, to townships or to counties, as state laws directed.

Related Articles. Consult the following titles for additional information:
License. Prohibition Temperance

LOCHINVAR, *lock'in vahr,* a ballad occurring in Sir Walter Scott's *Marmion,* beginning with the often-quoted lines:

O, young Lochinvar is come out of the west,
Through all the wide border his steed was the best;
And, save his good broadsword, he weapon had none,
He rode all unarmed, and he rode all alone.
So faithful in love, and so dauntless in war,
There never was knight like the young Lochinvar.

The author recounts in stirring verse the bold deed of the young knight, who entered the hall where was being held the wedding feast of the girl he loved. Defying the father, who had denied his suit, he pretended to lead the bride out to dance but instead ran with her to his horse and galloped away with her. The ballad concludes with these lines:

There was racing and chasing on Cannobie Lee,
But the lost bride of Netherby n'er did they see.
So daring in love, and so dauntless in war,
Have ye e'er heard of gallant like young Lochinvar?

LOCK, an arrangement for fastening doors, chests, drawers and the like. It is so made that it cannot be worked except by the key or knob especially fitted to it. The simplest lock contains a bolt, a staple into which the bolt locks,

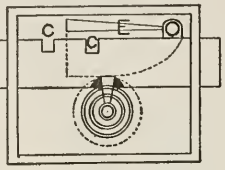


FIG. 1

and a spring which prevents the bolt from being moved without the key. The bolt has a rounded notch on the under side, into which the key fits. On the upper side are two square notches, *CC*, which are as far apart as the bolt moves. Back of the bolt and fastened to the frame by a pivot, is a tumbler, indicated by the dotted lines in Fig. 1. On the end of the tumbler is a square piece of metal, *E*, which drops into the notches, *CC*, as the bolt is locked or unlocked. This plug is pressed down upon the bolt by a spring attached to the frame and the other side of the bolt. The whole arrangement is enclosed in an iron frame. On the inside of the frame are curved ridges, called *wards*. Slots are cut into the key so as exactly to fit these wards, and by this arrangement each lock is protected so that it cannot be opened or closed by any key but the one made specially for it. In Fig. 2 is shown a lock with a number of tumblers,

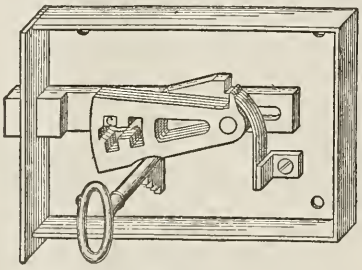


FIG. 2

which make it more complicated and more difficult to be opened with any key except its own. Formerly locks of this pattern were in general use on stores and other public buildings, but they have now been almost entirely replaced by the Yale lock, named from its inventor, Linus Yale. This has a flat key with noches on one edge, which fit a number of pin tumblers that move up and down. It is practically impossible to open this lock with any key except the one designed for it.

LOCK, in engineering, a device in a canal for raising or lowering boats from one level to another. A lock is a chamber whose side walls are made of stone or concrete and whose ends are closed by a pair of folding gates. The gates in each pair are called *leaves*. When closed, the leaves form a V-shaped partition across the chamber, with the vertex pointing up stream. This enables the gates to withstand the pressure of the water in the lock. When a boat is to be locked from a lower to a higher level, the gates at the upper end of the chamber are closed and those at the lower end are opened. This leaves the water in the chamber at the same level as that in the lower level of the canal. The boat passes into the chamber, and the lower gates are closed. By means of valves in the gates at the upper end or in the sides or bottom of the chamber, the water is gradually let into the lock until the boat is raised to the upper level of the canal. The gates at the upper end of the lock are then opened and the boat passes out. When the boat is lowered, the operations are reversed. In large locks the gates and valves are operated by machinery. See CANAL; PANAMA CANAL.

LOCKE, JOHN (1632–1704), one of the most influential of English philosophers, born at Wrington, in Somersetshire. He was educated at Westminster School and Christ Church College, Oxford, after which he applied himself to the study of medicine. Later he became secretary to the Earl of Shaftesbury and was assigned the task of drawing up a constitution for the Carolinas, of which the earl was one of the proprietors. His attempt, known as the Grand Model, was a failure, because it was based upon a feudal aristocracy, which was wholly impracticable in a new country. Later he published his *Essay Concerning Human Understanding*, a work which attracted wide attention and at once gave him a place among the foremost thinkers of his time. The theory upon which he based his system is that there are no inborn ideas, and that all experience is the result of impressions made on the mind by external objects.

LOCKJAW. See TETANUS.

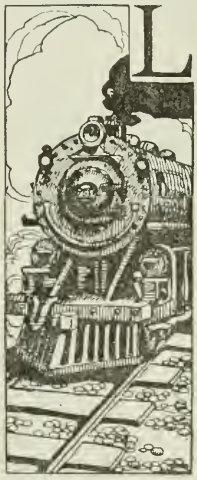
LOCK'OUT, the name applied to a condition resulting from an employer's refusal to continue a body of workmen in his employ. It results because of demands by them which he can not or will not concede. The lockout is really a strike, but on the part of the employer rather than by the employes. In both cases the effect is the same.

Related Articles. Consult the following titles for additional information:
Arbitration Labor Organizations Strike

LOCK'PORT, N. Y., the county seat of Niagara County, twenty-five miles northeast of Buffalo, on the New York State Barge Canal, and on the New York Central, the Erie and the International railroads. The canal here has a series of five locks, electrically operated, with a lift of twelve feet each. Near the city are extensive quarries of limestone and sandstone, and the principal manufactures are waterworks machinery, milling and woodworking machinery, pulp, paper, glass, brooms and textiles. The city has a large trade in grain and fruits from the surrounding agricultural region. The prominent buildings are an Odd Fellows' Home, a Federal building and courthouse and jail. The place was settled in 1823 by workmen on the Erie Canal. It was incorporated in 1829, was chartered as a city in 1865. Population, 1910, 17,970; in 1917, 20,028 (Federal estimate).

LOCK'WOOD, BELVA ANN BENNETT (1830–1917), an American lawyer and reformer, born at Royalton, N. Y. She graduated at Genesee College, Lima, N. Y., taught school for some years, afterward studied law and was admitted to the bar in Washington in 1873. After laboring for the passage of a law admitting women to practice before the Supreme Court, she herself was admitted to that practice. Mrs. Lockwood was afterward conspicuous in agitation for woman suffrage and was nominated for President of the United States in 1884 and 1888 by the Equal Rights Party. She was also active in the movement for international peace.

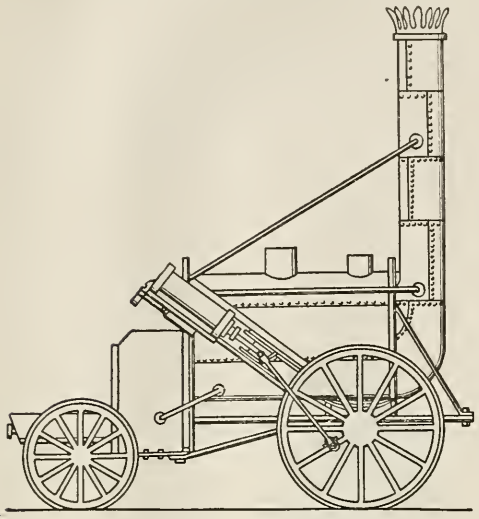
LO'CO-FO'CO, a name given to a faction of the Democratic party in New York state in 1835, which demanded the rechartering of the United States bank and was opposed to the chartering of state and private banks by special legislation. The faction received its name from an occurrence at a mass meeting held at Tammany Hall, New York, in October, 1835. The organization Democrats attempted to control the meeting, but being unsuccessful, they turned out the lights and retired. The victors, however, had supplied themselves with friction matches, which were at the time called loco-focos, and, lighting candles, proceeded to transact their business. The regular Democratic press soon took up the incident and dubbed the faction *loco-focos.* Eventually the Whigs applied this name to the Democratic party throughout the country. The faction was finally absorbed into the original organization, through the efforts of President Van Buren.



LOCOMOTIVE, *lo ko mo' tive,* a railway engine, to the invention of which is credited much of modern progress. The history of its development is a romance of commerce and mechanic art which has few parallels in the record of human achievements. The locomotive resulted from the pinch of necessity for means of transporting the products of the mines to ships, yet those who sought to construct a steam engine to run on a track were called visionaries. Many people at first called the clumsy invention a crime; the puffing, noisy contrivance disturbed the peace, and its terrific speed of fifteen miles per hour endangered public safety. It is recorded that when the locomotive first appeared in England a man on horseback was required to precede it to warn the public of approaching danger. If the *Rocket* (see page 2150), and the *Puffing Billy* and the first Baldwin were "crimes," the great Baldwin of 1917, the largest engine ever built (see illustration, page 2151), doubtless would have appeared to the fearful folks of 1829 as a dastardly outrage against peace and security.

Earliest Locomotives. The first successful attempt to construct a self-propelling engine was by a Frenchman named Cugnot in 1796, but the railway locomotive was invented by Richard Trevithick, a Cornish miner, in 1804. While this locomotive was considered a failure commercially, it con-

tained most of the important features successfully used in later patterns. The success of the locomotive is due to George Stephenson, an English engineer. In 1829, at a



THE "ROCKET"

competitive trial of several locomotives on the Liverpool & Manchester railway, Stephenson's engine, the *Rocket,* was the most successful, and many others were patterned after it. This engine was mounted on four wheels, and had a horizontal boiler 6 feet in length and 5 feet 4 inches in diameter, which contained 25 tubes, each 3 inches in diameter. The cylinders were placed at the rear end of the boiler, just over the fire box, and exhaust pipes led from them to the smokestack. The drive wheels were in front and were connected directly with the piston by connecting rods. When ready for use this engine weighed 4½ tons, and with the tender, 7½ tons. On its trial trip it hauled a load weighing over nine tons at a speed of twenty miles per hour, and on another trip it reached a speed of nearly thirty miles per hour. The success of this locomotive demonstrated the practicability of steam power for railways.

The first locomotives used in the United States were imported from England, but in 1830 one was built at the West Point foundry, and others soon followed. The early American engines copied the English patterns very closely, but the conditions to be met upon American railways made it necessary to deviate from the English type, and soon distinct type of American locomotive was developed, which, with various modifications and enlargements necessary to meet the constantly growing traffic, is still in general use.

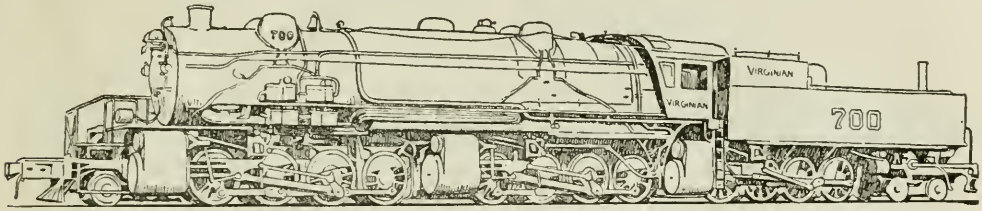
Essential Parts. A locomotive consists of a steam boiler of the tubular type (see BOILER), a pair of simple or compound engines, a running gear and a wrought iron frame, on which the various parts are so mounted that the engine can travel upon a track. The accessory parts are the *smokestack,* or *chimney;* the *pilot,* often called the *cowcatcher* by boys and girls, for knocking objects off the track; the *cab,* for sheltering the enginemen; the *tender,* for carrying fuel and water; the *injector,* for forcing water into the boiler; the *air brake pump* and necessary appliances; the *sand dome,* the *bell,* the *whistle, steam gauges, water gauges* and the *safety valve.*

The common type of American locomotive has a horizontal boiler; four, six, eight or even a greater number of small drive wheels, from four feet five inches to six feet five inches in diameter, and connected on each side of the engine by a bar joined to the pistons by connecting rods. The forward end of the machine rests upon a truck of four, six or eight small wheels, and the tender usually has eight, to twelve wheels arranged in two trucks. The wheels of freight locomotives are smaller than those of passenger locomotives, since in the freight engine great traction power is desired, while speed is not as essential. Large passenger engines, especially those designed for heavy grades, have six drive wheels, and if the engine is designed for high speed, the wheels are six or more feet in diameter. Every device for controlling the locomotive is within easy reach of the engineer, so that by pulling a lever, he opens the throttle valve and lets on the steam, or by pushing it from him, he closes the valve and shuts off the steam. Another lever, connected with a link in which the valves work, can be moved forward or backward, and by moving it the engine is reversed and will run as well in one direction as in the other.

The weight of passenger locomotives ranged from sixty to seventy tons in the older patterns, to as high as 200 and even 250 tons, in the newer models of special design for mountain climbing, while the largest freight engines weigh over 400 tons. The cost of a modern engine ranges from

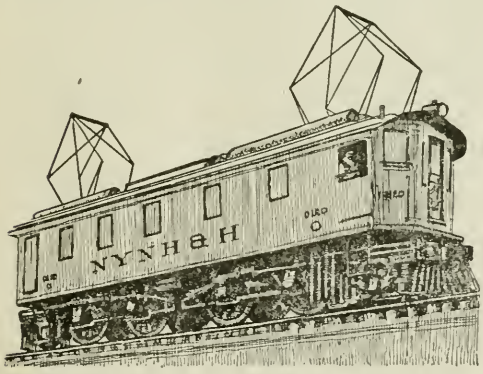
$18,000 to $25,000, and its life is about thirty years.

The largest locomotive works in the United States are the Baldwin Locomotive Works at Philadelphia. Others of importance are the Rogers Locomotive Works at Paterson, N. J., and the works of the American Locomotive Company, which are located in eight different cities. The American locomotive is now found on every continent.



LARGEST LOCOMOTIVE EVER BUILT
Designed for the Virginian Railway by the Baldwin Locomotive Works.

Electric Locomotives. Locomotives in which electric power is substituted for steam have been successfully operated for a number of years on suburban railroad trains, and since 1915 over even difficult lines of mountain road. The most notable electrification of both freight and passenger service is on the Chicago, Milwaukee & Saint Paul Railroad in Montana and Idaho. Engines are employed which are 112 feet 8 inches in length; each is equipped with motors which develop nearly 3,500 horse power.



TYPICAL ELECTRIC LOCOMOTIVE

The current is diverted to the motors by overhead feed wires, similar to those of the familiar city trolley lines.

For suburban service both trolley lines and third-rail systems are employed. As no steam locomotives are permitted on Manhattan Island, New York City, all trains entering there are motor driven. The New York, New Haven & Hartford Railroad uses electric locomotives on its entire suburban service; the other railroad companies detach their steam engines and attach electric locomotives to all trains before entering the city. The average electric locomotive weighs 110 to 125 tons, and is equipped with eight to twelve motors each developing 300 to 325 horse power.

Related Articles. Consult the following titles for additional information:

Air Brake	Steam
Electricity	Steam Engine
Electric Motor	Stephenson, George
Railroad	Westinghouse, George

LOCOMO'TOR ATAX'IA, a disease of the nervous system, characterized by a loss of the power to move the muscles harmoniously. It is not paralysis, for the person is able to move and even to walk. He walks, however, with a peculiar halting gait, during which he often falls, because the limbs will not move together. The approach of the disease is slow and long continued, and is often accompanied by partial paralysis. The disease usually continues to a fatal termination, though it is sometimes stopped if treatment, directed by a competent nerve specialist, is begun in the earlier stages. The chief cause of locomotor ataxia is syphilis.

LOCO, *lo'ko,* **WEED,** a peculiar and troublesome weed of the pea family which is well distributed over the American continent west of the Mississippi River. There are purple and white varieties; both are poisonous, but the purple is the more dangerous. When eaten by domestic animals, loco weed effects them seriously, almost at once. A horse which has been "locoed" cannot maintain an even gait, its sight is so altered that it may imagine a small stick to be a large obstruction, and it will lift its feet as high as possible in stepping over it. A person approaching may not be seen by such a horse until the two are but a few feet apart, and the

animal may be frightened by the sudden appearance. The effects upon cattle are quite similar. A sheep becomes very weak and frequently stumbles and falls.

If unchecked, the disease is usually fatal. In its last stages an animal is unable to eat; exhaustion and starvation follow. The Department of Agriculture, in *Bulletin 380,* suggests the best treatment yet found.

LO'CUST, the name applied rather loosely to several insects related to the grasshoppers. In the United States, the cicada, har-

LOCUST

vest fly, is called a locust, while the real locust of that country is known as the red-legged grasshopper (see CICADA; GRASSHOPPER). The hind legs of the locusts are large and powerful, so that they have great power of leaping, but their antennae are shorter than those of true grasshoppers. They make their peculiar "notes" by drawing their hind legs across their wing covers. When flying they produce sounds by rubbing their front and hind wings together.

The Rocky Mountain locust breeds west of the Mississippi River and east of the Rocky Mountains, selecting places along river bottoms or in grassy places of the mountains in the northern part of the region mentioned. The female lays twenty-five or more eggs, cementing them carefully together and covering them with a case, or cocoon, which she buries in the sand. From the first, the young resemble their parent, and after frequent molting they reach their full size in about seven weeks.

On reaching maturity locusts gather in flocks and begin incredibly long migrations, with an apparent definiteness of purpose and regularity of movement that no other insect ever shows. Sometimes they appear in such vast numbers as almost to obscure the light of the sun; toward night or on cloudy days they settle down on the earth and devour everything green they can find. Sometimes within a few hours whole acres of flourishing vegetation have been destroyed. In 1874 the locusts overran the whole territory west of the Mississippi, and it is estimated that $50,000,000 would not cover the damage they did. The next year 750,000 people were made destitute or suffered severely in Kansas, Nebraska and Missouri. Since that time, though there have been numerous flights of locusts, they have not appeared in such destructive numbers, and it is thought that the cultivation of the land and the destruction of their breeding places have made impossible anything of the kind in the future. Migratory locusts are found also in Asia and Africa, where their flights have been as destructive as those of the locusts in America. Arabs and other natives of the East frequently use the dried insects as food.

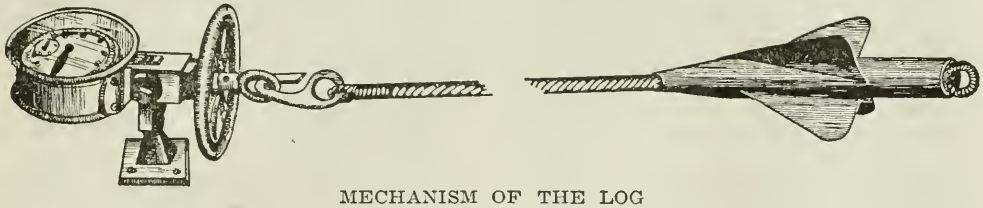
LOCUST, a group of trees belonging to the pea family, found in various parts of the world. Their flowers, which resemble pea blossoms, have a strong scent and are borne in drooping white clusters. The wood is hard and durable, and is used in making spokes, hubs, cog wheels, and furniture, and in shipbuilding. In America are found the *honey,* the *yellow* and the *clammy* locusts, the latter a small tree or shrub cultivated in gardens.

LODGE, *loj,* HENRY CABOT (1850–), an American statesman and historian, was born at Boston, educated at Harvard University and admitted to the bar in 1876. While attaining eminence in his profession, he also wrote many books upon historical and legal subjects, notably *A Short History of the English Colonies in America* and biographies of Daniel Webster, Alexander Hamilton and George Washington. He was elected a Representative in Congress in 1887, served three terms and was then elected United States Senator. He was reëlected in 1899, 1905, 1911 and 1917.

LODZ, *loje,* POLAND, a town in the government of Piotrkow, seventy-five miles southwest of Warsaw and 100 miles east of the old German frontier. Next to Warsaw, before the World War it was the largest town in Russian Poland. It was practically destroyed during the war, but previously was one of the most important cotton-manufacturing cities of the world. Population, 1913, 415,604.

LOEB, *löb,* JACQUES (1859–), an American biologist, born in Germany. He was educated at Berlin, Munich and Strassburg and became assistant professor of physiology at the University of Würtsburg

in 1886; two years later he was given a similar position in the University of Strassburg. In 1891 he came to America, to accept an appointment as associate professor of biology at Bryn Mawr College, and in the following year he was called to the University of Chicago. In 1902 he became professor of physiology in the University of California.



MECHANISM OF THE LOG

Professor Loeb specialized in comparative physiology, becoming famous for ingenious experiments upon the subject of reflex action in lower animals, for his researches in the composition of protoplasm and especially for showing the effect of salt solutions on muscles of the heart.

LOESS, *lo'es*, a sandy deposit consisting of a fine, porous silt, containing more or less carbonate of lime. The latter collects in round lumps which take a vertical position. Loess was first described from deposits in the Rhine Valley, but it is found in large quantities in all parts of the world. Where the deposits are cut by rivers, they often form bluffs like those along the Mississippi, in some of which the formation exceeds 250 feet in depth. When humus is present loess forms excellent soil, but on account of its sandy nature it requires more rainfall than loam (see SOIL).

LO'FOTEN, or LO'FODEN, ISLANDS, notable as one of the world's most important fishing grounds, belong to Norway and lie off its northwest coast. Most of them are rugged and precipitous, and several of them have mountains. They are for the most part unfertile, though there are some regions which are productive. The cod and herring fisheries are especially important and are the chief source of wealth. About 30,000 fishermen are engaged around the islands. In some places the navigation, even for schooners, is very difficult, because of the tidal currents and the narrow channels between the islands, and near the south end of the group is the whilpool called Malström. The best season for fishing is from December to March. Population, 1918, about 45,500.

LOG, a contrivance used in measuring the rate at which a ship travels through the water. The *common log* is a piece of thin board, forming the quadrant of a circle of about six inches radius, so balanced as to float perpendicularly in the water, with the greater part immersed. One end of the *log-line* is fastened to the log, while the other is wound round a reel. The log is thrown out and the length of line unwound in a given time gives the rate of the ship's sailing. This is calculated by knots made on the line at certain distances. See KNOT.

LOGAN, JOHN ALEXANDER (1826–1886), an American soldier and statesman, born in Jackson County, Ill. He served in the Mexican War with credit and at its close entered college, graduating from Louisville University in 1852. He was elected to the state legislature several times, and in 1858 was sent to Congress, as a Democrat, being reëlected after his first term. He resigned to enter the army, was made a colonel of an Illinois regiment, fought at Belmont, Fort Henry, Fort Donelson, and became brigadier-general, later major-general of volunteers. Logan participated in the Vicksburg campaign and was with Sherman in his march toward Atlanta, taking a conspicuous part in the Battle of Kenesaw Mountain and being twice placed at the head of the Army of the Tennessee. In 1866 he was reelected to Congress, where he served until 1871. He was one of the managers of Johnson's impeachment trial. He became United States Senator, but in 1877 resumed the practice of law, in Chicago; shortly afterward he returned to the Senate, where he won a reputation as a forceful and eloquent

JOHN A. LOGAN

orator. In 1884 he was a leading candidate for the Republican nomination for President, but being defeated, was made the candidate for Vice-President. Later he was again returned to the Senate and died in office. He was the author of the *Great Conspiracy* and *The Volunteer Soldier of America.*

LO'GAN, Utah, the county seat of Cache County, seventy miles north of Ogden, on the Logan River and on the Oregon Short Line Railroad. The city is in an agricultural and stock-raising district and has flour and woolen mills, knitting mills, condensed milk and sugar factories. The state agricultural college, Brigham Young College and the New Jersey Academy are located here; a Federal building was erected in 1911, and a Carnegie Library was completed in 1917. The commission form of government was adopted in 1911. Logan was settled in 1859 and was incorporated in 1866. Population, 1910, 7,522; in 1917, about 8,300.

LO'GANBERRY, a fruit having the flavor of the wild blackberry, named for its originator, Judge J. H. Logan of California. He produced it by crossing a species of wild California blackberry and the Old Red Antwerp raspberry. The loganberry grows on a plant of the dewberry type. It turns a dark red when ripe and sometimes grows to be an inch and a quarter long. Since the latter part of the nineteenth century the fruit has been cultivated widely in Europe and America. The berries are used for pastry and wine.

LO'GANSPORT, Ind., county seat of Cass County, seventy-two miles north of Indianapolis, at the confluence of the Wabash and Eel rivers and on the Pittsburgh, Cincinnati, Chicago & Saint Louis, the Vandalia and the Wabash railroads. The city has good water power. The industrial establishments are railroad shops, employing about 1,000 men, and manufactories of automobiles, motors, lumber, carriages, lime, cement, radiators and kitchen cabinets. The Northern Indiana Hospital for the Insane has a farm of 300 acres. The city has a fine courthouse, a Carnegie Library and Holy Angels' Academy. Logansport was first incorporated in 1838. Population, 1910, 19,050; in 1917, 21,338 (Federal estimate).

LOGARITHM, *log'a rith'm,* a mathematical term derived from the Greek words for *proportion* and *number.* The logarithm of a number is the exponent of the power to which a constant number, called the base, must be raised to obtain the given number. In the common system of logarithms the base used is 10. In writing 10^3 we are expressing the equivalent of $10 \times 10 \times 10$, or 10 raised to the third power. Ten raised to the third power=1,000, and the logarithm of 1,000 is 3. This is usually expressed: *log 1,000=3.* Also, $10^{2.9222}$ equals 836; therefore log 836= 2.9222. According to the same principle the following expressions are derived:

log .001	= —3	log 10	= 1
log .01	= —2	log 100	= 2
log .1	= —1	log 1,000	= 3
log 1	= 0	log 10,000	= 4

From this table it is evident that the logarithm of any number greater than 1 and less than 10 is fractional; the logarithm of any number greater than 10 and less than 100 is greater than 1 and less than 2; the logarithm of any number less than 1 is negative.

Logarithms are of inestimable value in trigonometry and other subjects requiring the solution of complicated problems. Since a logarithm follows the law of exponents, familiar to all students of algebra, we add the logarithms to obtain the logarithm of the product of the numbers represented by them. In division, one logarithm is subtracted from the other to obtain the logarithm of the quotient. To obtain the logarithm of the square root of a quantity we divide the logarithm of the given number by the number denoting the root to be extracted. In raising a number to the given power we multiply the logarithm of that number by the number denoting the power to which it is to be raised. Thus the complicated processes connected with the manipulation of long numbers are greatly shortened by the use of logarithmic tables.

LOGIC, *loj'ik,* a study pursued in college which may be called the science or art of pure reasoning. When a person is said to be logical it is because he argues a question reasonably on a basis of fact that he may arrive at true conclusions. Logic is a study of the processes of thought; it is pure reasoning, with a view to a conclusion believed to be genuine.

Reasoning is the mental process by which what is already known about a thing is used as a basis and from this other conclusions are reached. There, are two processes of reasoning, *induction* and *deduction,* which are described in their places in these volumes.

LOG'WOOD, the common name of a tree which grows in moist and swampy places in Central America and on the eastern shores of Mexico, and which has now become naturalized in many of the West Indian islands. The wood, which is red, tinged with orange and black, is so heavy as to sink in water, and it takes a fine polish. Its chief use, however, is as a dye wood. The best dyes were formerly obtained from the trees around the Bay of Campeachy, but that supply has been almost exhausted, and the chief sources are at present Honduras, Jamaica and Santo Domingo. When the trees have grown to a height of from twenty to fifty feet, they are cut down, and the heartwood is trimmed out, cut up into short logs and then hewn and ground into little chips. From these the color is extracted by water; the dye is afterward purified and varied by chemicals to such an extent that red, purple, black, violet, lilac, blue and green may all be obtained. An extract of logwood is used as a medicine.

LOGWOOD

LOHENGRIN, *lo'en grin*, the hero of an old legend which forms the basis of Wagner's popular opera of the same name. Lohengrin is represented as the son of Parsifal and one of the guardians of the Holy Grail. Sent by King Arthur to help the Princess Elsa of Brabant, he arrives in a vehicle drawn by a swan, delivers the princess from captivity and marries her. He accompanies the emperor in a campaign against the Hungarians and fights against the Saracens. He then returns to his bride at Cologne, but being pressed by her to state his origin, he is prevailed upon to tell it, after which he must, by the terms of his vow, return home to the Grail. See GRAIL, THE HOLY.

LOIRE, *lwahr*, (ancient Liger), the longest river in France, which rises in the Cevennes, flows first in a northerly, then in a westerly, direction and empties into the Bay of Biscay. Its whole course is over 620 miles, of which about 490 miles are navigable. It has been largely canalized; artificial waterways connect it with many cities and other river systems.

LOK, *lohk*, or **LOKI**, *lo'ke*, in Northern mythology, a wicked deity, the father of Hel, goddess of the dead. Although regarded as the personification of evil, he was described as of handsome appearance and well able to fascinate when he chose. His ingenuity far surpassed that of any of the other gods, and when he could, at times, be compelled to exercise it in behalf of the other gods, the results were most beneficial. Ordinarily, however, he was occupied with the most evil plotting, partly from a spirit of mischief and partly from pure wickedness. It was he who brought about the death of Balder (which see).

LOL'LARDS, a name applied as a term of contempt to various sects or fraternities deemed heretical, which arose in Europe about the year 1300. It became well known in England about the end of the fourteenth century, when it was applied to the followers of Wycliffe and to those influenced by his teaching. Later the Lollards drew upon themselves the enmity of the civil powers, and numbers of them were put to death, especially during the reign of Henry V.

LOMBARDS (so called either from the long *barte*, or spear, which they carried, or from the long beards they wore), a Germanic, or Teutonic, people who at the beginning of the Christian Era were dwelling on the Lower Elbe. They make little appearance in history till the sixth century, when, under their king, Alboin, they entered Italy in 568, and conquered the northern portion, which hence received the name of Lombardy. Authari, a successor of Alboin, married Theodelinde, a Frankish princess, who began the process of converting the Lombards to the orthodox faith. The only king of note among successors was Rothari, who in 643 promulgated a system of laws, which, with subsequent additions, became among German jurists the basis of the study of law during the Middle Ages. From 713 to 744 the Lombards had a powerful king in the person of Liutprant who extended temporary sway over the whole of Italy. From that time the power of the Lombards gradually declined; finally, Charlemagne captured Pavia and put an end to the Lombard kingdom (773 or 774).

LOMBARDY, *lom'burd y*, the part of Upper Italy which took its name from the Lom-

bards, who invaded and conquered it in the sixth century. The Lombard kingdom was overthrown by Charlemagne. Lombardy was formerly the name of an Italian department embracing what now constitutes eight provinces of modern Italy. Population, 1911, 4,786,907. See LOMBARDS.

LO'MOND, LOCH, the largest lake in Scotland. It is situated in the counties of Dumbarton and Stirling and is twenty-three miles in length and from one to five miles in width. The region around here is especially famous for its beautiful and picturesque scenery.


Westminster

LONDON, *lun'don*, ENGLAND, the capital and metropolis of the great British Empire and the United Kingdom of Great Britain and Ireland. "It is the Mother City," writes Burton Holmes in a Travelogue, "not of England only, but of the entire English-speaking world; to the American it means more than any other foreign city."

The largest capital on the face of the globe, London is very different from all of the other great capitals. It lacks the aspect of gaiety characteristic of Paris, the precise orderliness of Berlin, the artistic beauty of Washington, or the quaintness of The Hague. It is one of those cities that began in antiquity and grew without any special plan, absorbing in its expansion many other towns. Yet, when one considers the business and industrial interests centered there, the influence of the city in world politics, the ships that sail into its port from lands the wide world over, and its historic and literary traditions, one is compelled to agree with Mr. Holmes when he calls it the most important place on earth. For a thousand intimate pictures of this mammoth city, pictures not to be found in geographies or books of travel, one should read the novels of Charles Dickens.

Location and Extent. London is located in the southeastern part of England, on both banks of the Thames River, which runs through the city irregularly from west to east. As it is situated at the head of tidewater, between forty and fifty miles from the mouth of the Thames, London has many of the advantages of a city on the coast. There is more than one method of reckoning the area and population of the great capital. What is known as Greater London—consisting of the "city," the administrative county of London and numerous outlying villages—is a place of 7,251,358 inhabitants (census of 1911), and covers an area of nearly 700 square miles. It includes all the territory within a radius of about fourteen miles from Trafalgar Square. Greater London, therefore, is the largest municipality in the world.

The part officially called the "City of London," lying on the north bank of the river, covers slightly more than a square mile. It is a separate municipality, having a civic corporation of its own, at the head of which is the lord mayor of London. In this section are located the offices of the important industrial and commercial companies and the large financial institutions. The resident population, consisting of policemen, janitors, etc., was 20,000 in 1911. The "city" and the county of London occupy an area of 117 square miles, and in 1911 their total population was 4,521,685. London proper is exceeded in population by Greater New York City (which see).

Like the American metropolis, it is divided into separate boroughs, each governed by an elected council and an executive. London is divided into twenty-eight such boroughs, and the executives bear the title of mayor. All of Greater London is under the jurisdiction of the metropolitan police force. The metropolitan police is not a municipal organization, but is administered by the government. Its central offices are New Scotland Yard, a massive building near Westminster bridge. The postal authorities divide Greater London into districts, designated as E. C. (East Central), W. C. (West Central), etc.

General Description. London is not a beautiful city, although it has many magnificent buildings and some fine streets. It is on low ground, and from no one place can a general view of the city be obtained. The business portions are densely crowded, the streets are narrow and crooked, and the fogs and smoke have rendered the buildings dingy and unattractive in appearance. The commercial and money-making parts of London are in the East End. Here are the port, the docks, the customhouse, the bank, the general post office and many public buildings, be-

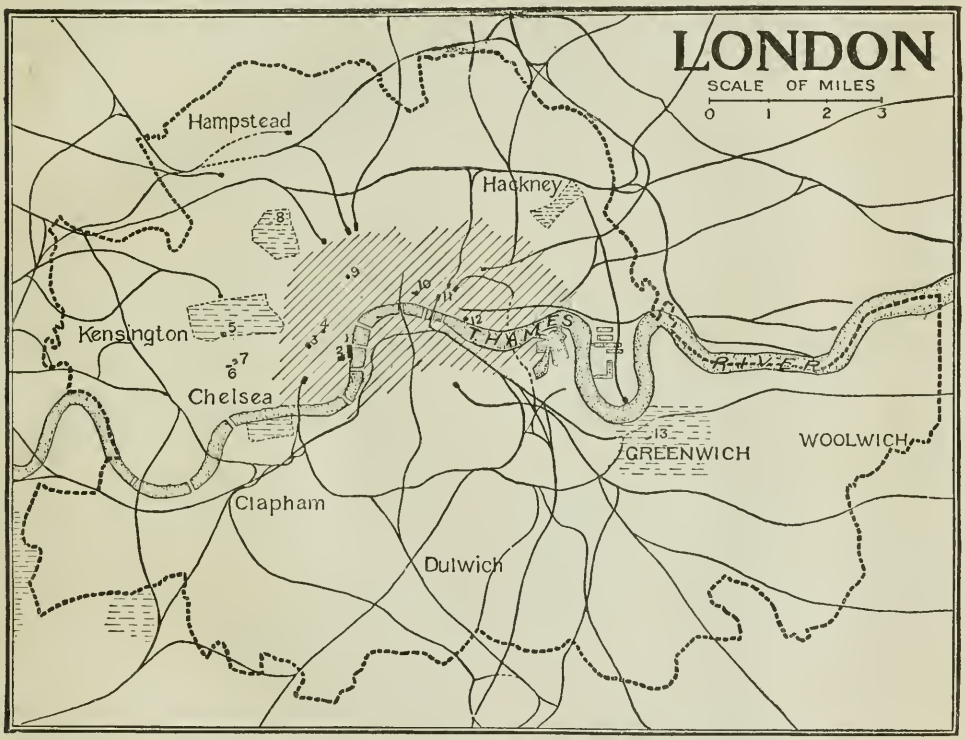
TRAFALGAR SQUARE AND NELSON MONUMENT, LONDON

It has been said that if one Englishman, for any reason, wishes to find another Englishman, he need not institute a world-wide search. If he will but be patient the man wanted will one day appear in Trafalgar Square

sides the great Saint Paul's Cathedral. That part of London which lies west of the Cathedral contains the Houses of Parliament, Westminster Abbey, the royal palaces, the government offices, the British Museum, picture galleries and the residences of the aristocratic and wealthy classes.

London is practical and commercial, and the city has grown because of its business importance, a fact which accounts to a great extent for the crudity of its plan. Communication between different parts of the city is effected by cabs, tramway cars, omnibus lines, street railways and steamboats, which ply regularly along the Thames. Elaborate systems of underground railways connect different parts of the city and join the terminal stations of the great railways. In order to dispose of the soil taken from the underground tunnels, or tubes, without detriment to the streets, it has been necessary to put them at a great depth and to work from the ends of the route into the city. Yet the problem of rapid transit within the city has not been satisfactorily settled, for it is a tremendous task to move the millions of people whom business requires to travel about from day to day.

London has excellent communication with all parts of the United Kingdom and with the outside world through the Thames River and the numerous railways, several of which have handsome stations at their terminals. The river is spanned by a number of broad, expensive bridges, some of which have been constructed on the site of other structures erected hundreds of years ago, and all of which are so arranged as not to interfere with navigation. The famous London Bridge is a granite structure erected in 1831 and enlarged in 1904. Over it passes an enormous traffic between the "city" and two densely populated boroughs.

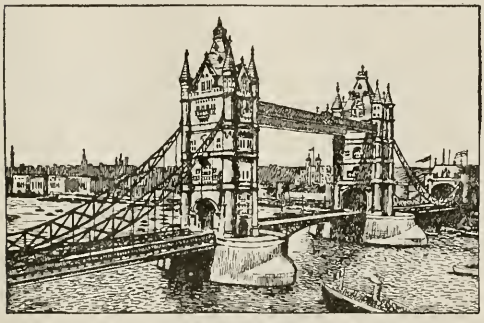


1. Houses of Parliament; 2, Westminster Abbey; 3, Buckingham Palace; 4, Saint James's Palace; 5, Albert Memorial; 6, Natural History Museum; 7, South Kensington Museum; 8, Zoölogical Gardens; 9, British Museum; 10, Saint Paul's Cathedral; 11, Bank of England; 12, Tower of London; 13, Greenwich Observatory.

Streets and Parks. Among the noted streets which run from east to west are Piccadilly and Pall Mall; the Strand and its continuation, Fleet Street, famed as the world's greatest newspaper center; Oxford

Street and its continuations, Holborn, Holborn Viaduct and Cheapside. Southward from Trafalgar Square extends Whitehall, on which are located many important government buildings, and to the right of this street is Downing, on which the Prime Minister has his offices. The Thames Embankment, otherwise known as the Victoria Embankment, which runs along the north shore of the river from the Houses of Parliament east, is a magnificent thoroughfare, adorned by important buildings and ornamented with parks and statuary. The river is held in control by a solid granite embankment, through which, at intervals, steps give access to the steamers. Hyde Park, containing about 400 acres, is surrounded by a carriage drive two and one-half miles long. This is the most fashionable of the royal parks and, together with Regent's Park, Saint James's Park and Green Park, is located in the West End. Regent's Park contains the gardens of the Zoölogical Society, with the largest collection of animals in the world, and the gardens of the Royal Botanic Society.

Other parks are located in different parts of the city, and more are being provided for as places of rest and recreation for the crowded inhabitants. On the southern side of the city is Greenwich Park, naturally one of the most beautiful, and famous as being the location of the Greenwich Observatory. More characteristic of London than its formal parks are the heaths, or commons, which are



TOWER BRIDGE

preserved nearly in their natural condition for the use of the people. Hampstead Heath, to the north, and Black Heath and Plumstead Common, on the southeast, are the largest.

Public Buildings, Monuments and Institutions. Saint James's Palace, erected by Henry VIII; Buckingham Palace, built by George IV; Marlborough House; Kensington Palace, the birthplace of Queen Victoria, and others are among the royal palaces which grace the city. The imposing Houses of Parliament stand on the north bank of the Thames, in the West End. The Tower of London is farther east on the same side of the river. The Bank of England; the Royal Exchange; the Mansion House, which is the official residence of the lord mayor; Guild Hall, the seat of municipal government, and the four Inns of Court are noteworthy buildings. The new Law Court is one of the most important of recent public structures. Saint Paul's Cathedral, completed in 1710 by Sir Christopher Wren, is a magnificent building, 510 feet in length, with a great dome 400 feet in height, the most conspicuous of London's buildings. Westminster Abbey adjoins the Houses of Parliament.

London is noted for its museums and galleries, chief among which is the famous British Museum. The South Kensington Museum occupies a capacious series of buildings which contain valuable collections in science and the fine arts, and the natural history department of the British Museum is located in an imposing building at South Kensington.

Notwithstanding its fogs and dirt, London is, taken as a whole, one of the healthiest cities in the world, and its public and charitable institutions are numerous. Hospitals and institutions for the care of the defective classes are well managed, and in recent years charitable work has been carried on extensively among the poorer classes.

On Fish Street Hill is a monument 202 feet high, erected in commemoration of the great fire of London; in Waterloo Place is the York Column, and in Trafalgar Square, the beautiful Nelson Column, at the base of which are the four famous bronze lions, the work of Sir Edwin Landseer. On the Thames Embankment is Cleopatra's Needle, a granite obelisk, companion to the one in Paris, that was brought to Europe from Egypt. Elsewhere in the city are many beautiful monuments and statues.

Commerce and Industry. The commerce of London is enormous. Besides that which is transacted over the railways from the ports Southampton and Liverpool, and the internal commerce with the other cities of Great Britain, there is an enormous tonnage from all parts of the world coming to the

docks, which extend along the river from London bridge eastward. London is the great port for the produce of the East and West Indies. The value of the imports is estimated at more than one-third that for the entire United Kingdom. The manufactories of London are almost limitless in number and capacity. The largest breweries and sugar refineries in the Kingdom are located here; extensive chemical works, soap manufactories and dye works are also to be found; silk weaving is an important industry; metal manufactures of all kinds, as well as manufactures of clothing and articles necessary to the shipping trade, are correspondingly greater than in smaller cities. In fact, it is impossible to give any clear idea of the extent and character of the varied industries which have made London what it is. In 1918 extensive harbor improvements were completed, in preparation for Great Britain's efforts to build up a great post-war trade.

History. When the Romans invaded Britain in 55 B. C. London was a trading town of considerable importance. Alfred the Great made it his official capital, in the ninth century. At the time of the Norman conquest, in 1066, London submitted to William and received from him a charter which is still preserved. Other charters were granted by subsequent rulers. In the fifteenth century some of the principal streets were paved, but for many years afterward the sanitary conditions remained terrible. In December, 1664, began the great plague which carried off about 69,000 persons. In 1666 the great fire broke out, destroying 14,200 buildings and spreading over 336 acres. Many improvements were made in rebuilding, and from that time the growth of the city was rapid.

During the World War London was repeatedly attacked by German aeroplanes, but did not suffer extraordinary material damage, though the loss of life was heavy. During the war many of the objectionable tenements in the East Side slum districts were demolished, and great improvements in housing conditions were effected.

Related Articles. Consult the following titles for additional information:
British Museum — Thames
Buckingham Palace — Tower of London
Greenwich — Westminster Abbey

LONDON, JACK (1876–1916), an American novelist whose spirited and imaginative stories won him wide popularity. He was born in San Francisco. Though he completed the freshman year in college, the education which fitted him for his literary career was his varied experience as a longshoreman, a sailor before the mast, a gold hunter in the Klondike, and as a care-free man tramping across the continent. He was a voluminous and powerful writer. Among his works which have been favorably received are *Before Adam, The Call of the Wild, The People of the Abyss, The Sea Wolf, The Valley of the Moon, The Turtle of Tasman* (a collection of short stories) and *The Human Drift.* The last named was published the year after his death.

LONDON, ONT., the capital of Middlesex County, 121 miles southwest of Toronto, on the River Thames and the Canadian Pacific, the Wabash, the London & Port Stanley, the London & Lake Erie, the Huron & Bruce, the Saint Mary's & Stratford, the Grand Trunk, the Michigan Central and the Pere Marquette railroads. London is in the center of a fine agricultural region and is the shipping point for Western Ontario. It has over 250 industrial establishments; among the manufactured products are stoves, boots and shoes, clothing, carriages, cigars and candy. Western University, Huron College and Sacred Heart Academy are located here. Population, 1911, 46,177.

LONDON COMPANY, a corporation chartered in London in 1606 for the purpose of English colonization in America. In the same year it was divided, one company being called the Plymouth, or North Virginia, Company, the other the London, or Virginia, Company. The latter was the first to plant a colony; it settled Jamestown in 1607.

Related Articles. Consult the following titles for additional information:
Mayflower — Plymouth Colony — Virginia

LONG BRANCH, N. J., a town in Monmouth County, forty-five miles by rail and thirty-five miles by water from New York City, on the Atlantic Ocean and a branch of the South Shrewsbury River, and on the Pennsylvania, the Camden & Amboy and the Central of New Jersey railroads. Long Branch was first settled in 1607. It has large hotels and many boarding houses, picturesque cottages, and bathing houses, parks and places of amusement, which accommodate many thousands during the hot weather. Ocean Grove, which extends along the high bluff overlooking the sea, is a favorite walk.

There is but little manufacturing. Population, 1910, 13,298; in 1917, 15,733 (Federal estimate).

LONGEVITY, *lonjev'i ty,* long duration of life. It is purely a relative term, since some forms of plants and animals live on the average but a few hours, while others live for thousands of years. Two causes may produce unusually long life—heredity and environment—and each may limit or offset the effect of the other. In general it is known that forms of life which take long to develop and which reproduce late in life usually live longer than those which mature early and reproduce in their first stages. Of mammals, man, the elephant and the whale are the only ones that ever live longer than one hundred years, and there are but few cases of human life extending over one hundred and eight. The modern sciences of sanitation, medicine and surgery have increased the average duration of man's life perceptibly. According to the census of 1890, the average age at death of persons in the United States was 31.1 years. Since that time it has risen to 35.2 years, and is going higher, but with less increase from year to year, as is natural to expect.

In the following table, the ages noted, in years, are those to which the various creatures may be expected to live, under normal conditions:

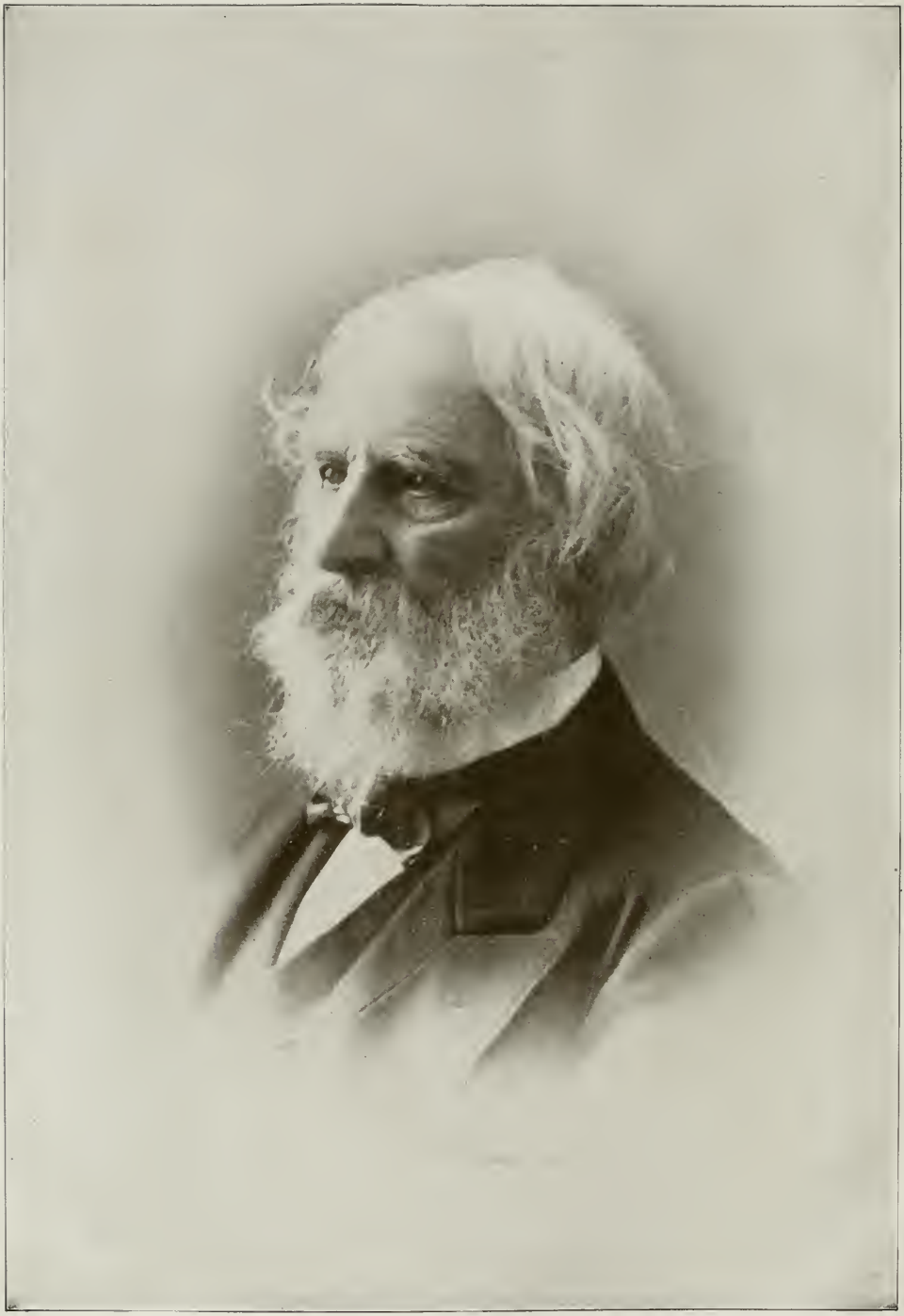
Birds			
Eagle	100	Goose	50
Swan	100	Sparrow	40
Crow	100	Skylark	30
Heron	60	Peacock	24
Parrot	60	Crane	24
Pelican	50	Canary	24
Linnet	23	Goldfinch	15
Pigeon	20	Hen	14
Nightingale	18	Blackbird	12
Lark	18	Robin	12
Pheasant	15	Thrush	10
Partridge	15	Wren	3
Animals			
Whale	500	Pig	25
Tortoise	350	Cow	25
Crocodile	300	Goat	15
Elephant	100	Ox	15–20
Lion	40	Frog	12–16
Camel	40	Dog	15
Toad	36	Cat	13
Horse	27	Sheep	12
Leopard	25	Hare	10
Bear	25	Squirrel	6
Tiger	25	Mouse	6
Fish			
Carp	150	Eel	60
Pike	150	Lamprey	60
Salmon	100	Crayfish	20


"The Belfry of Bruges"

LONG'FELLOW, HENRY WADSWORTH (1807–1882), one of the best-loved and most widely read of American poets, was born February 27, 1807, at Portland, Maine. His mother, who claimed descent from John Alden, was a gentle and devout woman, and his father was a man of culture and breadth of view. Thus the refined home influences of his childhood and youth gave final impress to a character naturally amiable, sympathetic and unselfish. At the age of fourteen Longfellow entered Bowdoin College, where he so distinguished himself in the study of modern languages that later he was offered the professorship of that department. He completed his preparation for this position by a tour in Europe, and took up his new duties in 1829. In 1831 he married Miss Mary Potter, of Portland, a gifted and charming woman; and in 1834 he published his first important work, *Outre Mer,* a volume of prose sketches.

Longfellow was elected in 1835 to the chair of modern languages and literature in Harvard University, and after another year spent in Europe in the study of Scandinavian languages and literature he entered on a professorship which was to last, with interruptions, for seventeen years. Before his return to America, however, he lost his wife, who died at Rotterdam in 1835. For a period of six years he remained at Harvard, living in the old Craigie house, where the prose romance, *Hyperion,* was published (1839), and the *Voices of the Night* (1839), *Poems on Slavery* (1842) and the *Spanish Student,* a drama in three acts (1843), were written. Then, for a third time, he went abroad. Returning, he resumed his professorship and retained it until 1854. His remaining years were quiet, contemplative and uneventful, except for the one tragedy which broke their serenity—the death of his second wife, who was burned before his eyes in their Cambridge home.

In 1847 *Evangeline* was published; in 1855, *The Song of Hiawatha;* and in 1858, *The Courtship of Miles Standish,* all thoroughly American in theme and sentiment.



HENRY WADSWORTH LONGFELLOW

LONGFELLOW'S HOME AND HIS STUDY

In 1863 *Tales of a Wayside Inn* appeared; in 1867, *Flower de Luce,* and in 1868 came *The New England Tragedy,* which, with *The Golden Legend* (1852) and *The Divine Tragedy* (1872), forms the trilogy, *Christus.* In company with his three daughters, Longfellow made a last trip to Europe in 1868–1869. While abroad he received the degrees of LL.D. and D.C.L. from the universities of Cambridge and Oxford, respectively, and when he died, in 1882, his bust was placed in the Poets' Corner in Westminster Abbey, an honor which had never been accorded to any other American. *Three Books of Song, Aftermath, The Hanging of the Crane, Morituri Salutamus,* the *Masque of Pandora, Keramos* and *Ultima Thule* were the chief productions of Longfellow's later years.

Longfellow's power of graceful translation is seen in *The Poets and Poetry of Europe* (1845) and in the translation of Dante's *Divine Comedy* (1867), but his fame rests chiefly upon his three American epics. Though he possessed wide culture and his poetry is remarkably free from vulgarity, he is preëminently the poet of the common people. The truths he expresses may be commonplace, but they are realized by him with such fresh force and are so simply and sympathetically told that his power of appeal is pronounced among a large body of people for whom the more abstruse poets have no message. Refined in sentiment, musical in form, stimulating in effect, his verse is one of the most potent influences in American literature. His influence in his own day lay not only in his writings, but in the fact that he was one of the first American scholars to introduce into America the culture and learning of European countries. In all his work as a lecturer in college, he strove to present to his students the spirit and beauty of foreign literature, to widen their outlook.

Of the briefer biographies of Longfellow the most satisfactory are those by Thomas W. Higginson and F. H. Underwood. The biography by Samuel Longfellow is a more extended work of two volumes. In the article Reading the reader will find an outline on the life of Longfellow, a full-page graphic, and type lessons for the study of his poems.

Related Subjects. Consult the following titles for additional information:

Alden, John	Evangeline
Courtship of Miles Standish	Hiawatha

LONG ISLAND, an island belonging to the state of New York, of which it forms the southeastern extremity. It is about 118 miles in length, its greatest width is twenty-three miles, and its area is 1,682 square miles. It is connected with New York City by four great suspension bridges across East River (see Bridge, subhead *Suspension Bridges*) and by a link of the New York subway system. It is separated from Connecticut by Long Island Sound. The island has become a vast suburban territory, and is dotted with towns and estates of people whose business is in the great city. The chief city is the borough of Brooklyn, which is a part of Greater New York. See New York (city).

Battle of Long Island, a battle of the Revolutionary War, fought on Brooklyn Heights, August 27, 1776, between an American force of 8,000 under Israel Putnam, and a British force of 15,000 under General Howe. The Americans were attacked from four directions, and though they fought gallantly for more than four hours, they were compelled to flee, many surrendering. The British loss was about 400; the American loss, about 1,400 in killed, wounded and captured. The battle decided Washington to evacuate his position on Long Island, and was the beginning of his masterly retreat which took him into the region of the Delaware River.

LONGITUDE, *lon'ji tude,* in geography, the distance of a place due east or west from a given meridian, this distance being measured along the equator or a parallel of latitude. Longitudes are generally reckoned from the meridian of Greenwich, England, although Washington has been used to a limited extent. Since the parallels of latitude get smaller toward the poles, at which all the meridians converge, it is evident that degrees of longitude which are 69½ statute miles long at the equator get shorter toward the poles, at which they finally become 0.

As the earth makes one revolution on its axis, that is, turns through 360° of longitude from east to west, in twenty-four hours, if the sun or a star is on the meridian of any place at a particular time it will be on the meridian of another place 15° west of the first in one hour. Thus, 15° of longitude represent one hour of difference in time, and hence longitude may be easily determined by the use of the chronometer set to Greenwich time, which is the method commonly employed at sea. Longitude is reckoned to 180° eastward or westward of the fixed meridian. See Latitude; Longitude and Time.

LONGITUDE AND TIME. The teacher in school tells us that the circle or circumference of the earth is divided into 360 equal parts, each part of which is called a degree. This measurement came down to us from more than 2,000 years before Christ, for it was used by the Babylonians and adopted, with slight improvements, by the ancient Greeks. The reason that 360 divisions in the great circle were made is that the ancients believed that the year contained 360 days. A degree, then, is one of the 360 equal parts of the circle of the earth.

We know that from the instant in any day that the sun is directly over our heads until it is again in the same position, 24 hours have passed. During that 24 hours each portion of the earth's surface, at one moment or another, has been directly under the sun. Therefore, in the 24 hours, the entire circumference of 360° has passed directly beneath the sun. Now we see clearly why our arithmetics tell us 24 hours of time will be the same measurement as 360° of space, for it takes 24 hours for the entire 360° of the earth's circumference to pass beneath the sun. If, then, 24 hours of time equal 360° of space, 1 hour of time will equal $\frac{1}{24}$ of 360° of space, or 15° of space. Now let us put in tabular form those two facts before we go farther:

24 hrs. of time =360° of space,
1 hr. of time = 15° of space;

and let us apply this truth at once in a practical way. If it is noon exactly where you stand and there is a difference of 1 hour in every 15°, how far east or west of you will the time be 2 hours different from what it is where you are? Will it be earlier or later than noon at points east of you? The earth in its orbit moves from west to east, so it is clear that when it is noon with you it has already been noon at places east, for they have been directly beneath the sun and the sun has appeared to move on westward toward sundown. If you are at a point called A and it is noon, and a point called B is 15° E. of you, then at that point it is 1 o'clock in the afternoon. By the same process of reasoning, when it is noon at your location at A, it is not yet noon at a point 15° W. of you, for that point has not yet, in its whirling through space, come directly under the sun. It will not do so for 1 hour, for it has yet to turn $\frac{1}{24}$ of the distance around on the axis before coming directly beneath the sun. These are elementary truths, but they must be understood before one has a basis of fact on which to build his knowledge of longitude and time.

It is clear that we must have smaller divisions than degrees if we would measure with accuracy. The ancients divided a degree into 60 equal parts, called minutes, because they divided their hour into 60 equal parts, called minutes. Now, we must not confuse a minute of time and a minute of space, for they are as distinct as hours and degrees. The minute of space is still further subdivided into 60 equal parts, called seconds of space, for the reason that the minute of time is also divided into 60 equal parts, called seconds. Therefore, we may complete the partial table above, as follows:

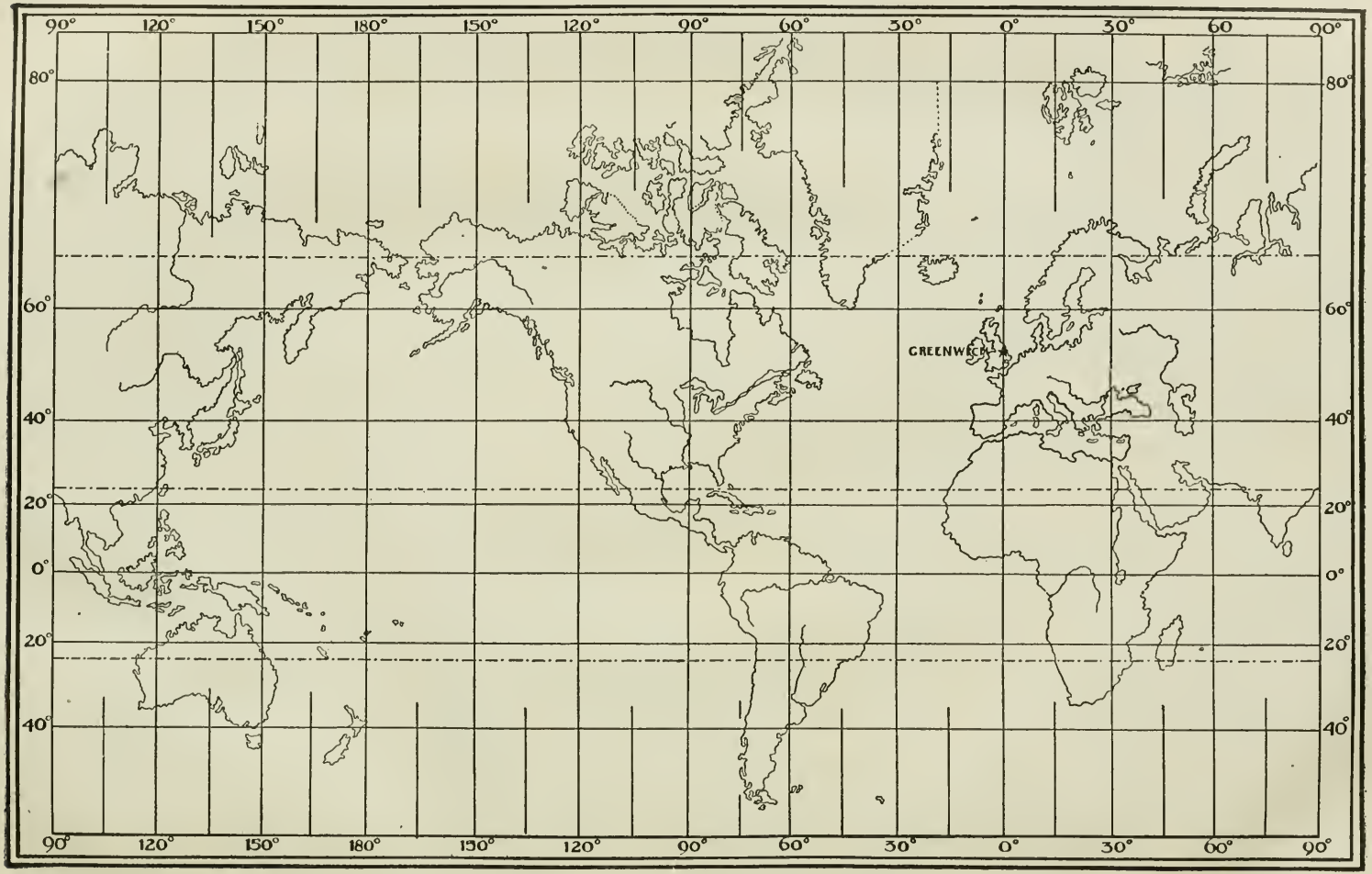
24 hrs. of time=360° of space,
1 hr. of time= 15° of space,
4 min. of time= 1° of space,
1 min. of time= 15′ of space,
1 sec. of time= 15″ of space.

Exercises. Let some object conveniently placed represent the sun; place a globe in such a position toward the sun that it must be noon at the place where you live; point out all the other places on the globe where it must be noon at the same time. *Meridian* is a term which means noonday; therefore, the name *meridian* has been given to this imaginary line which passes through your town and through all other towns where it is noon at the same time. A more complete definition of meridian is great circle—the meridian which passes through your home extends around the world. Locate on the globe the opposite meridian. When it is noon on your meridian, what time must it be at the place exactly opposite? How many hours difference in time between these two places? How many degrees difference between these two places?

Point out the place east of your meridian which is half-way toward the opposite side of the globe from you. It would be sunset. How many hours difference in time and how many degrees distant is that spot from your home? Point to another meridian where it is also 6 o'clock, considering it yet to be noon at your place. Will it be sunrise?

From what you can learn from the above exercises answer this question:

If clocks keeping correct time were placed at points exactly 15° apart clear around the earth, beginning at your home, what would



LONGITUDE AND TIME MAP OF WORLD, WITH DIVISIONS OF 15° AND 30°

be the exact difference in time these clocks would show?

Plan for Teaching. Longitude and time should not be taught without the use of the

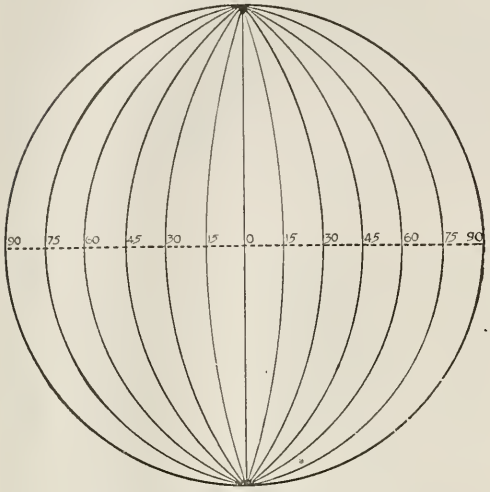


FIGURE 1. HEMISPHERE

globe and a flat map of the world; it would be well, also, to present a diagram of a hemisphere; better than the ordinary representation of a hemisphere as shown in Fig. 1 would be a diagram, such as Fig. 2, showing the north or south pole so that the entire 360° of the circle can be shown.

Do not leave the fundamental principles until each member of the class thoroughly understands them; the boy or girl who does not know the relative values of 1 hour and 15° will never learn longitude and time; drill over and over on the fact that 24 hours

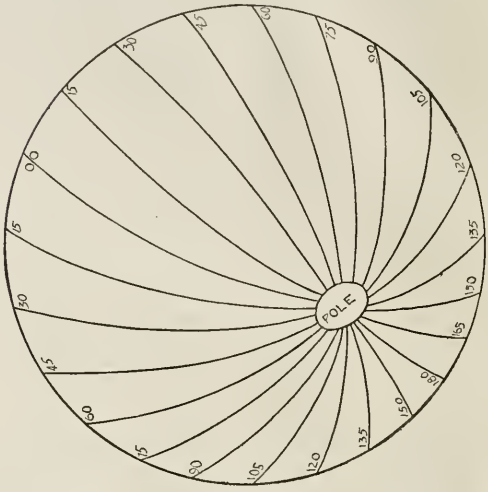
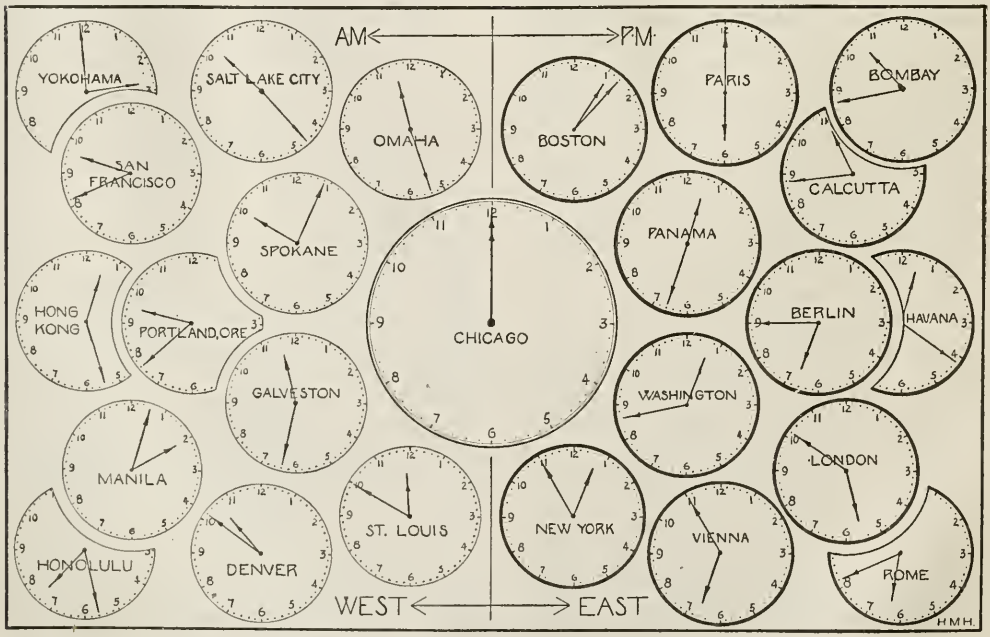


FIGURE 2. SHOWING CONVERGING MERIDIANS

of time represent the passing under the sun of 360° of space in the revolution of the earth. That once understood, it is easy to show that 15 of these degrees pass under the



COMPARATIVE TIME, WHEN NOON IN CHICAGO

sun in 1 hour of time, and from that, the other subdivisions are explained without difficulty.

Have a pupil stand facing north with hands outstretched toward the east and west. If it is noon directly over his head, ask him if it is earlier or later than noon in a certain city some hundreds of miles east or west. Then follow with easy problems relating to places whose location the class fairly well understands. Ask them to tell you how many hours apart in time the city A and the city B are, if one is 30° E. of you and one 15° W. You can continue such problems until you have practically made the circuit of the globe. (See map, page 2163.)

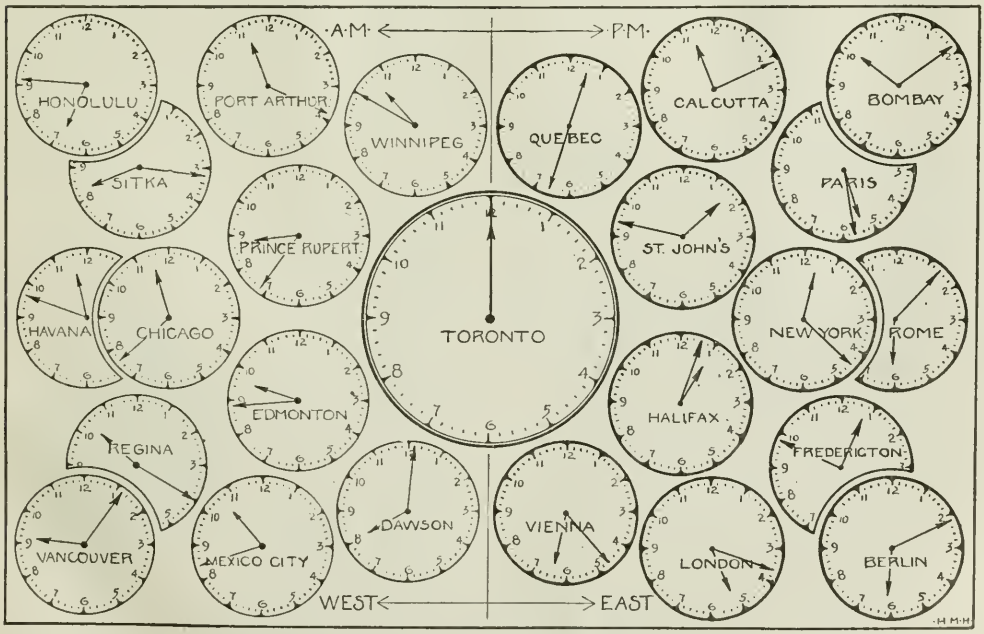
The Given Meridian. Thus far we have not developed the fact that all men must agree upon a certain meridian from which to reckon longitude east and west on all the earth's surface. In our investigations above we have based all questions and computations upon the meridian running north and south through our home. The children will understand clearly why it is impossible that all men should be able to use in their computations our own meridian, so we all agree upon a certain meridian which runs north and south through England, France, Spain and Western Africa, exactly at the point where it passes through Greenwich, England, where is located a great astronomical laboratory. This point is only a few miles from the largest city in the world. We call the meridian of Greenwich 0° and reckon all distances in longitude east and west from that given meridian.

Exercises. Have the pupils solve the following problems, mentally, without consulting the chart.

1. Chicago is about 90° W. of Greenwich. Chicago clocks show how many hours later or earlier than Greenwich time?
2. When it is 2 o'clock in the afternoon at Greenwich, what time is it in Chicago?
3. Petrograd is 30° E. of Greenwich; Hamburg, in Germany, is 10° E. of Greenwich. How many hours difference in time between the two places?
4. If it is noon in Petrograd what time is it in Hamburg?
5. Denver is about 105° W.; Carson City, Nevada, is about 120° W. When it is 11 o'clock in the morning at Denver, what is the time in Carson City?

The diagrams will help you to understand the differences in time between cities. The clocks in the center show noon in Chicago and Toronto.

Rule for Longitude and Time. If the pupils have had no difficulty in understand-



COMPARATIVE TIME, WHEN NOON IN TORONTO

ing the principles thus far developed and have been able to solve the simple problems above suggested, they will understand the reasons underlying the following rules for solution of the more difficult problems in longitude and time:

1. *When the difference in longitude is given, divide this difference in longitude, expressed in degrees, minutes and seconds, by 15. The difference will be the difference in time expressed in hours, minutes and seconds.*

Below is an example to illustrate the rule:

The longitude of Baltimore is 76° 37′ W.; that of San Francisco is 122° 23′ W. What is the difference in time?

122° 23′
76° 37′

15) 45° 46′

3 hrs. 3 min. 4 sec.

2. *When the difference in time is given, expressed in hours, minutes and seconds, multiply the difference by 15. The result will be the difference in longitude in degrees, minutes and seconds.*

Below is an example to illustrate the rule:

When it is noon at San Francisco it is 13⅓ minutes past 3 o'clock in the afternoon at New York. If the longitude of New York is 74° 3′ W., what is the longitude of San Francisco?

3 hrs. 13⅓ min.
15

48° 20′
74° 3′

122° 23′

Note. If one point is east of the meridian at Greenwich and one point is west, the difference in time or in degrees is found by adding rather than subtracting. Demonstrate the truth of this.

Below are a few problems for practice. Each should be understood by every pupil who attempts to solve it, and any difficult points should be fully explained before the next problem is attempted:

1. A vessel sailed from a port directly on a line of latitude for a certain distance, then turned and went due north to port. Here the captain found his watch to be 40 min. slow. In what direction did he sail at first, and how many degrees?

2. A man travels until his watch is 1 hr. 20 min. fast. Does he go east or west, and how many degrees?

3. A boat race is finished on the Thames River at 4 o'clock P. M. How early can the fact be published in Boston papers? Boston is 71° W.

4. What time is it in Buffalo, 79° W., when it is 20 min. after 6 o'clock A. M. July 6, in Constantinople, which is 29° E.?

5. The following cities have the longitude given:

Berlin	13° 24′ E.	Detroit	83° 43′ W.
Boston	71° 3′ W.	London	6′ W.
Calcutta	88° 20′ E.	Paris	2° 20′ E.

(a) When it is 3 o'clock P. M. in Berlin, what time is it in Detroit?

(b) When it is noon at Calcutta, what time is it in London?

(c) It is 8 o'clock P. M. in Paris; what time is it in Boston?

LONG PAR'LIAMENT, the name given to a Parliament of Charles I which assembled in 1640 and was not formally dissolved until March, 1660. Summoned to supply Charles with the means of subduing the insurgents in Scotland, it refused to proceed to this business until it had secured the redress of certain grievances. After its grievances had been attended to, Parliament turned its attention to religious questions, and here disagreement speedily arose. It was this Parliament which conducted the civil war against Charles I, and before the close of that struggle the Independents in the army had become strong enough to demand the withdrawal from Parliament of the Presbyterian members, who considerably exceeded in number the Independents. The name *Rump Parliament* is given to the body which remained. The Rump Parliament put Charles to death and established the Commonwealth, but Cromwell dissolved the body. After Cromwell's death it was called together again, but its only act of importance was to order a new election and vote its own dissolution.

Related Articles. Consult the following titles for additional information:

Charles I (England) — Cromwell, Oliver
Commonwealth of England — Strafford, Thomas

LONG'STREET, JAMES (1821–1904), a distinguished Confederate general, born in South Carolina. He was graduated at West Point in 1842, saw service on the Mexican frontier and was brevetted captain and major for gallantry. When the Civil War broke out Longstreet joined the Confederate forces. He fought in the Seven Days' Battle, in the second

LONGSTREET

Battle of Bull Run, at which his arrival at the right time turned defeat into a Confederate victory, at Fredericksburg, at Gettysburg, at Chickamauga and in the Battles of the Wilderness. After the war he held important government positions, among them those of minister to Turkey and United States commissioner of railroads, which post he held at the time of his death.

LOO'-CHOO', **LU-CHU**, **LIU-KIU**, **LIU-CHIU**, or **RIU-KIU**, a chain of over fifty islands in the Pacific Ocean, between Japan and Formosa. The largest island is Okinawa-Shima, or Great Loo-Choo, which has an area of about 500 square miles. The chief products of the island are sugar, rice, wheat, maize and sweet potatoes; but cotton, sago, tobacco, indigo, figs and bananas are also grown. The inhabitants are mainly of a race akin to the Japanese. Since 1874 the archipelago has belonged to the Japanese Empire. Population, 453,550.

LOOK'OUT MOUNTAIN, Battle of. See Chattanooga, Battles of.

LOOM. See Weaving.

LOON. See Diver.

LOQUAT, *lo'kwaht,* originally a Chinese and Japanese fruit, now cultivated also in the subtropical countries of Europe and in California and Florida. The tree is an evergreen, and attains a height of twenty to thirty feet, but when cultivated it is not allowed to exceed twelve feet. The fruit is pear-shaped, yellow and about an inch in diameter, and has an acid flavor agreeable to the taste. A number of improved varieties have been developed.

LORAIN', Ohio, in Lorain County, twenty-five miles west of Cleveland, on Lake Erie, at the mouth of the Black River, and on the Baltimore & Ohio, the Lorain & West Virginia and the New York, Chicago & Saint Louis and the Lake Shore Electric railroads. It is in the Ohio gas region and forms an important outlet for the central Ohio coal fields. There is a good harbor, and the city has several boat lines. Iron ore is brought from the Lake Superior region. The industrial establishments include steel mills, foundries, shovel works, brickyards and shipbuilding plants. There are a Carnegie Library, Saint Joseph's Hospital and more than a score of churches. It was settled in 1822, was incorporated as a village in 1873, and became a city in 1895. Population, 1910, 28,883; in 1917, 38,266 (Federal estimate).

LORD, a noble title in Great Britain, held by one of exalted birth, or bestowed by royal favor. The title by courtesy is given to eldest sons of earls, dukes and marquises. A lord is addressed, "My lord;" "your lordship."

LORD CHIEF JUSTICE, the title of the chief judicial officer in England. There are three English courts of practically equal power, but the title, by consent since early in Victoria's reign, has been given to the chief justice presiding over the King's Bench Division of the Supreme Court of Judicature. The Lord Chief Justice is a lord of Parliament, by virtue of his office, and is addressed, "My lord." See Reading, Lord (present incumbent).

LORDS, House of. See Great Britain, subhead *Government.*

LORELEI, *lo're li,* a rock on the right bank of the Rhine River, about 430 feet high. Its extraordinary echo gave rise to the legend that the rock was the home of a siren who, by her wonderful singing, lured all who passed by on the river to destruction. This legend is the subject of a beautiful poem by Heine, which has been several times translated into English.

LOR'IMER, George Horace (1868–), an American editor and story writer. He was born in Louisville, Ky., the son of a Baptist clergyman, and was educated at Colby and at Yale. He entered upon a business career in the Chicago stockyards, but abandoned it for a literary career. In 1899 he became editor of *The Saturday Evening Post,* which position he still holds. He published *Letters from a Self-made Merchant to His Son* and *Old Gorgon Graham.* Both of these volumes contain truths and aphorisms of the business world, expressed so interestingly and pithily that the books enjoyed an extensive popularity immediately upon their publication. They first appeared in the *Post* and greatly increased its circulation.

LO'RIS, a lemur found in the East Indies. It has a round head, long limbs, short muzzle, large eyes and no tail. One species is called the *slender loris.* They sleep during the day rolled up in a ball and cling with all four feet to a branch. They are slow and stealthy and live upon birds, insects and vegetables. The *slow loris* is larger than the slender loris and is held in reverence by the Malays because of its odd appearance and retiring habits.

LORNE, John, Sir. See Argyll, John Douglas Sutherland Campbell, Ninth Duke of.

LORRAIN' Claude. See Gelée, Claude.

LORRAINE. See Alsace-Lorraine.

LO'RY, a group of climbing birds belonging to the parrot family, with broad tails and dense, soft, brilliantly colored plumage. They live chiefly upon honey, which they are able to extract from flowers by means of their brush-tipped tongues. An Australian species has a bright green head and a blue body, marked on the under parts with red. The collared lory is easily taught to speak.

Palm Walk in Echo Park

LOS ANGELES, *lohs ang' gel es,* or *an'jel es,* Calif., the largest city in California and the tenth in population among American cities, is situated in a beautiful parklike region which attracts winter tourists by the thousands. It is the county seat of Los Angeles County, one of the most charming regions of Southern California, and is surrounded by numerous attractive suburbs. Among these are Pasadena, Alhambra and Universal City, the latter a municipality devoted chiefly to the moving picture industry. The mild climate and prevalent sunshine during the dry season make the Los Angeles district a haven for motion picture producers.

Location and Area. The city is situated on the Los Angeles River, ten miles south of the Sierra Madre Mountains, fifteen miles east of the Pacific Ocean, and 484 miles southeast of San Francisco, which it but recently supplanted as the first city of the state. This was largely due to a number of annexations, by which the ports of San Pedro and Wilmington, on the Pacific coast, became a part of the city. A strip of land a few blocks in width connects Los Angeles and its ports, and the corporate limits of the city now enclose an area of 287.9 square miles, as compared with 106 square miles in 1910.

Communications. With a water frontage of perhaps a score of miles, Los Angeles has become a first-class port of call, and is visited by regular steamers from Seattle, Portland, San Francisco, British Columbia, Honolulu and the Far East. It is also in touch with European ports by steamers using the Panama Canal. For the improvement of the harbor the United States government has appropriated more than $3,000,000, and the city government has expended an additional $10,000,000 in building wharves and a thoroughfare between the city and harbor. Los Angeles is served by the Atchison, Topeka & Santa Fé, the Southern Pacific and the Los Angeles & Salt Lake railroads, and is the center of a complete interurban system. All of the surrounding suburbs, including Santa Monica, Ocean Park, Venice, Long Beach, Pasadena and Catalina Island, are easily accessible.

General Description. Los Angeles is well laid out and is noted for its broad streets and handsome boulevards. In the residential sections the streets are embowered in palmetto palm, eucalyptus and other trees and various forms of tropical shrubs and flowers. The city has an elaborate system of parks, with a total area of more than 4,000 acres. Pershing Square, formerly Central Park, in the business section, is noted for its beautiful trees and flowers and for the soldiers' monument. Elysian Park is of interest because of Fremont's Gate, erected in honor of the great explorer, and its botanical gardens, which contain a great variety of trees, shrubs and flowers, gathered from nearly all parts of the world. Griffith, the largest park, is in the foothills without the city limits, and contains about 3,000 acres. Other notable parked areas include Lincoln, Westlake, Echo and Hollenbeck. In Exposition Park there is a museum of art, science and history, also the state exposition building and the Seventh Regiment Armory. The parks are connected by wide boulevards, which lead to the various resorts about Los Angeles and connect with the state road system.

Buildings and Institutions. Among the public buildings of note are the Federal building, erected at a cost of nearly $2,250,000, the city hall, the chamber of commerce, Blanchard Art Building, the county courthouse and hall of records, the Y. M. C. A. and Y. W. C. A. buildings, Temple and Shrine auditoriums, Trinity Auditorium and the Bible Institute. Among the most noted churches are the Roman Catholic Cathedral; Saint Paul's Cathedral, Episcopal; the First Congregational, the First Methodist

Episcopal, the Immanuel Presbyterian and the Old Plaza Church, of interest historically as the headquarters of General Fremont. There are many handsome hotels, and the private homes in the residential districts are beautiful and charming, with their setting of tropical verdure. Because of the general use of oil for fuel, Los Angeles buildings have not the grimy appearance of those in cities which endure the smoke nuisance. The city has many educational institutions, including the University of Southern California (Methodist Episcopal), Occidental College (Presbyterian), McClay Theological College, Saint Vincent's College and a state normal school. Its public libraries contain about 250,000 volumes.

Industry and Trade. Los Angeles is the center of a large fruit-growing region which produces oranges, lemons, olives, prunes and numerous fruits and walnuts in large quantities; consequently it is an important fruit market. Most of the wholesale fruit and produce business is transacted through the Wholesale Terminal, one of the largest and most complete wholesale markets in the country. The buildings, which are of the most modern type of concrete structure, are three and six stories in height, and have a combined floor space of over thirty acres.

Near by are oil wells, which furnish an abundance of cheap fuel for manufacturing purposes, and since 1900 the manufacturing industries of the city have developed very rapidly. Important among these are the refining of petroleum, the manufacture of asphalt, lubricating oils and other by-products, meat packing, fish canning and the manufacture of steel and iron, mining machinery and lumber products. The place is the center of a rich mining district, the products of which include cement and lime, gypsum, borax, clay, granite, gold and silver. In its annual foreign trade, the city is one of the leading Pacific ports.

History. Los Angeles was settled in 1781 by Spaniards from Mexico, and was named *Puebla de Nuestra Senora la Reina de Los Angeles*, which means "The city of Our Lady, the Queen of the Angels." From that time it grew slowly for a number of years, and previous to the American occupation it was for a time the capital of the Mexican province of California. It surrendered to the United States troops in 1846 and in 1851 was chartered as a city. After the construction of railway lines into Southern California, the city began to increase in population rapidly, and the discovery of petroleum in the vicinity gave an additional impetus to its already thriving industries.

In 1913 the great aqueduct through which water is brought to the city was completed. This structure diverts the flow of the Owens River, through an intake eleven miles north of Independence, near the base of Mount Whitney (see AQUEDUCT). It is 235 miles long and has a rated capacity of 259,000,000 gallons a day. Los Angeles uses the system also to generate electric power. Population, 1910, 319,198; 1917, 535,485 (Federal estimate).

LOS'SING, BENSON JOHN (1813–1891), an American historian, born in Beekman, N. Y. He first attracted attention by an interesting pictorial field book of the Revolution, which was followed after some years by similar works upon the Civil War and the War of 1812. His researches in the preparation of these volumes led to the writing of several historical works, of which the chief are a series of school histories, a large history of the United States, *Life and Times of Philip Schuyler* and *Encyclopedia of United States History*.

LOT'TERY, a scheme for the distribution of prizes by chance, the plan being generally to have a certain number of prizes and a much greater number of numbered tickets. The prizes are allotted to the holders of tickets which bear the same numbers as others drawn by chance from a receptacle. By act of the United States Congress lotteries are deprived of the use of the mails, and also of the privilege of the express companies. All lotteries in the United States are unlawful. The greatest lottery in the world was formerly the Louisiana lottery.

LO'TUS, a name given to a number of different plants. Of these the best known grows in Egypt. It is a beautiful water lily, with large, white and fragrant flowers and immense, wide-spreading leaves. This lily was held sacred to Osiris in ancient times and was a symbol of the creation of the world. A species of lotus no longer found in Egypt appears in Egyptian paintings and is used in the decoration of the capitals of the Egyptian columns.

In the United States the yellow water lily, or water chinquapin, is generally called the lotus, but the plant which is known by

botanists as the lotus is a little creeping herb, which is chiefly grown in temperate regions throughout the world. Four or five

AMERICAN LOTUS

species are found in Great Britain, where they are known as bird's-foot trefoil and cat-in-the-clover and by other fanciful names. The chinquapin is described more fully in the article NELUMBO.

LOTUS EATERS, in Greek mythology a race of people who fed upon the fruit and flowers of a plant called the lotus tree. This food caused all who partook of it to forget all about their native country. The Lotus Eaters, or Lotophagi, lived on the northern coast of Africa. In the *Odyssey* there is an account of a visit made by Ulysses to that land on his return from the siege of Troy. Three of his companions ate of the magical food, but their leader forced them to return to the ship and forbade the others to taste it, thus preventing the company from being seduced by its awful power. The lotus tree has been identified with the *jujube* (which see).

LOUBET, *loo'bay*, EMILE (1838–), a French statesman and president of the Republic. He began his career as a lawyer and rose rapidly. He was elected to the Chamber of Deputies in 1876 and to the Senate in 1885. In 1887 he became minister of public works, five years later he became premier and on the death of President Faure, in 1899, he was elected president of France. The country prospered under his administration. On the expiration of his term in 1906, he was succeeded by Fallieres.

LOUIS I, *loo'is*, called *the Debonair* or *the Pious* (778–840), the son of Charlemagne, succeeded his father in 814 as king of the Franks and emperor of the West. In 817 he divided his dominions among his three sons, Lothair, Pippin and Louis. In 829, in consequence of the urgent solicitations of his second wife, Judith of Bavaria, who had borne him a son, he made a new division of the Empire. The result was that the elder brothers revolted and commenced a war, which, with varying fortune to the parties concerned, lasted till the death of the father. He was succeeded as emperor by his son Lothair I; and by the Treaty of Verdun in 843 his son Charles the Bald obtained the territories from which France as a separate nationality developed; another son, Louis the German, obtained territories from which the distinctive German nationality developed.

LOUIS IX, known as SAINT LOUIS (1215–1270), one of the medieval Crusaders. He was king of France, eldest son of Louis VIII, and succeeded to the throne in 1226. In the year 1244, when dangerously sick, he made a vow to undertake a crusade to Palestine; and in 1248 he sailed with his wife, his brothers and a large army to Cyprus, whence in the following year he proceeded to Egypt. He was taken prisoner by the Mohammedans and released only on the payment of a large ransom, and it was not until the year 1252 that he returned to France. For the next fifteen years he employed himself in improving the condition of the people by wise laws. In 1270 he determined to undertake another crusade. He sailed to Africa, besieged Tunis and took its citadel, but a contagious disorder broke out, to which he himself fell a victim, together with a great part of his army. In 1297 he was canonized by Boniface VIII. See CRUSADES.

LOUIS XI (1423–1483), king of France, son of Charles VII. On his father's death, in 1461, he assumed the crown. The great object of Louis was the consolidation of France, the establishment of the royal power and the overthrow of the great vassals. In achieving this end he was very successful, although the means he used were unscrupulous. He encouraged manufactures and trade, and did much for the good of his kingdom, but was cold-hearted, cruel and suspicious. In 1481 Louis, who had been twice affected by apoplexy and was haunted by the fear of death, shut himself up in his castle and gave himself over to superstitious and ascetic practices.

LOUIS XII (1462–1515), king of France from 1498 until his death. He was the son of

Charles, Duke of Orleans, grandson of Charles V, and came to the throne on the death of Charles VIII, whose widow he married. In Italy he conquered the Duchy of Milan, took possession of Genoa and fought with Ferdinand the Catholic for the kingdom of Naples. He also took part in the League of Cambrai against the Venetians, whom he defeated at Agnadello. In 1510, however, he had to face the Holy League, formed against him by the Pope, Venice, England and the Swiss. He was beaten at Novara by the Swiss, and by the English at the Battle of the Spurs. He married, a short time before his death, Mary, the sister of Henry VIII of England.

LOUIS XIII (1601–1643), king of France, the son of Henry IV, ascended the throne in 1610, under the regency of his mother, Maria de' Medici. In 1614 Louis was declared of age, but for three years longer his mother managed to keep the power in her hands. She was at length banished from court, and the chief authority fell into the hands of various ministers. From 1624 Louis was almost completely under the guidance of Cardinal Richelieu, whose policy of oppression of the Huguenots brought on a war. Eventually Rochelle, the headquarters of the Huguenots, was captured (1628), and the revolt was put down. Louis was induced by Richelieu to take part in the Thirty Years' War, and he gained frequent successes over the Austrians and Spaniards, adding Alsace to France.

LOUIS XIV (1638–1715), king of France, known as Louis the Great and the Grand Monarch. His reign was the longest in the world's history, and when he was at the height of his power his court was the most splendid in all Europe. Louis was an autocrat, and his official policy may be summarized in the famous expression accredited to him: "I am the State."

He was the son of Louis XIII and Anne of Austria, and succeeded his father in 1643. His minority was occupied by the continuation of wars against Austria; by war with Spain; by the struggles of the Parlement against the regent and Mazarin, and by the bloody troubles of the Fronde. In 1659 peace was concluded with Spain, and Louis married the daughter of Philip IV of Spain. On the death of Mazarin, in 1661, the king resolved to rule without a minister. He reformed the administration and the method of raising taxes and chose as his chief adviser the famous Colbert, who accomplished a series of financial reforms, created the Company of the Indies, made roads and canals and founded manufactories. In 1662 Louis purchased Dunkirk from the needy Charles II of England. On the death of the king of Spain he claimed Franche-Comté, Luxemburg and various provinces of the Netherlands and invaded those territories, Turenne and Condé leading his armies. In 1672 he declared war with Holland, and in a few weeks he had conquered three provinces; but the formation of an alliance by the emperor, William of Orange, Spain and Denmark checked his ambition. Still the Treaty of Nimeguen (1678) left Louis in possession of Franche-Comté and a part of Flanders.

He was at this period at the height of his glory. His wife died in 1683, and Louis secretly married Madame de Maintenon about 1684. She is said to have had a considerable part in the revocation of the Edict of Nantes, which proved most unfortunate for France, by driving many industrious Protestants into exile. Louis's ambitious designs continued, and led, in 1689, to the formation of the League of Augsburg by Spain, Holland, England, the emperor and various small states. A general war continued with frequent and severe losses to the French till the Peace of Ryswick (1697), by which Louis was forced to restore all of his recent conquests and most of the acquisitions made since the Peace of Nimeguen. The question of the Spanish Succession once more brought Louis into conflict with a united Europe. The principal episodes of the war were the defeats of the French at Blenheim, Ramillies and Malplaquet; but circumstances favored Louis, and hostilities were terminated by the Peace of Utrecht in 1713, without altering the relative position of the combatants. His brilliant reign left France impoverished and most of its industries languishing. Louis was succeeded by his great-grandson, Louis XV.

Related Subjects. Consult the following titles for additional information:
Fronde — Nantes, Edict of
Marlborough, Duke of — Succession Wars
Mazarin, Jules — Utrecht, Peace of

LOUIS XV (1710–1774), a king of France, great-grandson and successor of Louis XIV, began his reign in 1715, but did not actually assume the government himself

till 1723. In the interval the country was under the regency of the Duke of Orleans, by whose folly it was brought to the verge of ruin. In 1726 Louis placed his tutor, Cardinal Fleury, at the head of the administration. In 1725 the king had married Maria the daughter of Stanislas Leszczynska, the dethroned king of Poland, and in 1733 he became involved in a war in support of his father-in-law's claims. After two campaigns he acquired for Stanislas the duchy of Lorraine. After the death of Charles VI, in 1740, the War of the Austrian Succession broke out, in which the victories of Count Maurice of Saxony gave new splendor to the French arms; and by the Peace of Aix-la-Chapelle, in 1748, France regained its lost colonies. Through Madame de Pompadour, under whose influence Louis had fallen, the Jesuits were declared a society hostile to France, and in 1764 by royal edict the order was suppressed throughout the French dominions.

From 1769 Louis was under the influence of Madamė du Barry, who is said to have cost the royal treasury in five years 180,000,000 livres. The Seven Years' War (1756-1763), in which France was involved, brought severe losses and humiliation to the country, and at the king's death France was completely demoralized. See Du Barry.

LOUIS XVI (1754–1793), king of France, grandson and successor of Louis XV. He was the victim of the excesses of the French Revolution, the seed for which were sown by his ancestors. Louis ascended the throne in 1774, on the death of his grandfather, and soon proved himself a man of honest intentions but of little ability. He could not comprehend the situation of affairs, and the reforms which he instituted were by no means sufficient to check the general discontent. A succession of incapable financial ministers brought matters from bad to worse, and even the popular Necker was unable to maintain order. At last, in 1789, all the grievances and discontents which had been gathering during a long period of misrule found vent; the populace attacked and destroyed the Bastille and the revolution was accomplished.

In June, 1791, the position of the king had become so perilous that he attempted to escape, but he was intercepted at Varennes and forced to return. Among the events which followed were the attack of the populace of Paris on the royal palace, June 20, 1792; the king's arrest in the National Assembly, to which he had fled for refuge, and finally, his trial before the convention, where he replied to the charges with dignity and presence of mind. On January 16, 1793, he was declared guilty of a conspiracy against the freedom of the nation; on the following day he was condemned to death, and on January 21 he was guillotined. His wife, the beautiful Marie Antoinette, perished in October of the same year. See French Revolution; Marie Antoinette.

LOUIS XVII (1785–1795), titular king of France, second son of Louis XVI, who was executed during the French Revolution. On the death of his elder brother, in 1789, he became dauphin, and on the death of his father he was proclaimed king by the royalists, but he was soon afterward separated from his mother and delivered to a shoemaker named Simon, a fierce Jacobin, who treated the boy with the most unfeeling barbarity. He survived this treatment only two years.

LOUIS XVIII (1775–1824), king of France, brother of Louis XVI, known before his accession to the throne as Monsieur. After the death of Louis XVI (which see), Monsieur proclaimed his nephew king of France as Louis XVII, and on the death of the boy he was himself proclaimed by the émigrés, king of France and Navarre. For many years he led a wandering life, supported by foreign courts and by some friends of the House of Bourbon. He at last took refuge in England and lived there till the fall of Napoleon opened the way for him to the French throne. He entered Paris in May, 1814; he had to flee on Napoleon's escape from Elba, but was replaced on the throne by the allies after Waterloo. He was weak in character, but his government was most despotic.

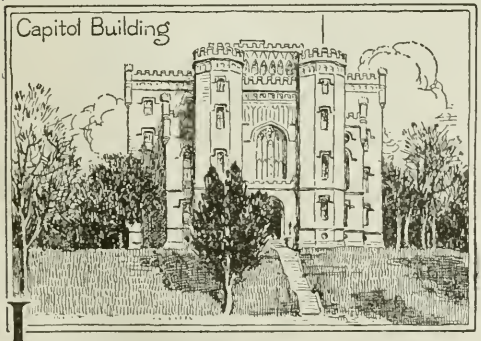
LOUIS, THE GERMAN (about 805–876), the son of Louis the Pious and grandson of Charlemagne (which see). In 843, by the Treaty of Verdun, which divided the domain of Louis the Pious, the younger Louis acquired the whole territory east of the Rhine, which formed the nucleus of modern Germany. In 858 Louis invaded France and conquered the country, but found it impossible to unite the East and West Franks, and was obliged to give up his conquest. He fought with the Normans in the northwest,

and the Bulgarians to the southeast of his dominions. In 870 he compelled his brother Charles the Bald to sign the Treaty of Mersen, by which the territories of their other brother, Lothair, were divided between the West Frankish and German kingdoms. The sons of Louis inherited his empire.

LOUISBURG, *loo'is burg,* SIEGES OF, two famous sieges about the village of Louisburg, Cape Breton Island. The place had been strengthened by the French until it was considered the strongest citadel in the New World, but was taken by a British and colonial force during King George's War in 1745, the French surrendering about 1,600 men. It was restored by the Treaty of Aix-la-Chapelle, but was again besieged in 1758, during the Seven Years' War, and again captured. The British destroyed the fortifications.

Louisburg is situated on the Atlantic coast of Cape Breton Island and has a fine harbor, but it has become of little importance, save as a shelter from storm. Population, about 1,000.

LOUISE, LAKE, a lake of the Canadian Rockies, celebrated throughout the world for its beauty. It is situated in Alberta thirty-four miles northwest of Banff and two miles from Laggan, on the Canadian Pacific. An imposing château hotel is maintained at Lake Louise by the railway for tourists, and the place may be reached by automobile or electric cars. The lake lies at an altitude of 5,645 feet, and is surrounded by lofty mountains and steep cliffs. The quiet surface of this small body of water reflects all the transient colors of the sky and mountains, and in its changing hues is lovely beyond description.



LOUISIANA, *loo e ze ah' nah,* called the CREOLE STATE and the PELICAN STATE, is one of the Gulf States and is thirtieth in size among the states of the Union. Its area is 48,506 square miles, and its population in 1910 was 1,656,388, making it the twenty-fourth state in number of people, and giving it a density of 36.5 inhabitants to the square mile. A Federal estimate in 1918 credited it with a population of 1,884,778. The magnolia is the state flower.

North of Louisiana is Arkansas; Mississippi is east, and Texas is west. Along the entire southern border is the Gulf of Mexico, and into this flows the mighty Mississippi River. It forms half of the eastern boundary, then flows southeast through the southern half of the state, past Baton Rouge and New Orleans. The state is 280 miles long from north to south; its greatest width from east to west is 290 miles.

The People. This section of the Union was settled by the French and remained a colony of France until 1803 (see LOUISIANA PURCHASE). To-day a large proportion of the native white people are descendants of the early families from France, and evidences of French dominion are very pronounced, particularly in New Orleans. In that city live nearly one-fifth of all the people of the state; nearly 30 per cent of the population is in cities. Within recent years there has been a large immigration of Italians.

Surface and Drainage. Louisiana is one of the lowest and most level states in the Union. The highest land consists of ridges which cross the central northern counties and nowhere exceed 500 feet in altitude. The land along the Mississippi and other rivers consists largely of flat plains, and the southern portion of the state is a Gulf plain, extending inland sixty miles or more. Many cities thirty miles inland are but ten to fifteen feet above sea level. A line drawn east and west north of Lake Pontchartrain through Baton Rouge, thence a little to the southwest, practically separates this plain from the higher land, which is somewhat rolling and hilly.

No other state has so many miles of navigable water as Louisiana. The Mississippi is the great state waterway. The Red River crosses the state from the northwest and joins the Mississippi, while the Ouachita enters near the northeastern corner and flows southward to near the middle of the state, before joining the Red. All of these streams are navigable, while the southern part of the state is cut up by bayous, which are really

broad estuaries of streams, all of which are navigable.

Louisiana contains many lakes. Those in the Gulf plain on the south are really shallow arms of the sea, and their water is salt or brackish. In the interior, along the rivers, are numerous lakes which are really lagoons that were formerly in river channels but have been cut off by changes in river courses. Such lakes are usually in the form of arcs of a circle and are connected with streams. Along the Red River in the northwestern part of the state are numerous lakes, which have been formed from the tributaries to that stream. These have had their outlets closed by the gradual rising of the river bed through continual deposit of sediment.

Climate. Louisiana has a semi-tropical climate, though, owing to the nearness of the Gulf, the intense heat is modified and the climate is equable. The average temperature for January is about 60° in the southern part, and about 45° in the northern, while in the summer the thermometer may rise as high as 100°. The coldest weather usually is in February, and frosts occur from the first of November until the first of March. The entire state has an abundance of rainfall, averaging nearly sixty inches in the southern half and about fifty in the northern section.

Natural Resources. The mineral resources are limited. Petroleum is found in the southwestern parishes of the state, which contain an extension of the Texas oil field. The Louisiana fields now yield over 16,000,000 barrels in average years. The year of greatest production was 1915, when 18,191,539 barrels were marketed. There is a great deal of natural gas, and evidence that the gas industry will increase in importance. Rock salt is found on the island of Petite Anse, and it is also obtained from marshes along the coast. There is also a coal region, an extension of the Texas field; as far as exploited it has yielded good returns. There are also in different parts of the state deposits of limestone and gypsum, and some mineral springs produce water valuable for their medicinal properties.

Production of sulphur has been important since 1904, and now Louisiana produces nearly all of the sulphur obtained in the United States—over 315,000 tons a year, valued at nearly $6,000,000.

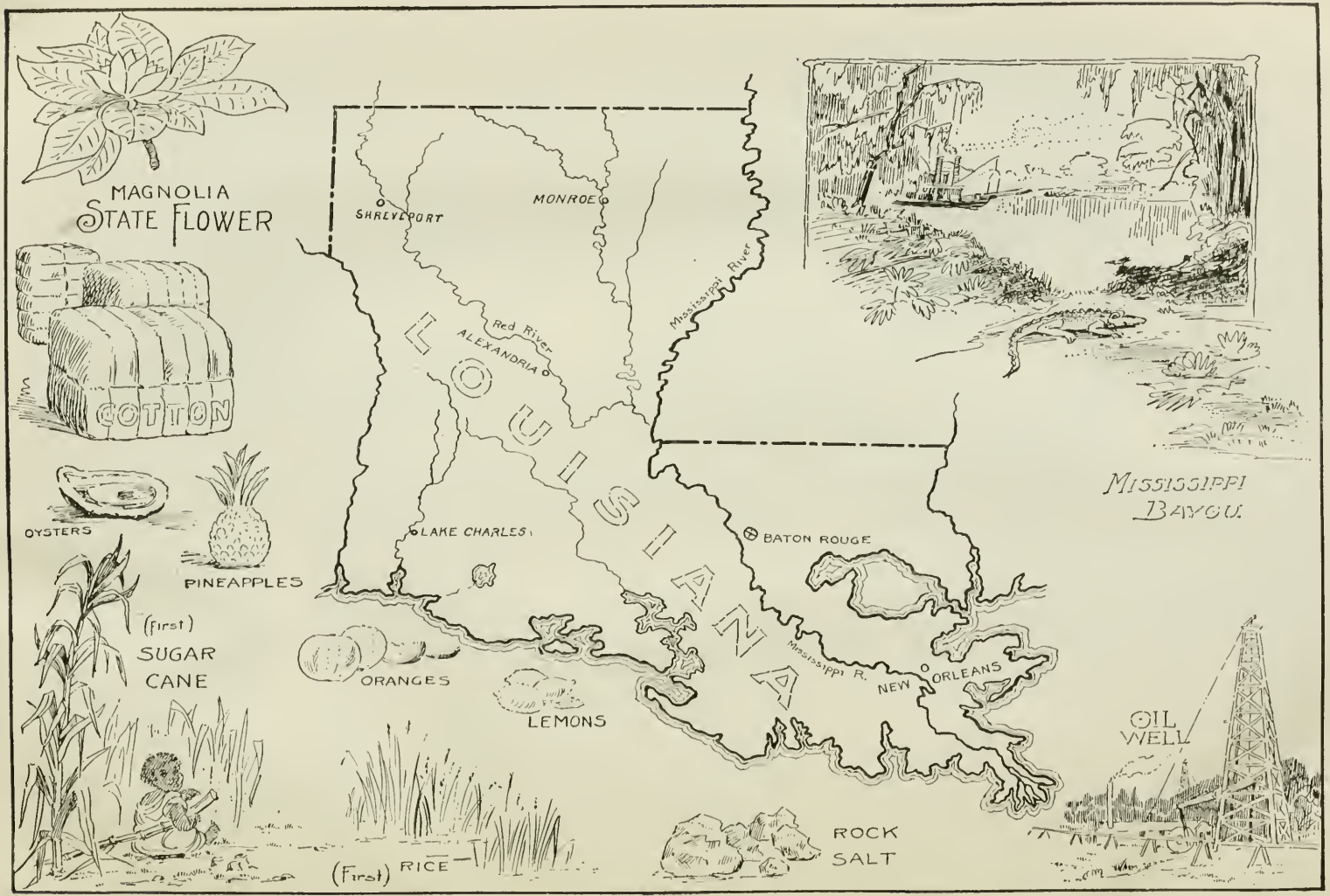
Forests. Louisiana contains extensive forest areas. These are found in the northern and eastern parts of the state and along the Red River. The prevailing trees are the long- and the short-leaved pine, and the swamp regions contain large quantities of cypress. Intermingled with these woods are numerous varieties of hard wood.

Agriculture. The soil and climate of the state are favorable to the growth of many crops produced in semi-tropical regions; Louisiana is the leading state of the Union in the growth of sugar cane and rice. These crops prevail in the southern part of the state, the rice fields occupying much of the swamp land west of the Mississippi. North of the region devoted to sugar cane is the area devoted almost wholly to cotton, but as a cotton state Louisiana ranks seventeenth. The annual yield varies from 450,000 to 600,000 bales. Other important crops are corn, oats and fruits, which are now extensively cultivated for Northern markets. But little attention is given to the raising of live stock, though the state raises nearly all the horses and mules needed for tilling the soil.

Manufactures. The refining of sugar is the leading manufacturing industry. This is followed by the making of cottonseed oil and cake and the preparation of lumber. Industries of less importance include the manufacture of tobacco products, bags, foundry and machine shop products; the raising and shipping of oysters employ a large number of people along the coast.

Transportation and Commerce. The navigable rivers enable almost all parts of the state to be reached by water; hence transportation is comparatively easy and cheap. There are about 5,325 miles of railway. These lines consist of trunk lines extending north and south and from the northwest to the southeast, besides an east and west line across the northern part of the state and another extending to the Pacific coast across the southern part. New Orleans is the great railroad center, and Shreveport ranks next to it in this respect.

Government. The legislature consists of a senate that cannot exceed forty-one members, and a house of representatives that cannot exceed 115 members. The members of each branch are elected for four years. The executive department consists of a governor, a lieutenant governor, an auditor, a treasurer and a secretary of state, each elected


MAGNOLIA
STATE FLOWER
COTTON
OYSTERS
PINEAPPLES
(first)
SUGAR
CANE
SHREVEPORT
MONROE
Red River
ALEXANDRIA
Mississippi River
LOUISIANA
LAKE CHARLES
BATON ROUGE
Mississippi R.
NEW ORLEANS
ORANGES
LEMONS
(First) RICE
ROCK
SALT
OIL
WELL
MISSISSIPPI
BAYOU

for four years. The judicial department consists of a supreme court, a court of appeals and district courts. The supreme court comprises one chief justice and four district justices appointed by the governor and senate for a term of twelve years. The state is divided into four supreme court districts. The court of appeals is composed of two district judges appointed by the supreme court. There are about thirty judicial districts, in which district judges hold court.

Local government is unique and differs very materially from that found in any other state of the Union. This is due to the fact that Louisiana was settled by the French, who, previous to the Louisiana Purchase, had thoroughly established their laws and institutions, most of which have been retained, with but little modification. The state is divided into sixty parishes, the equivalent of counties in other states. The laws are based on the Code Napoleon.

Education. Public schools are provided for both white and colored children, and notwithstanding the difficulties with which the state has been obliged to contend the schools are constantly increasing in number and are raising their standard. The educational system was practically rebuilt in 1912. The state maintains a normal school at Natchitoches. The state university, with the Agricultural and Mechanical College, is located at Baton Rouge and is at the head of the public school system. Tuition is free to residents of the state. Other universities and colleges of importance are Tulane University, at New Orleans; the Industrial Institute, at Ruston; Jefferson College (for men) at Convent; Silliman Collegiate Institute (for women) at Clinton; Mansfield Female College at Mansfield; Leland University at New Orleans, and New Orleans University, in the same city. There are about ten colleges for negroes.

Institutions. The state schools for the blind and deaf are at Baton Rouge. Charitable hospitals are maintained at New Orleans and Shreveport, and the asylum for the insane is at Jackson. A Soldiers' home is in New Orleans. Convicts are kept busy on an 8,000-acre farm and a 2,800-acre sugar plantation, both owned by the state.

Cities. The chief cities are Baton Rouge, the capital; New Orleans, Shreveport, New Iberia, Lake Charles, Alexandria and Monroe.

History. Louisiana was first visited by Europeans about 1519, when Alvarez de Piñeda and his companions entered the mouth of the Mississippi and spent six weeks on its banks. In 1541 De Soto, the Spanish adventurer, explored the coast west of Florida to the Mississippi River and visited the country on both sides of the river where New Orleans now stands. In 1682, La Salle descended to the mouth of the river, took possession of the country and named it Louisiana, in honor of his king, Louis XIV of France.

The first permanent settlement was made in 1699 by d'Iberville, at Biloxi now in Mississippi. In 1718, the charter of the Company of the West (see LAW, JOHN), was registered in Paris, and the commerce of Louisiana was granted to it for twenty-five years. In the same year, Bienville, the governor of the colony, founded New Orleans. In 1733 France declared Louisiana a royal province, and in 1763, by secret treaty, it ceded to Spain all that portion which lay west of the Mississippi, together with the city of New Orleans and the island on which it stood. On the same day France ceded to Great Britain all the rest of her territory in America. In 1800, Napoleon restored Louisiana (including all the vast territory west of the Mississippi River) to France, and in 1803 he sold the province to the United States for $15,000,000. Louisiana, comprising the present area, was admitted to the Union April 8, 1812, as the eighteenth state.

In the War of 1812, New Orleans was attacked by the English and was bravely defended by about 5,000 men under General Jackson (see NEW ORLEANS, BATTLE OF). The progress of the state from the close of this war until the Civil War was rapid. Baton Rouge became the capital in 1852. Louisiana passed the Ordinance of Secession December 23, 1860, and in 1861 it ratified the Confederate constitution. New Orleans was occupied by Union forces after May, 1862, and the state suffered severely from the cessation of commerce. During the period of reconstruction, Louisiana was the scene of long-continued excitement, extending through Hayes's administration. Bloodshed was frequent. In 1868, the state ratified the Fourteenth Amendment, and in 1877 a new constitution was adopted. In 1884 occurred the New Orleans Exposition, which had valuable commercial results. After a

Items of Interest on Louisiana

The flood plains of the rivers are protected against overflow by 754 miles of levee on the Mississippi and 602 miles on tributary and other rivers; this system of levees was built almost entirely since the Civil War and represents an investment of nearly $50,000,000 for the original cost of construction alone.

"Trembling prairies" — land that trembles when men or cattle pass over it—are common near the coast; these are plains of matted vegetable mold resting on water, peat, or quicksands.

Of native flowers the best known and commonest are water lilies, water hyacinths and irises, roses, japonicas, poinsettias, jasmines, camellias, oleanders and chrysanthemums.

The fisheries of Louisiana rank next to those of Florida among the Gulf states.

The state leads the country in the production of rice, though in some past years Texas has stood first.

The unit of local government is the "parish," corresponding to the county in northern states; the parish is based on an early Spanish division for religious purposes, as the names of the saints among the parishes would indicate.

Questions on Louisiana

What is the average density of population?

Into what parts may the surface of the state be divided?

What is a "bayou"?

What part of the total area is formed by the lowlands?

What are the three main classes of lakes?

What are the most important mineral products?

Name the three leading crops? What part of the total value of agricultural products do they form?

In what ways is New Orleans unique?

Why is New Orleans called the "Crescent City"?

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long contest in 1891, the state lottery was abolished. The state has also been concerned with the establishment of peaceful and satisfactory relations between the white and black races.

In 1898 a so-called "Grandfather's Clause" in the amended constitution sought to center political control in the white race. In 1908 a state railroad commission was authorized. The workmen's compensation laws have recently received several amendments, and the assignment of wages for debt is regulated by law. It is a misdemeanor since 1917 to abuse or neglect children under seventeen years of age.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Alexandria — Monroe
Baton Rouge — New Orleans
Lake Charles — Red River
Mississippi River — Shreveport

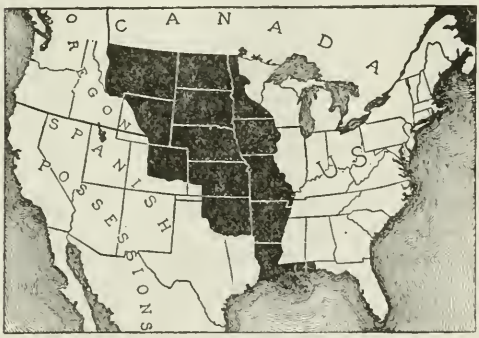
GOVERNMENT AND HISTORY

Code Napoleon — Grandfather's Clause
Louisiana Purchase — Reconstruction

MISCELLANEOUS

Cotton — New Orleans
Jetty — Rice
Levee — Sulphur

LOUISIANA PURCHASE, one of the most important events in American history, the purchase from France of the vast American territory known as the province of Louisiana. The transaction took place in 1803 in Jefferson's administration, and marked a new era of expansion for the United States. The area of the territory was 1,172,000 square miles. It included almost



LOUISIANA PURCHASE
In black.

all of the area that now constitutes fourteen states, whose present population is over 18,000,000.

The purchase was brought about by the discovery, in 1802, that Spain had ceded Louisiana to France by a secret treaty in

1800. This caused the greatest uneasiness on the part of American statesmen, since they felt that this event was merely a step in France's policy to regain its foothold in America. In order to prevent the carrying out of this plan, President Jefferson urged the purchase of the territory at the mouth of the Mississippi from France, in order that the Mississippi might be the boundary between the territory of the two nations. Robert R. Livingston was dispatched to accomplish this purchase and was met by a proposal on the part of Napoleon to sell the entire Province of Louisiana. An agreement was finally made by the promise of the United States to pay eighty million francs to France and to assume the debts of Americans to French citizens, amounting to twenty million francs. The agreement was signed April 30, 1803, and was ratified October 20. Though Jefferson believed such a step was unconstitutional and at first urged the passage of a constitutional amendment, the unanimity among the people in favor of it finally led him to accept the result. The total cost to the United States, including principal, interest and debts, was about $27,500,000.

LOUISIANA PURCHASE EXPOSITION, a world's fair, held at Saint Louis, Mo., in the summer of 1904, in celebration of the one-hundredth anniversary of the transfer of the territory of Louisiana from France to America. The site chosen for the exposition was Forest Park, consisting of more than 1,000 acres, in the western portion of the city. In this enclosure fifteen mammoth exhibition buildings were erected, arranged in the shape of a fan. The pivotal point was occupied by three domed buildings, from the center of whose base flowed a broad stream of water, which fell in cascades over a green background seventy feet in height to the grand basin below. Special care and skill were used in the distribution and designing of the buildings to produce a truly artistic scene, and the result exceeded all expectations in this respect.

The total cost to the exposition company before the opening of the gates was nearly $20,000,000, of which $5,000,000 was donated by the United States government, $5,000,000 by the city of Saint Louis, and $5,000,000 by the citizens of Saint Louis. In addition, the United States government spent $1,500,000 on its own exhibit and $1,000,000 on the exhibit of Filipino life and products. Forty-two states were represented by buildings and special exhibits, costing more than $7,000,000, while many of the most important foreign nations also erected buildings, at a cost of fully $7,000,000. The total attendance reached 21,000,000.

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, a state university at Baton Rouge, the outgrowth of a seminary and military academy founded near Alexandria in 1853. In 1860 the institution was opened, with William Tecumseh Sherman as president. Nine years later the school was removed to Baton Rouge, and in 1870 its name was changed to Louisiana State University. In 1877 the institution was merged with the Agricultural and Mechanical College founded at New Orleans in 1873, and the combined school was then chartered under its present name. It maintains courses in the arts and sciences, mechanical and civil engineering, agriculture (including a special course in the cultivation and manufacture of sugar), law and teaching. There is also a graduate school. Four experiment stations connected with the university are located, respectively, at New Orleans, Baton Rouge, Crowley and Calhoun. The faculty numbers about 100, and there are over 1,600 students; the library contains 37,550 volumes.

LOUIS PHILIPPE, *loo e' fe leep'*, (1773-1850), king of the French. He was the eldest son of Philippe, Duke of Orleans, surnamed Egalité, and during his father's lifetime he was known as the Duke of Chartres. He entered the army in 1791 and, favoring the popular cause in the Revolution, took part in the battles of Valmy and Jemappes and distinguished himself at Neerwinden. At the Revolution of July, 1830, he was made "lieutenant-general of the kingdom," and in August he became king of the French. He reigned for eighteen years, but his rule was popular with no class of people and the Revolution of 1848 drove him from the throne. He went to England, where he remained till his death.

LOUISVILLE, *loo'y vil*, or *loo'is vil*, Ky., the largest city in Kentucky, the twenty-eighth in the United States, and one of the most important manufacturing cities in the South, is situated on the Ohio River, 400 miles above its mouth and 130 miles southwest of Cincinnati. Louisville is the county

seat of Jefferson County. It is served by the Illinois Central, the Louisville & Nashville, the Chesapeake & Ohio, the Southern, the Baltimore & Ohio Southwestern and other railroads. The city extends along the river front for over seven miles, and its area is about twenty-four square miles. It is built upon a plain, which slopes gently toward the river but is sufficiently elevated to be free from danger from high water. It is connected with New Albany and Jeffersonville on the Indiana side by three steel bridges, varying from one-half to one mile in length. The falls in the Ohio at this place constitute a series of rapids, in which the river descends over twenty feet in the course of two miles. A canal has been constructed around these falls to provide for navigation during low water.

The city is regularly laid out, and has wide, well-paved streets and beautiful squares. The streets contain numerous shade trees, and the residential sections are noted for their beauty, most of the houses being set back from the street and surrounded by fine lawns. The business portion of the city is compactly built, Main, Market, Jefferson and Fourth streets and the cross streets from First to Fifteenth being the principal business streets. There are a number of parks, the most important of which are Iroquois Park, containing 670 acres, situated on the south side of the city, and Cherokee Park, on the east side. Shawnee Park, situated along the river bank in the west portion of the city, affords a beautiful view of the river and the opposite banks in Indiana. Fontaine Ferry and Riverview parks are other delightful parks along the river. Near Cherokee Park is Cave Hill Cemetery, noted for its beauty and for a number of fine monuments.

The chief buildings are the courthouse, erected at a cost of over $1,000,000; the city hall, the customhouse, the Stark's building, the Paul Jones building, the Seelbach hotel, the Masonic Temple, the Board of Trade building, the post office, the Kentucky National Bank and the building of the *Courier-Journal*. Among the churches worthy of mention are the Roman Catholic Cathedral, Christ's Church Cathedral (Episcopal), the Warren Memorial Church, the Second Presbyterian Church, the Church of the Messiah, the Temple Adas Israel and the Broadway Baptist. Louisville is an important educational center, being the seat of the University of Louisville, and a number of professional and denominational colleges. The Carnegie Public Library, including eight branches, has over 160,000 volumes. Its main building contains a museum of natural history, a fine collection of paintings and one of the largest collections of minerals in the United States. The state school for the blind is also located here, and has connected with it the American Printing House for the Blind.

Louisville is a flourishing manufacturing center. Its chief products include tobacco products, jeans, plows, cement, flour, farm wagons, furniture, foundry products and agricultural implements. Pork packing is also an extensive industry. The city is one of the chief distributing points for the southwest and has an extensive trade. It is the largest leaf-tobacco market in the world and handles fully one-third of all the tobacco raised in the United States. Its trade in pork, wheat and corn is also extensive.

The first settlement was made in 1778, and two years later it was incorporated as a town and named Louisville, in honor of Louis XVI of France. In 1824 it was chartered as a city. In 1890 it was seriously damaged by a tornado, which caused considerable loss of life and property, but the damage was immediately repaired. Population, 1910, 223,928; in 1917, 240,808 (Federal estimate).

LOUSE, the common name of a group of insects that suck the blood of man and animals. The common louse is furnished with two simple eyes, one on each side of its head, and a mouth adapted to sucking. The legs are short, with short claws or with two opposing hooks, which give a very firm hold. The body, which is composed of eleven or twelve distinct segments, is flattened and nearly transparent. The young pass through no metamorphosis, and they multiply rapidly. Human beings are infested by both head and body lice, and the latter sort were the cause of great misery to the armies during the World War; the soldiers called them "cooties." The following remedies are recommended for ridding the hair of lice and "nits":

LOUSE, MUCH ENLARGED

To rid the hair of lice saturate the hair thoroughly with tincture of larkspur. Rub in well. Be careful not to let the mixture get into the eyes or into scratches. Wrap the

head in a bath towel. Leave on for six hours. Then wash the head thoroughly. Take two quarts of hot water and add one teaspoonful of carbonate of soda. Wet the hair with this mixture. Soap thoroughly with castile soap for ten minutes. Wash the soap out with plenty of warm water. If "nits" are abundant, repeat the above several times.

To rid the hair of "nits" mix equal parts of kerosene oil and olive oil. Rub the mixture well into scalp. Then cover the hair with a piece of muslin and fasten it about the head, avoiding contact with a lighted gas jet or flame of any kind. The following morning the scalp should be washed with soap, hot water and vinegar. A fine toothed comb wet in vinegar should be used to remove the "nits." Dry the hair thoroughly with a towel. This treatment should be repeated three or four times.

LOUVAIN, *loo vaN'*, BELGIUM, a city in the province of Brabant, eighteen miles east of Brussels, on the Dyle River. In 1914 the Germans burned about one-fifth of the city in retaliation for alleged attacks on German soldiers by civilians (see WORLD WAR). The fire spared the townhall but destroyed the famous university; the few scholars and professors who were not serving in the army accepted the invitation of the University at Cambridge to use its buildings and equipment as long as necessary. Among other buildings that were destroyed were the magnificent Gothic cathedral and the church of Saint Pierre. Louvain was famous in the fourteenth century for its cloth-making industry, which employed about 15,000 people. Civil strife ended the industrial prosperity of the city, but it was later, especially about 1600, equally famous as a center of learning, its university then having about 6,000 students from all parts of Europe. At the outbreak of the World War the chief manufactures were liquors, chemicals, vinegar, machinery, lace and starch. Population, 1911, 42,307.

LOUVRE, *loo'vr'*, a group of magnificent buildings in Paris, on the Seine, and the world's greatest gallery of art. It was begun in 1204 and was used at various times as fortress, prison and castle. Francis I, after 1541, erected that part of the palace which is now called the old Louvre, and the buildings have been enlarged and adorned by successive kings, particularly by Louis XIV, until little trace of the original buildings remains.

The new Louvre was begun by Napoleon I, as a museum for the art treasures which he obtained from the nations he conquered, and was completed by Napoleon III in 1857. The whole group of buildings is distinguished by its great extent and by its elegant and sumptuous architecture. It contains paintings, among which are masterpieces of Murillo, Titian, Michelangelo, Delaroche, Bonheur and others; drawings; engravings; bronze antiques; sculptures, ancient and modern, together with special collections of antiquities and an ethnographic collection. It is the most extensive and varied museum in Europe.

In 1914, when the German army, in the War of the Nations, threatened Paris, the priceless treasures of the Louvre were removed to places of safety and were not returned until 1919.

LOVEJOY, ELIJAH PARISH (1802–1837), an American reformer, born at Albany, Maine. He was graduated at Princeton Theological Seminary in 1833, and became editor of the *Saint Louis Observer*, a Presbyterian paper, soon afterward. He soon took an active interest in the anti-slavery agitation and incurred the displeasure of pro-slavery citizens of Saint Louis. He therefore removed his plant to Alton, Ill., but it was seized and destroyed. Two other presses were also destroyed by mobs, and finally, on November 7, 1837, another mob attacked a warehouse containing a fourth press guarded by Lovejoy and his friends. In the mêlée Lovejoy was mortally wounded. The event caused the greatest indignation throughout the North and was the occasion of the first great anti-slavery address of Wendell Phillips.

LOV'ER, SAMUEL (1797-1868), an Irish novelist, poet and artist, born in Dublin. He first devoted his attention to painting, but afterward turned to literature. He at first wrote songs and ballads, and later he published several novels, which he illustrated with his own pencil. Among his works are *Legends and Stories of Ireland; Rory O'More*, a famous ballad; *Songs and Ballads*, and the novels, *Handy Andy* and *Treasure Trove*. *The Angel's Whisper* and *The Low-backed Car* are among his popular songs.

LOW, SETH (1850–1917), an American administrator and educator, born in Brooklyn, N. Y., and educated at Columbia. He began his business career as a clerk in his father's store, where he rose to the position of partner. He early manifested an inter-

est in public affairs and was the organizer and first president of the New York Bureau of Charities. In 1881 Mr. Low was elected mayor of Brooklyn on an independent ticket, and was reëlected. His administration was characterized by a radical reform in all departments of city administration, and, especially, by the advancement of the public schools. In 1889 he was elected president of Columbia, and during his administration the work of the institution was thoroughly reorganized and placed on a university basis; the college was located on its present site, and its name was changed to Columbia University. He was appointed one of the members of the United States delegation to the Hague Peace Conference, and from 1902 to 1903 he was mayor of Greater New York. His administration was characterized by extensive reforms.

LOWELL, Abbott Lawrence (1856–), an American educator, a nephew of James Russell Lowell. He was born in Boston and educated at Harvard University and Harvard Law School. From 1880 to 1897 he practiced law in Boston; from 1897 to 1899 he was lecturer on government at Harvard and in 1900 he was appointed professor of the science of government. In 1909 he was chosen president of Harvard to succeed President Eliot. President Lowell is known for his broad scholarship and his administrative ability. Many eminent scholars attended his inauguration. He is the author of *Government and Parties of Continental Europe, The Government of England* and other standard works on the science of government.

LOWELL, James Russell (1819–1891), America's most versatile man of letters, distinguished as poet, critic, essayist, orator and diplomat. He was born at "Elmwood," Cambridge, February 22, 1819, and his ancestors were among the earliest and most cultured settlers in New England. His early education came not so much from his work in school as from his reading and his out-of-door rambles. When he was sixteen years old he entered Harvard University, and while here it is said that he read everything except his text-books; certain it is that he almost failed to get his degree. He did graduate, however, in 1838, and then studied law for three years, after which he was admitted to the bar in Boston. This profession was uncongenial to him, and it is uncertain whether he ever had any clients. He soon gave it up and determined to devote himself to literature, and in 1843 he helped to found a monthly magazine, *The Pioneer*. Hawthorne, Poe and Whittier were contributors to this periodical, but it did not meet with success.

JAMES RUSSELL LOWELL

As a college student Lowell had written verse, and at his graduation he wrote the class poem. His first serious attempt at poetry, however, was a volume of love lyrics inspired by Maria White, whom shortly afterward he married. She induced him to use his talents in promoting the cause of freedom, and the result was the first series of the famous *Biglow Papers*, published in 1848. In this same year he published *The Vision of Sir Launfal*, his best-known poem, and the *Fable for Critics*, which, in spite of its frolicsome tone, shows much real critical power. In 1855 Lowell was appointed to succeed Longfellow as professor of modern languages at Harvard, and he spent two years abroad preparing for the duties of that position. In 1857 was founded the *Atlantic Monthly*, of which Lowell was the first editor, and he was also during the years that followed a frequent contributor to the *North American Review*. Lowell's first wife died in 1853, and he married four years later Miss Frances Dunlop, with whom his life was very happy.

Meanwhile, his writings had brought him before the public as an independent supporter of the Republican party, and in 1876 he was made a Presidential elector. In the following year he was appointed by President Hayes minister to Spain, and three years later he was transferred to England, where he remained until 1885. During this service he did much toward bringing the American and British people together. He was very prominent and exceedingly popular while in Great Britain. Lowell's wife died in the year that he returned to America, and he himself died six years later, in the old family mansion "Elmwood," where he was born and where he had lived most of his life.

Besides the works mentioned above, Lowell produced a second series of *Biglow Papers,* dealing with the Civil War; *The Commemoration Ode* to the Harvard graduates who died during the war, which is one of the most beautiful poems of its kind ever written; *Under the Willows,* a volume of verse issued in 1869 and containing many of his best poems; *The Cathedral,* his longest poem, which is of very uneven merit and into which he introduced, in the midst of the most serious passages, prankish humor. The chief elements which make Lowell's poetry great are its sound common sense and its vigorous expression. It is not evenly beautiful, as is that of Longfellow, and it is, like his prose work, often so crowded with literary references and allusions as to be difficult reading. Among his chief prose works are *Fireside Travels,* which abounds in pleasant fancy; and *My Study Windows* and *Among My Books,* two volumes of criticisms which show that he is entitled to rank with the best of American critics. Consult biographies by Underwood, Edward Everett Hale and Horace E. Scudder.

In the article Reading will be found additional facts about Lowell's life and work.

LOWELL, Mass., one of the county seats of Middlesex County, twenty-five miles northwest of Boston, on the Merrimac River at the mouth of the Concord and on the New York, New Haven & Hartford and several lines of the Boston & Maine railroads. The city is one of the world's centers of textile manufacture. Some of the features of interest are the Fort Hill Park, the Ladd-Whitney Monument, the Pawtucket Falls and the Rogers Street stone bridge. The Lowell Textile School, the state normal school, Rogers Hall School, Notre Dame Academy and other schools are located here. A group of high school buildings cost over $1,500,000. There are also various and charitable institutions, a large public library and four hospitals.

The Merrimac River has a fall of thirty-two feet at this point, and the Canal and Lock Company completed the first system of canals in 1825. The falls develop 30,000 horse power. The first mill was erected in 1823. The principal products are cotton, woolen, worsted goods, hosiery, felt carpets and foundry products. Lowell was founded in 1826 by the Merrimac Manufacturing Company. The settlement grew rapidly, was incorporated as a town in 1826 and chartered as a city ten years later. The city adopted the commission form of government in 1912. Population, 1910, 106,294; in 1917, 114,366 (Federal estimate).

LOWER CALIFORNIA, a long, narrow peninsula extending southeast from the American state of California, with the Gulf of California on the east and the Pacific Ocean on the west. It is a part of the republic of Mexico, and has a total length of about 750 miles; the width varies from thirty to 140 miles.

The peninsula is not a valuable possession, for the rainfall does not average more than ten to fifteen inches a year, and the climate is usually hot. The surface is mountainous, for almost the entire area is an extension of the Sierra Nevada Mountains. The southern extremity is not fit for habitation. The largest city is LaPaz. Population, 1910, 52,244, of which 5,550 are in the city named.

In 1919 there developed considerable discussion as to the desirability of the purchase of Lower California by the United States, as a safeguard against uses of the peninsula which would be prejudicial to American interests.

LOW GERMAN. See Plattdeutsch.

LOYO'LA, Igna'tius of (1491–1556), the founder of the Order of the Jesuits, was born at the castle of Loyola, in Spain. His baptismal name was Inigo Lopez de Recalde; his historical name was adopted after his conversion. In his youth he entered the army; during the defense of Pampeluna in 1521, against the French, he was severely wounded, and a long and tedious confinement was the result. During his convalescence he read several religious books, which caused him to change the whole course of his life. He renounced the world, made a formal visit to the shrine of the Virgin at Montserrat and vowed himself her knight. After his dedication he made a pilgrimage to Rome and Jerusalem; then he attended the schools and universities

LOYOLA

of Barcelona, Alcala and Salamanca. On completing his studies he went to Paris, where he went through a seven years' course of general and theological training. Here, in 1534, he formed the first nucleus of the Society of Jesus, or Jesuits, which afterward became so famous.

François Xavier, professor of philosophy, Lainez and others, in conjunction with Loyola, bound themselves together to devote themselves to the care of the Church and the conversion of infidels. Rome ultimately became their headquarters, and Loyola submitted the plans of his new order to Pope Paul III, who, under certain limitations, confirmed it in 1540. Loyola continued to reside in Rome and governed the society he had constituted till his death. He was beatified in 1607 by Paul V and was canonized in 1622 by Gregory XV. See JESUITS.

LUB'BOCK, JOHN, Sir, Baron Avebury (1834–1913), a British scientist and statesman, born at London and educated at Eton College. In 1848 he joined his father, Sir John William Lubbock, a famous astronomer and mathematician, in the banking business, and in 1856 he became a full partner in the firm. In this profession he became conspicuous and held many responsible positions under the government, in connection with financial and educational affairs. In 1870 he was elected as a Liberal to Parliament, and with the exception of a brief period he continued to be a member until 1900. During the latter years of his service he acted with the Liberal Unionists. Upon retiring from Parliament, he was made a peer, as the first Baron of Avebury. Besides being responsible for the passage of many important financial and educational measures, he won distinction as an archaeologist and anthropologist. He published many volumes, of which the most important are *Prehistoric Times; Origin of Civilization; Ants, Bees and Wasps; Flowers, Fruits and Leaves;* and *The Senses, Instincts and Intelligence of Animals.*

LU'BECK, GERMANY, a city state, governed in the same manner as Hamburg and Bremen. It consists of the city of Lübeck, the town of Travemunde, a surrounding rural district and portions of Holstein, Mecklenburg-Strelitz and Lübeck Principality. The total area is 115 square miles. The city of Lübeck lies ten miles southwest of the mouth of the Trave River, which flows into the Baltic Sea, and forty miles by rail northeast of Hamburg. In normal years there is carried on a thriving trade in lumber, grain, coal and other commodities with Denmark, Sweden and Russia, and Lübeck is known as a commercial rather than a manufacturing city. The older portion of the place has a distinctly medieval aspect, with its quaint gabled houses, picturesque brick churches and spired public buildings. It is a notable educational center. Population of the city state, 1910, 116,599; of the city, 109,106.

LUCERNE, *loo surn'*, SWITZERLAND, capital of a canton of the same name, situated on the banks of Lake Lucerne. It is a very popular tourist resort on account of the beauty of the surrounding country and the picturesqueness of the city itself. There are several ancient buildings, an arsenal with old armor, a gallery of art, a museum of antiquities and numerous interesting modern buildings. One of the chief points of interest is the famous Lion of Lucerne (which see). Population 1918, estimated, 44,400.

LUD'INGTON, MICH., the county seat of bounded by the cantons of Uri, Schwyz, Unterwalden and Lucerne, and noted for its magnificent scenery and historical associations. It is nearly in the shape of a cross, the bays of Lucerne, Küssnacht and Alpnach forming the head and arms, and the Bay of Buochs and the Lake of Uri forming the main body. Its length from Lucerne to Fluelen is twenty-three miles; from Alpnach to Küssnacht, at the extremities of the arms, about fourteen miles; its width is from one-half to two miles, and its greatest depth is 700 feet. It is a favorite resort for tourists.

LU-CHU. See LOO-CHOO.

LUCIFER, *lu'se fur*, a name anciently given to the planet Venus, as the morning star. The term is used figuratively by Isaiah (XIV, 12) and is applied to the Babylonian king, but it was mistaken by the commentators for a reference to Satan. In Milton's *Paradise Lost* Satan is called Lucifer.

LUCKNOW, *luk'now*, BRITISH INDIA, capital of a district in the United Provinces of Agra and Oudh, and the oldest of the great cities of India. It is situated on the south bank of the Gumti River, forty-two miles northeast of Cawnpore and 666 miles northwest of Calcutta. It ranks fourth in

size among British Indian cities, following Calcutta, Madras and Bombay. Although its streets are narrow and dirty and many of its buildings are small and mean, the city is from a distance picturesque and imposing in appearance, as there are minarets and domes on many of the larger buildings. Since the British gained control a number of improvements in sanitation and building have been put into effect.

Lucknow was one of the chief scenes of the Sepoy mutiny in 1857. At the beginning of the mutiny the residency was fortified by Sir Henry Lawrence, and after his death it was closely besieged by the rebels till relief was brought by Havelock and Outram. The relieving force was only a small one, however, and the British were again besieged. In the middle of October Sir Colin Campbell gained possession of the place after severe fighting and made it possible for the garrison to leave the city. In March, 1858, the British permanently recovered the city. Population, 1916, 265,310.

LUCRETIA, *lu kre'she ah*, in Roman legendary history, the virtuous wife of Tarquinius Collatinus, who was outraged by Sextus, son of Tarquinius Superbus, king of Rome. After telling her husband and father of her wrong, she stabbed herself, and her death was the signal for a revolution, by which the Tarquins were expelled from Rome and a republic was formed.

LU'DENDORFF, Erich (1865–), a German military leader who gained a reputation in the World War second only to that attained by Hindenburg. He was born in Posen. His father was a gentleman-farmer of moderate means, and the boy received a good education, entering the cadet school at Plön at the age of twelve. In 1882 he was commissioned a junior lieutenant in an infantry regiment, five years later was transferred to the Marine Corps, and in 1890 began a three-year course in the Berlin War College. After his graduation Ludendorff was sent to Russia to make military observations, and so efficiently did he perform this task that on his return he was promoted to a captaincy. Within a few years he reached the rank of colonel.

Soon after the outbreak of the World War Ludendorff was promoted to the rank of major-general and was appointed chief of staff to General von Emmich, who led the German troops in the invasion of Belgium. While he was assisting in this campaign he was called to aid General von Hindenburg in the defense of East Prussia, which had been invaded by Russians. Ludendorff contributed materially to the brilliant victory of Tannenberg, and was rewarded by being appointed lieutenant-general and Hindenburg's chief of staff. In August, 1916, he was made general of infantry, and subsequently became first quartermaster-general of the German forces. In this capacity, during the last two years of the war he exercised dictatorial powers over Germany's economic and industrial activities, and he welded the army and people into one great war machine. With his chief, General Hindenburg, he planned the last offensive of Germany on the Western Front, and his resignation, late in October, 1918, was a definite proof of the passing of the old order. When the revolution broke he retired to Sweden, but in March, 1919, returned to Germany. Ludendorff possessed remarkable organizing ability, and it was said of him and his chief that one was the brain, the other the arm, of the German offensive power. See World War.

LUD'INGTON, Mich., the county seat of Mason County, 105 miles northwest of Grand Rapids, on Lake Michigan, at the mouth of the Marquette River, and on the Pere Marquette Railroad. It is an important lake port. The manufacturing and shipping of lumber was once the main industry, but the lumber business has decreased, and more varied manufactures are produced, including game boards, furniture, tractors and engines. There is also a considerable production of salt. There is a Carnegie Library and a hospital. The city is in a beautiful lake region affording good fishing, and it has become a popular summer resort. The grounds and cottages of the Epworth League assembly are at Epworth Heights, near the town. Ludington was settled in 1851 and chartered as a city in 1874. Population, 1910, 9,132; in 1917, 10,566 (Federal estimate).

LUKE, Saint, the evangelist, author of the Gospel which bears his name and of the *Acts of the Apostles*. He was probably born at Antioch, in Syria, and was taught the science of medicine. He is supposed to have been one of the seventy disciples and was also one of the two who journeyed to Emmaus with Jesus after the resurrection (*Luke* XXIV, 13–35). He was for several years a companion of the apostle Paul in his travels,

LUMBER

1, Lumber Camp.
2. Log Train.
3, Log Pile by Lake.
4, Felling Trees.
5, Lumber Yard and Mill.

so that in the *Acts of the Apostles* he relates what he himself had seen and participated in.

LUMBA'GO, rheumatism or rheumatic pains affecting the muscles of the loins. The disease is usually the result of intestinal fermentation or other infection in the body. It is likely to recur after the first attack and may even become chronic. The pains may be sharp and intermittent or dull and steady. The attack lasts from a few hours to several weeks and often disables and weakens the sufferer for longer periods. Warmth and rest constitute the best treatment, but in severe cases the care of a physician is desirable.

LUMBER, the general term applied to all timber cut into various forms for commercial use. More specifically, however, it relates to boards, planks, lath, shingles, joists, etc. Other forms included in the general definition are telegraph poles, railroad ties, and the like. The manufacture of lumber constitutes one of the most important and one of the most extensive industries in the world.

Lumber Producing Countries. The principal lumber producing countries of the world are the United States, Canada, Russia, Sweden, Norway, Germany and France, but some tropical sections furnish many beautiful varieties of timber, such as mahogany, ebony and rosewood, which are chiefly used in furniture making. Russia and Sweden are the only important European exporters of lumber; most of the other nations, especially Great Britain and Germany, import large quantities, or produce just enough for their own use. With the increasing demands for lumber there has been a corresponding increase in the varieties of wood available for industrial purposes. Substitutes have been found for many varieties formerly in use; and such substitutes have often proved better than the varieties they displaced.

Divisions of the Industry. The lumber industry is divided into three branches, as follows:

(1) The logging industry, including the felling of timber, cutting it into lengths, and transporting it by rail or by river to the mill. This industry is carried on in part by individuals, who own or operate the sawmills. The raw material of this industry consists of standing timber; the finished product consists of logs delivered at the mill.

(2) The sawmill industry, in which the raw material consists of saw-logs, and the product of rough lumber, including beams, joists, scantlings, boards, shingles and laths.

(3) The planing mill industry, in which the raw material consists of rough lumber, and the finished products of planed, with such minor manufactures as are carried on in connection with these mills. Some of the planing mills are operated in connection with sawmills, while others are under separate ownership and management.

Cutting the Timber. In some of the lumber regions the cutting of timber is carried on only during the winter months, because it is at this time that the logs can be more economically transported than at other seasons. The lumbermen during the logging time live in camps, which are usually constructed of logs and consist of buildings in which the men sleep, a kitchen and dining room, one or more stables for the horses, and a blacksmith shop. The men of the camp are organized into squads, each in charge of a foreman and assigned to a special line of work. One squad fells the trees, which is done by sawing them off near the ground, instead of chopping them, as formerly. Another squad cuts trees into logs; still another hauls the logs to the river or to another suitable place, from which they are transported to the mills, while another may have charge of the roads over which the logs are hauled. The general foreman, or superintendent, has oversight of all the work, selects the trees to be cut and sees that each squad performs the work assigned to it in a satisfactory manner.

River-driving, that is, floating the logs down stream to the mills, is still practiced wherever possible, but as the timber supply near the rivers is being exhausted, other means of transportation have been used. The logs are sometimes carried out of the woods by teams over temporary log roads. In the mountain forests enormous loads are drawn on sleighs by single pairs of horses—the roads are previously flooded and frozen, so that the surface is icy. In the South and West temporary railroads are sometimes built into the forests to transport the logs. In the far West machinery is used to a far greater extent than in the East on account of great size of the timber. Donkey engines

and traction engines are used in the woods for handling logs and for dragging logs over roads to the railway. For loading logs on the cars cranes are commonly used.

The Source of Supply. The lumber industry of the United States and Canada may be roughly divided into two sections, eastern and western, separated by the relatively treeless plains of the central valley. The eastern forest is characterized by the predominance of broad-leaved trees and by the uniformity of its types over large areas. In the western forest the cone-bearing trees or pine family predominate; the individual species, moreover, often reaches enormous dimensions, the forest is frequently interrupted by treeless areas, and the transitions from one type to another are often abrupt.

The eastern forest may be conveniently divided into three sections: first, the northern, which produces chiefly maple, birch and beech, among the hardwoods, and white pine, spruce and hemlock among the cone-bearing; second, the southern, chiefly oak, white cedar and yellow pine; third, the central hardwood, chiefly chestnut, hickory, ash and other hardwoods already mentioned. The western division is also divided into two sections; first, the Pacific coast, whose characteristic trees are the redwood, Douglas fir, sugar pine, and western hemlock; second, the Rocky Mountain, with western yellow pine and spruce.

In the Sawmill. The sawmills contain all the machinery necessary for working the logs into the finished lumber. Circular saws, band saws and gang saws are common in the largest mills. The gang saw consists of a number of saws attached to an iron frame which moves up and down. The space between the saws is the same as is desired for the thickness of the board or plank to be cut, and each gang contains enough saws to convert the log into lumber as it passes through them. While a mill of this pattern seems to work slowly, yet because of the number of saws employed it manufactures more lumber in the same time than any other mill. All of the waste product is used. The slabs and poor boards are cut into lath; the bark, sawdust and other waste go to feed the fire in the boiler, so that practically nothing is wasted. Since lumber shrinks in drying, it must be thoroughly seasoned before it can be used, and many large mills contain drying kilns, or chambers in which the boards are stacked and subjected to the influence of hot air for a number of

Outline on Lumber

I. Kinds
  (1) Hardwood — mahogany, rosewood, ebony, etc.
  (2) Soft woods—pine, cedar, etc.

II. Saw Mills
  (1) Location
    (a) Lumber camps
    (b) Seaports, inland cities
  (2) Methods of sawing and handling trees
    (a) Large timber — Machinery
    (b) Small timber—Oxen, etc.
    (c) Transporting to mill
  (3) Product
    (a) Rough lumber—logs, poles, planks.
    (b) Finished lumber
    (c) Finished articles

III. Transportation of Logs to Distant Saw Mills
  (1) Methods
    (a) Rafting
    (b) Shipping by rail or water

IV. Drying
  (1) Kilns
  (2) Sun dried

V. Purposes
  (1) Buildings—public and private
  (2) Railways—all equipment of wood, etc.
  (3) Ship building and yards, etc.
  (4) Furniture, etc.

VI. Lumber Producing Countries
  (1) Canada—British Columbia, Ontario, Quebec, other provinces
  (2) United States—Wisconsin, Michigan, Minnesota, Washington
  (3) Other — South America, Sweden, Russia, Germany, France, Mexico, Canada, Africa

VII. Commercial
  (1) Fourth industry in United States

days. Some mills also contain planing mills and other finishing machinery, so that the lumber can be manufactured into any desired form for manufactured articles before leaving the mill.

Extent of the Lumber Cut. The greatest annual cut was once in New England, from which section it shifted to Pennsylvania, then to Michigan. Later the South led, but within the last few years the far West has dominated the industry. Michigan's greatest yearly cut was 4,311,240,000 board feet, in 1890. The state of Washington has exceeded this enormous output for several consecutive years. The output of Southern pine has reached the height of its production, and it will gradually decrease, but the great Northwestern industry has not reached its maximum yearly cut.

How Lumber is Measured. All the operations of the lumber trade in the United States and Canada are influenced by the peculiar unit of measure which has been adopted. This unit is the board-foot. It is generally defined as a board one foot long, one foot wide, and one inch thick, but in practice it is equivalent to one hundred forty-four cubic inches of manufactured lumber in any form. To purchase logs by this measure, one must know how much one-inch timber each log will yield. For this purpose a scale or table is used, which gives the number of board feet of logs of various lengths and diameters. Under this system the buyer pays for nothing but the salable lumber in each log, without any expense for the waste in slabs and sawdust.

Lumbering in Canada. In the article CANADA this subject is discussed.

Related Articles. Consult the following titles for additional information:
Building Lath Shingles
and articles relating to all timber trees, as Pine, Oak, Hickory, Cedar, Birch, Mahogany, Rosewood, etc.

LUMP'FISH, or **LUMP'SUCKER**, a fish, so named from the clumsiness of its form. The back is arched and sharp, the belly flat, the body covered with numerous bony tubercles and the ventral fins modified into a sucker, by means of which the fish can stick firmly to anything. Before the spawning season it is of a brilliant crimson color, mingled with orange, purple and blue, but afterward it changes to a dull blue or lead color. It sometimes weighs seven pounds. The lumpfish is not a valuable food fish.

LUMPY JAW, or **LUMP JAW**, a disease of cattle, usually manifested by the appearance of swellings on the lower jaw, though it affects other parts of the body. It is caused by a fungus which is found on grasses and on the awns of barley, spears of oats and other grains. These occasionally penetrate the gums of cattle, and the fungus lodges in the tissue and grows, producing tumors or abscesses. When opened and examined, these are found to contain minute grains, varying in color from pale yellow to a sulphur yellow. These granules are imbedded in the soft tissue composing the tumor or in the pus of the abscess. The presence of the fungus causes sufficient irritation to propagate these inflammatory growths. The disease progresses rather slowly, but unless checked it often produces ulceration of the jawbone, causing displacements or even loss of teeth. Without assistance the animals seldom recover.

It is supposed that the disease is contracted from food infected with the fungus. The treatment consists in lancing or removing the tumors and also in treating with solutions of iodide of potassium and iodine. The latter method is usually the more effective and has the advantage that it can be applied by any one, while the surgical operation can be undertaken only by a trained veterinarian.

LU'NA, the Latin name for the moon, whom the ancients worshiped as a goddess. To the Greeks she was known as *Selene*. Her worship is said to have been introduced among the Romans in the time of Romulus. Later the qualities of Luna were transferred to Diana (which see), and the latter became the moon goddess.

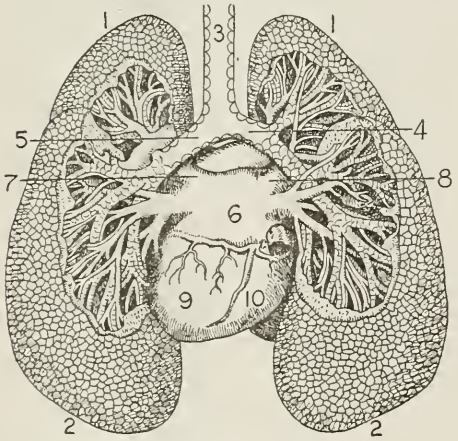
LUNACY, *lu'na se.* In law, "a lunatic is one that hath had understanding, but by disease, grief, or other accident, hath lost the use of his reason." This definition is from Blackstone. In the United States, Canada and most other countries there are special laws dealing with lunacy. The statutes provide that lunatics may be put under guardianship, provided lunacy is proved before a competent court. Until the contrary is shown, every man is presumed to be sound of mind. In criminal cases lunatics are not chargeable for their acts, but they may be sued and can sue, in the name of their guardians, for civil wrongs. See INSANITY.

LU'NAR CAUS'TIC, a chemical preparation, composed of nitrate of silver, and made

into little sticks, which are white or grayish in color and turn black on exposure to the air. Lunar caustic is used extensively in surgery, because of its antiseptic qualities and its power to burn away diseased tissue, warts, or such formations as the membrane in diphtheria. Lunar caustic is sometimes used in making black hair dyes and indelible inks.

LUN'DY'S LANE, Battle of, an important battle of the War of 1812, fought at Lundy's Lane, about one and a half miles from Niagara Falls on the Canadian shore, July 25, 1814. The American force was commanded first by General Scott and then by General Jacob Brown, and faced a superior force under General Reall. The Americans were the aggressors and first gained an important advantage, but the result after an all-day's struggle was probably a drawn battle. The loss on each side was about 850.

LUNGS, the most important of the organs of breathing. They occupy in man the greater part of the cavity of the chest and are separated from each other by the oesophagus, the heart and the large blood vessels. Though



THE LUNGS

1 Summit of lungs
2 Base of lungs
3 Trachea
4 Right bronchus
5 Left bronchus
6 Left aurical of heart
7 Left superior pulmonary vein
8 Right superior pulmonary vein
9 Left ventricle of heart
10 Right ventricle of heart

these organs occupy so large a space they are the lightest, according to size, of any in the body, weighing in man about three and one-half pounds, in woman two and three-fourths pounds. The color varies with the age of the individual, being pinkish at birth, slate colored and mottled in adult life and of a still darker tint in old age. Each lung is partially subdivided into lobes, the right into three, the left into two, and each lobe is made up of a large number of tiny lobules.

The two lungs are united at the top of the windpipe, or trachea, which divides into a right and left bronchus after its entrance into the cavity of the chest. Within the lungs are found the divisions and subdivisions of the bronchi, or the bronchial tubes. The minute terminal branches of these tubes open into tiny air cells. A dense network of capillaries lies outside the cells, so that between the air in the cells and the blood in the capillaries there are but the two very thin walls, and often there is only a single layer of capillaries between adjoining cells, thus exposing both sides of the blood vessels to the air. The blood vessels and bronchial tubes, together with nerves and lymphatics, also found in the lungs, are embedded in elastic tissue.

The special function of the lungs is to keep the cells of the body supplied with oxygen, and to help expel from the body carbon dioxide. When air is drawn in, in the act of breathing, oxygen is supplied to the lungs. This oxygen seeps through the walls of the air cells and the tiny blood vessels, and from them it goes into the blood stream and so to all parts of the body. When the other act of breathing, or expiration, takes place, carbon dioxide, a waste material, is sent out of the body. This process is explained more fully under the heading Breathing.

Related Articles. Consult the following titles for additional information:

Bronchitis	Physical Culture
Circulation	Pleura
Drowning	Pneumonia
Heart	Tuberculosis

LUNG'WORT, a name applied to several different plants. In America the Virginia cowslip, which blooms in early spring from Southern Canada to South Carolina, is called both lungwort and bluebell (see Cowslip). In Europe the name is given a plant bearing small purple flowers and leaves spotted somewhat like diseased lungs. It was formerly supposed to be a reliable remedy for diseases of the lungs.

LUPERCALIA, *lu per ka'li a,* a Roman festival, celebrated annually in honor of Lupercus, an ancient pastoral god, afterward identified with Pan. It was celebrated on February 15 at the Lupercal, a grotto in the Palatine Hill at Rome. Goats were sacri-

ficed, and two youths, arrayed in goat skins, ran through the streets of the city striking with leather thongs all the persons they met.

LUPINE, *lu'pin*, a very extensive genus of hardy plants, belonging to the pea family, some of which are cultivated in gardens for the sake of their gaily-colored flowers. These plants are found in the temperate parts of the Americas, and are of value to the farmer because they add nitrogen to the soil.

LU'PUS, tuberculosis of the skin. It manifests itself in the formation of reddish pimples, found usually on the cheeks near the nose. These pimples generally form ulcers, which leave noticeable scars. Lupus is a disease of childhood and youth. Victims should be under the constant care of a reliable physician, who will prescribe nourishing food, fresh air, exercise and medicine like cod-liver oil. The X-ray has been found helpful for local treatment.

LURAY' CAVERNS, a series of underground galleries in Page County, Va., near Luray. Most of the hundreds of chambers have not yet been explored. The cave is considerably smaller than the Mammoth Cave of Kentucky, as it underlies only about 100 acres, but it affords a wonderful display of stalactites.

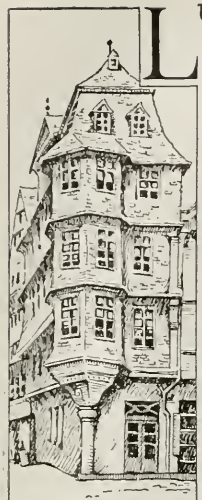
LUSITA'NIA, a British passenger ship owned by the Cunard Company, which was torpedoed without warning by a German submarine, on May 7, 1915. The ship carried 1,257 passengers, including women and children, and a crew of 702, a total of 1,959 people. Of these, 1,198 perished. There were 102 Americans lost, including such well-known persons as Charles Frohman, theatrical manager; Charles Klein, playwright; Alfred G. Vanderbilt; Elbert Hubbard, author and lecturer; and Justus Miles Forman, novelist. The sinking of the vessel shocked the civilized world, and it marked the definite turning of American sympathy toward the cause of the allies. From that time German propaganda was a losing venture in the United States. The disaster called forth a vigorous protest from the American Department of State, and was the occasion of much diplomatic correspondence between Germany and the United States. The German defense was that passengers had been warned not to sail on enemy merchant ships, that the *Lusitania* was armed, and that it carried ammunition. This charge was proved to have been used merely as a subterfuge.

In 1918, Judge J. M. Mayer, of the Federal District Court of New York, gave a judicial verdict on the disaster. In this decision the judge absolved the Cunard Company from damage suits involving $6,000,000. Among the facts brought out in the investigation were these: The vessel was seaworthy, it was unarmed, and it carried no explosives. Its cargo included a consignment of empty shells, cases of safety cartridges and cases of infantry equipment, but nothing that could warrant the Germans in calling the ship a munitions boat. After reviewing the facts in the case Judge Mayer said:

> The fault, therefore, must be laid upon those who are responsible for the sinking of the vessel, in the legal as well as moral sense. It is, therefore, not the Cunard Line, petitioner, which must be held liable for the loss of life and property. The cause of the sinking of the Lusitania was the illegal act of the Imperial German Government, acting through its instrument, the submarine commander, and violating a cherished and humane rule observed, until this war, by even the bitterest antagonists. As Lord Mersey said, "The whole blame for the cruel destruction of life in this catastrophe must rest solely with those who plotted and with those who committed the crime."
>
> But, while in this lawsuit there may be no recovery, it is not to be doubted that the United States of America and her allies will well remember the rights of those affected by the sinking of the Lusitania, and, when the time shall come, will see to it that reparation shall be made for one of the most indefensible acts of modern times.

Because the German people placed supreme confidence in their leaders and knew nothing of current opinion except as it was carefully prepared for them, they did not during the war understand the horror with which civilization viewed the atrocity. Later, confronted with the true feeling, they professed amazement.

LUTE, a stringed musical instrument, similar to a guitar, formerly very popular in Europe. It consists of four parts: namely, the table or belly, with a large round hole in the middle; the body, ribbed like a melon, with nine or ten ribs, or divisions; the neck, which has nine or ten stops, or frets, which divide the strings into semitones; and the head, or cross, in which are fitted the pegs, or screws, for tuning the strings. There are a dozen pairs of strings, each pair tuned in octaves or in unison. The strings are struck by the fingers of the right hand, and the sounds are regulated by those of the left, which manipulate the frets.


Home in Frankfort-on-the-Main

LUTHER, MARTIN (1483–1546), the founder of Protestantism, was born at Eisleben, in German Saxony. He was of poor parentage, his father being a miner. When but twenty years of age he was graduated as master of philosophy at Erfurt in Thuringia; in 1505 he entered the monastery of the Augustinians at Erfurt, and two years later was consecrated priest. The following year, by the influence of his patron, Staupitz, who was district vicar of the order, Luther was made professor of philosophy in the new university of Wittenberg. At first he lectured upon the philosophy of Aristotle, but soon turned his attention to the Bible, and his lectures on this subject attracted so much attention that Staupitz prevailed upon him to preach regularly in the monastery church at Wittenberg. In 1512, upon his return from a visit to Rome in the interests of his Order, he was made doctor of theology and began his famous lectures on Paul's *Epistles*. His first original work, the *Exposition of the Seven Penitential Psalms*, was published in 1517. Meanwhile, he had been made district vicar of the Augustinians and then preached not only in the convent chapel, but also in the parish church.

During these years he had worked zealously for the Church and in the interests of his order, but in 1517 a Dominican priest, Johann Tetzel, appeared in the vicinity of Wittenberg, selling indulgences, or the remission of temporal punishment for sin. The proceeds were to go toward the building of Saint Peter's, at Rome. Just at this time the dedication of the Schloss-kirche was being celebrated at Wittenberg, and, as it was customary upon special days to nail upon the church doors bulletins of general interest to the parish, Luther on the evening before the fete-day placed upon the door of the Schlosskirche ninety-five theses. These were called forth by Tetzel's abuse of the Church doctrine regulating indulgences. Their tone was, however, moderate, and it seems that at this time Luther contemplated no break with the Church. By means of the press, the theses were distributed through Europe, and all the continent was soon plunged into a tumult of controversy.

Luther, meanwhile, devoted himself to the further study of the Bible, Church history and canon law, in order to defend the position he had taken. His study resulted in his drifting further and further from the Church. His public utterances and writings became bolder, and he was soon attacking the entire system and body of teachings of the Church of Rome. At first the Pope did not regard the matter as of serious import; but at length, being convinced that Luther's influence was becoming dangerous, he issued a bull against him and his friends. Luther's writings were condemned as heretical, and he himself, if he did not recant his errors in sixty days, was to be seized and sent to Rome to be tried for heresy. Luther publicly burned this communication.

In 1521 the Diet of Worms, an assembly of the princes, nobles and clergy of Germany, was convened by the Emperor Charles V to deliberate upon state affairs in general and especially upon matters touching the great religious controversy. Luther was summoned before this body and called upon to recant his errors. Refusing to do so, he was pronounced a heretic and outlaw, but was allowed to depart in safety. Frederick, elector of Saxony, conveyed him privately to the Wartburg castle, where he remained for ten months in seclusion. During this period he translated the New Testament into German. Meanwhile, serious troubles arose from the excesses of some professed followers of Luther. Castles and monasteries were sacked, and horrible outrages were perpetrated. Although a legal outlaw, Luther now came forth, temporarily checked the disturbance, then resumed his work in the Church and university; and when several years later trouble broke out afresh, he made a tour through the neighboring towns, preaching a crusade against the image breakers. His history from this time is identical with that of the Reformation.

It is thought that the rapidity with which his doctrines gained ground was due as much to his hymns as to his preaching. Among these is *A Mighty Fortress is Our God*, sometimes known as the "battle hymn of the Reformation." In 1524 Luther married Katharine von Bora, a former nun, who for

several years had been a believer in his doctrines. In the same year he established a school at Eisleben. From 1526 to 1529 he was engaged in the preparation of a new Church service, and his translation of the Bible in 1534 permanently established the literary language of Germany. See REFORMATION.

LU'THERANS, the name given in derision by the opponents of the Reformation to those who adopted the theological doctrines of Luther. Luther himself protested against this name, as his intention had been, not to form a new Church, but to reform abuses in the Church then existing. It was permanently adopted, however, by a large body of Protestants. The Augsburg Confession (which see) set forth the doctrines which are held by the Lutherans of to-day.

The Lutheran creed includes the doctrines of "justification by faith alone, universal depravity, the vicarious atonement, regeneration, progressive sanctification, a true sacramental, but not a material, presence of Christ in the Lord's Supper, and the use of both the Bible and the sacraments as means of grace." Lutheranism is the prevailing form of Protestantism in Germany and is the national religion of Denmark, Sweden and Norway.

In 1918 the three English-speaking Lutheran bodies in the United States effected a merger, the united institution adopting the name United Lutheran Church in America. It represents a baptized membership of nearly 2,000,000, and a communicant and confirmed membership of about half that number.

LU'TZEN, BATTLES OF, two battles fought at different times in Prussian Saxony, near the town of Lützen. The first Battle of Lützen was fought in November, 1632, between the Swedes, under Gustavus Adolphus, and the imperial troops, under Wallenstein. The Swedes, although they had the smaller force, were victorious after a stubbornly-fought battle, but Gustavus Adolphus was killed. See THIRTY YEARS' WAR.

On May 2, 1813, occurred the second battle of Lützen, in which Napoleon defeated General Wittgenstein with a force of Russians and Prussians. The loss to each side was approximately 20,000.

LUX'EMBOURG, a small, independent grand duchy of Europe, bordering on Germany, France and Belgium. It has an area of 998 square miles, and had 259,891 inhabitants in 1910, nearly all Roman Catholic in religion. The people are of old Teutonic stock, but for many years French has been the language of the educated classes. The peasants speak a German dialect, in which are found French words. Iron is the chief mineral product, about 1,500,000 tons being produced every year. There are also deposits of copper and lead. Agriculture is well advanced, and there is considerable stock raising. There are over 500 miles of railroad —one mile to practically two square miles of territory.

From 1815 to 1866 Luxembourg was a part of the Germanic Confederation, but in 1867 its independence was guaranteed. However, while nominally independent, German influence held Luxembourg almost in vassalage for years; its richness in iron made it necessary to Germany. Having no seaport, the grand duchy was forced into the German Customs Union and thus into economic dependence upon the Germans.

Luxembourg was invaded by German forces at the outbreak of the World War, as was Belgium, but the people of the grand duchy made no attempt to oppose the invaders. At the close of the war American soldiers entered the state on the heels of the retiring, defeated Germans, and were welcomed as deliverers from oppression. See WORLD WAR.

The ruler of Luxembourg from February 26, 1912, to January 15, 1919, was Grand Duchess Marie Adelaide (born 1894). She abdicated the throne in 1919 in the hope of preserving the sovereignty of the grand duchy, and was succeeded by her sister, Princess Charlotte Adelgonde. The new grand duchess was born in 1896. There is a chamber of deputies of fifty-three members, elected for six years. The city of Luxembourg is the capital.

The future status of the duchy is in doubt. Only the presence of the American armies in 1919 deterred the people from agitation for a change in the form of government early in that year. They courteously refrained from inciting a revolution while Pershing's forces were their guests.

LUXOR, *luk'sawr*, EGYPT, a village on the east bank of the Nile, on the site of ancient Thebes. Its Arabic name is El Kusur. The place is chiefly interesting because it contains the ruins of a great temple erected by

Amenophis III about 1500 B. C. Here, too, may be seen three colossal statues of Rameses II, carved from black granite. See THEBES.

LYCEUM, *li sē'um*, a gymnasium in Athens in which Aristotle and his followers carried on philosophical discussions. Its name was derived from that of a near-by temple, dedicated to Apollo Lyceus. In modern times the name *lyceum* has been given to the schools intended to prepare young men for the universities, and to organizations which maintain lecture courses of a popular or technical nature.

LYCURGUS, *li kur'gus*, the great lawgiver of the Spartans, who flourished about 900 B. C. He traveled into Crete, Egypt and Asia and thus prepared himself to give Sparta the laws which have rendered his name immortal. His object was to regulate the manners, as well as the government, and to form a warrior nation, in which no private interest should prevail over the public good. See SPARTA.

LYDIA, in ancient geography, a large and fertile country of Asia Minor. It attained its highest prosperity in the seventh and sixth centuries B. C., especially under Croesus, who was conquered by the Persians under Cyrus, in 546 B. C. The Lydians are credited with the invention of certain musical instruments, the art of dyeing wool and the art of smelting and working ore. Sardis was the capital of Lydia.

LYELL, CHARLES, Sir (1797–1875), a British geologist, born at Kinnordy, Scotland. He was educated at Oxford and began the study of law, but afterward resolved to devote his time and fortune to geological research. For this purpose he visited the continent of Europe and the United States. His first important work was the *Principles of Geology*, and a portion of this book afterward formed the basis of the *Elements of Geology*. Another important work was the *Antiquity of Man*, in which he summarized the evidence in favor of the theory that the race of man was much older than was currently believed. Lyell is considered by many to be the founder of modern geological science.

LYMPH, *limf*, a colorless, nearly transparent fluid, the function of which is to provide nourishment for the growth and repair of the tissues, as well as for the storage of energy. It has a saltish taste and, on examination with the microscope, is seen to contain corpuscles resembling quite closely white blood corpuscles. The composition of lymph seems to be almost the same as that of the blood, with the exception that it does not contain any of the coloring matter found in blood. Lymph is absorbed by the *villi* of the small intestine, passes through the lacteals into the *receptaculum chyli* and thence into the thoracic duct. The formation of lymph is continuous, and it is absorbed by the tissues from the capillaries. Physiologists suppose that the amount formed is regulated to some extent by the pressure in the lymphatic vessels and that this pressure is controlled by the absorption by the tissues. See LACTEALS; LYMPHATICS.

LYMPHATICS, *lim fat'iks*, minute, transparent tubes, which originate in lymph capillaries and are found in all parts of the body except the brain, eye, spinal cord and tendons. They are so abundantly supplied with valves that when filled with lymph they present a beaded appearance. In the course of these lymphatics are glands, through which the lymph passes on its way to the blood vessels of the neck. The valves are abundant in the armpit and the groin, along the great vessels of the neck, thorax and abdomen, in the arm as far as the elbow, and under the knee. It is only after passing through these glands that the lymph is ready to enter the blood. The lymphatics of the left side of the body empty their contents through the thoracic duct into the left subclavian vein; those on the right side into the right subclavian vein. See LACTEALS; LYMPH.

LYNCHBURG, VA., in Campbell County, 124 miles west of Richmond, on the James River and on the Chesapeake & Ohio, the Norfolk & Western and the Southern railroads. It has a picturesque location on the hills along the river, where the Blue Ridge and the peaks of Otter Mountains make a beautiful background. The surrounding region is agricultural and contains deposits of coal, iron and granite. The main industries include large tobacco factories, iron and brass works, flour and cotton mills, shoe factories, an overall factory, and brick and tile works. Randolph Macon Women's College and Virginia Christian College are located here. The place was settled in 1786 by John Lynch and associates, and was incorporated in 1823. Population, 1910, 29,494; in 1917, 33,497 (Federal estimate).

LYNCH LAW, the practice of inflicting the death penalty upon men for offenses through private, unauthorized means, without legal trial. The origin of the phrase was in the name of one Charles Lynch of Virginia, who adopted this mode of punishing offenders. Lynchings are most frequent in the South, though the North in some years nearly equals the Southern record, and negroes are more often the victims than whites. There is a strong sentiment in opposition to lynch law, and there are frequent attempts, always unsuccessful, to bring lynchers to justice.

LYNN, Mass., a city of Essex County, ten miles northeast of Boston, on Massachusetts Bay and on the Boston & Maine and the Boston, Revere Beach & Lynn railroads. High Rock, with its well-equipped observatory, Lynn Woods Reservation and Lynn Beach are features of interest. The shore line is three miles long within the city. The two leading industries are the manufacture of women's shoes, for which there are about 300 factories employing 18,000 people, and the manufacture of electric motors and other electrical appliances, in which about 13,000 are employed. Other leading industries include the manufacture of machinery, leather and patent medicines. The total value of manufactured goods, at the factories, is over a million dollars a week. The place was settled in 1629 and was known as Saugus until 1637. In 1850 it became a city. The commission form of government was adopted in 1910. Population, 1910, 89,336; in 1917, 104,534. (Federal estimate).

LYNX, *lingks,* the name given to different wild cats found in North America, Europe,

THE LYNX

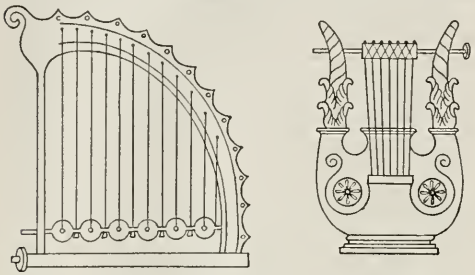
and Asia north of the Himalaya Mountains. The common lynx of North America is from thirty to forty inches in length and has stout limbs and a short, thick tail. The species found in the north is known as the *Canada,* or *red, lynx,* and that in the south as the *southern lynx,* or *bob cat.* The Canada lynx is of a grizzly, brownish-gray color and has tufts of black hair on the tips of its ears and at the end of its tail. The lower part of the animal is white. The bob cat is nearer a reddish-brown, especially in summer, and its fur is marked with spots and lines, which are most distinct about the head. The lynx feeds upon small animals such as rats, mice, and sometimes upon sheep and goats. It is especially fond of poultry, and in some localities it is a pest to the farmer. The animals seek their prey by night, and during the day they sleep in small caves or hollow trees. The fur is of good quality and finds a ready sale. For this reason and because of their depredations, these animals are approaching extermination.

LY'ONS, France, the third city in population in the country, and capital of the department of the Rhône. It is situated 250 miles south-southeast of Paris and 160 miles north of the Mediterranean. Among its chief buildings are the Cathedral of Saint Jean, which dates from the fifteenth century; the Church of Saint Martin d'Ainay, which has a cupola supported by ancient Roman columns and a crypt believed to date from the ninth century; the Church of Saint Nizier, and the modern Church of Notre Dame de Fourvière.

Lyons carries on various industries, among them the manufacture of hats, books, perfume, soap and laces, but it is noted chiefly for its silk manufactures, which are the greatest in the world. The silk industry in the town and surrounding neighborhood gives employment to almost 250,000 people. There is a large trade by railway, river and canal. Lyons was a place of considerable importance when Gaul was invaded by Julius Caesar, and it remained the chief city of Gaul throughout the greater part of the life of the Empire. During the Middle Ages it did not lose at any time all of its importance, and Louis XIV greatly improved the city. While the French Revolution was in progress, the city suffered severely; thousands of its citizens were put to death by the emissaries of the Paris Convention, and its chief buildings were destroyed. Fortunately, it was out of the war zone in both Franco-Ger-

man and World wars. Population, 1911, 523,796.

LYRE, *lire*, one of the most ancient stringed instruments of music, consisting of a frame, with two hornlike pieces rising from it, and a crosspiece between the horns,



TWO FORMS OF THE OLD GREEK LYRE

from which strings were stretched to the lower part of the frame. It is said to have had originally only three strings, but the number was afterward increased to ten or twelve. The lyre was common among the Egyptians, Assyrians and Greeks, and it was considered to be the favorite instrument of Apollo, the god of music and poetry.

LYRE BIRD, a very peculiar bird, living only in Australasia, where there are but three species. These birds take their name from the remarkable tails of the males, which in shape and arrangement resemble somewhat an ancient lyre. The birds are brownish, about the size of small hens, and live principally upon the ground, whence they can leap to branches many feet above ground. When running, they spread their tails out horizontally. During the breeding season the male bird is very vain, and scraping out little hollows in the ground, it struts about or dances, with erect tail and drooping wings, and sings a loud, rather pleasing song.

LYRE BIRD

LYR'IC POETRY, originally, poetry sung to, or suited for, the lyre; in modern usage, that class of poetry in which are expressed the poet's own thoughts and feelings, or the emotions attributed to another, as opposed to epic or dramatic poetry, to which a story of action is essential. There may be a lyrical element in other kinds of poetry, in epics or dramas, for example, but narrative and action have little to do with truly lyric poetry.

Among the most beautiful of English lyrics are the songs in Tennyson's *Princess*, "The Splendor falls on castle walls," "Sweet and Low," "Tears, idle tears," "As through the land at eve we went" and "Home they brought her warrior dead;" Wordsworth's *My Heart Leaps Up*, *The Daffodils* and *The Solitary Reaper;* Tennyson's *Break, Break, Break,* and *Crossing the Bar;* Holme's *Chambered Nautilus;* Longfellow's *Hymn to the Night;* Shelley's *Cloud;* Milton's *L'Allegro* and *Il Penseroso* and Burns's *Highland Mary* and *To Mary in Heaven.* Tennyson's "Tears, idle tears" is here given entire:

Tears, idle tears, I know not what they mean,
Tears from the depth of some divine despair
Rise in the heart, and gather to the eyes,
In looking on the happy autumn fields,
And thinking of the days that are no more.

Fresh as the first beam glittering on a sail,
That brings our friends up from the underworld,
Sad as the last which reddens over one
That sinks with all we love below the verge;
So sad, so fresh, the days that are no more.

Ah, sad and strange as in dark summer dawns
The earliest pipe of half-awaken'd birds
To dying ears, when unto dying eyes
The casement slowly grows a glimmering square
So sad, so strange, the days that are no more.

Dear as remember'd kisses after death,
And sweet as those by hopeless fancy feign'd
On lips that are for others; deep as love,
Deep as first love, and wild with all regret
O Death in Life, the days that are no more!

LYSAN'DER (?–395 B. C.), a Spartan general who was appointed to the command of the Spartan fleet off the coast of Asia Minor in 407 B. C., during the Peloponnesian War. In 405 he defeated and captured the Athenian fleet off Aegospotamos, and thus put an end to the war. He was killed in a battle with the Thebans. See SPARTA.

LYSIMACHIA, *ly si ma'ki a*, a genus of herbs, belonging to the primrose family. Four species occur in the United States, and many others in various parts of the world. They are usually leafy-stemmed and bear yellow flowers, which in some species are large and handsome. *Moneywort* is the common name of a pretty little trailing vine that forms dense mats and has been introduced

into the United States from Europe. Its roundish, light-green leaves, bright yellow flowers and graceful trailing stems make it a favorite for growing in hanging baskets.

LYSIPPUS, *li sip'us,* a Greek sculptor who flourished in Sicyon about 330 B. C., in the time of Alexander the Great. He worked only in bronze, in which he fashioned about fifteen hundred statues. Lysippus claimed to represent the human figure as it seems to be to the eye, and not as it actually is. His statues were characterized by a small head, long legs and slender figure. He became famous by his statues of Zeus, Heracles, Helios and of Alexander the Great, whom he represented many times. Celebrated colossal statues of Lysippus were those of Helios in Rhodes, Zeus in Tarentum and Poseidon in Corinth. But few examples of his art have been preserved. Notable among them are the bronze of *Hercules* and the statuettes of *Neptune* and *Jupiter,* preserved in the British Museum.

LYTTON, EDWARD GEORGE EARLE LYTTON-BULWER. See BULWER-LYTTON, EDWARD GEORGE EARLE.

LYTTON, EDWARD ROBERT BULWER (1831–1891), an English poet and statesman, son of the novelist Bulwer-Lytton. He early attained a reputation as a poet, under the name of Owen Meredith; and he published *Clytemnestra and Other Poems, Tannhauser, The Wanderer, Fables in Song, Glenaveril,* and the highly popular *Lucile.* He also produced several prose works, including the life and letters of his father.

M is the thirteenth letter of the English alphabet. The character has come, with but little change, through the Greek and Latin from the Phoenician. *M* has in English but one sound, and it is silent only in a few foreign words, such as *mnemonic*. As a symbol, M means 1,000.

MAARTENS, *mahr'tenz*, MAARTEN (1858–1915), the pen name of J. M. W. VAN DER POORTEN-SCHWARTZ, a prominent Dutch writer of fiction. All of his novels were written in England, and they gained a wide circle of appreciative readers. In his books the reader finds interesting accounts of life in Holland among the middle classes. Maartens was born in Amsterdam, and was educated in Germany and at the University of Utrecht. His works include *An Old Maid's Love, God's Fool, Harmen Pöls, Price of Lis Doris* and *Eve*.

MA'BIE, HAMILTON WRIGHT (1846-1916), an American critic, editor and essayist, for thirty-two years one of the editors of *The Outlook*. He was born at Coldsprings, N. Y., and was educated at Williams College and at the law school of Columbia University. Mabie was associated with *The Christian Union*, later called *The Outlook*, from 1879 until his death, becoming associate editor in 1884. He wrote voluminously on nature, literature and social and ethical subjects, and was also the author of a series of books for young readers, comprising collections of myths, fairy tales and legends.

MACADAM, *ma kad'am*. See ROADS AND STREETS.

McADOO, WILLIAM GIBBS (1863–), an American lawyer and Cabinet official. Secretary of the Treasury in President Wilson's administration from March, 1913, to the end of 1918. He was born near Marietta, Ga., of an old Southern family. While in his junior year at the University of Tennessee he left the institution to study law, and in 1885 was admitted to the bar. After practicing law for several years in Chattanooga, Tenn., he established himself in New York City in 1892, becoming the partner of another William McAdoo, not, however, a relative. While this venture was successful, he became most widely known as the builder of the tunnels under the Hudson River, connecting New York and New Jersey. To-day over 50,000,000 passengers a year make use of this great tunnel system.

McAdoo was a delegate to the Democratic national convention in Baltimore in 1912, and when President Wilson formed his Cabinet, in March, 1913, he appointed him head of the Treasury Department. His management of the Department was notably successful, and after the country entered the World War he not only directed four great Liberty Loan campaigns, but assumed new and burdensome duties as Director-General of Railways, which the government took over in December, 1917.

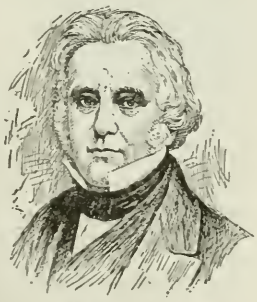
After the signing of the armistice, in November, 1918, McAdoo resigned; he was succeeded by Carter Glass as head of the Treasury Department, and by Walker Hines as railway director. Early in 1919 he accepted a position as counsel for the United Artists' Distributing Association, an organization consisting of Mary Pickford, Douglas Fairbanks, Charles Chaplin and David W. Griffith. In 1914 McAdoo married Eleanor Randolph Wilson, daughter of President Wilson.

McAL'ESTER, OKLA., founded in 1872 as South McAlester, is the county seat of Pittsburg County, 120 miles south of Oklahoma City, on the Chicago Rock Island & Pacific and the Missouri, Kansas & Texas railroads. It is surrounded by rich farm and stock-raising lands, and lies in the midst of the most extensive coal fields of the state. On account of cheap fuel, manufacturing indus-

tries are numerous. There are a number of wholesale houses and also cotton gins and compresses, foundries and flour mills. The commission form of government was adopted in 1910. There are two parks, a Carnegie Library and two hospitals. The state penitentiary is located here. Population, 1910, 12,954; in 1917, 19,398 (Federal estimate).

MACARONI, *mak a ro'ni*, a preparation of wheat flour, used as food. In the manufacture of macaroni, only the hardest wheat of the best quality is used. The wheat is ground into a coarse flour and then sifted, and the flour is mixed into a dough with warm water. This is placed in a cylinder with a perforated base. By means of hydraulic pressure the dough is squeezed through the holes, and the macaroni sticks, as they come through, are cut into lengths of about three feet. The sticks are then dried in the sun or by low heat. The largest sticks form macaroni, while the smaller ones are known as *vermicelli* or *spaghetti*. Macaroni is manufactured in large quantities in Italy, where it is a national dish. It is also exported to Great Britain and the United States, and is manufactured to a considerable extent in France and in the United States. Macaroni has a high percentage of starch.

MACAULAY, *ma kaw'ly*, Thomas Babington, Lord (1800–1859), an English historian, essayist and statesman, celebrated for the brilliance of his prose style. He had a marvelous memory, and the literary and historical allusions in his writings show that in his breadth of knowledge he hardly had a rival. Macaulay was born at Rothley Temple, Leicestershire. In 1818 he entered Trinity College, Cambridge, where he obtained the Chancellor's medal for a poem on *Pompeii*, winning it a second time for a poem on *Evening*. He received a fellowship and took his M. A. degree in 1825. Before this he began to contribute to *Knight's Quarterly Magazine*, in which appeared his poems *The Spanish Armada*, *The Battle of Ivry* and *Moncontour*, and in 1825 he inaugurated his brilliant career in the *Edinburgh Review*, by his essay on *Milton*.



MACAULAY

Macaulay was elected to Parliament in 1830 and was a most vigorous and effective partisan of the reform movement. During the years from 1834 to 1838 he was in India as a member of the Supreme Council there, and on his return he was again made a member of Parliament. In 1842 he published his *Lays of Ancient Rome*, and in 1848 appeared the first two of the five volumes of his *History of England from the Accession of James II*. This brilliant rhetorical exposition, although touched with partisanship and with a tendency to paradox, has attained the position of an English classic. Its popularity when it first appeared was phenomenal, and it is said that in America its sales exceeded those of any book except the Bible. Macaulay was created a peer in 1857, and at his death he was buried in Westminster Abbey. His *History* was unfinished at his death, having been brought down only to the time of William III. Fascinating in style, this great work suffers from the partiality of its author. *The Life and Letters of Macaulay* has been published by his nephew, Sir George Otto Trevelyan.

MACAW', a genus of large parrots, found in South America. They are characterized by strong powers of flight and brilliant plumage. The tail is long and wedge-shaped, and the wings are long and pointed. The feet are strong, the cheeks naked and the bill short, strong and highly arched. The largest species, the *great scarlet*, or *red and blue, macaw*, is more than three feet long. Its body is bright red, its tail is blue and crimson and its wings are greenish-blue and yellow. Its cheeks are bare, white and wrinkled, and the upper mandible of the beak is white. The *green macaw* is easily tamed, but none of the macaws can be taught to speak readily. Their notes are hoarse, and their screams are piercing; consequently, while prized for their brilliant coloring, they are annoying as pets. They feed upon fruits and seeds and are destructive to corn and other seed crops.

MACBETH' (?–1057), a king of Scotland whose name is familiar to most readers through Shakespeare's famous tragedy of the same name. In 1040, in a revolt against Duncan, king of Scotland, Macbeth killed the king and seized the throne. At the death of their father the sons of Duncan had taken refuge with their uncle Siward, Earl of Northumberland, and with his aid they invaded Scotland in 1054; a battle was fought

at Dunsinane, but it was not until 1057 that Macbeth was finally defeated and slain at Lumphanan, in Aberdeen. The legends which gradually gathered round the name of Macbeth were reproduced by Holinshed in his *Chronicles of Scottish History,* which is the source of Shakespeare's tragedy.

McBRIDE, Richard, Sir (1870–1917), a Canadian barrister and statesman, born in the city of New Westminster, British Columbia, and educated at the public and high schools of New Westminster and at Dalhousie University, Halifax, Nova Scotia. He was elected to the legislature of British Columbia in 1898, 1900 and 1903 and again in 1907. In 1900 he was appointed Minister of Mines in the Dunsmuir administration. He resigned the following year because of disagreement with the premier. In 1903 he became leader of the opposition in the House, and on June 1st of that year was called upon to form a Ministry, which he did, becoming Premier and Commissioner of Lands and Works. In 1907, 1910 and again in 1912 he reorganized the Ministry.

MACCABEES, *mak'a beez,* the name applied to a dynasty of Jewish priests, leaders in the movement to restore national independence. The first to come into prominence was Mattathias, who opposed the persecutions of the Syrian king Antiochus Epiphanes. With his sons and a few followers he destroyed heathen worship. When Mattathias died, 166 B. C., his sons Judas and Jonathan became successively leaders of the national movement. The last remaining member of the family was Simon, under whose rule trade and agriculture flourished. He was treacherously murdered by Ptolemy, his own son-in-law, 135 B. C. Properly, the name Maccabeus belongs only to Judas. It is supposed to mean the *hammerer.*

MACCABEES, Knights of The, a secret beneficiary and social order, founded in Ontario in 1878. In 1881 it was reorganized in the United States and since 1883 has prospered, with headquarters at Port Huron, Mich. Below the governing body, there located, are several grand tents, and more than 5,000 subordinate tents and hives, including, all told, 310,000 members. The order pays death, accident, sickness and disability benefits, and since its organization it has disbursed more than $94,000,000 in this way. The order known as the Ladies of the Maccabees is affiliated with this organization.

McCARTHY, Justin (1830-1912), a famous Home Rule leader, was a British novelist, historian and politician, born at Cork, Ireland. He traveled for three years in the United States, and was for a short time connected with the New York *Independent.* After his return to England he held for years an editorial position on the London *Daily News.* He was prominent in Parliament and was the leader of the Home Rule party after Parnell's overthrow. His writings include *History of Our Times, History of the Four Georges, The French Revolution* and *The Story of Gladstone's Life.*

McCLELLAN, George Brinton (1826–1885), an American general, born at Philadelphia. He was trained at West Point, served in the Mexican War and for gallant service at the battles of Contreras, Churubusco and Chapultepec was brevetted lieutenant and captain.

At the outbreak of the Civil War he was appointed major-general in the army, superseded McDowell in command of the Army of the Potomac after the first Battle of Bull Run and became commander in chief of the armies of the United States in November, 1861. In this capacity he organized the raw levies of the north and advanced toward Richmond in the spring.

McCLELLAN

After the evacuation of Yorktown by the Confederates McClellan led the Army of the Potomac in a series of engagements which terminated in the Seven Days' Battles, when he had to retire from his lines in front of Richmond. The result of this was his removal from the position of commander in chief. Afterward, when Lee advanced into Maryland, McClellan fought the battles of South Mountain and Antietam and compelled the Confederate forces to retire. The authorities at Washington were dissatisfied with his apparent slackness in following up this victory, and McClellan was relieved of his command and retired from the army. In 1864 he was nominated for the Presidency, by the Northern Democrats, but was defeated by Lincoln. In 1877 he was elected governor of New Jersey.

McCLURE, Samuel Sidney (1857–), an American editor and founder of *McClure's* Magazine, was born in Ireland. He emigrated to the United States in his youth and was graduated at Knox College in 1882. In turn he was editor of a bicycle journal, manager of the DeVinne Press in New York and founder of the McClure syndicate for the sale of newspaper articles, before he undertook his magazine venture. McClure was known as a pacifist before the United States entered the World War.

McCORMACK, *ma kor'mak*, John (1885–), one of the most popular concert tenors in the world. He was born in Athlone, Ireland, and was trained by the choir leader of Dublin Cathedral, in which church he began singing at the age of eighteen. After further study in Italy, he was favorably received in London in 1907 as a concert and opera singer, and two years later went to America under the management of Hammerstein. He subsequently became immensely popular with American audiences, both in grand opera and in concert, but won greatest favor for his sympathetic interpretation of Irish songs. In 1917 he became a naturalized citizen of the United States. McCormack's principal operatic rôles include Rodolfo, in *La Boheme;* Faust; Pinkerton, in *Madame Butterfly,* and Turiddu, in *Cavalleria Rusticana.*

McCOR'MICK, Cyrus Hall (1809–1884), an American inventor, born in Virginia. In 1831 he gave to the world the first reaping machine, which, with later improvements by him, has done so much for the cause of agriculture. In 1847 McCormick removed to Chicago, where the extensive works of the company were established. McCormick founded in Chicago the McCormick Theological Seminary for the Presbyterian Church and endowed a professorship in Washington and Lee University. See Reaping Machine.

CRYUS HALL McCORMICK

McCRAE, John (?–1918), a soldier, physician and poet who won lasting fame as the author of one of the greatest lyrics inspired by the World War—*In Flanders Fields.* He was a lieutenant-colonel with the Canadian forces. During the second Battle of Ypres (1915), in which the Canadian forces saved the allies from a grave disaster, John McCrae had charge of a dressing station in a hole dug in the foot of a bank. There he watched the progress of the sixteen-days' battle, cared for the wounded, saw the crosses, "row on row," daily grown more numerous. Out of the agony of that time were born the following lines:

In Flanders fields the poppies blow
Between the crosses, row on row,
That mark our place; and in the sky
The larks, still bravely singing, fly
Scarce heard amid the guns below.

We are the Dead. Short days ago
We lived, felt dawn, saw sunset glow,
Loved and were loved, and now we lie
In Flanders fields.

Take up our quarrel with the foe;
To you from failing hands we throw
The torch; be yours to hold it high.
If ye break faith with us who die
We shall not sleep, though poppies grow
In Flanders fields.

During the rest of the war that poem was an inspiration to "carry on" to soldier and civilian alike, but its author did not live to see the triumph of his cause, for he died of pneumonia in France, in January, 1918.

McCrae was a graduate of the University of Toronto, where he won high honors. He held the post of resident house physician at the Toronto General Hospital and at Johns Hopkins, and was subsequently pathologist to the Montreal General Hospital. For his services in the Boer War he received the Queen's Medal. He was also a member of the Royal College of Physicians, London, and of the Association of American Physicians. His poems and personal letters, with a memoir by Sir Andrew Macphail, were published in 1919.

McCUTCHEON, *ma kutch'en*, George Barr (1866–), an American novelist whose books are widely popular because of their spirited action and element of adventure. He was born on a farm in Tippecanoe County, Indiana, and is a brother of the cartoonist, John T. McCutcheon. He attended Purdue University, became a reporter on the Lafayette (Ind.) *Journal,* and was later city editor of the *Courier* of the same city. *Graustark,* one of his earliest and best-known

stories, was published in 1901. It was followed by over a score of others, nearly all of which were very successful. They include *Brewster's Millions, Beverly of Graustark, The Rose in the Ring, A Fool and His Money, Mr. Bingle, The Light that Lies, Green Fancy* and *Shot with Crimson* (1918). Some of his novels have been dramatized and also used for moving pictures.

McCUTCHEON, John Tinney (1870-), an American cartoonist and special newspaper correspondent, was born in Tippecanoe County, Ind. He was educated at Purdue University, where he studied art. He was first brought to public notice by his cartoons while correspondent for the Chicago *Record* in 1896. He made tours of special service in India, Burmah, Siam, China, Korea and Japan. During the Spanish-American War he attended the military expeditions in the occupation of the Philippines. After this he went to South Africa and joined the Boers in the interest of his paper. In 1900 he furnished political cartoons for the *Record-Herald,* and in 1903 he became the cartoonist for the Chicago *Tribune,* which post he yet holds. In 1918, soon after fighting ceased in the World War, he went to Europe to sketch the devastated areas. On the occasion of his marriage in 1915 he purchased a small island in the West Indies. He is the author of *Stories of Filipino Warfare* and *Cartoons by McCutcheon.*

MACDONALD, John Alexander, Sir (1815-1891), first Premier of the Dominion of Canada, was born in Glasgow, Scotland. His family came to Canada in 1820 and settled in Kingston, Ont., where he became a lawyer. In 1844 he was elected to the assembly as Conservative member for Kingston. A sentence in his first public address struck the keynote of his career:

"I therefore need scarcely state my firm belief that the prosperity of Canada depends upon its permanent connection with the mother country, and that I shall resist to the utmost any attempt (from whatever quarter it may come) which may tend to weaken that union."

During his first years in the Canadian assembly he spoke little, but he mastered the details of parliamentary business. His abilities attracted attention and he became receiver-general and then commissioner of crown lands. Macdonald was in opposition until 1854, but he gradually became the real if not yet the acknowledged leader of the Liberal-Conservatives, as distinguished from the Radicals and the Tories. In the Ministry of Sir Etienne Taché he was Attorney-General, and on Taché's retirement in 1858 he became Premier. For more than thirty years Macdonald continued to be the dominant figure in the government of Canada. The confusion due to the Fenian raids and other political causes, gave a great impulse to the movement for a union of all the provinces. In 1864 delegates from Ontario, Quebec and the Maritime provinces met at Charlottetown, and the outline of union as there agreed upon was worked out at the Quebec conference in the next year. The actual framing of the British North America Act, the result of these conferences, was carried out in London during December, 1866, and January, 1867, by delegates from the provinces in coöperation with law officers for the Crown. As the leader in the preliminary discussions Macdonald naturally became the first Premier of the Dominion in 1867.

Organizer of the Dominion. The difficulties of organizing the Dominion called for infinite tact and resource on the part of the new Premier. The jealousies of the provinces had to be smoothed over, yet the federal rights had to be maintained. The Northwest Territories were secured by purchase of the Hudson's Bay Company's territorial rights, and Manitoba was organized as a province. The Pacific scandals of 1874, in connection with the building of a transcontinental railroad, forced the Macdonald Ministry to resign, but in 1878 the Liberals were swept out of office and Macdonald again undertook the building of the railroad. "The faith of Sir John," says one of his biographers, "did more to build the road than the money of Mount-Stephen." During the remaining years of his life the history of Sir John is practically the history of Canada. Most of his efforts were directed to the organization and development of the great Northwest, one of his greatest reforms being the formation of the Royal Northwest Mounted Police. Until his death he retained the office of Premier. The excitement and anxiety of the contested election of 1891 brought on a stroke of paralysis, which caused his death.

The career of Sir John Macdonald cannot be studied apart from the history of Canada. He was a man of strong will and great ambition; but his foresight and political sagacity enabled him to submit to the leader-

SIR JOHN ALEXANDER MACDONALD

ship of smaller men without impatience. "He had the gift of living for the work in hand without feeling the distraction of other interests." Few political leaders have had so many opposing elements to reconcile, so many factions to hold together.

MACDOWELL, Edward Alexander (1861–1908), one of the most original of America's composers, was born in New York. He studied music in Paris, Wiesbaden and Frankfort, and became well known as a teacher, pianist and composer before his return to the United States in 1888. His works and his playing became very popular in his own country, and before his death he was generally recognized as probably the foremost American composer. From 1896 to 1904 he was head of the department of music at Columbia University, but overwork told on him, and in the year following his resignation his mind failed. A characteristic of MacDowell's work is his introduction of touches of American folk-music, notably Indian. He composed an *Indian Suite* for the orchestra, and his very popular *Woodland Sketches* for the piano make use of Indian themes. In all, he published about sixty works, which include almost 300 separate pieces.

MACE, *mase*, an East Indian spice, the dried covering of the seed of the nutmeg. This covering is a fleshy, netlike envelope, somewhat resembling the husk of a filbert. When fresh it is of a beautiful crimson hue. It is extremely fragrant and aromatic and is chiefly used in cooking or pickling. See Nutmeg.

MACE, originally, a weapon of offense, consisting of a club or staff with a heavy metal head. Later the mace came to be a symbol of office, and was borne before officials; and to-day it is in use chiefly as an emblem of authority in legislative bodies. The maces used in the House of Representatives in the United States and in the houses of the Parliament of Great Britain are very elaborately wrought and richly ornamented, and about three feet in length. When carried down the aisles by the sergeant-at-arms the mace commands silence and decorum.

MACEDONIA, *mas e do'ni ah*, a region in the Balkan Peninsula which in ancient times was the seat of a great empire. Politically speaking, there is no Macedonia to-day, but the name is still applied to the district. It extends west and south of the Rhodope Mountains, a chain in Southern Bulgaria, and its southeastern portion borders on the Aegean Sea. In 1913, at the close of the second Balkan War, Macedonia was divided among Greece, Serbia and Bulgaria. The region was the scene of considerable fighting during the World War. In September, 1918, allied victories on the Macedonian front prepared the way for the invasion of Bulgaria and Serbia and the subsequent surrender of Bulgaria.

It is thought probable by most historians that the ancient Macedonians were a Greek tribe which remained behind when other tribes migrated into Greece, but the customs and language became modified so that the Macedonians were a distinct people. The country did not become powerful until the accession of Philip II to the throne in 359 B. C. Under him Macedonia became leader of the Greek states and under Alexander the Great the kingdom expanded into an empire. After the death of Alexander the Macedonian Empire was divided among his generals, the chief divisions being Macedonia, Egypt, Syria, Pergamos, Bithynia, Rhodes and the Greek states. In 146 B. C. Macedonia was made a Roman province, and in A. D. 395, when the Roman Empire was divided, it became a part of the Byzantine Empire. At the fall of the Byzantine Empire it came into the power of the Turks, who held it until the close of the Balkan wars.

Related Articles. Consult the following titles for additional information:

Alexander the Great
Balkan Wars
Demosthenes
Greece, subhead History
Philip II of Macedon
World War

McGEE, Thomas D'Arcy (1825–1868), a Canadian poet, orator and statesman, was born in Louth, Ireland. He emigrated to the United States in 1842 and in three years made an international reputation as a poet and editor on the staff of the Boston *Pilot*. Daniel O'Connell induced him to return to Ireland as editor of the *Freeman's Journal* when he was only twenty years of age. McGee became associated with the "Young Ireland" party and was forced to escape to the United States in 1848. He became one of the editors of the New York *Nation* and the *Celt*, which was first published in Boston and afterward in Buffalo.

In 1857 he removed to Montreal and started the *New Era*. Here he became widely known as an orator, entered Parliament and

became president of the council. He afterward held cabinet offices as Secretary of State and Minister of Agriculture, and in 1867 was elected to the Dominion Parliament. In 1868 he was assassinated by a Fenian. His published works are *History of the Irish Settlers in America, History of Attempts to Establish the Protestant Reformation in Ireland* and *Popular History of Ireland.*

McGILL COLLEGE AND UNIVERSITY, a co-educational institution, established at Montreal, Canada, in 1821, by the bequest of Hon. James McGill. To the original departments of arts and medicine there have been added departments of law, applied science, engineering, agriculture, music and dentistry, and the graduate school. Women are admitted to the courses in arts, and they may also take advantage of scientific courses given at the Royal Victoria College for Women, by McGill professors and lecturers.

There are also several divinity schools affiliated with the university. McGill is affiliated with the universities of Oxford, Cambridge and Dublin, and it has a number of affiliated schools and colleges in the Dominion. Its government is similar to that of English universities. The supreme authority rests in the governor-general of the Dominion. The executive officer is styled principal and is *ex officio* vice-chancellor. The chancellor is the president of the board of governors and is usually a non-resident officer. The library contains 92,000 volumes, and the annual income is $900,000. In 1917 there were 249 faculty members and 1,085 students.

MACHIAVELLI, *mah kyah vel'le,* NICOLO (1469-1527), a distinguished Italian statesman and historian, born at Florence. From his name was derived the term *Machiavellian,* which means about the same as "unscrupulous use of power." Machiavelli was not a scoundrel, but he wrote a book, *The Prince,* in which he advocated the creation of a united Italy through the leadership of a prince who would stop at nothing to attain his ends. This theory stamped the man with a reputation time has never effaced.

MACHIAVELLI

Machiavelli for more than fourteen years guided the destinies of the Florentine Republic, undertook embassies, concluded treaties and jealously guarded the rights and liberties of his native city. When the Medici returned to power in 1512, by the aid of the Pope, Machiavelli was deprived of his office and retired to his country house. Here he devoted himself to literary labor, the chief results of which are found in his *History of Florence, Discourses upon the Ten First Books of Livy, The Prince* and the comedies of *La Mandragola* and *La Clizia.*

MACHINE, *ma sheen',* any device that will perform work, whether it be simple or extremely complex. The nut-cracker is a machine as truly as is a 400-ton locomotive.

The invention of machines which perform perfectly the most difficult operations has marked the present era in history as the age of machinery. The nations which are the most intelligent are those whose people lead in the development of labor-saving devices. At the top of the list of progressive countries, judged by this standard, are the United States and Great Britain and its enlightened overseas possessions.

The dawn of the age of machinery may be said to date from the day James Watt improved the steam engine and made it practicable. Electrical power to-day is supplanting steam at a rapid rate, and for this giant stride ahead the world owes an enormous debt to Thomas A. Edison. Without detracting from the honor due a great number of celebrated men whose work has enriched the world, it may be declared that the two men named have contributed most towards revolutionizing the social and business life of all civilized peoples.

Machines have entirely changed the processes of industry. Less than a hundred years ago one man made by hand all parts of a shoe; to-day one person operates a machine which produces only a single part, and he knows nothing of the numerous other processes by which the article is completed. From the small one-man shoe shop the industry has become one in which thousands of persons work in great factories amid the noise of hundreds of intricate machines. This is also the story of weaving, the power loom having relieved the housewife of a heavy burden. Her spindle and distaff have been supplanted by the modern spindle which can be run at the rate of 11,000 revolutions a minute.

Labor did not view with complacency the steady encroachment of machinery. The early inventors were bitterly assailed. The home weavers in England smashed the first spinning jenny, for it promised to destroy their occupations, and for a time their fears were realized. No opposition could long stay the progress of industry, however, and labor found it possible by a readjustment of views to prosper more than ever before. An entirely new condition has always brought temporary hardship, for immediate adjustment of the problems of labor is not possible.

MACHINE GUN, a name given to any of those pieces of ordnance that are loaded and fired mechanically. They have usually a number of separate barrels. As the range is limited, machine guns can never take the place of cannon and rifle, however deadly the guns may be at short range.

The first machine gun to come into prominence was the French *mitrailleuse*, which was employed in the Franco-German War. The Gatling gun first appeared in the United States and was speedily adopted with modifications by Great Britain and other powers. Other guns of this kind were the Hotchkiss, the Nordenfeldt and the Gardner. A more recent invention is the Maxim, which, after the first shot, continues to fire time after time by means of the power derived from the explosion of each successive cartridge.

The Browning Gun. In 1917, after severe tests, the United States adopted the Browning machine gun for use in the World War. The Browning is of two types; one is light, and can be fired from the shoulder, for it weighs but fifteen pounds; the other, weighing thirty-five pounds, rests upon a tripod. It is a water-cooled, gas-operated gun, and its cartridges will fit the Springfield and Enfield rifles, and thus are interchangeable. It will shoot over 400 shots a minute.

The principle of gas operation is simple. The gun is cocked with an easily operated handle for the first shot. The bullet is expelled by gases, which exert a maximum pressure of 50,000 pounds to the square inch. A small portion of this powder gas is taken off by the gun mechanism to act as power to operate the gun automatically. A bullet discharged from this gun has approximately the same energy as that fired from the United States rifle, model 1917, or from the Springfield service rifle. Cartridges are fed from a detachable magazine.

The gun may be operated as an automatic or as a semi-automatic arm by the manipulation of a conveniently located lever. By putting the lever in the first position, the gun is made to fire single shots by trigger release; by putting the lever in the second position the gun becomes an automatic and will fire twenty shots in from two and a half to three seconds; a third lever position is a locking device.

MACKAY, *m'kay'*, the family name of two influential American capitalists, father and son.

John William Mackay (1831–1902) was born in Dublin, Ireland. He moved to New York in childhood, in 1851 went to California and in the following year to Nevada, where, in 1872, he was one of the discoverers of the Bonanza mines, of which he owned two-fifths. In 1884, with James Gordon Bennett, he founded the Commercial Cable Company and Postal Telegraph Company and precipitated a long fight with the Western Union. Later he headed the company which constructed and laid two Atlantic cables. He died in London.

Clarence Hungerford Mackay (1874–), son of the above, succeeded to his father's holdings in various enterprises, becoming president of the Postal Telegraph-Cable Company. Mackay is man of many interests, having served as vice-president of the New Theatre, director of the Metropolitan Opera Company, and treasurer of the Lincoln Farm Association, which raised funds to preserve Lincoln's birthplace. He is also interested in racing, yachting, hunting and tennis.

McKEES'PORT, Pa., a city in Allegheny County, fifteen miles southeast of Pittsburgh, at the confluence of the Monongahela and the Youghiogheny rivers, and on the Pittsburg & Lake Erie, the Baltimore & Ohio and the Pennsylvania railroads. It is in a region having deposits of bituminous coal and natural gas, and it has a vast iron and steel industry. The National Tube Works has a very large plant here, employing nearly 7,000 men. There are also manufactures of tin plate, railroad cars, locomotives, glass and lumber products. The city contains a hospital, a Carnegie Library, a Y. M. C. A. building, two business colleges, a Masonic Temple and a new high-school building which cost $300,000. The place was settled in 1795, and was incorporated as a borough in 1842

and as a city in 1890. The city is governed on the commission plan. Population, 1910, 42,694; in 1917, 48,299 (Federal estimate).

MACKEN'ZIE, formerly a separate district and territory of Canada, now a part of the North West Territories. It was bounded on the north by the Arctic Ocean; on the east by Keewatin; on the south by Manitoba, Saskatchewan, Alberta and British Columbia, and on the west by Yukon. Its area was over 500,000 square miles, and the population was 5,216. It contained a large number of lakes, chief among which are Great Bear Lake, Great Slave Lake and Aylmer Lake.

MACKENZIE, ALEXANDER (1822-1892), a Canadian statesman, born in Perthshire, Scotland. Originally a stone mason, he emigrated to Kingston, Canada, in 1842 and began business as a builder and contractor. In 1852 he was made editor of a Liberal newspaper, and he entered the Ontario parliament in 1861 and the Dominion parliament in 1867. He soon became leader of the Liberal party, and on the resignation of Sir John Macdonald in 1873, he became premier and retained office with great success till 1878. He remained in parliament until his death, heading the opposition for a time, and he many times refused the honor of knighthood. (See illustration, *A Group of Premiers*, in article CANADA.)

MACKENZIE, ALEXANDER, Sir (1755–1820), a Canadian explorer, born at Inverness, Scotland. He emigrated to Canada in 1775 and in the employ of the Northwest Fur Company he explored the great river named after him, from the western end of Great Slave Lake to the Arctic Ocean (1789). He made another expedition to the western coast (1792) and was the first white man to cross the Rocky Mountains.

MACKENZIE, WILLIAM, Sir (1849-), a Canadian railroad man, was born at Kirkfield, Ont. He began life as a school teacher, but later became a storekeeper. He soon went west and became a contractor on the Canadian Pacific Railway. His association with Sir Donald Mann began in 1886; since that date the firm of Mackenzie, Mann & Co. has built many important lines, including the Calgary & Edmonton Railway and the Qu'Appelle, Long Lake & Saskatchewan Railway. In 1896 they commenced building on their own account, with 100 miles of the Lake Manitoba Railway & Canal Company. This was the beginning of the Canadian Northern, a system which now includes over 5,500 miles. Sir William has financed all the Canadian Northern lines, while his partner has been chief engineer in charge of construction; he is president of the Canadian Northern and of many subsidiary railways and other public service corporations. He also controls transportation lines in Cuba, Mexico and Brazil.

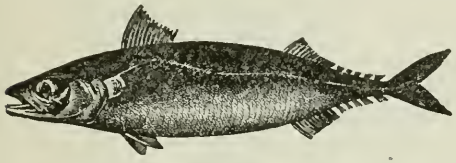
MACKENZIE, WILLIAM LYON (1795-1861), a Canadian politician and statesman, specially noted as leader of the rebellion of 1837–1838. He was born in Scotland, but at the age of twenty-five came to Upper Canada and settled at York, now Toronto. Four years later he established the *Colonial Advocate*, a paper in which he attacked the government and criticized many of its measures. He was elected to the legislature of Upper Canada in 1828, and was reëlected three successive times, but was refused a seat because of an alleged libel on the ministry. In 1832 he visited England as a delegate to secure reforms in government and the redress of certain grievances. He was successful in his mission, and on his return he was chosen the first mayor of Toronto and was again elected to the legislature.

During these years Mackenzie used his position and opportunity to create a strong sentiment against the existing government, and he publicly declared his sympathy with the inhabitants of Lower Canada (Province of Quebec), who were even more open in their opposition to the existing conditions than were the inhabitants of Upper Canada. In 1837 he led a movement to establish a new government and overthrow the existing order. He and his followers were defeated by a detachment of Canadian troops, and Mackenzie fled to the United States, where he established headquarters on Navy Island in the Niagara River and attempted to gather about him a following to invade Canada. Prompt action on the part of the United States authorities, however, prevented the success of his project, and he went to New York, where he remained several years. He returned to Canada after the proclamation of amnesty in 1849, and from 1851 to 1858 he served in Parliament. See CANADA, subhead *History*.

MACKENZIE RIVER, next to the Mississippi, the largest river in North America. It flows out of Great Slave Lake, first west, then north, finally northwest, and after a course of about 1,000 miles it falls into the

Arctic Ocean by numerous mouths. Its principal affluents, including the feeders of Great Slave Lake, are the Athabasca, the Great Slave River, the Liard and the Peel, and it is navigable throughout its course. It was discovered by Alexander Mackenzie in 1789.

MACK'EREL, one of the important food fishes, which inhabits almost the whole of the European seas and is found in tropical and temperate zones in other parts of the world. There are several species, but the common mackerel is the most important as a food fish. When full-grown it is from ten to eighteen inches long, and large specimens attain a weight of about three pounds. The mackerel is variegated blue and green above, with wavy black lines, and below is silvery white. The term *mackerel sky* has reference to the wavy stripes on the back of the fish, a mackerel sky being one in which the clouds suggest wavy parallel lines. In the United

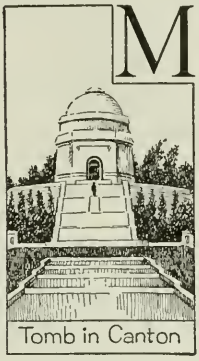


MACKEREL

States the center of the mackerel industry is at Gloucester, Mass., whence mackerel fleets fish all along the coast. The greater part of the product is salted.

MACKINAC, *mak'in ack*, ISLAND, an island and city in Mackinac County, Mich., 260 miles northwest of Detroit, in the Straits of Mackinac, at the northwestern extremity of Lake Huron. The island is about two miles wide and three miles long and is a state park. Its southern end rises abruptly from the lake, and the bluff is the site of the old Fort Mackinac, which was an important military post previous to and during the War of 1812, but has long since been vacant. The town of Mackinac is at the foot of the bluff along the south shore of the island, and is a noted summer resort, during the height of the season having from 8,000 to 10,000 visitors. The city contains a number of large hotels erected for the pleasure and convenience of summer visitors. The permanent population is about 675.

McKIN'LEY, MOUNT, the highest peak of North America, situated in the south-central part of Alaska. Its height is 20,464 feet, and it is covered with snow and has extensive glaciers. Mount McKinley was ascended on June 7, 1913, by Archdeacon Hudson Stuck and three companions.



Tomb in Canton

McKINLEY, WILLIAM (1843–1901), an American soldier and statesman, twenty-fifth President of the United States. Though a man of quiet manners and unemotional temperament, he made a deep impression on the minds of the American people, partly because he led them out of their traditional isolation in world politics, and partly because he died at the height of his career, the victim of an assassin. His administration marked a turning of the ways in American political history. A new issue of "imperialism" was created by the acquisition of the Spanish colonies, and a new note was struck in regard to the trusts and the time-honored Republican policy of protection. McKinley pointed the way to reform just before his death, leaving to his successors the task of formulating new policies in respect to the tariff and the regulation of "big" business.

Early Life. McKinley was born on January 29, 1843, at Niles, Ohio. His first ancestor in America was a Scotch-Irishman who settled in Pennsylvania in 1743 and later fought in the Revolution. The grandfather of the future President, settling in Ohio in 1829, prospered in the iron industry, and both McKinley and his father worked in an iron foundry in boyhood. William received his early education in Ohio at the Poland Seminary. In 1860, at the age of seventeen, he entered Allegheny College, Meadville, Pa., but ill health compelled him to discontinue his studies the first year. After teaching school for a short period, he enlisted, in June, 1861, in the Twenty-third Ohio Infantry, under command of Colonel (subsequently General) W. S. Rosecrans, and served through the war, gaining the rank of brevet major for gallantry at Antietam, Opequon Creek and Cedar Creek. He returned to Poland at the close of the war, began the study of law and was admitted to the bar in 1867.

Early Political Career. Entering on the practice of law in Canton, Ohio, Major McKinley soon became interested in politics.

Administration of William McKinley, 1897-1901

I The President
- (1) Birth
- (2) Parentage
- (3) Education
- (4) Military career
- (5) Public life
- (6) Character
- (7) Death

II. Governmental Affairs
- (1) Domestic
  - (a) Dingley Tariff
  - (b) Gold Standard Act, 1900
  - (c) Reorganization of the army
- (2) Foreign
  - (a) New postal treaty
  - (b) Spanish-American War
    - (1) Causes
    - (2) Principal events
    - (3) Results
      - (a) Porto Rico, Guam, Philippines ceded to U. S.
      - (b) U. S. paid $20,000,000 to Spain
      - (c) U. S. a colonial nation
  - (c) Attempted annexation of Danish West Indies
  - (d) Dispute over Alaska-Canadian boundary
    - (1) Joint High Commission
    - (2) Treaty of 1903 providing for new commission
  - (e) Relations with China
    - (1) "Open door question"
    - (1) "Open door question"
    - (2) Boxer insurrections, 1900
- (3) Colonial relations
  - (a) Cuba
    - (1) Protectorate under military law
    - (2) The Cuban Republic
      - (a) No foreign power to secure control
      - (b) U. S. to have coaling station
      - (c) Debt contracting power of Cuba to be limited
      - (d) When necessary U. S. troops to maintain the government
  - (b) Hawaii
    - (1) Annexed to U. S. 1898
    - (2) Organized as a territory, 1900
  - (c) Samoa
    - (1) Joint protectorate abolished
    - (2) Tutuila and other islands under United States sovereignty
  - (d) Philippine Islands
    - (1) Insurrection of Aguinaldo
    - (2) Military government
    - (3) Civil government

III. Local and Internal Affairs
- (1) Pan-American Exposition
- (2) Discovery of gold in Alaska
- (3) Wireless telegraphy in practical use
- (4) Dedication of Grant's tomb
- (5) Galveston destroyed by flood

Questions on McKinley

Give a short account of the career of William McKinley before he became President.

What was the Dingley Tariff? What did the law accomplish?

What were the main features of the Gold Standard Act of 1900?

What were the causes of the Spanish-American War?

What were the principal battles of the war?

What were the terms of the treaty of peace?

How was the dispute regarding the Alaska-Canadian boundary settled?

Why did the U. S. and other governments interfere in the affairs of China? With what result?

Who was Aguinaldo?

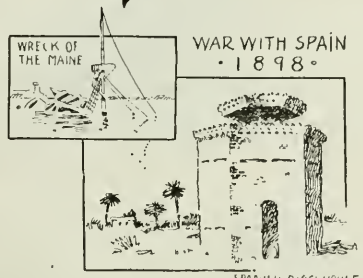
Where was the Pan-American Exposition held?

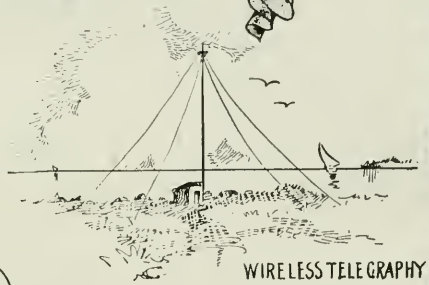
What great tragedy took place there?

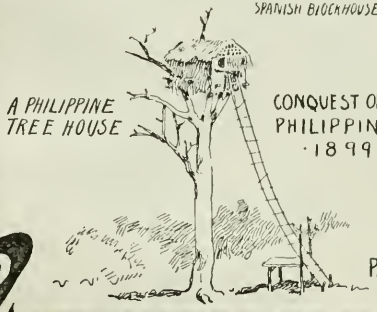
McKinley's Administration

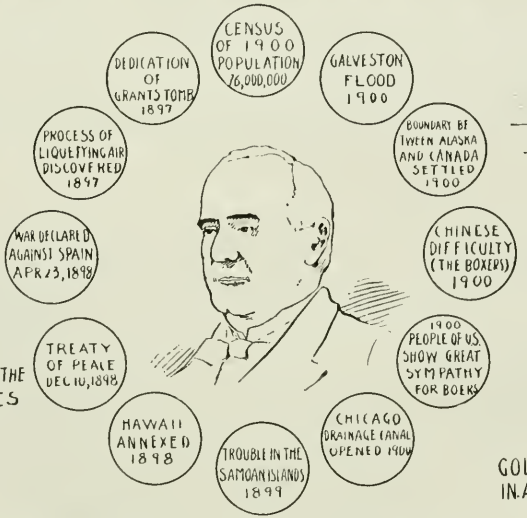
1897

1901









PAN-AMERICAN EXPOSITION AT BUFFALO 1901

ASSASSINATION OF McKINLEY-1901

He was elected prosecuting attorney in 1869, made successful speeches in support of Grant for President and of Hayes for governor of Ohio, and in 1876 was elected to Congress as a Republican, being reëlected successively until 1891. His service in Congress was notable for his advocacy of a high tariff, and in 1890 everyone was reading or talking about the McKinley Tariff Bill. In 1891 he was elected governor of Ohio, and reëlected in 1893 by a majority of 80,000. His administrations as governor, though severely criticised for close relations with corporations and for exceptional regard for party advantage, were so efficient, in general, that McKinley became a popular party leader throughout the nation.

WILLIAM McKINLEY

As President. In June, 1896, he was nominated by the Republican national convention at Saint Louis for President, and was elected by a vote of 271 in the electoral college to 176 for William J. Bryan, his Democratic opponent. In the Presidential canvass, men of both parties rallied to his support in opposition to the free silver movement represented by Bryan. His administration was notable for maintenance of a policy of expansion, both territorial and commercial, the former being emphasized by the Spanish-American War, the annexation of the Philippines and the annexation of Hawaii, the latter by the negotiation of reciprocity treaties. The Dingley tariff law was also passed in 1897, and a bill establishing the gold standard became a law two years later.

McKinley was reëlected in 1900 with increased majorities, receiving 292 of the 477 electoral votes. He had won a place in the hearts of many of his supporters as one of the most beloved of American statesmen; his second term had had an auspicious beginning, and his foreign and domestic policies were received with favor. On September 6, 1901, while holding a public reception at the Pan-American Exposition at Buffalo, he was shot and fatally wounded by Leon Czolgosz, an anarchist. He died September 14 and was buried at Canton, Ohio, September 19. For five minutes at the hour of his interment, all business ceased throughout the land, and remarkable evidences of respect and affection were manifested by the peoples of other countries. As a statesman, McKinley was influenced, perhaps exceptionally, by the sentiment of his constituents, and it was rather his foresight in determining their views, than his own convictions, that made him a popular leader. However, because of his sincerity, his purity of character, his devotion to high ideals, his generosity and his tact, he won general admiration and esteem.

Related Articles. Consult the following titles for additional information:

Aguinaldo	Porto Rico
Cuba	Spanish-American War
Pan-American Exposition	Tariff
Philippine Islands	Trusts

MACLAREN, *m'klair'en*, Ian. See Watson, John.

MacMAHON, *mak ma ohN'*, Marie Edme Patrice Maurice de, Duke of Magenta (1808–1893), a marshal of France, educated at the military college of Saint Cyr. He distinguished himself during the Crimean War and during the war with Austria in 1859, having much to do with the defeat of Austria at Magenta and Solferino. In the war between France and Germany in 1870, MacMahon was shut up in the town of Sedan by the German armies and was wounded in the battle before his surrender. After the war he assisted in putting down the Commune, and in 1873 he was elected President of the French republic, a position which he occupied until 1879.

McMAS'TER, John Bach (1852–), a present day American historian was born in Brooklyn. He was graduated from the College of the City of New York and soon became known as a writer on engineering subjects. He was instructor of civil engineering in Princeton; but, after six years, resigned to devote his whole time to the study of history and was later elected professor of American history in the University of Pennsylvania. He published a number of books of history and biography, but his most important contribution to the science is a *History of the People of the United States*, a work in seven volumes, covering the period from the Revolution to the Civil War.

McMONNIES, *mak mun'iz*, Frederick (1863–), an American sculptor, born in Brooklyn. He studied at first under Saint Gaudens and in 1884 went to Paris. His first work, a statue of Diana, was exhibited in France in 1889 and was accorded honor-

able mention. His best known works are the *McMonnies Fountain,* at the World's Columbian Exposition in Chicago, in 1893, admired by millions of people; *Sir Harry Vane,* in the Boston Public Library, and *Shakespeare,* in the Congressional Library at Washington. After 1900 McMonnies devoted his time to painting.

MACON, *ma'kon,* GA., the county seat of Bibb County, 100 miles southeast of Atlanta, on the Ocmulgee River and on the Central of Georgia, the Southern, the Georgia Southern & Florida, the Macon & Birmingham, the Georgia and the Macon, Dublin & Savannah railroads. It is the fourth inland cotton market in the country and ships large quantities of fruits, vegetables and other produce. The manufacture of cotton products is the most important industry. There are also railroad shops, lumber mills, foundries and manufactures of clay products, boats, furniture and other articles. The important educational institutions are Mercer University, Mount de Sales Academy, the state academy for the blind and Wesleyan Female College, one of the oldest colleges for women in the United States. There is a fine Y. M. C. A. building, and the city has two libraries and two hospitals. The place was settled in 1822 and was chartered as a city in 1832. Population, 1910, 40,665; in 1917, 46,099 (Federal estimate).

MADAGAS'CAR, a large island in the Indian Ocean, and a dependency of France. It is 240 miles from the southeastern coast of Africa, from which it is separated by the Mozambique Channel. With an area of 228,000 square miles, Madagascar is the fifth largest island in the world. In 1916 it had an estimated population of 3,512,690, of whom 14,390 were French and 2,710 were of other European birth. The native inhabitants, called Malagasy, belong to Malayo-Polynesian stock and speak a Malayan language. The Hovas are the most important tribe, and the other chief tribes are the Betsimisarakas, the Betsileos, the Tanalas and the Sakalavas.

In the coast districts the houses of the better class are built of framed timber and have high roofs; the dwellings of the lower classes are constructed of bamboo or rushes, or even of clay. The Malagasy show much aptitude as silversmiths, gunsmiths and carpenters, and with rude looms they make handsome cloths. The native religion of the great bulk of the people is a kind of fetishism, or worship of charms. Many of their superstitious customs have been abolished, and Christianity has been adopted, chiefly by the Hovas. The government is administered by a French governor-general and a council. The capital is Antananarivo (which see). Education is compulsory between the ages of eight and fourteen, and children are required to learn the French language.

Agriculture and cattle breeding are the chief occupations of the people. Natives have under cultivation over 2,634,000 acres, and the chief products are rice, sugar, coffee, manioc, cotton, cacao, vanilla, tobacco, beans and cloves. Butter is made, and the cultivation of the silkworm is encouraged. There are dense forests, and trees furnishing rubber, bamboo and rosewood are numerous. Plants producing gums, resins, textile fibers, dyestuffs and medicines are also abundant. Tamatave, the principal port, is visited regularly by steamers. The bulk of the trade is with France. The island has good postal and telegraph service, and a railway is in operation between the capital and Tamatave. There are a number of automobile and wagon roads in use, and additional railway construction is under way or being planned.

History. Madagascar was known to Marco Polo at the end of the thirteenth century, and in 1506 it was visited by the Portuguese, who gave it the name of Saint Lorenzo. In the latter part of the seventeenth century and during the most of the eighteenth century, the French had the ascendency in the island, but the English gained the supreme influence early in the nineteenth century. In the year 1810 Radama I became king of the Hovas, and with his approval Christian missionaries began to teach in the capital in 1820. Many converts were made, the Bible was translated into the Malagasy tongue, the language was reduced to a systematic written form and printing was introduced. In 1828 Radama was succeeded by his chief wife, Ranavalona I, a woman of cruel disposition, who persecuted the Christians and closed the island to Europeans.

She was succeeded in 1861 by her son, Radama II, who reopened the island to the missionaries and emancipated the African slaves. He also granted extensive territories and privileges to France, an act which offended his chiefs and led to his assassination in 1863. His wife occupied the throne five

years, and she was succeeded by Ranavalona II, who became queen in 1868. Under her, Christianity became the state religion. The government, jealous of foreign influence in the island, invaded French territory in 1883, and the result was a struggle which lasted for two years. By a treaty in 1885, Madagascar was virtually placed under French protection, and eleven years later it was declared a colony of France. In 1897, France emancipated the slaves of the Hovas and in the same year was obliged to put down a serious rebellion. During the World War France found the island a valuable source of foodstuffs.

MAD'DER, a genus of plants native in almost all tropical regions. From the roots of a species which is grown extensively in Holland is obtained a beautiful red coloring matter, which in one shade is known as *turkey red.* The chief coloring matter in the different madder dyes is called alizarin (which see). *Common madder* is a native of Southern Europe and Asia, though cultivated in most European countries. It has black fruit and small, greenish-yellow flowers. Cinchona trees and coffee trees are members of this family, and in the United States the common bluets and button-bush are representatives. The madder family has about 6,000 species.

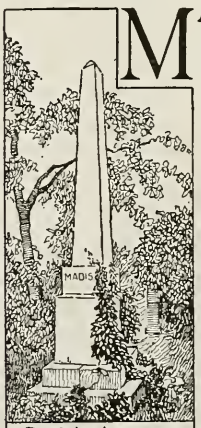
MADEIRA, *ma de'rah,* a Portuguese island in the North Atlantic, about 400 miles from the coast of Morocco. It is the largest of the group of Madeira Islands. Its length is about thirty-eight miles, its breadth, twelve miles, and its area, 315 square miles. The island is traversed by a central mountain ridge, the highest point of which is over 6,000 feet above the sea. The chief product of Maderia is wine, for which it has long been famous. The yearly exports of this product amount to about 700,000 gallons. The climate is equable, and the island is considered an excellent health resort. The capital and chief center of trade is Funchal. Madeira was colonized by the Portuguese in the early half of the fifteenth century. Its inhabitants are of mixed negro, Moorish and Portuguese descent. Population, 1916, 172,960.

MADEIRA RIVER, a large river of South America, the largest tributary of the Amazon. It is formed by the union of the Beni, the Mamoré and the Guaporé, on the frontiers of Brazil and Bolivia. With the Mamoré its length is about 2,000 miles, and it is navigable for almost half of this distance. East of the Bolivian frontier the navigation is interrupted by cataracts, but beyond the cataracts it is again navigable. The chief tributary of the Madeira, the Rio Teodoro, was discovered in 1914 by Theodore Roosevelt.

MADERO, *ma dair'oh,* Francisco (1873–1913), a Mexican soldier and politician, leader of the revolution which deposed Diaz. He was born in Coahuila, where in later years he supervised the estate of his grandfather, a wealthy landowner. Here he introduced modern methods of agriculture, and generally showed himself an able though occasionally impracticable idealist. In 1900 he moved to Mexico City, where he immediately became a prominent opponent of President Diaz and his policies. In 1910 appeared his book *The Presidential Succession of 1910,* a statement of proposed reforms, and Madero himself became a candidate for the Presidency. He was kept in jail a short time before the election. On his release he instituted the revolution which resulted in the resignation and voluntary exile of Diaz in May, 1911, and in November he himself became President.

Though devoted to justice and civic righteousness, Madero lacked the strength of character to control the situation. A number of opposing elements finally forced his resignation on February 14, 1913, and on February 22 he was killed. It seems certain that he was executed with the consent, and probably by the orders, of General Huerta.

Related Articles. Consult the following titles for additional information:
Diaz, Porfirio Huerta Mexico



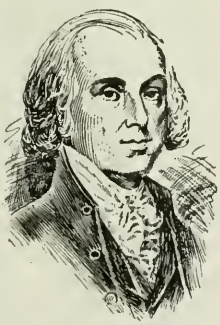
Burial place at Montpelier, Va.

MADISON, James (1751–1836), an American statesman who was prominent in the political affairs of his country from the outbreak of the Revolution to the period following the War of 1812. He was the fourth President of the United States, the successor of Thomas Jefferson, under whom he had served as Secretary of State during both terms. It is for the part he took in the drafting and ratification of the Constitution, rather than for his career as President, that Madison is chiefly honored to-day. He had the misfortune to direct a war that brought little glory to the

nation, and which he had neither welcomed nor prepared for, and he was greater as a constructive thinker than as a practical executive. Because of this he has lost prestige as a President, but as the "Father of the Constitution" he has earned the eternal gratitude of the country.

Birth and Education. Madison was born at Port Conway, Va., on March 16, 1751. He was a descendant of one John Madison, who took out a patent for land on Chesapeake Bay in 1653. The succeeding Madisons, including the boy's father, were all in comfortable financial circumstances, and James was well educated. In 1771 he was graduated at Princeton College, and after a year of postgraduate work, he returned home to take up the study of history and constitutional law. Though barely twenty-one, he realized the need of strong men in public affairs, for critical days were plainly in store for the colonies. Certain it is, his knowledge of law and government proved to be of inestimable value in the making of the nation.

Early Political Career. Madison served in minor local public offices until 1776, when he was a member of the Virginia constitutional convention. There he vigorously advocated the granting of absolute religious freedom and thus displayed for the first time his natural democratic inclinations. In this service he was closely in touch with Jefferson, who was later to write that great document on the rights of man—the Declaration of Independence. Madison became a member of the first state assembly, but was defeated at the end of the term by corrupt means, and in 1780 he was sent by the state to the Continental Congress.



JAMES MADISON

Returning to his state in 1784, he again was elected to the legislature, where he labored diligently toward the upbuilding of a strong union of the colonies, in order to secure for all the necessary stability and prestige. In the constitutional convention of 1787 he was a leading figure, though, being secretary of the convention, he did not take a conspicuous place in the debate. In the actual drafting of the Constitution he had a place second to none, and it was he who suggested the plan of Congressional representation on the basis of population. He was not able to have this principle applied to the Senate, because of the opposition of the small states. The ratification of the Constitution by the states was a second task to which he gave his finest efforts, and with Jay and Hamilton he published a series of brilliant essays in *The Federalist* which gave convincing reasons for its adoption. Madison's title of "Father of the Constitution" was well earned.

In the First Congress. In 1789 Madison was elected to the first House of Representatives. Though officially he was one of the Federalists, as the supporters of the Constitution were called, he found himself in sympathy with Jefferson, rather than with Hamilton, leader of his party, and eventually he aligned himself with the Anti-Federalists, the forerunners of present-day Democrats. In the House he performed notable constructive work, proposing the resolutions to create the State, War and Treasury departments, and suggesting the subject-matter of the first ten amendments to the Constitution. He remained in the House throughout Washington's administrations (1789-1797), and then retired to private life. During the administration of John Adams he did not take an active part in political affairs, but it is believed that the Virginia Resolutions of 1798 were written by him. These were a protest against the extension of Federal authority as exemplified by the passage of the Alien and Sedition Laws.

Secretary of State and President. When Jefferson became President, in 1801, he chose Madison as his Secretary of State. Exceedingly grave problems soon began to confront the administration, for France and England were at war, and in their efforts to conquer each other they trespassed heavily on the rights of neutrals on the seas. Neither the President nor his Secretary desired war, and they sought by every possible means through diplomacy to avert it. The result was a complication that neither Jefferson nor his successor could untangle. Madison himself was elected President for the term beginning in 1809, and he was reëlected in 1812. His first term was largely occupied with fruitless negotiations with France and England, and in June, 1812, Congress declared war on England. (The military events of that struggle

Administration of James Madison, 1809-1817

I. The President
- (1) Ancestry
- (2) Birth
- (3) Education and youth
- (4) Early career
- (5) Character
- (6) Death

II. Government Affairs
- (1) Domestic
  - (a) Revolutions in Florida
  - (b) Admission of Louisiana and Indiana
  - (c) End of the first Bank of the United States
    - (1) Expiration of charter
    - (2) Contraction of the currency
    - (3) Attempts to secure recharter
  - (d) Changes in congressional procedure
    - (1) Development of power of the Speaker
  - (e) Trouble with the Indians
    - (1) Tecumseh and the conspiracy
    - (2) Battle of Tippecanoe
  - (f) Election of 1812
    - (1) Candidates
    - (2) Issue
    - (1) Leaders of public opinion
      - (a) Henry Clay
      - (b) John C. Calhoun
      - (c) Daniel Webster
      - (d) Andrew Jackson
    - (2) Effect on policy of the government
      - (a) Agitation for army and navy
      - (b) Monroe, Secretary of State
      - (c) New taxes
      - (d) New Embargo
      - (e) War
  - (h) Second Bank of the United States
  - (i) Tariff Law of 1816
    - (1) Essentially protective
    - (2) To make United States independent of foreign manufactures.
- (2) Foreign
  - (a) Negotiations with England
  - (b) Macon Bill No. 2
  - (c) Napoleon's Rambouillet Decree

III. War of 1812
- (1) On land
- (2) At sea
- (3) Treaty of Ghent

IV. Internal Affairs
- (1) Hartford Convention
- (2) Gerrymandering
- (3) "Star Spangled Banner" written
- (4) Economic condition of the people

V. Election of 1816

Questions on Madison

Give a short sketch of Madison's career before he became President.

What states were admitted to the Union during his administration?

When did the charter of the Bank of the United States expire?

What were some of the effects of the closing of the bank?

Who was the first great Speaker?

What other public offices had he held?

To what group of statesmen did he belong?

What are some of the policies for which this group stood?

What effect did these men have on the policy of the government?

Why was the tariff law of 1816 passed?

When and for how many years was the second Bank of the United States chartered?

When was the war declared by Congress?

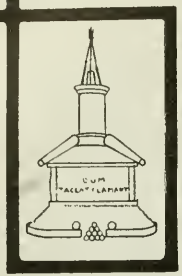
Name four important land battles of the war.

When was the Battle of New Orleans fought?

When was the Treaty of Ghent signed?

What was the origin of the term "gerrymandering"?

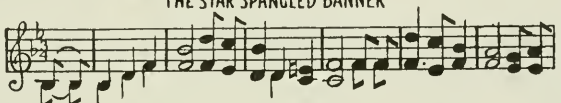
JAMES MADISON 1809 1817



MONUMENT, NEW ORLEANS

AMERICAN SOLDIER

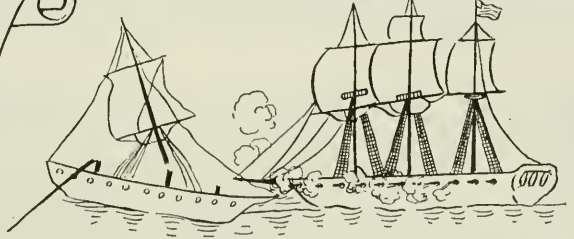
THE STAR SPANGLED BANNER



OH, SAY, CAN YOU SEE BY THE DAWN'S EARLY LIGHT WHAT SO PROUDLY WE HAILED

HARTFORD CONVENTION

I - TIME
II - PLACE
III - MEMBERS
IV - RESOLUTIONS
V - RESULTS



DESTRUCTION OF THE GUERRIERE BY THE CONSTITUTION

WAR OF 1812

I - TIME
II - CAUSE
III - ACTS & EVENTS (INFLUENCING)
IV - GENERAL IN CHIEF
V - CAMPAIGNS & EVENTS
VI - RESULTS

SEAL OF INDIANA

SEAL OF LOUISIANA

are related in the article WAR OF 1812.) On land the Americans suffered a number of humiliating reverses, and saw their national capitol burned. At sea their ships proved in every way the equal of those of the "mistress of the seas," and on the whole honors were about even. Both sides were glad to conclude peace, and a treaty was signed at Ghent, on December 24, 1814.

Madison's second term was marked by a strengthening of Federal authority. Though theoretically the Anti-Federalists were opposed to centralization of power, they virtually adopted the nationalist policies of the Federalists, and when Madison went out of office there was practically but one party. The Federalists, who had opposed the war, lost all public confidence through holding a convention at Hartford (Dec. 1814–Jan. 1815), at which, it was erroneously said, they advocated secession. Subsequently they disappeared as a distinct party. In 1816 Madison gave his approval to the chartering of a second United States Bank and to the passage of a protective tariff law, both measures being along the line of Federalist policies. Among other events of his administrations were the admission of Indiana and Louisiana as states, and the appropriation by Congress of large sums for public roads. Madison, however, vetoed the bill providing for public improvements.

The Private Citizen. When his second term was finished Madison retired to Montpelier, Va., where he spent twenty years, quietly and happily. His wife, Mrs. Dorothy Paine Todd Madison, survived her husband thirteen years. As the "Dolly" Madison of Washington society, she was one of the most fascinating of the ladies who have presided over the White House.

Related Articles. Consult the following titles for additional information:

Alien and Sedition Laws
Banks and Banking
Constitution of the United States
Continental System
Embargo
Federalist, The
Ghent, Treaty of
Hartford Convention
Jefferson, Thomas
Kentucky and Virginia Resolution
Political Parties in the United States
Tariff

MADISON, WIS., founded in 1837 and named for the fourth President of the United States, has been the capital of the state since its settlement, and is the county seat of Dane County. The city has a beautiful setting, for it is in the midst of rolling country, rich in agriculture and dairying, and is nearly surrounded by four beautiful lakes. It is eighty-three miles west of Milwaukee and 130 miles northwest of Chicago, on the Chicago, Milwaukee & Saint Paul, the Chicago & North Western and the Illinois Central railroads. The first named road was built to the city in 1852.

Madison is known chiefly as an educational city. It is the home of the University of Wisconsin (see WISCONSIN, UNIVERSITY of) an institution which is the special pride of the state and is famous throughout the nation. The university buildings are close to the largest of the city's lakes. One of the finest buildings in the town is that of the State Historical Society, which contains a library of over 371,000 volumes and pamphlets. In the same building are the libraries of the university and of the Wisconsin Academy of Science, Arts and Letters. There are also legislative, state, law and Carnegie libraries.

The most imposing structure in the city is the new state capitol, standing in the center of the city and completed in 1916 at a cost of over $5,000,000. It is unsurpassed in architectural beauty, and in its interior decorations probably only the Congressional Library at Washington excels it. The city has sixteen parks, aggregating 500 acres. The Federal government has appropriated $550,000 for a new postoffice building.

There is considerable manufacturing; the products of greatest note are carriages, farm implements, dynamos, gas engines, machine tools and art glass. Population, 1910, 25,531; in 1917, 31,315 (Federal estimate).

MADON'NA, a term now commonly used in all languages to refer to the Virgin in works of art. It was not until after A. D. 431, when the Council of Ephesus declared the Virgin Mary to be the Mother of God, that she was frequently represented in art, but after that time the number of paintings increased rapidly. In early art she was painted with a robe of blue, starred or marked with gold and usually draped over her head. Byzantine models were followed up to the thirteenth century, when the revival of painting in Italy brought more natural and beautiful forms. Fra Filippo Lippi was the first to portray the in-

carnation of maternal love and childish innocence. Botticelli's two best productions represent the Virgin crowned and adored by dreamy angels. Only two of Leonardo da Vinci's Madonnas remain, both of which are charming representations. The Umbrian painters left striking and beautiful pictures of the Madonna, one of the best of which is the *Madonna Enthroned,* by Dosso Dossi, now in the Cathedral at Ferrara. Of Venetian painters, Giovanni Bellini and Titian stand out most prominently, and Titian's *Pesaro Madonna* in the Church of Frari, Venice, is the most celebrated. Of all the Italian painters of Madonnas, Raphael was the greatest. In his early period his theme was Mary the mother, while later he represented her as queen of heaven. Of his fifty or more excellent Madonnas, the most celebrated are the *Madonna of the Chair* and the *Sistine Madonna* (see below).

The artists of Northern Europe did not produce many famous Madonnas, and of these, few remain. The first in rank of the German Madonnas is the *Madonna of Burgomaster Meyer,* at Darmstadt, the work of Holbein. Rubens and Van Dyke also furnished excellent examples. Murillo is the representative Spanish painter, and his best works are to be seen in the Pitti Gallery, Florence, in the Corsini Palace in Rome and in the Louvre, Paris.

A few of the famous Madonnas now in the galleries are the following:

Madonna di Ansidai, by Raphael (1506), the finest in England, in the National Gallery, London. Sometimes it is called the Blenheim Madonna, because it was purchased there in 1844 for $350,000.

Madonna del Baldacchino (Madonna of the Canopy), by Raphael (1508), in the Pitti Palace, Florence. The Virgin, enthroned under a canopy, the curtains of which are raised by angels, sits with Jesus in her lap.

Belle Jardiniere (Pretty Gardener), by Raphael (1507), in the Louvre. The Virgin, seated in a meadow among flowers, is looking at the infant Jesus, who stands at one knee; at the other, Saint John kneels, holding a cross.

Madonna de Candelabri, or **Madonna de la Candelabras,** by Raphael (1516–1517), in London. On one side of the Virgin, who holds the infant Jesus, is a burning torch held by an angel. Because this was formerly in the Borghesi Palace it is sometimes called the Borghesi Madonna.

Madonna of the Basket, by Correggio (1520), in the National Gallery, London.

Sistine Madonna, by Raphael (1518), now in the Dresden Gallery, Germany. It represents the Virgin supported on clouds and carrying the child Jesus in her arms. On one side Pope Sixtus II kneels in supplication. At the other side kneels Saint Catherine, and below, the two famous cherubs of Raphael are leaning. This picture was painted as an altar piece for the Church of San Sisto at Piacenza, and it was finished just before Raphael's death (see Raphael).

Madonna of the Rocks, by Leonardo da Vinci, in the National Gallery, London. It takes its name from the appearance in the background of a grotto, with high rocks. The Virgin is presenting the infant John to Jesus, who, supported by an angel, is blessing him.

Madonna of the Rosary, by Domenichino, in the Bologna Gallery. Other paintings of the same name have been done by Murillo, Caravaggio and Van Dyke.

Madonna of the Chair (Madonna della Sedia), by Raphael (1516–1517), in the Pitti Palace, Florence. The Virgin is seated in a chair, clasping Jesus in her arms, while Saint John is depicted in adoration at the left.

There is one Raphael *Madonna* in the United States, the gift of J. P. Morgan to the Metropolitan Museum, in New York. It is entitled the *Madonna Colonna.*

MADRAS, *mah dras'*, a province of British India. With its dependencies, it comprises the extreme southern part of the peninsula of India. Its area, not including the natives states, is 141,726 square miles. It is surrounded by the sea on every side except the north and northwest, on which it is bounded by Orissa, the Central Provinces, the territory of Hyderabad and Mysore. The chief rivers are the Godavery, the Kistna and the Kavery. The climate of Madras is varied. The soil is sandy along the coast, but there are many fertile districts; iron, copper, lead and coal are found in considerable quantities. There are extensive forests in the province, yielding teak, ebony and other valuable timber trees. The principal vegetable products include rice, wheat, cotton, spices, sugar cane, tea and fruit. The people live in small villages, in which schools are slowly being established. The population in 1911 was 41,405,404, and the native protected states had in addition a population of 4,811,841.

MADRAS, British India, a maritime city, capital of the province of the same name, on the eastern coast of the peninsula of India. It is ill-situated for commerce, standing on an open surf-broken shore, with no proper harbor, though an area has been enclosed by piers so as to shelter a certain amount of shipping. Despite drawbacks,

however, Madras enjoys an extensive commerce, being the terminus of railways from Bombay and the south, and the headquarters of all the province departments. There are no manufactures worthy of mention, but the export and import trade amounts to millions of dollars annually. Madras was founded in 1639 by the English, and it soon became their chief settlement on the coast. It was taken by the French in 1746, but three years later it was restored to the English. In population it is exceeded only by Calcutta and Bombay among the cities of India. Population, 1911, 518,660.

MADRID, Spain, the capital and metropolis of the kingdom, is situated near the center of the Iberian Peninsula, on the small Manzanares River. It lies about 860 miles west of Rome and 660 miles southwest of Paris. Situated upon a high plateau, 2,150 feet above the sea, wind-swept from the snowy Guadarama, with unhealthful extremes of temperature, the city has no advantages except the fanciful geographical merit of being in the center of Spain. The principal streets are broad, long and airy, but the squares are generally irregularly built and deficient in decorative monuments. The royal palace, a combination of Ionic and Doric architecture, is one of the most magnificent palaces in the world.

Bull fights take place in the Plaza de Toros (bull ring), a building about 1,100 feet in circumference, which is capable of seating 13,000 spectators. The Prado, a boulevard on the east of the city, is one of the finest promenades in Europe, and beyond it is the park. In the Royal Museum of Painting and Sculpture, in the Prado, there are more than 2,000 pictures, many of them by the greatest masters of painting, especially those of Spain. The National Library, founded by Philip V, contains over 600,000 volumes. The university has an average attendance of 5,000 students, and there are numerous colleges, and medical, military and law schools. In 1917 there was erected a magnificent hospital, with accommodations for 200 charity patients.

Madrid has experienced considerable industrial development in recent years; it possesses a national tobacco factory and manufactories of jewelry, chemicals, musical instruments, perfumes and other commodities. The city began to be a place of importance under Charles V, and in 1561 Philip II made it the capital. Population, 1910, 571,539; 1917, estimated, 648,760.

MAELSTROM, *male'strom*, the name of a tidal current or whirlpool off the northwestern coast of Norway, immediately southwest of the most southerly of the Lofoten Islands. The current is caused by the ebb and flow of the tides through the channel, producing an immense whirling motion. Formerly the water was supposed to be of such depth that it could not be sounded, but later explorations show that the depth does not exceed 120 feet. This whirlpool has been the subject of numerous legends by both medieval and later writers. When the wind is northwest it is at its worst at either high or low water, and in these circumstances it cannot be passed over with safety. At other times boats traverse it without difficulty.

MAETERLINCK, *met'ur link*, Maurice (1862–), a Belgian poet, naturalist and dramatist, one of the outstanding literary figures of his day. His dramas, on which his fame largely rests, include *Monna Vanna*, perhaps his greatest work; *The Princess Maleine, The Blind, The Intruder, Home, The Blue Bird* and its sequel, *The Bethrothal.* These plays, mystical and symbolic, are not well adapted for presentation on the stage. *The Blue Bird*, however, was a great success in America, and its presentation as a moving picture spectacle was regarded as a triumph of art. Maeterlinck's characters are not living human beings, but simply figures which the poet uses to express his morbid views on life and death. Another kind of work in which he has been exceedingly successful is essay writing. *The Treasure of the Humble, Wisdom and Destiny, Our Friend the Dog* and *The Life of the Bees* are charming studies. In 1911 Maeterlinck received the Nobel prize for literature.

MAFIA, *mah'fe ah*, a Sicilian (Italian) secret society, whose object is to protect its members from punishment for any crimes they may commit. Nothing is known definitely of its origin or its organization, but it is believed to have been founded to protect its members from oppression of former governments. The members take oath to obey their leader in all things, to keep the secrets of the order, never to go to law for any grievance and to help their fellow members in all circumstances. Branches of the Mafia have existed in various cities of the

United States. When in 1890 the chief of police in New Orleans was murdered the crime was laid to the Mafia, eleven of whose members were put in jail. But little is now heard of the organization in the United States.

MAG'DALEN, or **MAGDALENE**, MARY, that is, Mary of Magdala. She is mentioned in the New Testament as having had seven devils cast out of her, as watching the crucifixion and as having come early to the sepulcher on the resurrection morning. She was erroneously identified as the "woman who was a sinner" (*Luke* VII, 37), and hence the term Magdalen came to mean a penitent fallen woman.

MAGDALENA, *mahg dah la'nah,* a river of South America, which rises at the frontier of Equador, flows generally north through Colombia, and empties into the Caribbean Sea by several mouths. Its length is about 1,000 miles, and it is navigable for ocean steamers as far as Barranquilla, Colombia. The Magdalena is the chief thoroughfare for commerce in Colombia.

MAGDALEN, *mag'dah len,* **ISLANDS**, a group of islands in the Gulf of Saint Lawrence, fifty-four miles northwest of Cape Breton Island. The inhabitants depend for their support chiefly upon the fisheries. Lobster, cod, herring and seal are taken in great numbers. The chief settlements are House Harbor and Amherst. Population, about 5,000.

MAGDEBURG, *mahg'de boorK,* GERMANY, the capital of Prussian Saxony and a fortress of the first class, is situated on the Elbe, seventy-six miles southwest of Berlin. The city is chiefly on the left bank of the river, which here divides into three arms. The fortifications comprise the citadel and a number of detached forts and redoubts. Among the chief buildings are the Cathedral of Saints Maurice and Catharine, the churches of Our Lady, Saint Ulrich and Saint Paul, the Synagogue, the Rathaus and the old royal palace. The manufactures are varied, embracing machinery, castings, armor plates, chemicals, spirits, pottery, sugar, beer, cottons, ribbons, leather and tobacco. Magdeburg is the chief center of the beet sugar industry in Germany. The trade is extensive, both by rail and river. Magdeburg was first prominent in the tenth century, when it became the seat of an archbishop. It early distinguished itself in the Reformation. During the Thirty Years' War the town was besieged, stormed and sacked by Tilly, and 20,000 persons are said to have been murdered. Population, 1910, 279,629.

MAGELLAN, *ma jel'lan,* FERDINAND (about 1470–1521), a Portuguese navigator, who conducted the first expedition around the world. He served in the Portuguese army in the Indies for a time, but was not well rewarded and offered his services to Spain. In 1519 he received the command of a fleet of five ships, with which he sailed westward, entered the straits since called by his name, and sailed into the Pacific Ocean. Subsequently he was killed in a skirmish with the natives on one of the Philippines, but one of his vessels completed the journey to Spain.

MAGELLAN, STRAIT OF, the strait which separates the continent of South America from the islands of Tierra del Fuego. It was discovered in 1520 by Magellan, for whom it was named. It is over 350 miles long and varies in breadth from two to seventy miles. This strait is the link between the South Atlantic and South Pacific oceans. The number of obstructing islands makes the channel difficult of navigation.

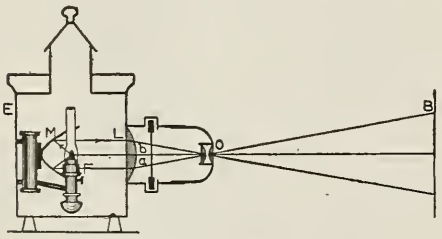
MAGGIORE, *ma jo'ray,* **LAKE**, or **LAGO MAGGIORE**, a lake partly in Northern Italy, partly in Switzerland, thirty-four miles in length and averaging two miles in breadth. It is 646 feet above the level of the sea and is in some places considerably over 1,000 feet deep. The lake is surrounded by picturesque mountains and verdure-clad hills, and on its shores are many prosperous towns.

MAGI, *ma'ji,* the hereditary priests among the Medes and Persians, set apart to manage the sacred rites and to preserve and propagate the sacred traditions. They acted also as diviners and astrologers. The magi possessed great influence, both in public and private affairs, conducted the education of the princes and were constant companions of the monarchs. Their order was reformed by Zoroaster, who compelled them to live the severe and simple lives that the law had laid down for them. The name *magi* came also to be applied to holy men or sages in the East. The wise men that came from the East to worship Jesus were magi, whose names given by tradition were Melchior, Balthasar and Gaspar. In later times the magi degenerated into jugglers and fortune tellers.

MAGIC, *maj'ik,* the pretended art or practice of producing wonderful effects by the aid of superhuman beings or of departed

spirits or the hidden powers of nature. A large proportion of magical rites are connected with the religious beliefs of those using them, their efficiency being ascribed to supernatural beings. There is, however, an element in magic which depends on certain imagined powers and natural powers, that can be utilized in various ways. In savage countries the native magician is often sorcerer and priest, and sometimes chief of the tribe. Among the ancient Egyptians magic was worked into an elaborate system and ritual, and it was regularly practiced among the Babylonians and Assyrians, as well as in Greece and Rome. The term is also, though wrongly, applied to the operations of sleight-of-hand performers.

MAGIC LANTERN, or **STEREOP'TICON**, an instrument used for projecting upon a screen a highly magnified image of a transparent picture or some other object. The important parts of the magic lantern are (1) the box, *E,* which may be of wood or metal, but must be light-tight and must contain a chimney and openings for the admission of the air; (2) the light, *F,* back of which in some lanterns there is a concave mirror, *M;* (3) the condenser, *L;* (4) the slide or picture to be magnified, *a b;* (5) the magnifying glass or objective, *O*. The condenser collects the rays of light from the lamp and concentrates them upon the slide. As they pass through the object glass they are caused to expand and produce an enlarged image of the picture upon the screen, *B*. Since the rays cross in the object glass, the image is inverted, and in order to have



MAGIC LANTERN

it appear erect the slide must be placed in the lantern in an inverted position. The light employed in the best instruments is the calcium, or lime, light, or the electric light.

The magic lantern is extensively used as an educational appliance, in teaching geography and history in elementary schools and for scientific purposes in high schools and colleges. It is an admirable device for a study of objects that can best be examined when at rest, but as a source of entertainment it has been superseded by moving-pictures.

MAGNA CHARTA, *mag'na kahr'tah,* or **GREAT CHARTER**, a document forming part of the English Constitution and regarded as the foundation of English liberty. It was extorted from King John by the confederated barons in 1215. Its most important articles are those which provide that no freeman shall be taken or imprisoned or proceeded against except by the lawful judgment of his peers or by the laws of the land; and that no scutage or aid shall be imposed in the kingdom (except certain feudal dues from tenants of the crown), except by the common council of the kingdom. The remaining and greater part of the charter is directed against the abuses of the king's power as feudal superior. The charter was confirmed several times during the reigns that succeeded John's and the form adopted in the reign of Edward I was set down in the statute books. The most accurate and complete copy of the original charter is that preserved in Lincoln Cathedral. Two other copies are exhibited in the British Museum, and there is a fourth copy in Salisbury Cathedral. See JOHN.

MAGNESIA, *mag ne'zhe ah,* a white, tasteless, earthy substance of an alkaline nature. It is almost insoluble, is an absorbent and possesses laxative qualities in a mild degree, being used as a medicine for dyspepsia. Magnesia is a compound of the elements magnesium and oxygen. It withstands a high temperature, and is used in making protective mixtures for steam pipes and vessels exposed to intense heat.

MAGNESIUM, *mag ne'zhe um,* a silvery-white metal, with a brilliant luster. Although magnesium is not found separate in a state of nature it is one of the widely distributed elements in such mineral compounds as chrysolite, dolomite, hornblende, serpentine, soapstone, tourmaline and meerschaum. Heated to redness in oxygen gas it burns with brilliancy and combining with oxygen it becomes magnesia or the oxide of magnesium. A magnesium light is rich in chemical rays and is now employed to some extent in photography. Magnesium is also used in making fireworks. Combined with sulphur and oxygen it forms a white solid found in several varieties. One of these water forms Epsom salts.

MAGNET. See MAGNETISM.

MAGNETIC NEEDLE. See MAGNETISM; COMPASS.

MAGNET'IC EQUATOR, *e kwa'tor,* an imaginary line encircling the earth connecting at points at which a dipping needle assumes a horizontal position (see DIPPING NEEDLE). At all points on the magnetic equator, therefore, the dip is zero. Its course is near the geographic equator, never reaching more than 16° north or south of it.

MAG'NETISM, the power possessed by certain objects by virtue of which they attract iron and steel. Such objects are called *magnets,* a term derived from *magnetite,* the common name of black oxide of iron. This ore sometimes possesses the property of attracting iron, and long ago, when pieces of the ore were discovered near Magnesia, in Asia Minor, they were called *magnetic stones,* or *natural magnets. Loadstone* is another name

1—BAR MAGNET. 2—HORSESHOE MAGNET

used. Bars of iron or steel that have been made magnetic by contact with a natural magnet are called *artificial magnets.*

Experiments and What They Prove. There are many interesting yet simple experiments with magnets. Two that will help us to understand the subject are as follows:

Magnetize a piece of watch spring by contact with a magnet. Then heat it red hot and test it for magnetism. It will be found to have lost its power of attracting other metals.

Magnetize a knitting-needle and find by several trials how many tacks can be lifted by it. Now hold one end firmly against the edge of the table or in a vise, and pluck the free end so that the needle vibrates for several seconds. The power of the magnet to pick up tacks will be found to be considerably less.

What conclusion can we derive from these experiments? It is clear that in both of them we have reduced or removed the magnetic power. The fact is that heating the spring or causing the needle to vibrate rearranged the tiny particles of matter of which the spring and needle are formed. These particles are called molecules, a long word for a "small object," which is a literal translation of the Latin parts which make up the word. Magnetism is really a strained condition of these molecules, so that their power of attraction is greatly increased. According to the general "law of attraction," all matter possesses a degree of power to attract. The earth and a falling bar of iron attract each other, but as the bar of iron is smaller, it moves easily and yields to the attraction of the earth. Magnetism increases the force of this natural attraction.

Magnetic Poles. Magnetism is imparted to soft iron quickly, but when the magnet is removed the force disappears. It requires considerable time to magnetize hard steel, but when magnetized it retains its magnetism for a long time. The magnetic force is manifested at the ends of the magnet, which are called *poles.* This is illustrated by placing a bar of magnetized steel in a box of iron filings. The filings will adhere to each end, but will not adhere to the middle of the bar. When a bar magnet is suspended in a horizontal position so that it can move freely, it always points nearly north and south. For this reason the end pointing to the north is called the north (+) pole, and the end pointing south, the south (—) pole. The magnetism of the two poles is different, and when poles of the same name are brought together they repel each other, while those of different names attract each other. If the north poles of two bar magnets are free to move upon a point of suspension, they will turn in opposite directions.

The *magnetic needle* is a small bar magnet suspended horizontally upon a point; it is always found in the compass. The space over which a magnet exerts influence is called the *magnetic field.* If a piece of soft iron, as a tack or a staple, is brought within this space, it becomes magnetized by induction, but loses its magnetism as soon as it is removed from the field. All magnets lose their power if left without protection. For this reason, a piece of soft iron, called the *armature,* should be placed across the end of a horseshoe or U-shaped magnet when it is not in use, and bar magnets should be laid side by side so that the north pole of one will be next the south pole of the other, and armatures should then be placed across each end.

Magnetism and Electricity. Closely connected with magnetism, because many of its effects are similar, is electricity. Bodies which show the power of attracting light bodies after being rubbed are said to be electrified; there are other methods of elec-

trification, but rubbing is the simplest. Rods of glass, very dry wood, sealing-wax, etc., if rubbed gently, will attract bits of paper and light objects of various kinds.

Related Articles. Consult the following titles for additional information:

Compass
Electro-Magnet
Electro-Magnetism
Magnetic Equator
Magnetite
Magneto-Electric Machine

MAG'NETITE, or **MAGNETIC IRON ORE,** an ore of iron, containing a large proportion of oxygen and exhibiting magnetic properties. It is of an iron-black color, has a metallic luster and is very hard. Magnetite is one of the most valuable of iron ores, since its addition to other ores greatly improves the quality of the iron produced. It is further discussed in the article IRON.

MAG'NETO-ELEC'TRIC MACHINE, a machine for generating electricity by magnetism. In the ordinary machine an electro-magnet, called the armature, is caused to rotate near the poles of a powerful fixed magnet, in such a manner that the core of the armature becomes magnetized first in one direction and then in the opposite, by the inductive action of the poles of the fixed magnet. Every change in the magnetization of the core induces a current in the coil wound upon it. Hence currents in alternately opposite directions are excited in this coil, their strength increasing with the speed of rotation. It is now usual in powerful machines of this class to employ electro-magnets as the fixed magnets, and the current which feeds these fixed magnets is often the current generated by the machine itself. The machines in this case are called dynamos. This name was originally confined to machines which thus supply the current for their own field magnets; but it is now applied to any machine where it is desired to use alternating currents. Such machines, of which there is an enormous variety, driven by steam engines or other powerful motors, are now almost universally employed when electric currents are required on a large scale, as in electric lighting. One of the widest fields for the use of the magneto is in the automobile, for furnishing ignition for the gas engine. See DYNAMO; ELECTRO-MAGNETISM.

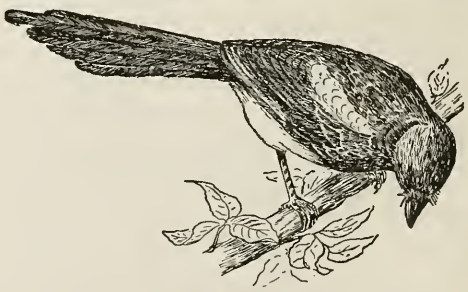
MAGNIF'ICAT, the song of the Virgin Mary, *Luke* I, 46–55, so called because it commences with this word in the Latin *Vulgate.* It is sung throughout the Western Church at vespers, or evensong.

MAGNO'LIA, a genus of trees and shrubs, remarkable for their rich green foliage and large, beautiful flowers. There are more than a dozen species, most of which are natives of subtropical Asia and North America, but they have been long cultivated extensively in the warmer parts of Europe. The *great-*

MAGNOLIA

flowered magnolia is the most beautiful of several species that are native to the Southern states. This is a magnificent evergreen, which bears large leaves, fragrant, white flowers nearly a foot in diameter, and scarlet cones. These cones, which are the fruit of the plant, open when they are ripe, and the bright red seeds hang suspended from fine threads like cobwebs. The *cucumber tree,* the *melon tree,* the *mountain magnolia* and the *sweet bay, white laurel* or *swamp sassafras* are other native species. The magnolia is the official flower of Georgia, Louisiana and Mississippi.

MAG'PIE, a bird of the crow family. There are several species, two of which belong to America and are found from the



MAGPIE

Arctic regions to California. The American magpie is a handsome black and white bird and a determined robber of other birds' nests. The European magpie is a fine, black bird, with white patches on its belly and shoulders. It is celebrated for its crafty instincts, its power of imitating words, its continuous chatter and its habit of stealing every glittering article it sees.

MAGYARS, *mod'yahrs,* the name used by the dominant race in Hungary, which, prior to the World War (1914-1919), was a constitutional kingdom in the Austro-Hungarian monarchy. The Magyars are related to the Finns, and trace their descent to a horde of barbarians that invaded Central Europe from regions east of the Carpathian Mountains, about A. D. 900. They have occupied Hungary for about ten centuries, and now number over 8,000,000. During the World War the Magyars loyally supported the Central Powers. See HUNGARY; WORLD WAR.

MAHABHARATA, *ma hah bah'ra ta,* an epic of ancient India of about 220,000 lines, divided into eighteen books, the leading story of which narrates the history of the war between the Kauravas and the Pandavas for the possession of the ancient kingdom of Bharata, which is said to have comprised the greater part of India. The Pandavas, who are represented as incarnations of heroism and goodness, are finally victorious. The authorship of the epic is attributed to Vyâsa, "the arranger," but this simply means that the materials of which the poem consists were at some time welded together with a certain order and sequence so as to form one work.

MAHAN', ALFRED THAYER (1840-1914), an American naval officer and author, an authority on sea power, was born at West Point, N. Y. He was graduated from the United States Naval Academy and at once entered the navy, serving until he was retired in 1896 at his own request. For several years he was president of the Naval War College at Newport; he was a member of the naval board of strategy during the war with Spain, and the next year he was one of the American representatives to the peace conference at The Hague. He wrote a number of historical works, of which the most important were *Influence of Sea Power upon History,* 1660–1783, and *Life of Nelson.* It is said that the first-named book influenced Emperor William II of Germany so profoundly that he began at once to build the great navy which his country surrendered in 1918.

MAHANOY, *mah ha noi',* **CITY**, PA., a borough in Schuykill County, fifty-five miles northeast of Harrisburg, on the Mahoney Creek and on the Philadelphia & Reading, the Lehigh Valley and the Pennsylvania railroads. It is in the anthracite coal region, has ten mines, and is near deposits of fire clay and building stone, and it contains foundries, potteries, flour, lumber and hosiery mills and extensive shirt factories. It was settled in 1859 and incorporated in 1863. Population, 1910, 15,936; in 1917, 17,709 (Federal estimate).

MAHDI, *mah'de,* the name given by certain Mohammedans to the expected Messiah who will at some time appear to finish the work begun by Mohammed. He is to destroy all infidels and divide the world among the faithful. The appearance of such a being was prophesied by Mohammed. Many professed Mahdis have appeared from time to time in Africa as well as Asia, the latest being Mohammed Ahmed, the leader of the Sudanese insurrection (1883–1885). He made the chief city of Kordofan his capital and annihilated the Egyptian army, November 5, 1883. His influence extended to the Red Sea. The Mahdi died in 1885. See GORDON, CHARLES GEORGE.

MAHOG'ANY, a tree which produces one of the most valuable woods used in furniture making. It is native to Mexico, Central America and the West Indies, and is known botanically as *Swietenia mahogani.* The tree is also found in the Florida Keys, but there it grows only to medium size. Ordinarily it attains a height of forty to fifty feet and a diameter of six to twelve feet. It bears compound leaves similar to those of the ash, and small five-petaled flowers. The seeds are contained in a woody capsule.

Mahogany wood is remarkable for its hardness, closeness of grain and beauty, the dark red color and satiny finish of the polished wood being exceedingly attractive. Because of the scarcity of genuine mahogany and its high cost, various substitute woods are in great demand in furniture making. A related species of the genus *Cedrela,* found in Central America, is used in large quantities. It resembles true mahogany in general appearance, but is lighter and less durable. Other substitute woods are found in Australia, Africa and the Philippines.

MAHOM'ET. See MOHAMMED.

MAHRATTAS, *ma rat'taz,* a people inhabiting the western part of the peninsula of India and numbering from 15,000,000 to 20,000,000. They are of mixed blood, speak the Hindu language and are followers of the Hindu faith. In the latter part of the seventeenth century they rose rapidly and were instrumental in depriving the Mogul Empire of much of its power. In the latter part

of the eighteenth century they were overpowered by the Afghans and later became subject to the British government.

MAID'ENHAIR, the name given to beautiful ferns, of which there are many widely distributed species. The common maiden-

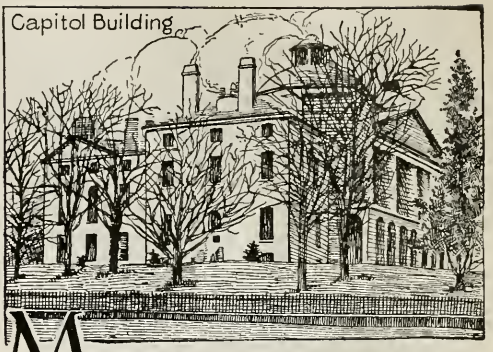
MAIDENHAIR FERN

hair of North America bears a cluster of upright, brown, shiny, wiry stalks, upon the top of which the graceful fronds expand horizontally. In some cultivated species these fronds are exceedingly delicate, and in all, the rounded, scalloped leaflets are characteristic.

MAID OF ORLEANS. See JOAN OF ARC.

MAIM'ING, a statutory offense consisting of permanent injury wilfully inflicted on men or animals. When on human beings it is known as mayhem (which see). Another legal term for maiming is *mutilation*. The offense is designated as a felony (which see).

MAIN, *mine*, a river of Germany which rises in the Fichtelgebirge, a mountain chain in the northern part of Bavaria. The Main flows in a general westerly direction for 300 miles and joins the Rhine a little above the town of Mainz. For about 200 miles from its mouth it is navigable. By means of the Ludwig Canal it affords through navigation to the Danube, and between Mainz and Frankfort it has been canalized.



MAINE, *mane*, called the PINE TREE STATE because of its widespread forests of pine, is the largest of the New England states and the most northeasterly state of the Union. It touches two Canadian provinces, New Brunswick on the northeast and east, and Quebec on the northwest. The entire eastern frontier of New Hampshire adjoins Maine's western boundary line; the eastern boundary is the Atlantic Ocean. Maine lies in approximately the same latitude as the southern half of France, but it has a more rigorous climate.

Area and Population. The extreme length of the state is 303 miles, and the extreme width is 212 miles. It has a total area of 33,040 square miles, making it a little larger than South Carolina and a little smaller than Indiana. It is the thirty-eighth state of the Union in size. The coast in a direct line from Eastport to a point opposite Portsmouth is 218 miles, but because of the numerous indentations Maine has really about 4,300 miles of seacoast, and it has proportionally more good harbors than any other part of the Atlantic coast.

At the census of 1910 Maine had a population of 742,371, about one-seventh of the inhabitants being French and English Canadians. Among the states of the Union it ranks thirty-fourth in population. On July 1, 1918, according to a Federal estimate, the population was 782,191, an increase of 39,820 in seven years. Until immigration was halted by the World War the population was increased yearly by large numbers of European immigrants. About forty-four per cent of the inhabitants live under rural conditions. There are several hundred Indians in the state, all of whom have adopted the customs of civilization.

Surface and Drainage. Though there are no towering mountains nor scenery of ex-

traordinary grandeur, the state as a whole is one of the most beautiful regions east of the Mississippi, with its fragrant evergreen forests, diversified by hundreds of clear, cold lakes, its verdure-clad hills, its rapidly-flowing rivers with their picturesque waterfalls, and its rugged coast fringed with islands. The interior is generally hilly. A height of land, lying on the west near the source of the Magattaway River, extends across the state in a northeasterly direction, reaching the eastern border at Mars Hill. At its western extremity this elevation is 2,000 feet high, but its altitude gradually lessens until at the eastern boundary it is only 600 feet high. To the north of this divide the country is drained almost wholly into the Saint John.

The state contains a number of mountain peaks, which, though apparently detached, belong to the Appalachian system. The most noted of these is Mount Katahdin, in the central part of the state. Others worthy of mention are Mount Abraham, 3,387 feet; Mount Bigelow, 3,600 feet; Saddleback, 4,000 feet; Mount Blue, 3,900 feet; Bald Mountain, Mount Kineo and Mount Haystack are also well known. That portion of the state south of the divide is hilly and broken. The numerous islands off the coast and the irregular coastline with its numerous good harbors are due to the extension of the surface under the level of the sea.

The Saint John River and its tributaries drain nearly all the state north of the divide; the southern portion is drained by the Penobscot, Kennebec, Androscoggin and Saint Croix rivers, all of which are rapid streams and furnish excellent water power.

There are over 1,500 lakes, many of which are famed for their beauty and for their excellent fish. The most noted of these is Moosehead Lake, in the west-central part of the state. It has an area of 120 square miles, and is the largest inland lake in New England.

Climate. Maine has long, cold winters, and snow covers the ground from three to five months. The summers are cool, and even in the southern portion the farmer has not more than five months in which to mature his crops. The prevalence of forests, the fine river drainage, the bracing air and the sea breezes have all tended to make the climate very healthful, and summer tourists visit its attractive resorts in large numbers. Among these resorts are Bar Harbor, on Mount Desert Island (now Lafayette National Park), Rangeley and Moosehead lakes, Mount Katahdin and Old Orchard Beach.

Minerals. Granite is found in large quantities in the southern part of the state, and the quarrying and shipping of this stone form the chief mineral industry. For many years Maine ranked next to Vermont and Massachusetts in the production of granite, but California had a larger output than any of these in 1914. Large quantities of lime are made from the extensive limestone deposits of Knox County, and a good quality of slate is found in the central part of the state. It is quarried for table tops, blackboards, roofing, and for finishing interiors. The slate from Piscataquis County is remarkably pure, is of a deep black color and can be split into thin plates.

In some localities there are deposits of feldspar and silica of excellent quality. Some of the products made wholly or in part of this feldspar and silica are glass, porcelain, sandpaper, scouring soap and earthenware.

There is a famous tourmaline deposit in Oxford County, from which the largest and most beautiful crystals known have been taken. There are about thirty mineral springs of commercial importance. Water from the famous Poland Spring is shipped even to foreign countries.

Forests. Maine is one of the leading states in the Union in the extent of its forest area and the annual value received from the forest products. The woodland covers more than three-fourths of the total area. The primeval forests of pine are all gone, but a good-sized second growth is now furnishing material for the lumber mills. The spruce forests are the most extensive and the most heavily drawn upon at the present time. A belt of white birch, extending across the state, furnishes wood for spools. This spool timber is shipped extensively to Scotland. Large quantities of cedar are found in the Saint John and Penobscot basins, and maples and poplars also flourish. Because of the rapid destruction of forests, both the state and private corporations are taking active measures for the preservation of the timber, and the reforestation of denuded areas.

Fisheries. The fisheries rank second in importance among those of the New England states, Maine being surpassed only by Massachusetts. In the coast waters are large quantities of lobsters, clams and mussels; in the

bays and fiords are rock-cod, sculpin, bluefish, cunners and flounders; while in the offshore waters are cod, herring, halibut, haddock, mackerel, hake, porgy, menhaden and pollock. One of the smaller species of herring furnishes a large amount of the fish used in the sardine canning industry of Lubec and Eastport. The rivers and lakes are so well stocked with the choicest fish that Maine is considered a sportsman's paradise. Salmon fishing is largely in the Penobscot and the Kennebec rivers.

Agriculture. The river valleys in Aroostook County are exceptionally fertile regions of a state not as a whole well adapted to agriculture. This county has a larger output of potatoes than any other county in the Union, with a yearly crop of more than 17,000,000 bushels. In 1917 the total yield for the state was 24,800,000 bushels, Maine ranking fifth among all the states. In the state as a whole there are about 2,500,000 acres of improved land, found chiefly in the river valleys. Hay is the most important crop as regards quantity, though it is outranked in value by potatoes. The annual hay crop is about 1,500,000 tons. Maine also produces a superior quality of sweet corn, and apples are grown in nearly all parts of the state. The dairy products are second in value only to those of Vermont among the New England states. In Aroostook County there is an experiment station owned and managed by the state for the encouragement of agriculture.

Manufactures. The rivers flow swiftly over rocky beds, and the consequent extensive water power has made Maine an important manufacturing state. Shipbuilding was one of the first manufacturing industries. Bath was the chief shipbuilding center of the United States for a hundred years, and is still engaged in this industry, though now the out put consists chiefly of steel vessels. Lewiston, Biddeford and Saco are very extensively engaged in the manufacture of cotton goods. Immense quantities of paper and wood pulp are manufactured in Maine. Large quantities of lime are made in Knox County. Other important manufactures are woolens, leather, boots and shoes, flour, lumber products and foundry products. Fish canning is also a flourishing industry.

Transportation. The coast of Maine abounds in good harbors, and the Penobscot and Kennebec are each navigable for about sixty miles. Portland is connected by steamers with Boston, New York and Canadian ports, and is the port for several trans-Atlantic lines. Railway lines cross the state from east to west and from north to south. Two of these, the Grand Trunk and the Canadian Pacific, are important trunk lines, connecting with other great systems of the United States and Canada, thus giving direct communication with the central and extreme western portions of the country. Another important system, the Boston & Maine, makes similar connections through Boston and New York with the Southern states, while the Maine Central connects various places within the state. The state has more than 2,280 miles of railway lines, besides numerous electric lines which are being extended every year. Portland is the chief railway center.

Government. The legislature consists of a senate of thirty-one members and a house of representatives of 151 members elected biennially by popular vote. The governor is chosen by popular vote for a term of two years. His council, consisting of seven members, and the secretary of state and the state treasurer are elected by joint ballot of the legislature. As in the other New England states, the local government is largely in the hands of town officers. The supreme court comprises eight judges appointed by the governor and council for a term of seven years. The judges of two special courts in Kennebec and Cumberland counties, known as superior courts, and the judges of the inferior courts, except the probate courts, are also appointed by the governor and council. The probate judges are chosen at popular election for a term of four years. The attorney-general is elected biennially by joint ballot of the legislature.

Maine's general elections are held in October, and in all other states the general elections are in November. Therefore Maine's vote is considered as a political barometer; there is a familiar saying that "as Maine goes, so goes the Union."

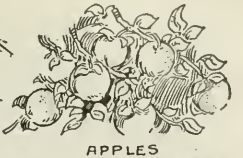
Education. The town system of common schools is in use, the town being the smallest unit for their administration. A state superintendent of schools is appointed by the governor and council for a term of three years. A compulsory school law which covers the ages of seven to fifteen is well enforced. All cities and the larger towns maintain graded schools and high schools. There are state

MAINE
THE PINE TREE STATE


PINE CONE & TASSEL


WHEAT


HAY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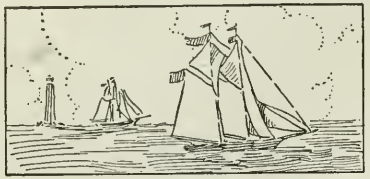
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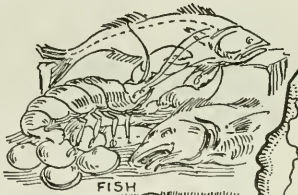
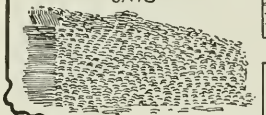

FISH

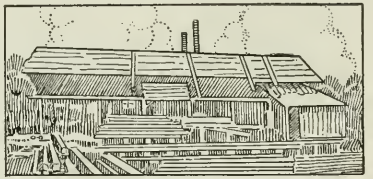

OATS

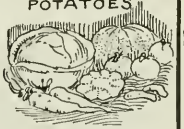

PINE FOREST


LOBSTER FISHING

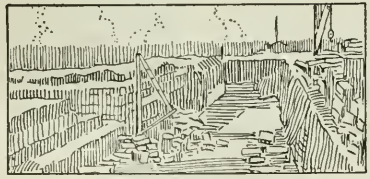

POTATOES

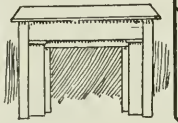

BARK USED IN TANNING


LUMBER MILL


GARDEN VEGETABLES


SWEET CORN


GRANITE QUARRY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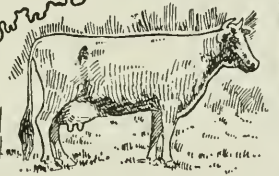
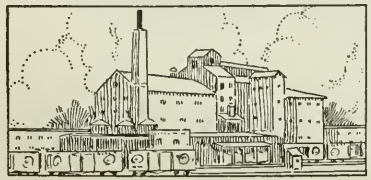

DAIRY COW


A HUNTER'S CAMP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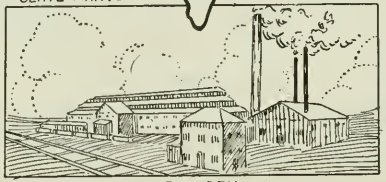
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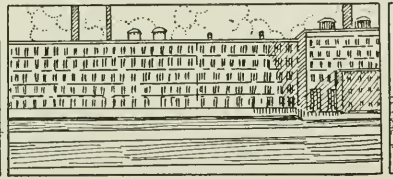
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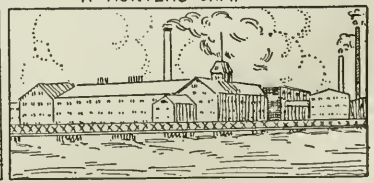

PAPER MILL

Items of Interest on Maine

Maine is nearly as large as all the rest of the New England states combined, and about three-fifths the size of Old England.

It ranks thirty-fourth among the states of the Union in population, and has an average density of about twenty-five inhabitants to the square mile.

There are more Roman Catholics in Maine than Protestants, because of the nearness of the French Catholic districts of Canada.

The illiteracy among native whites in Maine is less than three per cent.

The Indians living in Maine are survivors of the Wawenock, Penobscot and Passamaquoddy tribes.

Maine spends more than $3,000,000 a year in support of its public schools.

Mount Katahdin is composed of granite, large sections of which are exposed on the slopes. Lichens grow on the bare summit.

The irregular coast of the state somewhat resembles the Norwegian fiord-cut shore.

Mount Desert Island was created a national park in 1917, and the park was named in honor of the French hero, Lafayette.

The value of the forest products of the state is over $50,000,000 a year. Maine makes a yearly appropriation of $73,000 for the upkeep of the state forests.

The state produces over one-third of the feldspar of the United States. The total annual income from minerals is about $4,000,000.

The first cotton mill in Maine was built at Brunswick in 1809.

Maine has had but one constitution, and this was adopted in 1819. It has been many times amended.

In 1917 a budget system was introduced for the first time in the history of the state.

During the World War the First Maine Heavy Artillery was organized and filled by volunteer enlistment in nineteen days.

Longfellow, Hawthorne and John S. C. Abbott, the historian, were classmates at Bowdoin College. After Longfellow's graduation he was appointed professor of modern languages at Bowdoin.

Questions on Maine

In what part of the United States is Maine?

What proportion of the surface area is water?

How many miles of seacoast has it?

Which are the most important rivers of the state? Why are they important?

What is the character of the climate?

Why is the state frequented by tourists in summer?

What is the population of Maine?

What are the leading industries?

Name the principal cities. The principal summer resorts.

Which are the main railway lines?

Name the leading educational institutions.

Who were some of the earliest explorers of Maine?

When and where was the first English settlement established?

When was Maine admitted to the Union?

With what other state is it connected historically?

How many constitutions has Maine adopted?

Why is Bowdoin College of special interest?

What is the leading vegetable crop? What is the banner county of the Union in this product?

Why is Maine called the PINE TREE STATE?

What is the highest peak in Maine?

Was Maine one of the thirteen original states?

What constitutes the divide of the state?

How does Maine rank as a fishing state?

What is the leading agricultural product in point of quantity?

In what respect has the shipbuilding industry changed?

What trunk lines connect with the railway system of the state?

How was the boundary dispute settled?

normal schools established at Castine, Farmington, Gorham, Presque Isle and Fort Kent. Other prominent educational institutions are Bowdoin College at Brunswick, the University of Maine at Orono, Colby College at Waterville, Bates College at Lewiston, and the Maine Wesleyan Seminary and Woman's College at Kent Hill.

Institutions. The school for the deaf is in Portland, as are the Maine General Hospital and a United States Marine Hospital. There is a United States soldiers' home at Togus. The hospitals for the insane are at Augusta and Bangor; there is an orphans' asylum at Bangor, a military and naval orphans' asylum at Bath, and other children's aid institutions in various parts of the state. The state prison is at Thomaston, the state school for boys at South Portland, and the state industrial school for girls at Hallowell.

Cities. There are eleven cities with populations of more than 8,000. The first five, in order of size, are Portland, Lewiston, Bangor, Biddeford and Auburn. Augusta is the capital.

History. Maine was visited by the earliest explorers, probably by the Norsemen, about A. D. 1000, by Verrazano in 1524, by Sir John Hawkins, in 1565; by Gilbert, in 1583; by Gosnold, in 1602, and by John Smith, in 1614. The first English settlement was established at the mouth of the Kennebec River in 1607, under the auspices of the Plymouth Colony, and was directed by George Popham, but owing to the rigorous climate the settlement was abandoned in the following spring. In April, 1622, Sir Fernando Gorges and George Mason received the grant of land between the Merrimac and the Kennebec. In 1629 this was divided and Gorges received the strip between the Piscataqua and the Kennebec. A settlement was made at York, which was the first chartered city in America. Later settlements were made at Saco, Biddeford and Scarboro, but all were destroyed by Indian uprisings, and in 1677 Massachusetts purchased the whole territory, which was united with it by charter in 1692. It did not again have a separate existence until it was admitted to the Union as a state in 1820, to offset the admission of Missouri as a slave state.

From that time until the Civil War the only important public questions in the state were the dispute over the northeast boundary, which was finally settled by the Webster-Ashburton Treaty of 1842; and the enactment in 1851 of the first state law in America prohibiting the manufacture and sale of intoxicating liquors. This law, in 1884, became an amendment to the state constitution. In the Civil War the state furnished more than 70,000 men in the Union army, and during the World War when the draft went into effect Maine was second in number of men enlisted in proportion to the quota. In 1908 the initiative and referendum were adopted by popular vote; later there were passed laws regarding child labor and workmen's compensation.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Auburn, Augusta, Bangor, Bar Harbor, Bath, Biddeford, Katahdin, Kennebec, Lewiston, Moosehead Lake, Parks, National, Penobscot, Portland, Saco, Saint John River

HISTORY

Missouri Compromise, Webster-Ashburton Treaty

MAINE, UNIVERSITY OF, a state university, established at Orono in 1865, under the name of State College of Agriculture and Mechanic Arts. This was changed to the present name in 1897. The organization now includes colleges of agriculture, technology and law, and a college of arts and sciences, which offers classical, Latin and general scientific courses. The law school is at Bangor. The university is coeducational. Its faculty numbers about 120, and there are about 1,200 students enrolled. The library contains 60,000 volumes.

MAINTENON, *maN t' nohN',* FRANÇOISE D'AUBIGNÉ, Marquise de (1635–1719), second wife of Louis XIV. Left quite destitute in her tenth year, Mademoiselle D'Aubigné spent her youth in dependence on her rich relatives, and was glad to contract a marriage with the famous wit Scarron, a deformed, old and infirm man. Her beauty and intelligence gained for her powerful friends among those who frequented her husband's house; and on Scarron's death she was intrusted with the charge of the children born to Louis XIV by Madame de Montespan. She assumed this office and soon so captivated the king that he married her privately in 1684. For the remaining years of his life she was his most confidential adviser.

MAINZ, *mynts,* GERMANY, a fortified town in Hesse, situated on the left bank of the Rhine, opposite the mouth of the Main, twenty miles west-southwest of Frankfort.

It is the largest town in Hesse, and one of the oldest in Germany. The older part of the town was modernized after the destruction caused by a powder-magazine explosion in 1857, and an extensive new quarter has been added since the recent widening of the fortified circuit. The manufactures embrace leather, furniture, hardware, carriages, tobacco, beer, chemicals, musical instruments and cars. The trade, particularly transit, is extensive. Mainz was long the first ecclesiastical city of the German Empire, of which its archbishop-elector ranked as the premier prince. Its history during the sixteenth century is of considerable interest in connection with the progress of the Reformation. Population, 1912, 118,000.

MAIZE, one name of the common corn, or Indian corn. See CORN.

MAJ'ESTY, a title bestowed upon kings and queens. The former kings of France were addressed as "most Christian majesty," the former kings of Portugal, as "most faithful majesty;" the kings of Hungary, "apostolic majesty;" the kings of Spain, "most Catholic majesty." The emperor of Germany bore the title of "imperial royal majesty."

MAJOL'ICA, a beautiful enamel earthenware, decorated in colors. It was first made in Spain, but reached its highest splendor in Italy. There the term is applied to all such wares, but by artists it is restricted to such as are decorated with a fine metallic luster or to the richly decorated wares of the fifteenth and sixteenth centuries. Unquestioned specimens of ware of these dates are very valuable, single pieces selling for $1,000 to $10,000 or more. The finest collection in the world is that of J. P. Morgan, loaned to the Metropolitan Museum of Art, New York. See POTTERY.

MA'JOR. See MUSIC; SCALE.

MAJOR, the title of a military officer above the rank of captain and below that of lieutenant-colonel. The major commands a battalion of infantry or artillery or a squadron of cavalry. The salary is from $2,500 to $3,500, dependent on length of service. See RANK IN ARMY AND NAVY.

MAJORCA, *ma jaw'ka*, an island in the Mediterranean Sea, belonging to Spain. It is the largest island of the Balearic group, is about fifty-eight miles in length and about 1,386 square miles in area, and is very irregular in shape and deeply indented. The west and north coasts, which look towards Spain, are steep and lofty, but in other directions, and particularly on the east, the coasts are low and shelving. The island is generally fertile, producing, besides large crops of cereals, hemp, flax and fruits. Silk is also raised. The pastures are rich and maintain large numbers of cattle, and the fisheries on the coast are valuable. Several railways traverse the island. The chief town is Palma. Population, 1916, about 263,000.

MAJOR-GENERAL, the title given to a military officer of commanding rank. In the United States army it is usually the highest commission in the service; only in war time are the higher ranks of lieutenant-general and general designated. In war a major-general commands a division or a field army; if the latter, a brigadier-general (next lower in rank) commands a division. The salary of a major-general is $8,000, with certain additional allowances. See RANK IN ARMY AND NAVY.

MAKAW', a small tribe of Indians who live near the entrance to Puget Sound. They are skilful and daring fishermen and boatmen and in former times were warlike in nature. The women weave beautiful baskets. Unlike other Indians, the men have beards. The Makaws live upon a small reservation and are fairly civilized. They number fewer than 400.

MALACCA, *ma lak'kah*, STRAIT OF, the channel between the Malay Peninsula and the island of Sumatra. In length it is a little over 500 miles, and in width it varies about thirty miles to 250 miles.

MALACHI, *mal'a ki*, the last of the twelve minor prophets of Israel. The book which bears his name is the last one of the Old Testament. It is supplementary to the writings of Ezra and Nehemiah, and was written about 420 B. C. The word *Malachi* means *messenger of Jehovah*, and by some is thought to be a title rather than a personal name.

MALACHITE, *mal'a kite*, a carbonate of copper, of a dark, emerald-green color. The finest specimens are obtained from Siberia and Arizona, but it is found in many places all over the world. Fibrous malachite, when finely pulverized, is used as a paint; massive malachite is made into boxes, knife-handles, table-slabs and other ornamental articles and takes a beautiful polish.

MALAGA, *mah'lah gah*, SPAIN, a seaport on the Mediterranean Sea, in the extreme

southern part of the country, sixty-four miles northeast of Gibraltar. It is the capital of the province of Malaga. The city is a favorite health resort, as the climate is uniformly mild. The old portion of the city, which lies around a steep hill crowned by a medieval castle, is unattractive and unimproved, but the newer parts have several handsome avenues, including a beautiful promenade near the harbor. The most prominent structure in the city is the cathedral. Malaga carries on an active export trade in raisins, lemons, grapes, olives and olive oil, wine, almonds and esparto grass, and there are a number of manufacturing establishments, including several large iron foundries. Malaga was a flourishing city under the Romans, and its long occupation by the Moors left distinct marks in the older parts of the town. Population, 1917, estimated, 140,975.

MALARIA, *ma la'ri a*, an infectious disease known also as *ague, marsh fever* and *chills and fever*. It is caused by an animal parasite belonging to a class of protozoa (which see). This parasite is introduced into the blood through the bite of the *Anopheles* mosquito, and the problem of preventing malaria is therefore a matter of sanitation. The name is Italian for *bad air*, and was originally applied because it was believed that the disease was caused by poisonous air from marshes. Malaria was formerly a dreadful scourge in tropical regions, but in sections cleared of the *Anopheles* mosquito it has been wiped out. The extermination of this mosquito in the Canal Zone was one of the tasks of the sanitation department of the United States army during the construction of the Panama Canal, under Surgeon-General Gorgas.

An attack of malaria generally goes through three stages: first, headache and chills, then fever, and lastly, the sweating stage. These attacks last several hours, pass off, and recur again at intervals of from one to four days. The only specific known to cure malaria is quinine. Persons exposed to the bite of the mosquito have been kept from acquiring the disease by doses of this drug.

Related Articles. Consult the following titles for additional information:
Gorgas, William C. Panama Canal
Mosquito

MALAY' ARCHIPELAGO, also known as the Indian or Eastern Archipelago, the great group of islands situated to the southeast of Asia and washed on the west by the Indian Ocean and on the east by the Pacific Ocean. The archipelago lies, approximately, between the parallels of 11° south latitude and 17° north latitude. Within these limits lie some of the largest and finest islands in the world, including Borneo, Sumatra, Java, Celebes and the Philippines. The islands are generally fertile and are covered with a luxuriant vegetation; they produce all kinds of tropical products in abundance. Many of them contain volcanoes. The chief native race is the Malayan. A large portion of the archipelago is really, or nominally, under the sway of Holland, and this portion is frequently called the Dutch East Indies (which see).

MA'LAY PENINSULA, a long, narrow strip of land extending in a southeasterly direction from the southeastern coast of Asia. It is about 850 miles in length, and from forty-five miles to 200 miles in width. On the south it is separated from the island of Sumatra by Malacca Strait. The China Sea washes its eastern shores, and the Indian Ocean its western. Politically the peninsula is divided between Siam and Great Britain. See Straits Settlements; Singapore.

MALAY RACE, or **BROWN RACE**. See Races of Men.

MALDEN, *mawl'den*, Mass., a suburb of Boston, five miles distant, on two divisions of the Boston & Maine Railroad and on the Malden River. It is an important manufacturing center, with more than 600 establishments and almost fifty different industries. The chief products are rubber, boots and shoes, shoe lasts, boot trees, leather, paper, fiber and knit goods, furniture and other articles. The city has a Y. M. C. A., four libraries, a home for the aged and two hospitals. The place was settled in 1641 and remained a part of Charlestown until 1649. It was chartered as a city in 1881. Population, 1910, 44,404; in 1917, 52,243 (Federal estimate).

MAL'DIVE ISLANDS, a chain of coral islands in the Indian Ocean, 400 miles southwest of Ceylon. The chain is composed of twelve clusters of atolls (see Atoll). The larger islands are covered with trees, chiefly palm, and produce fruits, various kinds of edible roots and millet. All kinds of fish are found about the islands, and the inhabitants carry on a considerable trade with Bengal, Ceylon and the Malabar coast. An elected sultan rules over the islands, which are in-

habited chiefly by people of mixed Arab and Singhalese blood, who are Mohammedan in faith. The islands are under the protection of Great Britain. Population, about 50,000.

MALFEASANCE, *mal fe'zans,* a wilful illegal act on the part of an official. It differs from *misfeasance* in that the latter refers to an act wrongfully and injuriously done in a lawful manner, or doing a lawful thing in an unlawful manner. Malfeasance in office, if proved, may subject the guilty person to removal from office and even to criminal prosecution.

MALICE, *mal'is,* in law, a definite design or intention of doing mischief to another, called also *malice prepense* or *malice aforethought.* The former relates to prearranged design, and not to mischief committed by reason of impulsiveness when opportunity is offered. *Malicious mischief* is the committing of an injury to public or private property from sheer wantonness. This offense is punishable with great severity. The law presumes malice in the very commission of the act; so it lies with the party indicted to rebut the presumption of malice or sufficiently to explain the act. See MURDER.

MALINES, *ma leen',* or **MECHLIN**, *meK' lin,* BELGIUM, a city on the River Dyle, formerly celebrated for its exquisite lace, known as *Mechlin.* In a sense Malines is the religious capital of Belgium, as it is the residence of the only archbishop of the country. It is situated fourteen miles southeast of Antwerp, and suffered the same fate as that city in the second month of the World War, falling into the hands of the Germans; it suffered much damage through bombardment. Malines was a city of fine squares and public buildings, beautiful gardens and well-paved streets. Its beautiful Saint Romauld's Cathedral dates from the sixteenth century. The manufactures of Malines include woolen goods, hats, carpets, tapestries and furniture. Population, 1912, 59,735.

MALLEABIL'ITY, a property of matter by virtue of which it can be hammered or rolled into sheets. Malleability is confined almost entirely to metals, and there are but few metals that are not malleable. Those possessing this property in the highest degree are, in the order named, gold, silver, copper, platinum, palladium, iron, aluminum, tin, zinc and lead. See GOLD.

MAL'LOW, the common name of a family of plants which secrete a mucilagelike substance. Included in this group are the hibiscus, hollyhock, cotton plant, marsh mallow, common mallow and others. The common mallow is a widely diffused species with reddish-purple flowers, which on drying become blue and yield their coloring principle both to water and alcohol.

The dwarf mallow is a common weed in America. Its stems, which are short, simple and spreading, rise from a long, deeply buried root. Its leaves are of a handsome, round, heart-shaped form, somewhat lobed and scalloped on their edges; the flowers are white, violet-white or purplish, and the fruits are flat and circular. The musk mallow has handsome, deeply cut leaves, which diffuse a pleasant, musky odor.

MALMO, *mahl'mö,* SWEDEN, capital of the prefecture of Malmöhus, and third largest city in the kingdom. It is situated on the Sound, opposite Copenhagen, with which there is ferry connection. Malmö is the terminus of eight railway lines, and has steamship connection with many European cities. The chief buildings are a city hall, which dates from the sixteenth century, the governor's residence and several old churches. An old citadel, now used as a prison, was the scene of the captivity of the Earl of Bothwell, husband of Mary Stuart. The manufactures are considerable and consist chiefly of iron, cottons, tobacco, gloves, brandy, chocolate and cars. Population, 1917, 111,823.

MAL'ORY, or **MALLORE**, THOMAS, Sir, an English author, about whom little is known, save that he lived in the latter half of the fifteenth century. He is famous as the author of the *Morte d'Arthur,* which contains the stories of Arthur and the Round Table which Tennyson afterward rewrote in verse in the *Idylls of the King.* These tales were probably translated into English from old French romances, and they form the first important English romance in prose.

MALPRACTICE, *mal prak'tis,* improper treatment of a patient by a physician, with injurious results. The patient and his family place confidence in the practitioner; if he feels incompetent to meet an emergency he must employ a physician better qualified or retire from the case. If a patient is injured through his bungling operation he becomes liable for damages.

MALT, *mawlt,* grain, usually barley, steeped in water and made to germinate. The starch of the grain is thus converted into

sugar, after which it is dried in a kiln and then used in the brewing of porter, ale or beer, and in whisky distilling. One hundred parts of barley yield about ninety-two parts of air-dried malt. See BEER; BREWING.

MALTA, *mawl'ta,* an island in the Mediterranean Sea, belonging to Great Britain. It is the same island as that mentioned in *Acts* under the name *Melita,* upon which Paul sought refuge when shipwrecked. Malta is about fifty-eight miles south of Sicily and 180 miles from the nearest point in Africa. Valletta, the capital, is eighty-three miles southwest of Syracuse (in Sicily) and 991 miles southeast of Gibraltar. London is 2,298 miles distant. Malta is seventeen miles long and has an area of 91.5 square miles. It is chiefly important because of its strategic position. Valletta, which has an excellent harbor, is the base and resort for repair of the British fleet in the Mediterranean, and is one of the most important ports of call in the world, over 2,000 ships entering and clearing the harbor each year.

The island is for the most part low, the highest elevation not exceeding 845 feet. Though there are no rivers; springs are numerous, and the soil is very fertile. Potatoes, oranges, lemons, mandarines, onions and corn are the chief agricultural products; cotton is grown on a small scale. Farming is the most important industry, and cotton goods and filigree the leading products of manufacture. The people, who are industrious and frugal, speak a language believed to be derived from Arabic and Carthaginian. Italian and English are spoken by the commercial and educated classes, and both these languages are taught in the public schools. Malta was annexed to the British Empire in 1814. The government is administered by a governor and an executive council. Population, 1911, including a garrison, 228,534.

MALTA, KNIGHTS OF. See JOHN, KNIGHT OF SAINT.

MAL'VERN HILL, BATTLE OF, an important battle of the Civil War, fought near the James River, at Malvern Hill, Va., July 1, 1862, between the Federal Army of the Potomac of about 80,000 men, under General McClellan, and the Confederate Army of Northern Virginia, about equal in numbers, under General Lee. It was the last of the "Seven Days' Battles" and practically terminated the Peninsula Campaign. The Federals held the hill, naturally a strong position, and the Confederates were compelled to begin the assault. Though conducted with the greatest bravery and skill, the attack failed, and Lee's force was compelled to withdraw with a loss of fully 5,000. The loss of the Federals was about one-third of that number.

MAM'ELUKES, the former mounted soldiery of Egypt, consisting originally of Circassian slaves. As early as 1254 they became so powerful that they made one of their own number sultan, and this dynasty continued till the sixteenth century, when it was overthrown by Selim I. They suffered severely in opposing the French at the end of the eighteenth century, and in 1811 Mehemet Ali caused a general massacre of them throughout Egypt.

MAMMALS, the highest class of the vertebrates (backboned animals) and the most important class of the animal kingdom. In all excepting the lowest orders the young are brought into the world alive and feed themselves upon the mother's milk; but in some of the lower orders the young are not fully developed when born and are carried and fed by the mother. The higher we ascend the scale of life, the longer is the period through which the young are more or less dependent upon their parents. No animals outside the mammalian group suckle their young, and the class name is derived from the Latin word for *teat.*

The skin of mammals is always covered more or less with hairs, which are found in many forms, from the finest wool to large, coarse bristles and even spines. The skeleton is quite uniform in essentials, and in most points it agrees with that of man. The skull forms a single piece, composed of bones fixed together, to which is articulated a lower jaw. The skull rests upon the vertebral column, to which limbs, never more than four in number, are attached. The fore limbs are invariably present, but the whales and some other mammals have no hind limbs, or they appear only in rudimentary form. Most mammals have teeth, but they appear only in embryo in the whales and are entirely absent in the ant-eater and some other forms. The muscles of mammals are well-developed and perfect, resembling the birds in this respect. The diaphragm, which divides the body cavity in two, is peculiar to mammals. Air is breathed directly into the lungs, even by the whales and other water-inhabiting animals. All

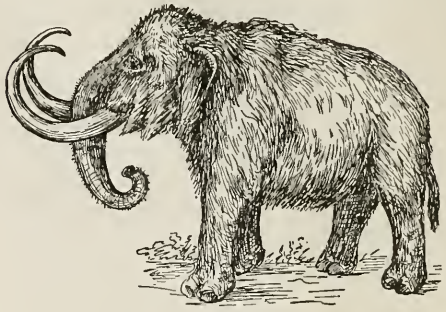
have warm red blood, which is driven by a four-chambered heart to all parts of the body through vessels called arteries, and which returns through another set of tubes to the lungs for purification. The anatomy of all mammals is so similar to that of man that the student is referred for greater detail to the separate articles in this work descriptive of the organs of man.

No mammals existed in New Zealand nor the Polynesian Islands until they were introduced by man. The marsupials, or animals which carry their young for a time in pouches, are confined to the Australian region, and the one genus opossum to America. Otherwise mammals are distributed widely in all parts of the world. Mammals are so well adapted for life under varying conditions that they have been carried from their native haunts, and concerning the original home of many we now have no information. The apes, monkeys and those mammals which are most closely related to man in structure inhabit the tropical or subtropical regions. The character of mammals seems to be largely dependent upon their food and surroundings. Those which live upon other animals are fierce and active and highly intelligent, living comparatively solitary lives. On the other hand, the vegetable-eating mammals are comparatively timid and often herd together; though many bear weapons of defense, most of them trust to their fleetness or to their ability to conceal themselves in order to escape from their enemies. Of course many mammals combine vegetable and animal food in varied proportions.

Related Articles. Consult the following titles for additional information:

Carnivora	Marsupials	Ungulates
Cetacea	Primates	Vertebrates
Man	Rodentia	Zoölogy

MAM'MOTH, a species of extinct elephant, the fossil remains of which are found in Europe, Asia and North America. Geologically speaking, the mammoth dates from before the Glacial Period, which it survived, and lived into the earlier portion of the human period. Its bones and large curved tusks have been found in great abundance in Siberia. An entire carcass, which had been preserved in the ice, was discovered toward the close of the eighteenth century on the banks of the River Lena, in such a perfect state that the flesh was eaten by animals. The skin was perfectly preserved and was clothed with a furry wool of reddish color, interspersed with black hairs. The skeleton and other parts of this animal were removed



MAMMOTH

to the Royal Museum of Petrograd. Another large specimen is preserved in the Chicago Academy of Sciences.

MAMMOTH CAVE, the largest known cave in the world, situated in Kentucky, near Green River, about eighty miles southwest of Louisville. It is one of a series of large caverns, formed in limestone rock which extends over an area of about 8,000 square miles, including portions of Kentucky, Tennessee and Indiana. The cave is about ten miles in diameter, and passageways aggregating more than one hundred miles in extent have been explored. The main cave is three miles long and from 40 to 175 feet in width, and in some places it is 125 feet high. The largest room, known as the Chief City, is oval in form, 541 feet long, 287 feet wide and 125 feet high. It is so called because it contains a number of Indian relics. In it were once held the council meetings of the Indians.

There are numerous other very interesting rooms, among which is the Star Chamber, a dome with a lofty ceiling of black rock, dotted with snow-white crystals of gypsum. These, when seen by reflected light, glisten like stars. The cave contains a number of rivers and small lakes. The largest, Echo River, is about three-fourths of a mile long and obtains its name from the wonderful echoes produced in the portion of the cave through which it flows.

As far as explored, there are five altitudes, or levels, and from the pit descending to the lowest of these a number of passageways have been discovered. These passageways undoubtedly lead to other chambers of great interest. The rivers contain numerous blind fish, and blind grasshoppers, beetles and other insects are found in the cave. Mammoth Cave

was discovered in 1809 and was first brought to general attention through large deposits of saltpeter found there and used for the manufacture of gunpowder during the War of 1812. At present it is privately owned, but a movement has been started to create a national park out of the region.

MAN, the most highly organized being in the animal world. Though many attempts have been made to classify man as entirely separate from the rest of the animal kingdom, yet the more recent studies show him physically to belong to the highest family, in the group of apes and monkeys. But in mental endowment man ranks far above the highest of the apes. Again, he walks erect upon his feet and uses his hands solely for the purpose of taking and holding things; the bones of his face do not project forward, but rather downward, and are immediately below his brain; he has much greater cranial capacity than any other animal, and the convolutions of his brain are far more numerous and complex; his teeth are arranged close together; his hair covers only restricted areas of the body, and in various other minor ways man shows his difference from the apes.

Man possesses a reasoning mind and has a moral sense of right and wrong; he possesses an articulate language, by which he can communicate his thoughts readily—gifts which no other animal ever possessed. The gorilla, orang-outang and chimpanzee most closely resemble man, the latter differing less than any of the others.

Where man originated or how he became distributed over the earth are questions which no one can settle. Darwin believed that he was directly descended from some form of anthropoid ape now extinct and that all present races have come from one parent stock. Wallace believes a portion of this doctrine, but thinks that man has been especially endowed by his Creator with a high, controlling intelligence. Other great scientists believe that the race has been developed from separate beginnings and deny the supernatural creation of mind or soul.

Related Articles. Consult the following titles for additional information:

Evolution	Mammals
Geology	Vertebrates

MAN, Isle of. See Isle of Man.

MANAGUA, *mah nah'gwah*, a town in Central America, capital of the republic of Nicaragua since 1855, on the shore of Lake Managua. It is connected with Granada and with Isla de Limon, on the Pacific, by rail, and has a wireless telegraph station. Population, 1918, about 35,000.

MANAOS, *mah nah'ohs*, Brazil, a beautiful, modern city on the east bank of the Rio Negro, ten miles from its junction with the Amazon, 850 miles from Belem (or Para) and 3,800 miles by steamer from New York City. It has many handsome public buildings, botanical gardens and parks, a public library, a museum, etc. Good waterworks, an electric lighting system and street cars are among the public improvements. Manaös is the capital of the state of Amazonas. It lies on a harbor which can accommodate large ocean vessels, and is a thriving center for the export of rubber. A United States consular agent has his residence in Manaös. Population, 1912, 50,000; 1917, estimated, nearly 80,000.

MANATEE' or **SEA COW**, an animal which resembles the dugong (which see), found on the coasts of South America, Africa and Australia. It frequents the mouths of rivers and feeds on algae and such land vegetation as it can reach at high tide. The animal is assisted in feeding by a peculiar upper lip, which is cleft in two and furnished with strong bristles. It has no hind limbs, and the fore limbs, or swimming paws, have nails, by means of which the animal drags itself along the shore. Manatees are large, awkward animals, attaining a length of from eight to twenty feet. The skin is grayish-black, and is sparsely covered with hairs. The flesh and oil are valuable.

MAN'CHESTER, England, third in size among its cities and one of the most important manufacturing centers in the world. It is a municipal and parliamentary borough and inland port of Lancashire, on the Irwell River, thirty-two miles northeast of Liverpool and 164 miles northwest of London. A ship canal, connecting it with the Mersey, enables the largest ocean steamers to enter the heart of the city (see below). On the west side of the Irwell is Salford, connected with Manchester by numerous bridges and considered as virtually a portion of the city. Manchester has many important and striking public buildings and many fine streets. The center of the town is largely occupied by immense piles of warehouses and offices, while factories and other manufacturing works are chiefly in the outskirts. Among the principal public buildings are the town-

hall, or municipal building, in the Gothic style, one of the finest modern buildings in England; the Assize Courts, also a fine specimen of modern Gothic; the Royal Exchange, the new buildings of the Victoria University; and the Free Trade Hall, a building which has a seating capacity of 4,000. In this hall President Wilson addressed an audience of working men in December, 1918.

The most noteworthy ecclesiastical buildings are the cathedral, a fine specimen of Perpendicular Gothic, built in the early fifteenth century, and the Church of the Holy Name. The chief educational institution is Victoria University. Chetham's Hospital was founded under the will of Humphrey Chetham for the education of poor boys. Attached to the institution is a library of 40,000 volumes, the first free library in Europe. Among the public monuments, the most noteworthy is the Albert Memorial, in front of the townhall.

The chief manufacture of Manchester is cotton, but woolen and silk fabrics are also produced, as well as metal manufactures and all kinds of machinery. About 700 industries are represented in Manchester. The history of the city is legendary down to the tenth century, when it was devastated by the Danes. In the twelfth century the woolen manufactures began to develop, and in 1301 the place received municipal liberties and privileges. During the civil war the town suffered much at the hands of both parties. The introduction of machinery in cotton spinning toward the end of the eighteenth century gave power and direction to the trade of modern Manchester, and its progress since has been extraordinarily rapid. A temporary check resulted from the Civil War in America, which led to a cotton famine in 1862, causing the deepest distress in South Lancashire. Population, 1911, 714,333; 1914, estimated, 731,830.

Manchester Ship Canal, a canal extending from Manchester, England, to the estuary of the Mersey River, at Eastham. It is thirty-five and one-half miles long, twice as wide as the Suez Canal, and has a depth of twenty-six feet. It was ready for traffic on January 1, 1894, and was formally opened by Queen Victoria on May 21. The construction of this canal cost $75,000,000. Through it the largest ocean steamers enter the heart of the city, which has six miles of wharfage and 100 acres of dock accommodations.

MANCHESTER, N. H., one of the county seats of Hillsboro County, Nashua being the other. It is the largest city in the state, is fifty-six miles northwest of Boston, on the Merrimac River at the mouth of the Piscataquog River, and on several lines of the Boston & Maine Railroad. The city contains a public library, a training school for teachers, Saint Anselm's College, Saint Augustine and Saint Mary's academies and a state industrial school. Other prominent structures are a Federal building, a courthouse and a Roman Catholic cathedral. Among the manufactures, boots and shoes are important, though cotton cloth is by far the leading product, more than thirty mills being engaged in its manufacture. Other manufactures include fire engines and locomotives, hosiery, paper, woolen goods, needles, lumber and furniture. The output of all manufactured goods is nearly $1,000,000 every week. The place was settled by the Scotch-Irish in 1722, and was known under different titles until 1810, when it received its present name. It was chartered as a city in 1846. Population, 1910, 70,063; in 1917, 79,607 (Federal estimate).

MANCHURIA, *man.choo're ah*, the northeastern part of the Chinese republic, with Chosen (old Korea) on its southern border, Chinese Mongolia on the west and Siberia on the north. The area is about 363,000 square miles; the population is not known, but it is estimated from 15,000,000 to 29,000,000. It is believed that 20,000,000 is nearly correct.

The central part of Manchuria was the original home of the Manchus (which see), the powerful clan which swept southwestward nearly 300 years ago and gained control of China's government. Manchu emperors held the throne from 1644 to 1912, when the republic was proclaimed. In stature the Manchu is large, quite the opposite of the smaller Chinamen of the Canton, or Southern China, districts, who are familiar to all the world through emigration. Few Manchus have left China, but nearly all of them have scattered over other parts of China, and few remain in Manchuria.

Manchuria has fallen largely under Japanese influence, though before 1917 Russia had made important advances there. The Russian revolution and consequent political chaos lost everything that Czar Nicholas had gained. The prospective Siberian republic

will reach across the Amur River boundary and save for the Muscovite some of the advantages of Russian zeal under the old régime.

The mineral wealth of Manchuria has never been estimated, but it is known to be great. Gold, silver, copper, iron and lead are abundant. Mining operations are largely controlled by Russians, Japanese, Americans and Englishmen.

The eastern portion of the country is mountainous, but in the west and south is a great, fertile plain where agriculture flourishes. The latitudes here are practically the same as those from Central Iowa to Winnipeg. There are only two railroad lines, the Trans-Siberian Railroad to Vladivostok and a branch of the same road to Harbin southward to Port Arthur and to Pekin. Most of the products of the country are transported overland in winter, when the ground is frozen, for wagon roads, few in number, are very poor.

Manchuria acknowledges the central authority of the republican government at Pekin. There is a governor for each of the three provinces comprising the country. The capital city is Mukden (which see). Harbin, opened to the commerce of the world in 1907, has 68,000 people.

MAN'DALAY, India, the former capital of Burma, is situated on the left bank of the Irawadi, 350 miles north of Rangoon, with which it is connected by railway. Since 1885 Mandalay has been the capital of Upper Burma. A destructive fire in 1892 made it possible to rebuild a large portion of the city, and in the rebuilding, under British direction, the town was greatly improved. The area covered is about six square miles, the central portion being a picturesque walled town now used as a military station. The chief buildings are the palace of the former king, the government house and the hall of justice. The city also contains a number of temples, pagodas and monasteries, and it is celebrated for its grand bazaar, which is a market containing miscellaneous collections of wares. The most important industry is silk weaving. Kipling used the city effectively for local color in his popular ballad *Mandalay*. Population, 1911, 138,299.

MANDA'MUS. See Writ.

MAN'DAN, formerly a large tribe of Indians living in North Dakota. Few now remain after years of great disasters, which were, however, met with remarkable courage. The Mandans were driven about by the Sioux; smallpox depopulated their villages, and the tribe was almost forgotten. Yet a few retained faithfully their customs and habits, and, living clean lives, kept the tribe alive. In their primitive mode of living they stretched buffalo skins over a circular wooden framework and made awkward tub-like boats, which, however, they handled with much skill. They tattooed their breasts, and in some of their ceremonies they inflicted terrible torture upon themselves. In complexion they are very light, and albinos are frequently found among them. There are now about 200 Mandans on Fort Berthold Reservation, in the western part of North Dakota.

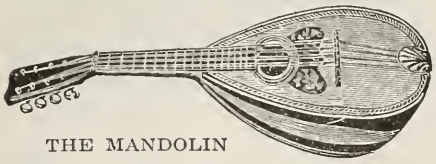
MANDARIN, *man da reen'*, a Chinese word adopted from the Hindu, meaning *counselor*. It referred to the governing class in China under the empire. There were nine grades of mandarins, the exact status of each being designated to the public by the size of an ornamental button worn on his hat.

MAN'DEVILLE, John de, Sir, the name adopted by the compiler of an extraordinary book of travels, originally written in French, between 1357 and 1371. An English version was made from the French manuscript in the latter part of the fourteenth century. That part of the book which treats of the Holy Land may be a record of the author's experience, but the greater part is compiled from the accounts of various other travelers.

MANDIN'GO, a negro tribe of West Africa, numbering many millions, remarkable for their intelligence and for the advances they have made in civilization. The original country of this people, who are now spread over a great portion of West Africa, was the north slope of the high tableland of Senegambia. They are nominally Mohammedans, are keen traders, work iron and gold, manufacture cotton cloth and leather and cultivate a variety of crops. They live in small independent states, in large, clay-built, walled towns.

MAN'DOLIN, a musical instrument with a shell-shaped body, composed of strips of different kinds of wood glued together. It has a neck like a guitar. There are from four to six double strings, which are struck by a plectrum in the right hand, the fingers of the left stopping the strings on the fretted

fingerboard. A long note is produced by rapid striking of a single note many times in



THE MANDOLIN

succession, producing a peculiar, tremulous tone. The instrument is of Italian origin and is of great antiquity.

MAN'DRAKE, a genus of plants belonging to the nightshade family, two species of which are found in Southern Europe and the East. They have large tap-roots, bearing clusters of rootleaves, and short stalks, upon which are the white, bell-shaped flowers. The fruit is a large, two-celled berry, of an orange color, containing many kidney-shaped seeds. The root possesses narcotic qualities, and from its occasional resemblance to the human figure it was formerly supposed by the superstitious to shriek when torn up. In the United States, the *May apple,* a very different plant, is sometimes called mandrake.

MAN'DRILL, a species of baboon, which is distinguished by its short tail, elongated, dog-like muzzle, an ugly-looking head crowned with a crest of black hair, and an orange-yellow beard. Mandrills inhabit Western Africa, where they mingle in large troops. Full-grown males measure about five feet and are exceedingly strong and fierce. The animal has cheek swellings, colored with stripes of brilliant red and blue, and the nose is tipped with bright scarlet. See BABOON.

MANGANESE, *man'ga neese,* a hard metal of a whitish-gray color, occuring in nature in iron, lead and silver ores, various mineral waters and in vegetables and grains. This metal is not used by itself, but it forms alloys with copper, iron, zinc, lead and other metals, and is of especial value in the manufacture of steel, to which it adds elasticity and hardness. Manganese compounds are also valued in the manufacture of dry batteries, flint glass and pottery. The most important deposits of manganese are found in Brazil, in the Piedmont Mountains of Georgia and Virginia, and in Southern Russia.

MANGE, *maynj,* a skin disease which afflicts dogs and cattle and, under the name of *scab,* or *scabies,* sheep. It is due to the presence of a small mite, which burrows beneath the skin. The disease appears in the form of pimples, the animal suffers severely and in a short time the skin becomes covered with scabs. The disease is contagious and can be conveyed in numerous ways. The most successful treatment consists in dipping the animal in solutions which will destroy the insect. These are usually solutions of tobacco and sulphur, lime and sulphur or carbolic acid. Preparations containing mercury and arsenic or other poisonous materials should not be used. In most regions where the disease is prevalent, farmers combine and construct dips, which are small tanks into which the animals can be plunged.

MAN'GO, the name of a genus of evergreen trees, which are natives of India and the Malay Peninsula, though they have been introduced into numerous tropical countries. In India there are nearly 150 varieties. In its native state the common mango grows to a height of about forty feet and has a spreading top with dense foliage, the leaves being from six to eight inches long. The flowers are

THE MANGO

small, reddish-white or yellow and are borne in dense clusters. The fruit is kidney-shaped and varies considerably in size and color with different species. The best varieties of fruit are highly prized for eating. Some are sweet, and others are slightly acid. The unripe fruit is frequently used for sauces and pickles. By cultivation the mango has been extended to most of the West India Islands and to Florida and California.

MAN'GROVE, a genus of trees or shrubs which grow in tropical countries along the muddy beaches of low coasts, where they form

impenetrable barriers for long distances. They throw out numerous roots from the lower part of the stem and also send down long, slender roots from the branches, like the Indian banian tree. The seeds germinate in the seed vessel, the root growing downward till it fixes itself in the mud. Mangrove trees thus are responsible for shore lines being extended into the water, for their roots catch flying particles and hold mud washed up by the waves. The fruit of some species is said to be sweet and edible, and the fermented juice is made into a kind of light wine.

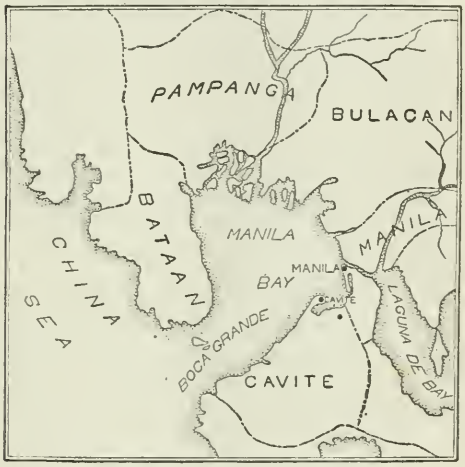
MANHAT'TAN ISLAND, N Y., an island at the mouth of the Hudson River, between that river and East River, constituting the Borough of Manhattan, New York City. It is separated from the mainland on the north and northeast by the Harlem River. The maximum length of the island is 13½ miles, the width, 2¼ miles, and the area, 22 square miles. It has a wharfage front of 22 miles. It was originally acquired by Dutch settlers, who gave its Indian possessors the equivalent of $24 for it. To-day, excepting a small area in metropolitan London, Manhattan is more valuable than any other similar area on earth. See New York (City) for further description.

MANNHEIM, *mahn'hime*, GERMANY, the largest city in the former grand duchy of Baden, on the right bank of the Rhine, near its junction with the Neckar. The former grand-ducal palace, one of the largest buildings of its kind in Germany, is the most interesting building, and it contains a fine picture gallery and a library. The city has an extensive harbor and docks and is the chief commercial center of the upper Rhine. Among its thriving industrial plants is a manufactory of machines of various kinds that employs 10,000 workers normally. Other important manufactures are celluloid, leather goods and railway supplies. Mannheim was a great munitions center during the World War, and its population increased from 193,902 in 1911 to 295,835 in 1918.

MA'NIA. See INSANITY.

MANIL'A, the capital of the Philippine Islands, is a city in which American enterprise and a typical Spanish civilization have met and been harmonized. Manila is situated on the western coast of the island of Luzon, at the head of Manila Bay and at the mouth of the Pasig River. It is 1,343 miles northeast of Singapore, 9,554 miles from Liverpool, by way of the Suez Canal, and 6,238 miles from San Francisco. The original Spanish settlement, a quaint old place surrounded by walls, lies on the south bank of the Pasig; on the other bank are the suburban sections.

Intramuros, as the walled city is called, is still picturesquely Spanish, with its convents, monasteries, churches, public buildings and private homes reminiscent of the old régime. Directly across the river is Binondo, the commercial and industrial section of Manila,



MANILA AND VICINITY

in which electric street cars have replaced the slow-moving carabao of former days. Adjoining Binondo on the north is the suburb of the poorer classes, no longer a place of filth and disease, but clean and healthful. It has been made so by a good water supply and drainage and sewage systems. The upper classes live in San Miguel, an island formed by an arm of the Pasig. A spacious boulevard has been constructed along the bay shore, and on it are the new United States government buildings and a splendid modern hotel. At the head of the boulevard is the Luneta, a small park used as a promenade and pleasure ground. (For other details, see the article TRAVELS IN DISTANT LANDS.)

Manila harbor has been improved under American direction until it is now the best in that section of the Far East. The improvements include dredging of the harbor area and the construction of jetties and large steel wharves. The harbor is visited by steamships from ports on both sides of the Pacific and from islands in the ocean, rice, cotton goods, wine, metal goods, chemicals and

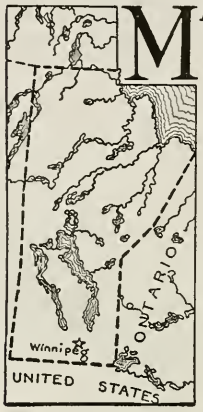
machinery being imported in large quantities. From Manila is shipped the bulk of the Filipino hemp crop, besides tobacco goods, sugar, coffee and dyewoods. The chief manufacturing industry is the making of cigars, in which thousands of workers, including women and children, are employed.

Manila was founded by Legazpi, the conqueror of the Philippine Islands, in 1571. It has frequently suffered from earthquakes, one of the most disastrous being that of 1863. The city was surrendered by the Spaniards to the American naval and military forces in the Philippines, August 13, 1898 (see SPANISH-AMERICAN WAR). At that time the Filipino insurgents were surrounding the city, and in the early part of 1899 they broke through the American lines which invested the city and burned a considerable portion of it. In August, 1901, the military government gave place to civil rule. The city is now under the commission form of government. Population, 1914, 266,943; of this number, 236,940 were Filipinos.

MANILA BAY, BATTLE OF, a naval battle of the Spanish-American War. It was fought in the bay at Manila, in the Philippine Islands, May 1, 1898, between an American fleet, under Commodore George Dewey, and a Spanish fleet of about equal strength, under Admiral Montojo, supported by land batteries. The American fleet, which, at the declaration of war, was in Chinese waters, had proceeded to the Philippine Islands and had entered the harbor at Manila during the night of April 30. At about 5:30 the following morning, a vigorous attack was begun against the Spanish vessels. This continued with brief interruption until 12:30 and resulted in the complete destruction of the Spanish ships and the silencing of the batteries. The Spanish loss was more than 600 killed and wounded, while the Americans had none killed and only six wounded. See SPANISH-AMERICAN WAR.

MANILA HEMP. See HEMP.

MANISTEE', MICH., the county seat of Manistee County, 140 miles northwest of Lansing, on Lake Michigan, on the Manistee River near Lake Manistee, and on the Pere Marquette, the Manistee & North Eastern and Michigan East and West railroads. The city has a good harbor and ships considerable lumber, shingles and salt; however, fruit orchards are now taking the place of what was once a great lumber district. There are foundries, furniture factories, tanneries and other works. The important buildings include a courthouse, a fine opera house, a Carnegie Library, an Elks' Temple and two hospitals. The place was settled in 1840 and was chartered as a city in 1869. The commission form of government was adopted in 1914. Population, 1910, 12,381; in 1917, practically unchanged.



MANITO'BA, one of the central provinces of Canada. Before 1912 it was 73,732 square miles in extent, but in the latter year it was enlarged to an area of 251,382 square miles. It extends from the international boundary northward to Hudson Bay at the 60th parallel of latitude. Ontario is east, Minnesota and North Dakota are south, Saskatchewan is west, and on the north are the vast North West Territories. Manitoba had a population of 455,614 in 1911, which increased to 553,860 by 1916. Nearly a third of the total population is in the capital city of Winnipeg, which is now the third city in the Dominion; only Montreal and Toronto are larger.

Surface and Drainage. In the northeastern corner a section of the Laurentian Hills produces a broken and hilly country, somewhat higher than the surrounding region. The southern and central parts of the province are nearly level and are a continuation of the broad valley of the Red River of the North, found in Minnesota and North Dakota. The western border of this valley is formed by an escarpment, which marks the shores of the ancient lake of which the valley was the bottom. West of this escarpment the surface consists of rolling or undulating prairie, which increases slightly in elevation toward the western boundary. The higher swells here are known as the Riding and Duck mountains. In the northwestern corner these mountains are covered with heavy forests of pine.

The Red River of the North crosses the southern boundary a little east of the middle point and continues to Lake Winnipeg. Its chief tributary is the Assiniboine, which enters the province from the west. In the

northeastern part are found the Berens and the Pigeon rivers, while the northwestern section is drained by the Swan. All of these streams are small. Three large lakes occupy a portion of the north central part of the province. These are Lake Winnipeg, Lake Winnipegosis and Lake Manitoba. Of these, Lake Winnipeg is the largest, being 270 miles long and varying in width twenty to sixty miles. All of the lakes are shallow and their shores are low.

Climate. The climate is characterized by extremely cold winters, in which the thermometer may fall as low as 50° below zero, and short, hot summers; but the dryness of the atmosphere prevents these extremes from being felt to the extent that they would be in more humid regions. The rainfall averages about seventeen inches, but three-fourths of this occurs during the growing season; so, notwithstanding the limited annual precipitation, the country is well suited to agriculture.

Mineral Resources. Manitoba's most valuable resource consists in her large areas of deep, rich soil. Of minerals, coal and lignite occur along the southern boundary and these are mined to a limited extent. There are also some deposits of iron ore, but they have never been worked. One-third of the gypsum of the entire Dominion is found in this province.

Agriculture. The great valley occupying the central portion of the province is well suited to the growing of all crops that can be raised in a cool temperate climate, but because of the peculiar nature of its soil, Manitoba is especially adapted to raising the best varieties of spring wheat, and this crop far outranks in acreage and amount all other cereals. Next in importance to wheat are oats, barley, flax and potatoes. Hay and forage crops are grown to a considerable extent, and the raising of live stock and dairying are fast becoming important branches of agriculture. The average crops are the following: wheat, 41,000,000 bushels; oats, 45,000,000 bushels; barley, 16,000,000 bushels; potatoes, 4,000,000 bushels.

Other Industries. The lakes and streams abound in fish, and the taking and exporting of whitefish, sturgeon, pickerel and other fish is an important industry. There are but few manufactures, and these consist of such industries as meet the local demands of the population. No large establishments have yet located within the province, but there are numerous small mills for the manufacture of flour, and some lumber mills are engaged in supplying the inhabitants with lumber and timber products.

Transportation. There are nearly 4,100 miles of railroad in the province. The Canadian Pacific railway crosses it from east to west and has numerous branches extending in various directions from Winnipeg. The Canadian Northern and the Grand Trunk Pacific likewise cross the province on trans-continental routes. A branch of the Northern Pacific railroad enters from Minnesota and extends to Winnipeg, thus forming connection with the trans-continental lines of the United States and with Saint Paul and Minneapolis. The National Transcontinental enters from the east and runs as far as Winnipeg. During high water the Red River and the Assiniboine are navigable, though since the construction of railways they are but little used. The Saskatchewan and its outlet, the Nelson, are navigable.

Plant and Animal Life. The central and southern prairie regions have few trees; they are found principally in the vicinity of lakes and along rivers. The northern and eastern parts of the province are rich in tamarack, spruce and pine, with scattering hardwood. The western section has more hardwood, such as the oak, elm and maple. There are four forest reserves—the Turtle Mountain (70,000 acres), the Porcupine (759,000 acres), the Duck Mountain (988,000 acres) and the Spruce Woods (143,700 acres). Most of the extensive lumbering operations are carried on in the region of conifers, north of the prairie region, and under strict government regulation.

The central and northern parts attract the trapper, for martens, minks and muskrats are abundant. The hunter finds in season duck, grouse, plover and the like. In the wild regions such large game as deer, moose, elk and caribou, abound; these are protected most of the year. There are great quantities of fish—whitefish, pickerel, trout and pike, principally—in the rivers and great lakes of the province.

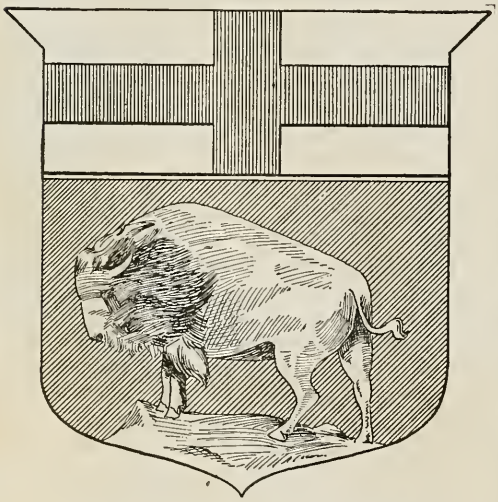
Manufactures. There are fewer than 1,000 manufacturing establishments in Manitoba, and these are connected largely with agricultural interests. Among manufactured products flour is the most important, with lumber products second.

Education. Manitoba was first among the provinces to set aside for future school funds two sections of land in each township; in this provision it followed the lead of the United States. Current school expenses are met by local and provincial taxation. There is a minister of education for the province.

At the head of the school system is the University of Manitoba at Winnipeg, in which city also is an agricultural college. There is one normal school at Winnipeg and another at Brandon.

Cities. There is but one large city in the province, and this is Winnipeg (162,999). Other cities are Brandon (15,225), Saint Boniface (11,022) and Portage la Prairie (5,892), as reported by the census of 1916.

Government. The government consists of a lieutenant-governor, appointed by the Governor-General and council of Canada for a term of five years, and a legislature of one house of forty-nine members, elected for five



COAT OF ARMS OF MANITOBA

The buffalo, which formerly roamed the plains of Manitoba, is chosen as the provincial emblem. Above is the cross of St. George the symbol of British rule. When colored properly the cross is red, on a silver background.

years. Women may vote, and may be elected to the provincial parliament. The common law of England prevails in Manitoba. The courts consist of a supreme court, with one chief justice and four associates, and inferior courts, for each county. Local affairs are managed by counties and townships.

History. The first settlement in Manitoba was the Selkirk colony on the Red River, a

Items of Interest on Manitoba

Manitoba lies nearly midway between the Atlantic and the Pacific coasts.

The word Manitoba is a contraction of two Indian words, *Manito* (the Great Spirit) and *Waba* (the "narrows" of the lake); this strait in Lake Winnepeg was a sacred place to the Crees, who were impressed by the sound of the wind rushing through the narrows.

The surface is chiefly a prairie region, but the river banks are fringed with trees, sometimes forming forests of considerable size.

The Manitoba forest reserves have an area of 3,600 square miles.

Aspen, maple, oak, elm and willow are the important varieties of trees.

Manitoba was the first province to set aside two sections of land in each township for school purposes.

The Manitoba Agricultural College at Winnipeg was first opened in 1906; its new buildings are estimated to cost $1,000,000.

The provincial university stands at the head of the educational system.

The Dominion government maintains three fish hatcheries, two on Lake Winnipeg and one on Lake Winnipegosis; all three handle only whitefish.

There are fifty-two Indian schools, with a total attendance of 1,700 boys and girls.

The Indian population of the province is nearly 14,000.

Questions on Manitoba

What is the present area of Manitoba? When was the last change made in the provincial boundaries?

What is the origin of the word Manitoba?

What are the principal rivers?

Of what drainage system are they a part?

What is the highest point in the province?

What are the important native trees? Where are they found?

Name three of the principal mineral products.

MANITOBA

1

2

3

4

5

6

7

H. M. HAINES

1, Fish Hatchery.
2, Winnipeg Postoffice.
3, Wheat Field.
4, Interior of a Flour Mill.
5, Lumber Mill.
6, Windbreak of Trees.
7, Live Stock and Poultry.

little north of the present city of Winnipeg. The whole section was called until 1870 the Red River Settlement. Founded in 1812 by the Earl of Selkirk, the colony struggled on for a few years in the face of great opposition from the Northwest Fur Company. In 1821 this company was absorbed by the Hudson's Bay Company, and for nearly fifty years the Canadian Northwest remained in the hands of the fur-traders. The only inhabitants were the *métis,* or half-breeds, who trapped and hunted most of the time. When the Northwest was transferred to the Dominion Government in 1869, the *métis,* fearing that their privileges would be withdrawn, resisted the influx of English settlers and rose in rebellion. They organized a republic, with Louis Riel as President. On the arrival of Canadian troops, however, Riel and his followers immediately fled. Meanwhile the Canadian Parliament passed a law making Manitoba a province, and a permanent government was organized in 1870, under its present name, but with only about one-third its present area. At that time its population was only about 25,000.

In 1908 the provincial government acquired the telephones; two years later a workmen's compensation law was passed. Since 1916 no language other than English has been legally employed in the schools.

Related Articles. Consult the following titles for additional information:

CITIES

Brandon — Saint Boniface — Winnipeg

LAKES AND RIVERS

Assiniboine — Red River of the North
Churchill — Winnipeg
Manitoba — Winnipegosis
Nelson

HISTORY

Hudson's Bay Company — Riel, Louis

MANITO'BA LAKE, a lake of Canada, situated in the province of Manitoba, southwest of Lake Winnipeg, is about 135 miles in length, about twenty-five miles in breadth, and has an area of 1,817 square miles. It receives the water of several lakes at its northern extremity, and at its southern it receives those of White Mud River. It discharges into Lake Winnipeg through the Daphin River, and is forty feet higher than Lake Winnipeg. It is an attractive region for sportsmen, for fish and game abound.

MANITOU, *man i too',* Colo., a town of El Paso County, six miles northwest of Colorado Springs, at the base of Pike's Peak, 6,296 feet above the level of the sea. It is known widely as a health and pleasure resort, because of its mineral springs and its beautiful scenery. The place has many canyons and falls, and Monument Park and the Garden of the Gods are here. Population, in summer, over 5,000.

MANITOULIN, *man i too'lin,* **ISLANDS,** a group of islands in Lake Huron, divided between the Canadian province of Ontario and Chippewa County, Michigan. Georgian Bay is separated from the main body of the lake by these islands, and they are separated from the north shore of Lake Huron by the North Channel. The largest island, Great Manitoulin (or simply Manitoulin), belongs to Canada. It is ninety miles long and from five to thirty miles in width. Cockburn Island, or Little Manitoulin, a round island about seven miles in diameter, also belongs to Canada. The only important one belonging to Michigan is Drummond Island, twenty-four miles long. Population of the group, about 2,000, more than one-half of whom are Ojibway Indians.

MANITOWOC, *man i toh wahk',* Wis., the county seat of Manitowoc County, seventy-five miles north of Milwaukee, on Lake Michigan, at the mouth of the Manitowoc River, and on the Minneapolis, Saint Paul & Sault Ste. Marie and the Chicago & North Western railroads. It is connected by a boat line with the Pere Marquette and the Ann Arbor railroads, in Michigan. The town has considerable lake commerce, shipping large quantities of grain, flour, dairy products and leather. The industrial establishments include, also, cigar factories, aluminum-ware and canning factories, shipyards, planing mills, brickyards and machine shops. The city contains a county insane asylum, a training school for teachers and a Polish orphanage. It was chartered as a city in 1870. Population, 1910, 13,027; in 1917, 13,931 (Federal estimate).

MANKA'TO, Minn., the county seat of Blue Earth County, ninety miles southwest of Saint Paul, at the confluence of the Blue Earth and Minnesota rivers, and on the Chicago Great Western, the Chicago & North Western, the Chicago, Saint Paul, Minneapolis & Omaha and the Chicago, Milwaukee & Saint Paul railroads. It is situated in an agricultural region near valuable stone quarries. The principal manufactures are knit goods, cement, lime, candy, butter, lumber, flour, and foundry and machine shop prod-

ucts. A state normal school is located here, and the city has a Carnegie Library, two hospitals, a fine courthouse, good schools, a ladies' seminary (Lutheran) and a Catholic training school for teachers (nuns). The place was settled in 1852, was incorporated six years later, and was chartered as a city in 1868. The commission form of government was adopted in 1910. Population, 1910, 10,365; in 1917, practically unchanged.

MANN, DONALD, Sir (1853–), a Canadian railroad builder, was born at Acton, Quebec. He went to Winnipeg in 1879 and became a contractor for the Canadian Pacific Railway. The firm of Mackenzie, Mann & Co., was established in 1886 and has since taken a great part in the development of the west, especially through its construction of the Canadian Northern Railway, of which Sir Donald is vice-president. His work has chiefly consisted in directing construction, in which he has a unique reputation for speed, efficiency and economy. He was knighted in 1911. See MACKENZIE, WILLIAM.

MANN, HORACE (1798–1859), an American educator who helped to establish the present common school system in the United States. He was born at Franklin, Mass. During his boyhood and youth he worked on a farm and attended a country school. At the age of twenty he left the farm and began the study of Latin and Greek, after which he entered the Junior class of Brown University. After graduation he studied law and was admitted to the bar, but four years later he was elected to the lower house of the Massachusetts legislature, and was ultimately elected to the state senate. In 1837 Mann was appointed secretary of the Massachusetts board of education, a position which he held for twelve years. He devoted his entire time to revising and reorganizing the common school system of the state, publishing the *Common School Journal* and a series of annual reports, which exerted great influence in securing the changes that he desired. During his term of office he secured the establishment of the Massachusetts state normal school, the first in the United States, and completely reformed the public school system. His influence was felt in many other states. In 1848 Mann was elected to Congress to fill the vacancy caused by the death of John Quincy Adams, and there he vigorously opposed slavery. During the last seven years of his life he was president of Antioch College, Yellow Springs, O.

HORACE MANN

MAN'NA. When the Children of Israel were journeying in the desert, according to the account in *Exodus* XVI and *Numbers* XI, they were fed with a substance which fell from heaven, to which the name *manna* was given. It consisted of small, round, white flakes which had a sweet taste. Each person gathered in the morning enough to last him through the day and no longer, for if it was kept over from one day to the next, it spoiled. On the day before the Sabbath, however, a double portion fell, and on that day it could be kept. When the Israelites entered Canaan, the falling of the manna ceased.

MAN'NERING, MARY (1876–), whose real name is FLORENCE FRIEND, is an English actress who has been familiar to American theater-goers since 1900, when she appeared in Buffalo as the star in *Janice Meredith.* She was born in London, and first appeared professionally in 1892, in Manchester. In 1896 Daniel Froham induced her to go to America, and within a few years she was an established favorite of the American stage. Her family name was dropped when she began playing in America; Mary Mannering was the maiden name of her father's mother. Miss Mannering has beauty and charm, and is possessed of a very musical voice. The plays in which she appeared, besides *Janice Meredith,* include *White Roses, The Truants, A Man's World* and *The Garden of Allah.* In 1897 she married James K. Hackett; subsequently she was divorced from him and married Frederick E. Wadsworth.

MAN'NING, HENRY EDWARD (1807–1892), a Roman Catholic prelate, born at Totteridge in Hertfordshire and educated at Harrow and at Balliol College, Oxford, and made a Fellow of Merton. He was a leader of the Tractarian party, but in 1851 left the Church of England and joined the Roman Catholic Church. After being ordained priest, he studied several years in Rome, founded the congregation of the Oblates of Saint Charles Borromeo at Bayswater, London, was made archbishop of Westminster in 1865 and car-

dinal in 1875. Manning worked for the advancement of the Church of England, for the improvement of the people in temperance and education, and wrote many articles and pamphlets on the Vatican Council, infallibility and the temporal power of the Pope. See Oxford Movement.

MAN-OF-WAR, a term now nearly obsolete, but once current and referring to a war vessel. See Warship; Navy.

MANON, *ma mahN'*, Jeanne Philipon, Madame. See Roland de la Platiere, Marie.

MAN'SARD ROOF, a roof formed with a break in the slope, so that each side has two planes, the lower one approaching more nearly to the perpendicular than the upper. This kind of roof permits of an upper story in place of an ordinary attic. It received its name from François Mansart, a famous French architect, who first brought it into general use.

MANS'FIELD, Ohio, the county seat of Richland County, eighty miles southwest of Cleveland, on the Baltimore & Ohio, the Erie and the Pennsylvania railroads. The city is in an agricultural region, has a large trade and contains manufactures of thrashing machines, boilers, engines, pumps, automobile tires, watch cases, electrical appliances and other articles. The important buildings include a children's home, a Y. M. C. A. and a new bank building. The Ohio state reformatory is located here, and the city has a Carnegie Library, a Federal building, a Roman Catholic cathedral and a business college. It was settled in 1808 and was first incorporated in 1828. Population, 1910, 20,768; in 1917, 23,051 (Federal estimate).

MANS'FIELD, Richard (1857–1907), an American actor who for many years was considered a leader in his profession. He was especially effective in rôles requiring a sympathetic understanding of the spiritual nature of the characters portrayed, and no one surpassed him in the care and thought he gave to the details of character portrayal.

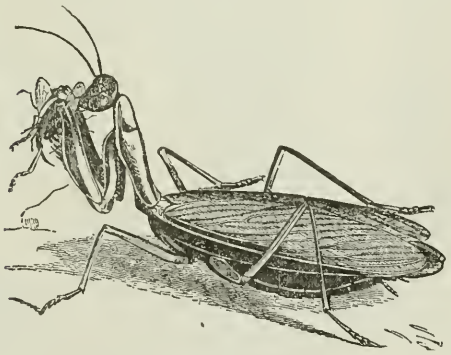
RICHARD MANSFIELD

Mansfield was born on the island of Helgoland. His father was a London merchant, and his mother was an opera singer. The boy began the study of painting in London, but lacked money to finish his course, and at the age of seventeen went to America. On a subsequent visit to England he joined a company of strolling actors who were giving Gilbert and Sullivan operas, and thus began a theatrical career. Returning to America, he won popular favor in a number of rôles, including the leading parts in *Dr. Jekyll and Mr. Hyde, Beau Brummell, Monsieur Beaucaire, Julius Caesar* (in which he acted Brutus), *Peer Gynt* and *The Scarlet Letter*. The latter he adapted himself from Hawthorne's novel.

MANSLAUHGTER, *man slaw'tur*. See Murder.

MANTELL', Robert Bruce (1854-), an actor and theatrical manager who has rendered valuable service to the American people by bringing before them the art of Shakespeare. Mantell and a gifted company traveled in the United States for several seasons, presenting *Hamlet, Othello, Julius Caesar, Richard III, Macbeth* and other great plays, and their performances were at all times dignified and instructive. Mantell is a native of Scotland. Since 1885 he has been a familiar figure to American theater patrons. He has also appeared in moving pictures.

MAN'TIS, a genus of insects, remarkable for their grotesque forms. They frequent



PRAYING MANTIS

trees and plants, and the forms and colors of their bodies and wings are so like the leaves and twigs as to be almost indistinguishable. One species, called *praying mantis*, has received its name because it holds its forelegs in the position of the hands of

a person at prayer. In its habits, the mantis is voracious, killing insects and cutting them to pieces. It is a native chiefly of tropical regions, but one species is found in the United States.

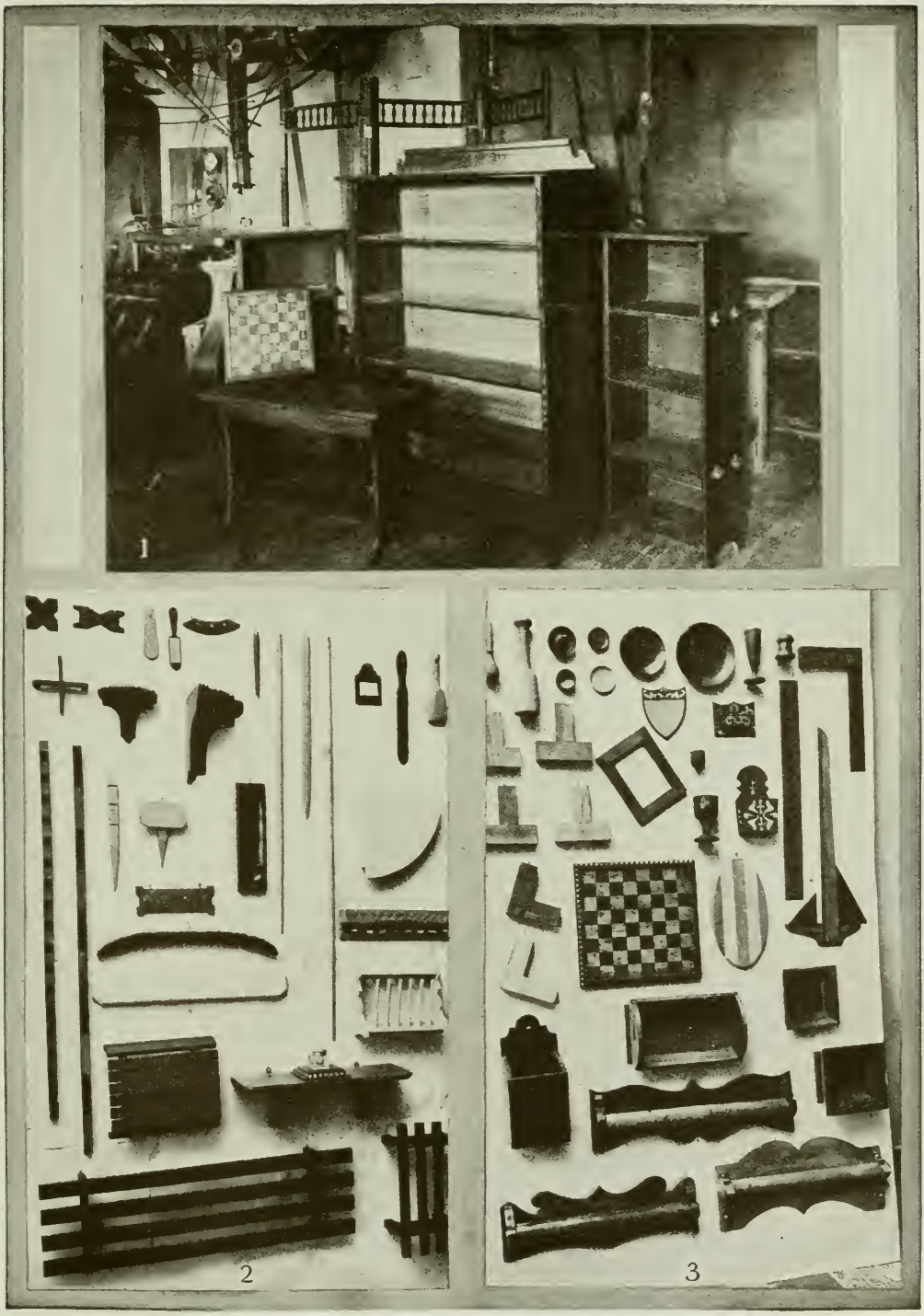
MAN'UAL TRAINING, a department of education that systematically teaches the theory and use of tools, the nature of common materials, and the elementary processes in the more common industrial arts, such as carpentering, wood carving, forging and machine-shop practice. In a broad sense manual training includes also such branches as cooking and sewing, which are especially suited to girls. The purposes of manual training are (1) to enable the child to enlarge his powers of expression, through the action of the hand, guided and controlled by the action of the mind; (2) to make him acquainted with the nature and use of the most common materials, such as clay, wood, iron and textiles; (3) to lead him to develop a certain degree of skill in the use of tools; (4) to develop his originality, and (5) to connect the work of the schools with the affairs of everyday life.

The weight of the best educational thought upon this subject is that manual training should commence at the beginning of the elementary school work and that it should be continued through the high school period; that the work should not be confined to a single material and the tools necessary in the treatment of that material, but that it should cover a wide range in the use of tools and materials. In the lower grades the construction work in drawing constitutes a natural basis and preparation for the more elaborate work of the sixth, seventh and eighth grades, which includes mechanical drawing, practical exercises in carpentry, and lessons in the use of woodworking tools. The accompanying table gives a suggested course for the three upper grades.

In the high schools there is a continuation of carpenter work, in addition to machine work, forging, etc. In many large cities there are technical high schools with well-equipped workshops and laboratories, where pupils perform the same sort of work that

Suggested Course in Manual Training for Grammar Grades

Grades.	Boys.					Girls.		
		Industrial arts.				Household arts.		
	Design.	Mechanical drawing.	Course A.	Course B.	Course C.	Design.	Course A	Course B.
Sixth	Largely articles to be made (a progressive course).	Largely working plans of articles to be made (a progressive course).	Carpentry	Printing	Bookbinding and printing each one-half year.	Related to household and home planning, furnishing, and decoration.	Sewing	Sewing, cookery, and general home management.
Seventh	Same, with new principles of design.	....do....	Elementary bench-work in wood.	Woodwork (carpentry or bench-work).	Woodwork (carpentry and bench work each one-half year).	....do....	....do....	Do.
Eighth	Same, with new principles of design.	....do....	Elementary metal work.	Metal work	Metal work and electricity each one-half year.	....do....	Cookery	Do.



WOOD WORK FROM MANUAL TRAINING SCHOOLS

1. Furniture. 2 and 3. Smaller articles showing handiwork of students

is done in industrial plants. In some instances employers permit young workers to spend part of the day in such schools, that they may receive technical training in preparation for the trade selected.

History in America. The first manual training school in the United States was opened in Saint Louis in 1880, under the direction of Doctor Calvin M. Woodward, as a department of Washington University. Such excellent results were obtained from this school that other large cities established similar schools, either as independent institutions or as departments in existing high schools.

The introduction of manual training into the elementary schools began in 1882, in the Dwight School of Boston. Progress, however, was slow. Many patrons were opposed to the work, because they believed that the time of a school should be devoted to the study of books; also, because of the extra expense for material and because teachers were not prepared to do the work. At first the work lacked system, and the results were very crude; but with the establishing of the Sloyd School of Boston, a way was prepared for the introduction of this system of construction work into the elementary schools. Wherever Sloyd was introduced and taught by competent teachers, the results were so satisfactory as highly to recommend it.

Modifications of the Sloyd system and other systems have followed; and now manual training constitutes a regular feature of the system of instruction in every large city and in more than three-fourths of the cities of 8,000 inhabitants in the United States, while a large number of cities below 8,000 population have introduced it, either in the elementary schools or in the high school. In 1903 a movement was begun by the National Education Association for the introduction of manual training and elementary agriculture into the rural schools and the schools of small towns and villages. A committee was appointed to investigate the feasibility of such a movement and to prepare plans for carrying it out, provided the work was found feasible. This committee made its report in 1905 and recommended the introduction of these lines of work into all rural high schools and into consolidated common schools in which there were several grades. The committee also recommended the establishment of secondary schools in rural communities, in which instruction in the elements of agriculture, manual training and domestic economy should be made leading features. The committee did not, however, see its way clear to recommend the general introduction of manual training into one-room schools, because of the lack of suitable apparatus, the crowded condition of programs in such schools and the inability of most teachers of rural schools to do the work.

Related Articles. Consult the following titles for additional information:
Domestic Science Nature Study
Drawing Sloyd

MANUEL II (1899–), the last king of Portugal, overthrown in the revolution in 1910 which made the country a republic. He reigned only two and a half years. During the revolution he escaped to England, where he has since resided, and where he married a princess of the House of Hohenzollern. In 1911 and 1912 attempts were made by royalists to establish him again on the throne, but they failed; a like attempt in 1919 was defeated. Manuel was born in Lisbon. His private life was not above criticism, either before or after he ascended the throne in 1908, upon the assassination of his father Carlos I.

MANURES′, *ma nurze*′, substances applied to the soil for the purpose of aiding in the production of crops. Manures are divided into natural manures and artificial manures, or commercial fertilizers. By natural manure is usually meant the excrements of farm animals, also called stable manures; but the term may also include green manures, which are growing crops plowed under for the purpose of adding to the organic matter of the soil. Plants obtain their food from the air and the soil, and the continued growing of crops tends to exhaust the substances in the soil which are the most important elements of plant food. These are nitrogen, potash and phosphoric acid. Manure is used to restore this loss. It does this directly and indirectly; directly, since it contains the substances needed and sets them free by decomposition; indirectly, since the manure by its decomposition causes such chemical changes in the soil as to liberate the plant-food already there, which the plant alone cannot obtain.

Stable manures are injured by exposure to air and rain and should be kept under cover. They are the most effective when rotted, unless the process is carried on in

the open air, when much of the value is lost; therefore, if manure cannot be kept under cover it should be spread upon the land before rotting begins. Manure usually gives the best results when spread evenly over the surface and plowed under or harrowed in. Stable manures are bulky and are at best three-fourths water. A ton of such manure contains less than forty pounds of plant-food; consequently, good fertilizing requires several tons to the acre. See FERTILIZERS; GUANO.

MAN'USCRIPTS, literary writings of any kind, whether on paper or any other material, as distinguished from printed matter. Although properly including all writings on hard substances, such as stone or baked clay, the term as generally used means only those writings which are on parchment or on paper. The paper of the ancient manuscript is sometimes Egyptian, prepared from the real papyrus shrub, sometimes cotton or silk paper, which was invented in the East early in the eighth century A. D. and continued in use until after the invention of linen paper. The most common ink is a black, made of lampblack or burned ivory or bone. Red ink of a dazzling beauty is also found in some ancient manuscripts. With this color were written the initial letters, the first lines and the titles, which were thence called *rubrics*. Blue, green and yellow inks were more rarely used. On rare occasions gold and silver were used, though from their cost they were oftenest confined to initial letters.

Illuminated Manuscripts. The art of illuminating manuscripts dates from the remotest antiquity. The Egyptian papyri were ornamented with vignettes or miniatures attached to the chapters, either designed in black outlines or painted in primary colors. It is supposed that the Egyptians used gold and silver for decorating their manuscripts, but no trace of such work has been found. The oldest ornamented Greek and Roman manuscripts that have survived are the Dioscorides of Vienna and the Vergil of the Vatican, both of the fourth century. From the eighth to the eleventh century, initial letters were composed of figures of men, quadrupeds, fishes and birds, while the initials of the twelfth century were made up of masses of conventional foliage, interspersed with the animal figures of the preceding centuries. Continuous borders, with vignettes and tailpieces, were also prevalent in later times, and some manuscripts are ornamented with very artistic designs. From the sixth century to the sixteenth, the art of illuminating manuscripts was much practiced in Europe, and the ornamentation was often very complex and very brilliant. With the invention of printing the art became practically extinct.

MAN WITHOUT A COUNTRY, THE, a story written by Edward Everett Hale, which, though not narrating an actual occurence, is so convincing in its realism that it has the effect of real history. It has done much to stimulate patriotism and respect for the flag in young Americans. The story, in brief, is as follows:

Philip Nolan, a lieutenant of the United States army, was implicated in the Aaron Burr conspiracy. During his trial he was asked if he wished to say anything to show his loyalty to the United States. In a moment of nervous irritation he cried out, "Damn the United States! I wish I may never hear of the United States again!" As a result of this outburst he was sentenced to spend the rest of his life at sea, where he was never permitted to hear the name of his country or any news of it. He lived to be an old man, but not until he was on his death-bed did he learn of the marvelous growth of his country and the great events that had happened during his exile. In a pathetic dying statement he gave utterance to his love for country and flag, and asked that a stone bearing the following inscription be set up:

> In Memory of
> Philip Nolan,
> Lieutenant of the Army of the United States. He loved his country as no other man has loved her; but no man deserved less at her hands.

In 1918 this story was effectively presented in moving pictures. It was first published in the *Atlantic Monthly* in 1863.

MANX, the name of the native inhabitants of the Isle of Man (see MAN, ISLE OF). They are a branch of the Celtic race, and their language is closely related to Scottish Gaelic and to Irish. Manx is spoken chiefly in the northwestern parishes of the island and along the west coast, and is taught in the parish schools, together with English. Hall Caine, a novelist whose ancestors came from the Isle of Man, has given some inter-

esting pictures of Manx life and character in *The Manxman, The Christian* and other books.

MANZANILLO, *mahn sa nee'lyo,* CUBA, a seaport on the southern coast of the island, in the province of Oriente. It has a good harbor, and its coastwise traffic is extensive. The region about it is low and unhealthful. Sugar, tobacco and lumber are the chief exports. Population, 1916, 62,485, including suburbs.

MAORIS, *mah'o reez,* the native inhabitants of New Zealand. They belong to the Polynesian branch of the Malay race and are characterized by their stature, which is above the average, and by their excellent physical development. Tattooing is common among them, and they are also noted for their ornamental and decorative art. Formerly they were among the fiercest cannibals of the South Pacific, but after they were conquered by the British they rapidly adapted themselves to the customs of civilization and are now an intelligent and industrious people.

MAP, a drawing, picture or diagram of a portion of the earth's surface or of a part of the heavens, presented in one or more colors. It is always drawn to scale; that is, an inch or fraction of an inch on the drawing represents a stated number of miles, meters or kilometers of surface of the thing pictured. Such a scale is only approximately correct, however, if the parallels are shown at right angles, for such a map does not take into account the curvature of the earth (see *Mercator's Projection,* below).

Kinds of Maps. Besides the familiar political and relief maps there are many kinds, technical in detail, of which the average person seldom hears. Among these are navigators' maps, called charts, maps of the ocean bed, and the like.

A Political Map. A map showing the divisions of a country into states or provinces, or one showing counties comprised within a state, together with the locations of cities and towns, railroad routes and electric lines is called a political map, because it represents political, or man-made, divisions.

A Relief Map. If a map gives no consideration to political boundaries, to cities or to other conditions set up by man, but pictures physical aspects, such as mountains, valleys, rivers, plains, plateaus, etc., showing graphically proportionate elevations, it is known as a relief map.

A Historical Map. Some maps are intended to picture political changes in a series of historical events, in regular sequence; these are known as historical maps. An example is a series of diagrams showing the development of the forty-eight states of the American Union from a fringe of thirteen colonies along the Atlantic seaboard, or a series showing the growth of France from its beginning to the present-day, or maps showing the spread of state prohibition.

Mercator's Projection. Gerard Mercator (1512–1594) was a Flemish geographer who constructed globes showing the heavens and the earth. It was he who first made maps with all parallels of latitude and longitude at right angles. This style was known as *Mercator's projection.* Such a map does not show serious distortion when representing small areas or countries near the equator, but in maps of large areas far from the equator a lack of proportion is inevitable—the drawing shows a continued widening of lands, contrary to fact.

MA'PLE, a family of trees peculiar to the northern and temperate parts of the globe. About 100 species are known, distributed through Europe, North America and different parts of Asia. The maples are characterized by their opposite branches, palm-shaped leaves, with from three to seven lobes, by their full, symmetrical tops, when growing in the open country, by their gray bark and by their hard, fine-grained wood, which is white, or in the older trees, slightly rose-tinted. The *sugar,* or *rock,* maple is the most important species; this yields maple sugar, an important product of Vermont, Northern New York and some parts of Canada. Its leaf is the emblem of Canada. The knotted parts of the sugar-maple furnish the pretty *bird's eye* and *curled maple* of cabinet-makers (see below).

Some other American species are the *white maple;* the *red,* or *swamp, maple;* the *striped maple,* or *moosewood;* the *mountain maple,* the *vine maple* and the *large-leaved maple.* Two species are common in Great Britain, the *great maple,* often miscalled sycamore, and the *common maple.* The wood of the former is valuable for various purposes, as for carving, turnery, musical instruments and wooden dishes. Another well-known species is the *Norway maple,* often planted in Great Britain as an ornamental tree.

Bird's-eye Maple, a peculiar formation of sugar maple caused by a defect in the growth of the wood. The defect is the result of injury to the bark. A piece of bird's eye maple shows a number of small, round spots not unlike bird's eyes, and when polished it is very attractive. Curled maple, another variation from the ordinary wood, has wavy ripples instead of a straight grain. Both forms are used in making high-grade furniture.

MARABOU STORK. See STORK.

MARACAIBO, *mah rah ki'bo,* a seaport of Venezuela, on the west shore of the strait which unites the lake and gulf of the same name. It is important, for it is the only port of entry for Western Venezuela and Eastern Colombia. There is a good trade in coffee, cacao, timber, hides and medicinal plants. The climate, though hot, is healthful. Population, 1915, 48,500.

MARACAIBO, LAKE, a lake of Venezuela, eighty miles wide in its greatest extent, connected with the Gulf of Venezuela by a channel nine miles wide. The lake is 500 feet deep in places, but it cannot be entered by large vessels on account of a bar at its entrance.

MARAJO, *mah ra zho'* or **JOANNES,** a large island of Brazil, at the mouth of the Amazon, between the estuaries of the Amazon and Para rivers, belonging to the province of Para. Its length is about 180 miles, its width, 150 miles, but the population is scanty and consists largely in transient dwellers, who come to the island to hunt or to gather rubber. During the rainy season it is mostly a vast marsh. (See illustration, in article AMAZON.)

MARAT, *ma rah',* JEAN PAUL (1744–1793), one of the most famous leaders of the French Revolution, whose career was ended by the act of a courageous young woman. On the outbreak of the Revolution Marat became the editor of the *L'Ami du Peuple,* or *Journal de la République Française.* This was the organ of the radicals and it soon become the oracle of the mob. It early advocated the most extreme measures, and the tone became more furious as Marat was inflamed by the prosecutions of the authorities. In 1792 he took his seat at the Commune and played a leading part in the assassinations of September, 1792. He was a member of the Committee of Public Safety and of the Convention and as president of the Jacobin club, he signed an address instigating the people to an insurrection and to the massacre of all traitors. For this Marat was delivered over to the revolutionary tribunal, which acquitted him; and the people received him in triumph and covered him with wreaths. He was assassinated shortly after by Charlotte Corday (see FRENCH REVOLUTION; CORDAY D' ARMONT).

MAR'ATHON, a village of ancient Greece, in Attica, about twenty miles northeast of Athens. It was situated on a plain which extends for about six miles along the seashore. On this plain Miltiades, the Athenian general, defeated Darius with his Persian forces in 490 B. C. The battle has been called one of the "fifteen decisive battles of the world" (see FIFTEEN DECISIVE BATTLES).

Marathon Race. After the battle was won Miltiades selected a swift runner named Pheidippides, bidding him bear the joyful news to the people at Athens. The runner obeyed, reaching the city in exhaustion, and as soon as he had told the news, dropped dead. In commemoration of this event the long foot race in the Olympian games was called the Marathon Race. See OLYMPIAN GAMES.

MAR'BLE, the most beautiful and the most expensive stone for building purposes and the one invariably used for fine sculptures, is limestone which has undergone purification and crystallization by the intense internal heat of the earth. It is harder and more finely grained than limestone, and will receive a high polish. The crystals are infinitely small, but they may be seen through a magnifying glass.

Pure marble is perfectly white, but there are many varieties and colors, owing to the different impurities in the rock. This, however, is an advantage, since the different varieties are suited to many different purposes. Some varieties are also harder and stronger than others, and some will withstand the water better than others. All these varieties are grouped under five classes: (1) pure or single-colored marbles; (2) variegated; (3) brecciated, that is, made of other rocks cemented by limestone; (4) fossiliferous, made wholly or in part of fossils; (5) statuary, which is perfectly white.

Where Found. Marble is found in a number of localities, but the quarries most widely known are those in Italy, on some islands of the Mediterranean Sea and in the United States. Of the foreign quarries those at

Carrara, Italy, yielding the celebrated Carrara Marble, are at present the most widely known. The Carrara quarries are still productive, after having been worked for about two thousand years. In the United States the most extensive quarries are found in Rutland County, in the southwestern part of Vermont. Other important quarries occur in Georgia and in Tennessee, and valuable quarries have been opened in Alaska. There are also quarries of considerable value in California, Colorado and Arizona.

In the American quarries and marble works most of the work is done by machinery, and there is very little waste, but in the foreign countries the old methods of blasting the rock and cutting by hand are still in vogue. This involves much waste and requires a long time for cutting the stone from its bed. Marble is extensively used for headstones, monuments and for finishing the interiors of buildings. It is very durable when shielded from the weather.

Related Articles. Consult the following titles for additional information:

Building Stone
Carrara Marble
Fossil
Sculpture

MARBLES, like tops and balls, are playthings that never lose their popularity. The variety of games played with marbles is almost endless, and every locality has its own favorite games. The snow is no sooner off the ground in towns and villages than every boy brings out his marbles and plays vigorously with them for a few weeks, when they disappear suddenly and completely for another year, usually giving way to more exciting sports.

Coburg, in Saxony, where hard limestone is found, is a center of manufacture for common marbles. This stone is broken into small cubes, and several hundred of these cubes are placed in grooves cut around a stationary millstone. Revolving on this millstone is a block of oak, which smooths the cubes into rough spheres while water runs over them. Later the marbles are polished in revolving barrels, lined with stone. Three mills, it is said, will manufacture 60,000 marbles in a week. Agate marbles are made at Oberstein by pressing the hot glass into metal molds. The bull's-eye and striped marbles are molded in clay, then baked, painted and glazed. Natural onyx marbles are manufactured on a large scale in Akron, Ohio.

MARCH, in the modern calendar the third month of the year, named in honor of Mars, the Roman god of war. In the old Roman calendar March was the first month, and in England, until 1752, New Year's Day was the twenty-fifth of March. Now, as in ancient times, March has thirty-one days. The first day of spring comes technically on the twenty-first of this month, and it is the month that brings back the robin to northern climes. It very often happens, however, that severe cold and deep snows continue to the end of the month, and it has the reputation of being windy and blustering. As early spring is a most uncertain season, mild, balmy days and blizzards are likely to occur in close proximity in this month. March 4 is inauguration day of the President in the United States every four years, and the uncertainty of the weather at that time has prompted a movement to have the date of the ceremony changed.

The special flower of March is the violet, and its gem is the bloodstone, or heliotrope.

Anniversaries for Celebration. The following birthdays of notable people fall in March:

William Dean Howells, March 1, 1837.
Augustus Saint Gaudens, March 1, 1848.
Pope Leo XIII, March 2, 1810.
Alexander Graham Bell, March 3, 1847.
James Lane Allen, March 3, 1848.
Elizabeth Barrett Browning, March 5, 1806.
Michelangelo, March 6, 1475.
Philip H. Sheridan, March 6, 1831.
Luther Burbanks, March 7, 1849.
Americus Vespucius, March 9, 1451.
Dudley Buck, March 10, 1839.
William Lyon Mackenzie, March 12, 1795.
Andrew Jackson, March 15, 1767.
James Madison, March 16, 1751.
John C. Calhoun, March 18, 1782.
Grover Cleveland, March 18, 1837.
David Livingstone, March 19, 1813.
William Jennings Bryan, March 19, 1860.
Charles W. Eliot, March 20, 1834.
Johann S. Bach, March 21, 1865.
Rosa Bonheur, March 22, 1822.
Raphael, March 28, 1483.
John Tyler, March 29, 1790.
John Fiske, March 30, 1842.
Franz Joseph Haydn, March 31, 1732.

The following important events occurred in March:

Ratification of Jay Treaty, March 1, 1796.
Nebraska admitted to the Union, March 1, 1867.
Passage of Missouri Compromise, March 2, 1820.
Florida became a state, March 3, 1845.
William Penn given grant of Pennsylvania, March 4, 1681.
Vermont became a state, March 4, 1791.
Massacre at the Alamo, March 6, 1836.

Founding of Providence, R. I., March 7, 1638.
Amundsen's announcement of his discovery of the South Pole, March 7, 1912.
Battle between the Monitor and the Merrimac, March 9, 1862.
Grant appointed commander in chief, March 12, 1864.
Whitney's cotton gin patented, March 14, 1794.
Maine became a state, March 15, 1820.
Nicholas II of Russia abdicated, March 15, 1917.
Founding of West Point Military Academy, March 16, 1802.
Death of Robert F. Scott and his party on their return from the South Pole, March 21, 1912.
Patrick Henry's "Liberty or Death" oration delivered, March 23, 1775.
Abolition of slave trade in British dominions, March 25, 1807.
British North America Act passed by Parliament, March 29, 1867.
Marshal Foch became supreme head of the allied forces, March 29, 1918.
First meeting of Congress under new Constitution, March 30, 1789.

MARCO'NI, GUGLIELMO (1874–), a celebrated Italian electrician, to whom is due chief credit for the invention of wireless telegraphy. He was born near Bologna, Italy, and educated at the University of Bologna. Marconi showed remarkable aptitude for electrical science at an early age. After many experiments he was successful in perfecting instruments which made wireless telegraphy practicable, his first wireless telegraph station being established near Cornwall, England. He demonstrated the success of his invention by sending signals across the Atlantic for the first time in 1902. In 1904 the Marconi Company installed a daily news service by wireless telegraphy on the trans-Atlantic liners, and three years later established a public wireless service between England and North America. The Marconi system is now in general use throughout the world. Marconi has continued his experiments and has perfected a wireless telephone. His inventions and discoveries won for him the Nobel prize in physics for 1909. In 1915 he took charge of the wireless telegraph service of the Italian government, and in 1917 visited the United States on war business.

MARCONI

MARCO POLO. See POLO, MARCO.

MARCUS AURELIUS. See AURELIUS, MARCUS.

MARCY, *mahr'sy,* WILLIAM LEARNED (1786-1857), an American statesman, was born at Southbridge, Mass. He began the practice of law at Troy, N. Y., but enlisted in the War of 1812, becoming captain in the army but retiring from the service before the close of the war. In 1831 he was chosen United States Senator, and in the following year he became governor, which office he held for three terms. During his brief service in the Senate, he was a staunch follower of Andrew Jackson, and was the first to declare the propriety of the rule that "to the victors belong the spoils of the vanquished." He became Secretary of War in 1845 and under Pierce was Secretary of State.

MARDI GRAS, *mahr'de grah',* or SHROVE TUESDAY, in Catholic countries of Europe a celebration on the last day of revelry before the advent of Lent. The term is from the French, and means *fat Tuesday,* referring to the old French custom of parading a fat ox through the streets during the festivities. The day following is Ash Wednesday.

Only in New Orleans in the United States is the celebration of Mardi Gras famous, although a few other cities celebrate the day. The first New Orleans Mardi Gras day was in 1857, and not a year was thereafter missed until 1917. No celebration was held that year, nor in the two succeeding years because of the World War. In New Orleans on the occasion of the Mardi Gras at the height of the celebration there is a parade in which are seen gorgeous floats and thousands of people in costumes of every conceivable design. The streets are decorated with banners and streamers, and especial illumination is provided. The event attracts thousands of visitors from great distances. See SHROVE TUESDAY; ASH WEDNESDAY.

MARE ISLAND, an island in San Pablo Bay, near San Francisco, of importance because it is the site of the chief United States naval station on the Pacific. It has a large navy yard, an arsenal, a dry dock, an observatory and a large plant for building war vessels.

MAREN'GO, BATTLE OF, a famous battle fought near Alessandria, Italy, June 14, 1800, between the French, under Napoleon, and the Austrians under General Melas. The Austrians were completely defeated and were

obliged to surrender Genoa, Piedmont and Milan. Napoleon's supremacy was firmly established by this victory.

MARIA CHRISTINA, *ma re'a kris te'nah* (1806-1878), a queen of Spain, daughter of Francis I of the Two Sicilies. She was the fourth wife of Ferdinand VII of Spain and bore to him in 1830 a daughter, Isabella, who, in virtue of a proclamation issued before her birth, became heir to the kingdom. Isabella was destined to be the grandmother of Alfonso XIII, the reigning king of Spain. When Ferdinand died, Maria Christina was made her guardian, but when civil war broke out on account of the pretensions of Ferdinand's brother, Don Carlos, to the throne, Maria Christina took little interest in the affair. Her entire attention seemed to center in one of her royal bodyguard, whom in 1833 she married. She became exceedingly unpopular, and in 1840 she was obliged to escape to France. In 1843 she returned to Spain, but eleven years later she was driven from the country. In 1864 she again returned, but was again driven into exile.

MARIA LOUISA, *loo ee'zah*, (1791-1847), second wife of Napoleon I, daughter of Francis I of Austria. Her marriage with Napoleon took place in 1810, after the divorce of Josephine, and in 1811 she bore him a son, who was later named king of Rome. After his overthrow, she received in 1816 the duchies of Parma, Piacenza and Guastalla, which she governed till her death.

MARIANA ISLANDS. See LADRONE ISLANDS.

MARIA THERESA, *te re'sah*, (1717–1780), a queen of Hungary and Bohemia, archduchess of Austria and wife of the Emperor Francis I. On the death of her father, Charles VI, in 1740, she ascended the throne of Hungary, Bohemia and Austria, and a little later she declared her husband joint ruler. Her accession was in accordance with the Pragmatic Sanction, to which her father had secured the consent of the powers of Europe, but her claims were at once contested. Frederick the Great made himself master of Silesia; Spain and Naples gained possession of the Austrian territory in Italy, and the French, Bavarians and Saxons marched into Bohemia, carrying all before them. Charles Albert was proclaimed archduke of Austria and shortly after emperor of Germany; the young queen fled to Pressburg, where she convoked the diet and threw herself upon the sympathy of her Hungarian subjects. The French and Bavarians were speedily driven from her hereditary states; Prussia made a secret peace with the queen, who unwillingly abandoned Silesia to Frederick, and by the treaty of Aix-la-Chapelle (1748) her husband was declared emperor.

During the time of peace which followed, Maria Theresa, with the aid of her husband and her minister Kaunitz, made great financial reforms; agriculture, manufactures and commerce flourished, the national revenue greatly increased and the burdens were diminished. The Seven Years' War again reduced Austria to a state of great exhaustion, but on its conclusion the empress renewed her efforts to promote the prosperity of her dominions. Her son Joseph was elected king of the Romans in 1764, and on the death of her husband, in 1765, she associated the young prince with herself in the government. In 1772 she joined in the dismemberment of Poland, obtaining Galicia for Austria, and in 1777 she acquired Bukowina from Turkey. Of her sixteen children ten survived her, one of whom was the unfortunate Marie Antoinette.

Related Articles. Consult the following titles for additional information:

Aix-la-Chapelle, Treaties of	Pragmatic Sanction
Charles VI	Seven Years' War
	Succession Wars

MARIE ANTOINETTE, *ma ree' ahN twan net'*, (1755–1793), a beautiful queen who was one of the most unfortunate of the victims of the French Revolution. She was the youngest daughter of the Emperor Francis I and Maria Theresa of Austria, and was married at the age of fifteen to the Dauphin, afterward Louis XVI. Her manners were ill-suited to the French court, and she made many enemies by her contempt for its ceremonies. The freedom of her manners was frequently the occasion of scandal, for her youthful spirits and her impatience with court etiquette led her into many indiscretions.

MARIE ANTOINETTE

Without doubt, she had great influence over the king, and she constantly opposed all measures of reform. The enthusiastic recep-

tion given her at the guard's ball at Versailles on October 1, 1789, raised the general indignation to the highest pitch, and was followed in a few days by the insurrection of women and the attack on Versailles. When the royal family were practically prisoners in the Tuileries it was she who advised their flight, in June, 1791, an episode which ended in their capture and return.

On August 10, 1792, she heard her husband's deposition pronounced by the Legislative Assembly and accompanied him to the prison in the Temple, where she displayed the magnanimity of a heroine and the patient endurance of a martyr. In January, 1793, she parted from her husband, who had been condemned by the Convention; in August she was removed to the Conciergerie, and in October she was charged before the revolutionary tribunal with having dissipated the finances, exhausted the treasury, corresponded with the foreign enemies of France and favored the domestic foes of the country. She defended herself with firmness, decision and indignation; and she heard the sentence of death pronounced with perfect calmness—a calmness which did not forsake her when the sentence was carried out the following morning. There has been endless controversy as to the character of Marie Antoinette, and it seems certain that the bitter statements of her detractors are no more to be received absolutely than are the eulogies of those who regard her as a martyr and saint.

MARIET'TA, Ohio, the county seat of Washington County, 125 miles southeast of Columbus, on the Ohio River, at the mouth of the Muskingum, and on the Baltimore & Ohio, the Marietta, Columbus & Cleveland and the Pennsylvania railroads. It is the oldest settlement in Ohio, founded by a colony from New England under the Ohio Company in 1788. In the same year the government of the Northwest Territory was formally organized here. The city is the seat of Marietta College; there are two hospitals, a Carnegie Library and, also, the oldest church and the oldest building in the Northwest Territory. Petroleum, coal and iron are found in the vicinity, and there is a large river trade. The manufactures include flour, oil machinery, paints, lumber products, furniture, wagons, harness, glass and other articles. Twelve miles below the city is Blennerhassett Island, the scene of incidents connected with the conspiracy of Aaron Burr (see Burr, Aaron). Population, 1910, 12,923; in 1917, 14,785 (Federal estimate), including people in territory annexed in 1912.

MAR'IGOLD, a name of several plants belonging to the composite family. The common marigold is a native of France and of the more southern parts of Europe. It is

MARIGOLDS

an annual, from one to two feet high, bearing large, deep yellow flowers. It is as prolific as any weed and was formerly used in cookery and as a medicine. The so-called African marigold and French marigold, common in flower borders, are both Mexican species and have brilliant flowers.

The name *marigold* is applied wrongfully to several plants. The English marigold is really a chrysanthemum, and the American marsh marigold belongs to the buttercup family.

MARINE CORPS, a body comprising the enlisted fighting men of a navy, particularly of the United States navy. Originally they were not regarded either as sailors or soldiers, and their status was in question, but within a score of years a romance has enveloped them as real "soldiers of the sea." They are as truly soldiers as any body of infantrymen.

The marines on a war vessel man the guns and the fighting positions, but not all their work is on shipboard. Indeed, their duties are more often ashore. It is said that the marines are "the first to fight," and this is true. In any remote United States possession if trouble breaks out a United States war vessel sends marines ashore to restore order. They are in the midst of events long before soldiers arrive, if, perchance, the latter are needed at all. They garrison outlying posts and serve there as naval police. This is true not only in far-away places under the American flag, but in other lands, as well. Frequently insurrections in Central American states become serious, and the authorities call for the help of American war vessels. Marines are landed, and they remain as long as they are needed. In other countries, if American interests are jeopardized or American lives are in danger, marines may be sent to protect their countrymen.

In the World War the American marines won glory which will live in history. Eight thousand of them faced the famous Prussian Guards in 1918 in Belleau Wood, in Northeastern France. They defeated the finest troops of Germany, but paid a price of 6,000 killed or wounded. Grateful France the next day renamed the spot the "Wood of the American Marines."

Candidates for admission to the marine corps must be between the ages of eighteen and thirty-five. In peace times, at least, the position of a marine may be considered enviable. He is well cared for and well clothed; he has advantages of education on shipboard, and is quite likely during his period of service to see a great deal of the world. He receives from $30 to $69 per month (with no expenses), with twenty per cent additional when serving aboard ship or in a foreign country. Through examination a private in the corps may advance to officer's rank.

MARINETTE', Wis., the county seat of Marinette County, on Green Bay, at the mouth of the Menominee River, opposite Menominee, Mich., fifty miles north of the city of Green Bay, on the Wisconsin & Michigan, the Chicago, Milwaukee & Saint Paul and the Chicago & North Western railroads. The city has a fine harbor and a large lake trade, especially in lumber. It contains large box factories, and manufactories of various other wood products, a piano factory, knitting mills, and has machine shops and foundries. The chief structures are the city and county buildings, a Federal building, two hospitals and a public library. Marinette was settled in 1857, and was incorporated in 1887. Population, 1910, 14,610; in 1917, practically unchanged.

MA'RION, Francis (1732–1795), an American Revolutionary commander, whom a British officer called the "old swamp fox." He entered the service as a captain, but was rapidly promoted until he became brigadier-general. In 1775 he served in a regiment organized by Colonel William Moultrie in his native state of South Carolina, and he accompanied Moultrie on his occupation of Fort Sullivan. Later he commanded Fort Moultrie, took part in the attack on Savannah and then retired to South Carolina. With a cavalry force which he himself had organized in South Carolina, he kept up a guerrilla warfare on the British, and in August, 1780, he won a brilliant victory at Nelson's Ferry. At the Battle of Eutaw Springs he distinguished himself by his daring. After the close of the war he was for some time a member of the South Carolina senate.

MARION, Ind., the county seat of Grant County, sixty-five miles northeast of Indianapolis, on the Mississinewa River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Toledo, Saint Louis & Western and Chesapeake & Ohio railroads. There are also electric lines to Indianapolis and other cities. A national soldiers' home is three miles to the south, and the city contains a Carnegie Library, a fine courthouse and a normal school. The principal industrial establishments include shoe, motor and paper factories and iron and glass companies, foundries and brickyards. The city has a Federal building, a Masonic Temple and two parks. Population, 1910, 19,359; in 1917, 19,923 (Federal estimate).

MARION, Ohio, the county seat of Marion County, forty-five miles north of Columbus, on the Cleveland, Cincinnati, Chicago & Saint Louis, the Erie, the Pennsylvania and the Hocking Valley railroads. The city is in a farming region, has lime kilns and quarries and contains manufactories of steam shovels, engines, thrashers, carriages, foundry products, agricultural implements, silks and other articles. It has a Carnegie Library, Sawyer Sanitarium, a Y. M. C. A. and a Federal building. There are three parks and three

hospitals. The place was settled chiefly by people from Rhode Island in 1815, and was chartered as a city in 1890. Population, 1910, 18,232; in 1917, 24,129 (Federal estimate).

MA'RIUS, Caius (about 156-86 B. C.), a famous Roman general, born of obscure parents. He served with distinction at Numantia in 134 B. C., under Scipio Africanus, was tribune of the people in 119 and acquired much popularity by his opposition to the nobles. In 109 he accompanied the Consul Q. Caecilius Metellus, as his lieutenant, to the Jugurthine War, and later he himself was placed in command of the war, which he brought to a successful conclusion. He had been elected consul in 107, and his successes against the barbarians who threatened Rome made him so popular that he was six times reëlected to that office. On the outbreak of the war against Mithridates, Marius, who had long been jealous of Sulla, endeavored to deprive him of his command, and in the struggle which followed the former was compelled to flee from Italy. After hairbreadth escapes he landed in Africa and remained there until recalled by Cinna, who had headed a successful movement in his favor. In company with Cinna he marched against Rome, which was obliged to yield, and later Cinna declared himself and Marius consuls, but the latter died seventeen days later.

Related Articles. Consult the following titles for additional information:

Cinna, Lucius C. Mithridates
Jugurtha Sulla, Lucius C.

MAR'JORAM, a shrub which grows in limy soils of Great Britain, now naturalized in parts of the United States and Canada. The leaves are small and pointed; the flowers are reddish and grow in clustered spikes. Sweet marjoram is a biennial, cultivated in gardens. As soon as it blossoms it is cut and dried and is employed as a seasoning.

MARK, a term originally used in Europe, especially Germany and Spain, to designate eight ounces of silver or gold. It is now used commonly as a money of account and after 1873 was the official monetary unit of the German empire. It weighs .3982 grams, $\frac{9}{10}$ pure gold, and it is worth 24.8 cents in United States money. It is equivalent to $\frac{1}{3}$ of a *thaler* or *100 pfennige*. Coins in multiples of the unit and of these divisions are issued, also crowns (*10 marks*) and double crowns (*20 marks*). With German reverses in the World War, especially the blockade which shut the empire from the sea, the mark fell about 40 per cent in exchange value.

MARK, Saint, the Evangelist, according to the old ecclesiastical writers, the person known in the *Acts of the Apostles* as "John, whose surname was Mark" *Acts XII*, 12, 25). He was for many years the companion of Paul and Peter on their journeys. His mother, Mary, was generally in the train of Jesus, and Mark was himself present at a part of the events which he relates in his Gospel. Some of his information he received from eye-witnesses. He was the cousin of Barnabas (*Col.* IV, 10), and he accompanied Paul and Barnabas to Antioch, Cyprus and Perga in Pamphylia. He returned to Jerusalem, whence he afterward went to Cyprus, and thence to Rome. He was the cause of the memorable "sharp contention" between Paul and Barnabas.

MARK AN'TONY. See Antony, Mark.

MARK'HAM, Edwin (1852-), an American poet and educator, born in Oregon City, Ore. He spent his boyhood on a cattle ranch in California, in 1871 entered the San José state normal, and later was graduated from the Christian College, Santa Rosa. He became a prominent California educator and rendered valuable service as head master of the Tompkins Observation School at Oakland. From an early age he contributed poems to magazines, but came into prominence at the publication of *The Man with the Hoe* in 1899. Later productions were *Lincoln, and Other Poems; The Poetry of Jesus; The Shoes of Happiness, and Other Poems,* and *The Hoe-Man in the Making.*

MARK TWAIN. See Clemens, Samuel Langhorne.

MARL, an earthy substance used as a fertilizer, composed of carbonate of lime and clay in various proportions. In some marls the proportion of clay is comparatively small, while in others it abounds and furnishes the chief qualities. The fertility of any soil depends, in a great degree on the suitable proportion of the earths which it contains; and whether a lime or a clay marl will be more suitable to a given soil may be determined with much probability by its tenacity or looseness, moisture or dryness. The quicker action and greater efficiency of slaked lime have in many districts led to its substitution for marl. See Fertilizers; Soil.

MARLBOROUGH, John Churchill, First Duke of (1650-1722), an English gen-

eral, celebrated for his victories in the War of the Spanish Succession. He strengthened his influence at court by his marriage with Sarah Jennings, an attendant upon the princess, afterward Queen Anne. When William III came to the throne of England, Churchill went over to his side, and when the War of the Spanish Succession broke out, Churchill was made by William commander in chief of the English forces in Holland. Anne came to the throne in 1702, and influenced by Mrs. Churchill, gave the general full authority.

In the campaign of 1702 he drove the French out of Spanish Guelders and took Liége and other towns, for which he was created Duke of Marlborough. In 1704 he stormed the French and Bavarian lines at Donauwörth, and in the same year, in conjunction with Prince Eugene, he gained the victory of Blenheim over the French and Bavarians. The years that followed were marked by the brilliant victories at Ramillies, Oudenarde and Malplaquet. On Marlborough's return to England he found that his wife had quarreled with the queen, but subsequently George I reinstated him in the supreme military command. Throughout the rest of his life, however, he lived in retirement. See SUCCESSION WARS.

MARLOWE, *mahr'lo,* CHRISTOPHER (1564-1593), an English dramatist. He settled in London and became an actor, as well as a writer for the stage. His death occurred in a drunken brawl. Besides six tragedies of his own composition, the best known of which are *Tamburlaine the Great, Edward II, Doctor Faustus* and the *Jew of Malta,* he wrote parts of dramas, collaborating with Nash and perhaps with Shakespeare. Marlowe was accounted the greatest dramatic writer before Shakespeare.

MARLOWE, JULIA (1870–), an American actress, one of the foremost Shakespearean artists of her time. She was born in Cumberlandshire, England, but when she was five years of age her parents removed to the United States, where she afterward resided. She was educated in the public schools and began her career on the stage in her twelfth year, when she joined a juvenile opera company and took part in *Pinafore, The Chimes of Normandy* and other light operas. SARAH FRANCES FROST is her real name, but she was known as FRANCES BROUGH during her connection with the juvenile company, "Julia Marlowe" being assumed in later years.

After playing small parts in classic dramas, Miss Marlowe retired from the stage for a period of study, and on reëntering theatrical life made her début as Parthenia in *Ingomar.* After 1888 she starred in Shakespearean and other rôles and was most successful as Viola in *Twelfth Night,* Rosalind in *As You Like it* and Juliet in *Romeo and Juliet.* She married Mr. Robert Tabor, for several seasons the leading man in her company, but she was divorced a short time later. In 1911 she was married to E. H. Sothern, with whom she has played in various Shakespearean dramas. Miss Marlowe retired to private life in 1916, but resumed acting with her husband in 1919.

JULIA MARLOWE

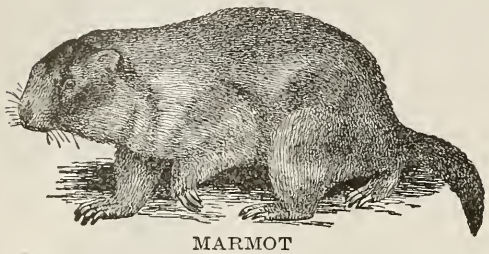
MARMORA, *mahr'mo ra,* or **MARMARA,** SEA OF (ancient Propontis), an inland sea, lying between European and Asiatic Turkey, communicating with the Mediterranean by the Dardanelles and with the Black Sea by the Bosporus. Its greatest length is about 160 miles, its greatest breadth, about fifty miles. It contains several islands, of which the largest is Marmora, famous for its quarries of marble and alabaster. At its northeastern extremity is the city of Constantinople (which see).

MARMOSET, *mahr'mo zet,* the smallest species of the monkey tribe, differing from other monkeys principally in having thick, woolly fur. They are agile in their movements, resemble squirrels in general appearance, feed upon fruit and insects and occasionally upon the smaller birds and their eggs. One species, known as the *silky marmoset,* has a long, silky mane on the head and neck. They are among the most intelligent of the entire monkey family. See MONKEY.

MARMOT, a small gnawing animal, classed with the squirrels. It lives in North America, Europe and Northern Asia. Marmots have thick bodies, short tails and short legs. They live in large communities in long burrows, and during the winter lie in deep sleep. The prairie dog, or prairie marmot, is the most familiar American species. Another species found in America is the wood-

chuck of the middle states. See Prairie Dog; Woodchuck.

MARNE RIVER, since 1914 the most notable river in France, better known than even the Seine, into which it flows, four miles from Paris. It was at the Marne that the German



MARMOT

hordes were stopped in 1914, at the beginning of the World War, after they had declared their intention to enter Paris before the end of September. A series of intensely critical battles, fought between September 6 and September 12, were given the collective name, "the Battle of the Marne." In 1918 this engagement was renamed the "first Battle of the Marne," for the titanic struggle which was the turning point of the war was fought on practically the same field. This time, too, the defending allied troops were fighting to keep the enemy, mad with victory, out of France's beautiful capital. At Chateau Thierry, on the north bank of the river, the Germans were so badly worsted that the retreat then begun was not halted until their surrender ended the war. In this battle American troops showed their valor. See World War, for details.

The Marne is 325 miles long and is navigable for 226 miles, to Saint-Dizier. In many places the current is swift and furnishes water power. Connected with it is a system of canals which reaches 195 miles, to Strassburg, in Alsace-Lorraine.

MARQUE, *mahrk*, AND REPRI'SAL, Letters of, a license or commission granted by the supreme power of one state to the citizens of this state to make reprisals at sea on the subjects of another nation, under pretense of indemnification for injuries received; that is, it is a license to engage in privateering. Letters of marque were abolished among European nations by the Treaty of Paris of 1856. The United States was invited to accede to this agreement, but declined, because the treaty did not forbid the capture of unoffending neutral ships by a belligerent.

MARQUESAS, *mahr ka'sas*, ISLANDS, a group of volcanic islands in the Pacific Ocean, about 8° 11′ south latitude and 140° west longitude. There are thirteen islands and islets, and their joint area is about 480 square miles. The principal products are yams, breadfruit and cocoanuts. These islands were discovered in 1595, rediscovered in 1813 and named Washington Islands, for it is a matter of history that they once belonged to the United States, having been so proclaimed by Commodore Porter, who visited them. The American government, however, never claimed jurisdiction, and they became French territory in 1842. Population, 1910, 3,424.

MARQUETTE, *mahr ket'* Jacques (1637–1675), a French Jesuit missionary and explorer in America. He came to Canada in 1666, founded the mission of Sault Sainte Marie in 1668, and in 1673 accompanied Joliet upon his exploration of the Mississippi. In the following year, Marquette founded a mission among the Illinois Indians, but contracted fever and died before reaching Upper Michigan. His pure character and lofty aims gave him a powerful influence among the Indians with whom he labored. Wisconsin has placed his statue in the rotunda of the Capitol at Washington.

MARQUETTE, *mahr ket'*, Mich., the county seat of Marquette County, on Marquette Bay, Lake Superior, and on the Duluth, South Shore & Atlantic, the Munising, Marquette & Southeastern and the Lake Superior & Ishpeming railroads. The city is one of the principal shipping points of ore from the Lake Superior region. It has iron works, foundries, machine shops, sash and blind factories, flour and lumber mills, chemical works and shops of two railroads. The Northern State Normal School is located here, and the city has a Federal building, a courthouse, an opera house, the Peter White Public Library, Episcopal and Roman and French Catholic cathedrals and the Upper Peninsula state prison and house of correction. The place was settled in 1845, when the iron mines were first worked. It was chartered as a city in 1869. The commission form of government was adopted in 1914. Population, 1910, 11,503; in 1917, 12,555 (Federal estimate).

MARQUIS, *mahr'kwis*, a title of nobility in Great Britain, ranking next below that of duke and above that of earl and baron.

The wife of a marquis is known as a marquise. See Nobility.

MARRIAGE, *mar'ij,* an assumed relationship between a man and a woman, by which they are united supposedly for life, and attain the legal status of husband and wife. Different localities have different forms of the institution, the most broadly marked of which are connected with the right of a man to have only one wife, *monogamy,* or his right to have several wives, *polygamy.* Marriage is now commonly regarded as a civil contract and is held to be valid only when both parties are able and willing to contract according to certain established forms. In the Roman Catholic Church, marriage is considered a sacrament. The Church does not deny the validity of marriage as a civil contract, but it does deny the validity of a divorce.

The laws in relation to marriage in the United States are founded mainly on the laws of England. Though the different states have different statutes on the subject, most of them requiring ceremony in the adoption of the relation, there is a consensus of intent that no specific form in marriage is necessary, if the consent of the parties is proved. The old common law marriage of England, which was evidenced by declared intention and acknowledgment in connection with cohabitation, is valid is most states of the Union. In some states epileptics, feeble-minded and other defectives may not legally marry, and in some marriage between first cousins is forbidden. Each state fixes the age of consent, and there is no uniformity of legislation in this respect, though there has recently been a movement toward raising this age, and in most states it is now either sixteen or eighteen years.

The peculiarly sacred character of marriage has distinguished the marriage contract, in the eyes of the law. It cannot be set aside or abrogated by consent of the parties, nor on proof of fraud, except in rare cases. See Divorce; Husband and Wife.

Morganatic Marriage, a term applied to marriage between a member of a royal house and a woman of inferior rank, when the law requires marriage between equals. The children of such a marriage cannot inherit the father's public position nor the family property. In some cases the wife and children receive titles of nobility.

MARS, *mahrz,* the fourth planet from the sun, the next to the smallest in size, and the one most interesting to inhabitants of the earth because it is more like the earth than any of the other planets. Numerous speculations concerning life on Mars open up a very fascinating field for study, but the question as to whether people inhabit that planet cannot be answered with certainty. In his interesting *War of the Worlds,* H. G. Wells imagines the earth invaded by gigantic Martians, but this book, like other stories based on the subject, is pure imagination.

Facts about Mars. We know for a certainty several interesting things about this planet, whose name is that of the Roman god of war. It shines with a reddish light, and was the symbol of war to the ancients, who attributed to its influence many disturbing happenings. Once about every sixteen years Mars and the earth are separated only by 35,000,000 miles, and at such times all possible observations are taken of the ruddy planet. In 1909, the most recent year of approach, Mars shone so brightly that it was more than once mistaken for a light on an airship. When farthest away it is about 244,000,000 miles from the earth.

Mars moves round the sun in a little more than 686 of our mean solar days, at an average distance of about 140,000,000 miles, its greatest distance being 152,000,000 miles, and its least, 126,000,000. It rotates on its axis in 24 hours, 37 minutes, 22 seconds, and has a diameter of about 4,230 miles, as compared with about 8,000 miles for the earth. As it takes Mars about two years to complete its revolution round the sun, the seasons on the planet are similar to our own, but are about twice as long.

The volume of Mars is about one-seventh that of the earth, and its gravitation is only about one-third. A weight of three pounds on the earth's surface would therefore weigh but one pound on the surface of Mars. In 1877 two satellites were discovered by Professor Hall of the Naval Observatory, Washington. These are among the smallest of the heavenly bodies, and the larger and outer one, called Deimos, is supposed to be only about seven miles in diameter. Deimos revolves about the planet in a period of thirty hours, and the inner one, Phobos, which is five or six miles in diameter, revolves about it in seven hours, thirty-nine minutes.

Peculiar Markings. Through the telescope Mars appears to have a yellowish surface,

marked with indistinct and irregular gray patches. Under a stronger telescope the irregular patches are shown to be connected by gray lines which intersect in every direction. These patches and lines are constant, and maps have several times been made of them. For a long time it was thought that the gray tract and lines were water, and the lighter portions, land; but now it is quite certain that both are solid, as the surface of both is irregular, often mountainous. It is thought that water cannot exist upon the planet because the atmosphere, which is thin and light, contains little or no moisture. White caps have also been observed at both poles, which disappear during the Martian summer. Some authorities believe them to be great fields of ice and snow; others regard them as formations of condensed gases.

Canals on Mars. In 1877 an Italian astronomer announced his observation of a network of straight lines on the planet, hundreds of miles in extent. Many later astronomers have made studies of these lines, and Professor Percival Lowell worked out an elaborate theory as to their being vast irrigation canals, built for the purpose of conducting melting water from the polar regions over the planet. This theory presupposes an advanced stage of civilization on Mars, and beings possessing a knowledge of engineering. Like other speculations on this subject it can neither be proved nor disproved.

Related Articles. Consult the following titles for additional information:

Astronomy	Mars (war god)	Satellite
Earth	Planet	Solar System

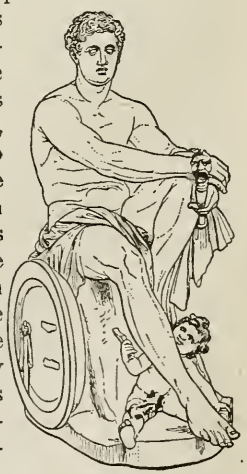
MARS, the Roman god of war, called by the Greeks, Ares. He was the son of Jupiter, and like him he was often called *father,* especially by the Romans, who regarded his son Romulus as the founder of their city. He was a fierce and terrible god, who delighted in the rush and noise of battle, and from him kindnesses were never expected. That he was not, however, absolutely unable to feel any softer emotions was shown by his love for Venus. Although he was the god of war and was able to protect his favorite warriors, he himself was not invulnerable, but was wounded at various times. Mars was greatly feared, and human sacrifices were sometimes offered on his altar.

MARSEILLAISE HYMN, *mahr sel ayz'* (in French, *mahr say yayz'*), the stirring national anthem of the French people, so called because it was first sung in Paris by volunteers from Marseilles. The words and music were composed in April, 1792, by Rouget de l'Isle, an officer stationed at Strassburg. A company of volunteers were about to leave that city to take part in the war of the Revolutionists against Austria and Prussia, and young de l'Isle was asked by the mayor of the city to write a song to be sung at a farewell banquet in their honor. The hymn proved a wonderful inspiration to the soldiers, and was called by its composer *War Song of the Army of the Rhine.*

The present name was given it when the Marseilles volunteers sang it in Paris while marching to the attack on the Tuileries. Not only in France but in many other countries is the *Marseillaise* sung on patriotic occasions. The following words—a free translation of the first stanza—are the ones most often sung in America:

Ye sons of France, awake to glory,
Hark! hark! what myriads bid you rise!
Your children, wives, and grandsires hoary,
Behold their tears, and hear their cries!
Behold their tears, and hear their cries!
Shall hateful tyrants, mischief breeding,
With hireling hosts, a ruffian band,
Affright and desolate the land,
While peace and liberty lie bleeding?
To arms, to arms, ye brave!
Th' avenging sword unsheathe!
March on, march on, all hearts resolved
On liberty or death!

MARSEILLES, *mahr saylz',* FRANCE, the second city of the republic in size and its principal seaport, is situated on the Mediterranean Sea, on the Gulf of Lyons. It has a beautiful location, for hills from 1,200 to 1,750 feet high rise back of the seashore in a semi-circular form as a background, and the city has encroached on their slopes. For the last hundred years the town has been worthy of the best traditions of city building; previously it was illkempt and of little importance. It dates back to a Greek settlement about 600 B. C., but there are few reminders of its ancient existence.



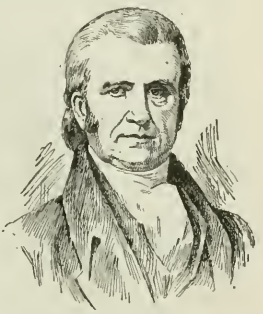
MARS
A statue in Villa Ludovisi, Rome.

The manufacturing interests are large. Here are the greatest soap factories of France; the city is noted for its automobile works, the construction of steam engines, the refining of sugar and the production of petroleum, candles, macaroni, oil, flour and clay products. Its seaborne commerce has made Marseilles great, particularly since the opening of the Suez Canal. There are twelve miles of wharfs, and a recently constructed harbor of 420 acres joins an old harbor, now used for sailing vessels. The national hymn, *The Marseillaise,* was named for the city, because it was first sung by troops from here. Population, 1911, 550,619.

MARSH, a tract of wet land, partially or wholly covered by water. Marshes are formed by springs or rivulets, the flow of whose outlet is obstructed. They may occur on slopes, but are usually found on low and nearly level lands, and they are frequently extensive in alluvial plains along the lower courses of rivers. Salt marshes are found along the shore of the ocean, where the land is low and nearly level. Marshes on hillsides often constitute bogs (see Bog) and quagmires. Sometimes such marshes loosen the soil and cause landslides. Many marshes are the site of peat bogs, and most of them contain more or less muck (see Peat). Good illustrations are the cypress swamps along the Mississippi River in Mississippi and Louisiana.

MARSHAL, *mahr'shal*, a word of German origin, signifying originally a man appointed to take care of horses, but which during the centuries has changed to a title signifying the highest military office. The title of marshal in the German Empire had its origin in a similar title under the Frankish monarchs. In France *marechal de France* is the highest military honor, and the title is now borne by Foch, Joffre and Pétain, in recognition of their leadership in the World War. In Germany *general field marshal* was the highest military honor to the end of the World War. In Great Britain *field marshal* is the highest military rank, and the title is borne by Lord French and by Sir Douglas Haig. In the United States a marshal is an executive officer connected with the Federal courts. The same name is popularly applied to the chief police officer of a village or small town.

MARSHALL, John (1755-1835), the most famous Chief Justice of the American Supreme Court, born at Germantown, Va. He did not go to college, but early began the study of law, which was interrupted only by four years of distinguished service in the Revolutionary War. Admitted to the bar in 1781, he served several terms in the Virginia legislature, and as a member of the Virginia convention was influential in securing the ratification of the Federal Constitution. He was a firm supporter of Washington's administrations, but declined public office under the nation until 1797, when he was sent with Gerry and Pinckney to settle several points of dispute with France. In 1798 Marshall was elected to Congress, became Secretary of State in 1800 and from 1801 till his death was Chief Justice of the United States Supreme Court. In this office he proved himself one of the greatest of the world's jurists, and several of his decisions established extremely important points of interpretation of the Federal Constitution. (For an account of the most noted decision which he handed down see Dartmouth College.) When he died the nation mourned, and the Liberty Bell in Independence Hall was tolled in his honor during his funeral ceremony, July 8, 1835. It was at this time that the bell was cracked (see Liberty Bell).



JOHN MARSHALL

MARSHALL, Tex., the county seat of Harrison County, forty-five miles northwest of Shreveport, La., on the Texas & Pacific and the Marshall & East Texas railroads. The city is in a fertile agricultural region, producing cotton, fruit and vegetables. It contains foundries, machine shops, cotton compresses, lumber mills, carriage works and railroad shops. Wiley University and Bishop College, for negroes, are located here, and the city has a fine courthouse and an opera house. The commission form of government has been adopted. Population, 1910, 11,452; in 1917, 14,076 (Federal estimate).

MARSHALL, Thomas Riley (1854-), a lawyer and statesman and Vice-President of the United States, was born at North Manchester, Indiana. He was graduated at Wabash College in 1873, and two years later was admitted to the bar. He was elected gov-

ernor of Indiana in 1909, and in 1912 was chosen Vice-President of the United States on the Democratic ticket. In 1916 he succeeded himself in that office, serving until 1921. Marshall was the fifth man in American history to serve two terms in the Vice-Presidency.

MAR'SHALLTOWN, Iowa, the county seat of Marshall County, sixty miles northeast of Des Moines, on the Chicago Great Western, the Minneapolis & Saint Louis and the Chicago & North Western railroads. The city is in a stock raising and agricultural region. It contains grain elevators, flour mills, glucose works, packing houses, machine shops, heating specialty factories and railroad shops. The state soldier's home is located here, and the city has a Masonic Temple and a Carnegie Library. The first settlement was in 1860; a charter was granted in 1868. The commission form of government was adopted in 1911. Population, 1910, 13,374; in 1917, 14,519 (Federal estimate).

MARSH GAS. See Methane.

MARSH HAWK, or **HARRIER**, a fine, light, bluish-gray hawk, that hunts over marshy regions and wet grounds. It is a long-winged bird, capable of strong flight; it should be favored by agriculturists, because of the great numbers of insects and troublesome small animals it destroys. In the spring the male may often be seen performing marvelous aërial evolutions, sometimes almost at the surface of the ground and again far up in the air, in his efforts to attract the female.

MARS HILL, a rocky hill in Athens on which were held the meetings of the Areopagus (which see), the oldest justice court of the Athenians. The hill of Mars, or Ares, lay west of the Acropolis. Paul preached to the Athenians on the hill, as is related in *Acts* XVII. The origin of the name is unknown.

MARSH MAL'LOW, a common plant of the mallow family, growing in great abundance in marshes, especially near the sea. It is perennial and has a white, fleshy, carrot-shaped root, which is used in making marshmallow confectionery and in the preparation of a soothing medicine. The stem is from two to three feet high. Both leaves and stem are covered with soft down, and the flowers are a delicate flesh-color.

MARSTON, *mahrs'ton*, **MOOR**, a locality in Yorkshire, England, about seven miles west of York, celebrated for the battle between royal forces, under Prince Rupert, and troops of Parliament, under Fairfax and Cromwell, including the famous Ironsides brigade, July 2, 1644. The royal forces were routed, and the Cromwellians gained control of all of Northern England.

MARSUPIALS, *mahr su'pi alz*, or **MARSUPIALIA**, *mahr su pi a'li a*, an order of mammals confined almost wholly to Australia and America. Marsupial animals live in trees, on the ground or, in a few instances, in water. They are generally like the other mammals, but differ in one striking peculiarity; the young are born in an immature state and are placed immediately by the mother in a pouch, where they attach themselves to the nipples and remain until fully developed. The pouch is permanent and differs in many respects from the temporary pouch of the duck-billed platypus, in which the young are hatched from eggs. The young marsupials remain in the pouch until they are clothed with fur and are able to care for themselves, but for some time after they are able to move about they return to the mother's pouch as a refuge. The only marsupial found in America is the opossum.

Related Articles. Consult the following titles for additional information:

Bandicoot	Koala	Tasmanian Wolf
Kangaroo	Opossum	Wombat

MARTEN, *mahr'ten*, the name of several flesh-eating animals, whose fur is a valuable material for warm outer garments. The body of the marten, like that of the weasel, is elongated and slender. The legs are short, and the feet are provided with five toes, armed with sharp claws. In habit, martens differ from weasels in living in trees, which they climb with great ease. The *pine marten* is found chiefly in Great Britain and Europe. It is of smaller size than the

MARSH MALLOW

common marten, is of a dark-brown color, with a yellowish mark on the throat, and has fine fur, which is largely used in commerce for trimmings for clothing. The famous *sable marten,* which furnishes the valuable sable fur, inhabits Siberia, and is nearly allied to the pine marten. *Pennant's marten,* or the *fisher,* as it is popularly called, is another well-known species. See FUR AND FUR TRADE.

MARTHA'S VINEYARD, *vin'yard,* a wooded island off the southern coast of Massachusetts, forming the principal part of Dukes County. It is about four miles south of the mainland and is twenty-three miles long and from two to ten miles broad. It has a permanent population of about 5,000, but there is a large transient population in the summer.

MARTIAL, *mahr'shal,* in full, MARCUS VALERIUS MARTIALIS (about 40–about 104), a Roman writer of epigrams, born at Bilbilis, in Spain. He went to Rome when young, during the reign of Nero, and lived there under Galba and the following emperors. Domitian gave him the rank of tribune and the rights of the equestrian order. In the year 100 he returned to Spain, to his native city, where he died. His fame rests on fourteen books of epigrams, which for the most part depict with remarkable good sense and pungent wit the life of imperial Rome.

MARTIAL LAW, or military law, is the law by which the discipline of an army is maintained. Under special circumstances of insurrection or rebellion, or serious local riot, where the civil law is insufficient to protect life and property, it is sometimes necessary to administer the law by an armed force of soldiers or militiamen, called at the request of civil authorities, who occupy the disturbed district. Military law is then above the civil ordinances, and every order of the military authorities must be obeyed. See RIOT.

MAR'TIN, a large swallow, common in North America, where it is widely distributed throughout the summer. It winters in Central and South America. The male is a beautiful purplish-blue, and from its large size and vigorous flight it is a conspicuous bird wherever it lives. The martins have become thoroughly accustomed to the presence of man, and they build freely in bird houses or even in the crevices and under the eaves of inhabited buildings. Four to six glossy white eggs are laid, and there are two broods during a season. There are several species of true martins, a name which unfortunately is locally given to other birds; for instance, the kingbird is sometimes called the bee martin.

MARTINIQUE, *mahr te neek',* one of the French West India Islands, belonging to the Windward group, thirty miles nearly south of Dominica. The island is about forty miles long and ten to fifteen miles wide, and has an area of 385 square miles. The form is irregular and the coasts are rugged, while the surface is rough and mountainous, culminating in Mont Pelée, which has an altitude of 4,500 feet. Like the other islands of the group, Martinique is of volcanic origin. The climate is humid, but not unhealthful. The principal products are sugar cane, coffee, cocoa and tropical fruits.

Martinique was discovered by Columbus, and in 1635 it was settled by the French. In 1902, in May and in August, occurred destructive eruptions of Mont Pelée, which destroyed the city of Saint-Pièrre, until that time the largest and most important city on the island, and killed from 30,000 to 35,000 people. Population, 1916, 197,400.

MAR'TINSBURG, W. VA., founded in 1778, is the county seat of Berkeley County, seventy-five miles west of Washington, on the Baltimore & Ohio and the Cumberland Valley railroads. The town has a Federal building, two hospitals and a county courthouse. It is near valuable stone quarries and contains railroad shops, clothing factories, wool and hosiery mills, grain elevators, canneries, automobile works and other factories. The surrounding region is a fine fruit country. Population, 1910, 10,698; in 1917, 12,984 (Federal estimate).

MARTIN'S FERRY, OHIO, a city in Belmont County, on the Ohio River, nearly opposite Wheeling, W. Va., on the Baltimore & Ohio, the Wheeling & Lake Erie and the Pennsylvania railroads. It is in a region that has deposits of coal, iron and limestone, has a blast furnace and steel mills, tin mills, and contains manufactures of stoves, shovels, nails, glass and lumber and machine-shop products. There is a new Federal building, a library, a hospital and a small park. Martin's Ferry was settled in 1785. Population, 1910, 9,133; in 1917, 10,135 (Federal estimate).

MAR'TYRS, a name applied by the Christian Church to those persons who, in the early ages of Christianity and during the

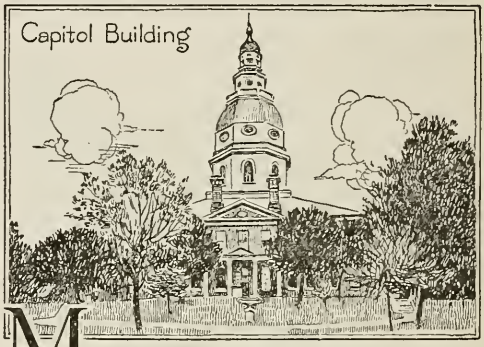
great persecutions, suffered ignominy and death rather than renounce their faith. Festivals in honor of the martyrs seem to have been observed as early as the second century. The Christians offered prayers at the tombs of the martyrs, thanked God for the example which they had given to the world, delivered eulogies, read accounts of the lives of the deceased and concluded the rites with the sacrament of the Lord's Supper and the distribution of alms.

MARX, *mahrks*, KARL (1818–1883), a German economist whose theories have been adopted by modern Socialists. He was born at Treves, of Jewish parentage, and studied law and philosophy at Berlin. After editing a liberal paper at Cologne from 1841 till its suppression, he went in 1844 to Paris, where he took part in the publication of the *Deutsch-Französische Jahrbücher* and a liberal newspaper. In 1845 he was compelled to flee to Brussels, and he there became head of the central committee of the Socialists. Banished from Germany, he went in 1849 to London, which was his home from that time. In 1864 he established the International Workingmen's Association, which for a time had wide influence. His chief work is *Das Kapital* ("Capital"), which sets forth his socialistic ideas and is the textbook of modern scientific socialism. See SOCIALISM.

MA'RY I (1516–1558), queen of England, daughter of Henry VIII by Catharine of Aragon. She ascended the throne on the death of Edward VI, in 1553, after an attempt to set her aside in favor of Lady Jane Grey. One of her first measures was the restoration of the Roman Catholic prelates, who had been superseded in the late reign, and the suppression of all changes in the Church. Her marriage to Philip II of Spain, united as it was with a complete restoration of the Catholic worship, produced much discontent. Under Philip's influence a war began with France, which ended in the loss of Calais in 1558, after it had been in the hands of the English for more than two hundred years. The queen was responsible for a number of executions of Protestants, but in the matter of persecutions she was not unlike other monarchs of her time.

MARY II (1662–1694), queen of England, the daughter of James II of England. She was married in 1677 to William, Prince of Orange, and when the Revolution dethroned her father, Mary was declared joint possessor of the throne with William. See WILLIAM III.

MARY, THE VIRGIN, the mother of Jesus. The story of her life, so far as it is given in the New Testament, begins with her betrothal to Joseph and the narrative of the birth of Christ. She is thrice mentioned during Christ's public ministry and once after His death. A tradition asserts that she lived and died at Jerusalem, under the care of John; another that she died at Ephesus, to which she and John had retired from the siege of Jerusalem. She is a perfect type of Christian womanhood, and as the Madonna has been pictured by some of the world's greatest painters. See MADONNA.



MARYLAND, called popularly the OLD LINE STATE, because the greater part of its northern boundary was the one-time Mason and Dixon's Line, lies south of Pennsylvania, west of Delaware and the seaboard, and north of Virginia and West Virginia. It is one of the original thirteen states of the American Union. On the south its boundary is very irregular, being formed by the winding Potomac River. At one point in the western section the state is only two miles wide. The area is 12,327 square miles; of this, 2,386 square miles are water, comprising Chesapeake Bay and numerous rivers. The population in 1910 was 1,295,346, or 130 per square mile, more than four times that of the United States as a whole. In 1918 a Federal estimate gave the number of people as 1,384,539. Only twenty-six states have a greater population.

Surface and Drainage. Chesapeake Bay and the Susquehanna River divide the state into two parts, known as the eastern and the western shores. The eastern division is low, nearly level, sandy and fertile. In the north the surface of this division is diversified by a

number of low, rounded hills. The western portion of the state is crossed by the Blue Ridge, the central Appalachian and the Alleghany Mountains, making this region decidedly mountainous, though there are no high altitudes, the highest peaks reaching 2,500 and 3,000 feet. The highest point in the state is Eagle Rock, 3,162 feet, in the extreme southwest. The ranges are nearly parallel and are separated by deep valleys, and the entire region wooded. The portion of the state lying between the mountains and Chesapeake Bay is rolling and hilly. The mountainous region is celebrated for its beautiful scenery.

The Potomac, flowing along the western and southern borders, is the largest river within the state. The longest stream of importance is the Susquehanna, which crosses the state from the north. Other streams are small, except at their mouths, where many of them have estuaries. Flowing into Chesapeake Bay on the west are the Pawtuxent, the Patapsco, the Gunpowder and the Susquehanna. On the east are the Elk, the Sassafras, the Chester, the Choptank and a number of others. The important tributaries of the Potomac are the Monocacy, the Antietam and the Youghiogheny.

Climate. The climate is mild and healthful. The mean summer temperature is 75°, and the mean winter temperature, 34°. No section is free from snow, and cold waves of short duration occur during the winter months. The average annual rainfall in the western portion is thirty-eight inches, and near the Atlantic coast it is forty-six inches.

Minerals. Coal is the most important mineral product, and is found in three regions in the northwestern section; these are known respectively as the Cumberland, the Georgia Creek and the Frostburg area. The veins vary from one to fourteen feet in thickness, and they yield the best quality of bituminous coal. The annual output is always close to 5,000,000 tons. Limestone is generally distributed throughout the central part and granite and marble of excellent quality are found near the head of Chesapeake Bay. Stone from these quarries has been quite extensively used in public buildings in Washington and for important structures in New York and Philadelphia. Clay suitable for the manufacture of pottery and brick and an excellent quality of kaolin are found in the central part of the state. The clay products are next to coal in annual value. Slate, chrome and hydraulic cement also occur in paying quantities.

Fisheries. The oyster beds of Chesapeake Bay are famed for their size and the excellent quality of their product. Oyster fishing is one of the important industries, and in output exceeds any other state, nearly 6,000,000 bushels a year being marketed. The area of the oyster beds exceeds 200 square miles, and during the season over 7,000 small vessels are employed in dredging, scraping and tonging for oysters. Shad, menhaden, mackerel and crabs are also taken in large quantities.

Agriculture. The eastern shore, or that portion of the state between Chesapeake Bay and the ocean, is remarkably well suited by soil and climate to the growth of fruit and vegetables, and a large part of this region is devoted to these branches of agricultural industry. Truck farms and fruit orchards prevail. The northern part of the state is well suited to growing wheat, corn, grass, Irish and sweet potatoes and tobacco. The most important crops are corn, wheat, hay, oats, tobacco and potatoes. In the region adapted to grazing, considerable numbers of horses, mules and cattle are raised, and dairy farming is practiced.

Manufactures. Maryland is not essentially a manufacturing state, but within recent years all lines of manufacturing industry have been extended, and the value of products has steadily increased. There are nearly 5,000 factories in the state, and their product is valued at about $380,000,000 a year. The leading industries are the canning and preserving of oysters and other shellfish, the preparation of tobacco, slaughtering and meat-packing, the production of iron and steel and foundry and machine-shop products, shipbuilding and the manufacture of textiles. The leading manufacturing interests center in and about Baltimore.

Transportation and Commerce. While the Atlantic coast has no good harbors, the coast of Chesapeake Bay affords many excellent harbors for vessels of light draft, and that of Baltimore is open to the largest ocean steamers. That city has become a great ocean port. The Potomac is navigable as far as Washington, 125 miles. The Baltimore & Ohio, the oldest railway in the country, has lines connecting Baltimore with Philadelphia and Washington and also with the Ohio val-

ley. The Pennsylvania system, the Western Maryland and the Philadelphia, Baltimore & Washington, traverse the state. The Chesapeake & Ohio Canal extends to Cumberland and is still maintained as a common carrier, chiefly for coal. The government is constructing the Chesapeake & Delaware ship canal. There are 1,433 miles of railroad, and 657 miles of electric lines.

Government. The legislature consists of a senate of twenty-seven members and a house of delegates of 102 members, apportioned among the counties according to population. The members of the senate are elected for four years; the terms of one-half expire every two years. The members of the house of delegates are elected for two years. The legislative sessions are biennial, and are limited to ninety days.

The executive authority is vested in a governor, who is elected for four years; an attorney-general, elected for four years, and a comptroller of the treasury, elected for two years. A treasurer is elected on joint ballot by the legislature, for two years. The highest court is a court of appeals, composed of the chief judges of the seven country circuits and the circuit of Baltimore. In each circuit except that of Baltimore, the chief judge and two associates are elected, and they must hold court in each county of the circuit. These courts have both civil and criminal jurisdiction in important cases and are courts of appeal from cases arising in courts of the justices of the peace.

Education. Illiteracy of 11.1 per cent in 1900 has dropped below 7 per cent. The public schools are in charge of a board of education and a superintendent of public instruction appointed by the governor. The governor appoints school commissioners for each county, and the county commissioners appoint school trustees for the districts. The law requires ten months of school in each district whenever it is possible for a term of that length to be sustained. Separate schools are provided for white and colored children.

The Maryland state normal schools are at Baltimore, Frostburg and Bowie. The important higher institutions of learning are Johns Hopkins University, the University of Maryland and the Woman's College, all located at Baltimore; Saint John's College at Annapolis; the agricultural college at College Park; Western Maryland College at Westminster; Washington College at Chest-

Items of Interest on Maryland

The state is famous for its song birds; of these the best known are the mocking bird, the cardinal bird and the Baltimore oriole.

The climate of Maryland in the southeast is influenced by the presence of the bay and ocean, while in the west it is influenced by the mountains; in the eastern and southern parts the normal winter is mild, the normal summer rather hot; in the west the winter is generally cold, the summer cool.

The great variety of soils is one of the features of the state, almost every possible mixture being found.

In no other state except South Carolina is so large a percentage of the value of the crop spent for fertilizer.

Nearly all the high-grade blacksmithing coal mined in the United States come from Maryland.

The iron ore deposits, once the most important in the United States, are now comparatively insignificant.

Maryland cans a larger amount of tomatoes and sweet corn than any other state; in the production of all canned fruits and vegetables it stands second only to California.

The Jacob Tome Institute, at Port Deposit, is one of the most richly endowed secondary schools in the world.

Questions on Maryland

What is the area of Maryland? What part of it is water?

Name some well-known song birds found in the state.

What are the principal crops? What part of the total do vegetables form?

How do the oyster fisheries rank?

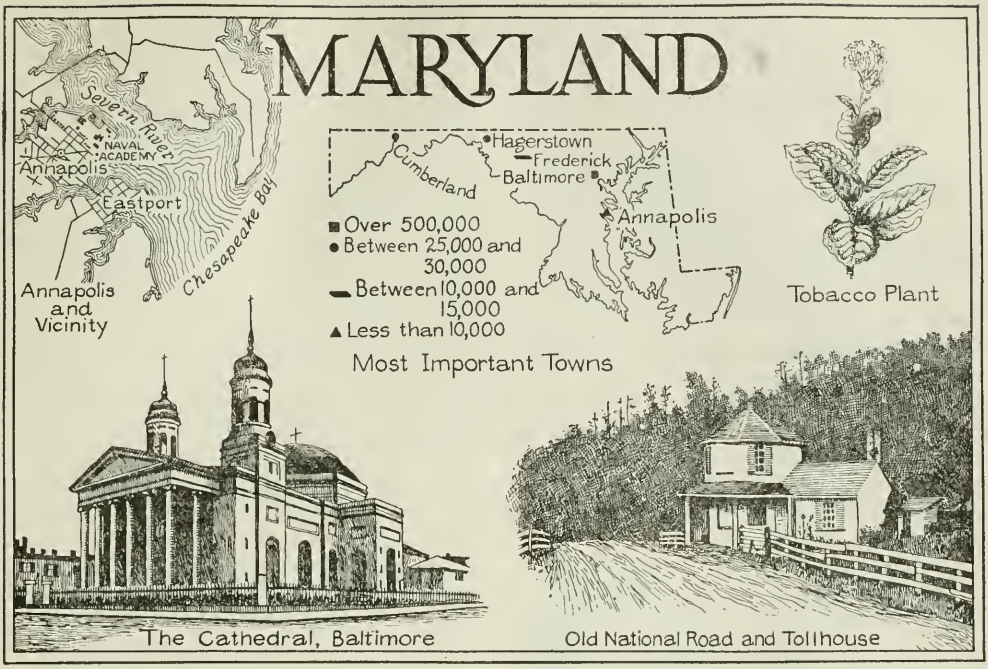
What is the most important mineral product? Where is most of it found?

Name five important manufactured products.

How many miles of railroad are there in Maryland?

What advantages in transportation facilities has Baltimore?

What are some of its leading industries? In what product does it lead all other cities in the Union?



ertown, and Blue Ridge College at New Windsor. All of the above receive state aid. Prominent among the self-supporting schools are Goucher and Hood Colleges (for Women) at Baltimore, and Jacob Tome Institute at Port Deposit.

Institutions. Schools for the blind and deaf are located at Baltimore and for the deaf at Frederick. The school for feeble-minded children is at Owings Mills; the hospitals for the insane are at Sykesville and Spring Grove. The penal institutions include the state penitentiary at Baltimore, a house of refuge for boys and a similar institution for girls.

Cities. There are but five cities in Maryland with more than 8,000 people each. These are, in order of size, Baltimore, Cumberland, Hagerstown, Frederick and Annapolis. The latter city is the state capital.

History. Maryland was first settled in 1634 by the English, under the auspices of Cecilius Calvert, Lord Baltimore, of England. It was established through the effects of George Calvert, first Lord Baltimore, was intended to be a refuge for persecuted Catholics of England, and was the home of religious toleration from its foundation. Its early history was disturbed by conflicts between the proprietary party and Virginian traders, the former finally being successful. Another trouble was the boundary dispute with the heirs of William Penn, which was finally decided in 1767 by the establishment of Mason and Dixon's Line.

In the pre-Revolutionary period, Maryland was aggressive in defense of colonial rights, and took a prominent part in the Revolutionary War. It was the last to adopt the Articles of Confederation, owing to its insistent demands that the large states relinquish their territorial claims in the northwest (see ORDINANCE of 1787). Maryland adopted the Federal Constitution April 28, 1788. The first half of the nineteenth century witnessed marked progress through the establishment of an elaborate policy of internal improvements, including canals, railroads and telegraph lines. During the Civil War Maryland remained loyal to the Union, though a slave-holding state, but sent many soldiers to both armies. Since the close of the war Maryland has been a doubtful state politically, though usually favoring the policies of the Democratic party. In June, 1915, the "Grandfathers' Clause," so-called, was made applicable to cities, where the negro vote is heavy. A "lazy-man's law" of 1917 requires all able males between the ages of eighteen and fifty not usefully employed to register

so they may be required to work. In the same year to store goods for the purpose of raising prices was declared a felony.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Annapolis
Baltimore
Chesapeake Bay
Cumberland
Frederick
Hagerstown
Potomac River
Susquehanna

MISCELLANEOUS

Grandfather's Clause
Johns Hopkins University
Mason and Dixon's Line
Oysters

MARY MAG'DALEN. See MAGDALEN, MARY.

MARY STUART (1542–1587), a famous queen of Scotland, known more commonly as MARY, QUEEN OF SCOTS. Her tragic story has been perpetuated in painting, song and drama. Mary was the daughter of James V by his queen, Mary of Lorraine, a princess of the family of Guise. Her father dying when she was a few days old, she was proclaimed queen, and the regency was, after some dispute, vested in the Earl of Arran. Mary was educated in a French convent, and in 1558 she married the French dauphin, afterward Francis II. He died seventeen months after his accession to the crown, and the young queen returned to Scotland. The calamities of Mary began with her marriage to her cousin, Lord Darnley, in 1565. Darnley was a Roman Catholic, and Mary had hoped that his influence might be of help to her in her claims to the English throne; but his weakness and profligacy soon won her contempt. He almost entirely alienated the queen by his complicity in the murder of Rizzio, Mary's Italian councilor, though a reconciliation seemed to be effected between them about the time of the birth of their son, afterward James VI of Scotland and I of England.

MARY STUART

At the close of the same year, however, Darnley withdrew from the court, and in the meantime the Earl of Bothwell had risen high in the queen's favor. Darnley had fallen ill at Glasgow, and Mary visited him and took measures for his removal to Edinburgh. He was there tended by the queen herself; but during the absence of Mary at a masque at Holyrood, the house in which Darnley lay was blown up by gunpowder, and he was killed. The circumstances attending this crime were very imperfectly investigated, but popular suspicion pointed to Bothwell as the ringleader in the outrage, and the queen herself was suspected of complicity, suspicion becoming still stronger when she was carried off by Bothwell, with little show of resistance, to the castle of Dunbar, and was married to him. A number of the nobles now banded together against Bothwell, who succeeded in collecting a force; but on Carberry Hill, where the armies met, Bothwell was defeated. The queen was forced to surrender herself to her insurgent nobles, Bothwell making his escape to Denmark. The confederates first conveyed the queen to Loch Leven Castle. A few days later a casket containing eight letters and some poetry, all said to be in the handwriting of the queen, fell into the hands of the confederates. They were held to afford unmistakable evidence of the queen's guilt, and she was forced to sign a document renouncing the crown of Scotland in favor of her infant son and appointing the Earl of Murray regent during her son's minority.

After remaining nearly a year in captivity Mary succeeded in making her escape and made an effort for the recovery of her power. Defeated by the regent's forces, she fled to England and wrote to Elizabeth entreating protection and a personal interview; but this the latter refused to grant until Mary should have cleared herself from the charges laid against her by her subjects. For more than eighteen years she continued to be the prisoner of Elizabeth, and in that time the place of her imprisonment was frequently changed, her final prison being Fotheringay Castle, Northamptonshire. She was at last accused of being implicated in the plot of Babington against Elizabeth's life, was tried by a court of Elizabeth's appointing and was condemned to be executed.

MASARYK, THOMAS G. (1850–), the first President of the Czecho-Slovak Republic, which came into being during the last phase of the World War and was recognized as an independent state by the allied governments early in the fall of 1918. Masáryk was born in Moravia, of humble parentage. In his boyhood he was apprenticed to a blacksmith, but succeeded in obtaining a university education, studying at Vienna and Leipzig. In 1879 he became a teacher of philosophy at the University of Vienna, and three years

later was appointed professor of philosophy at the University of Prague. Professor Masáryk was elected deputy to the Parliament at Vienna in 1891, where he was vigorous in his denunciation of the treatment accorded the Czechs, whom he represented. Resigning his seat in 1893, he devoted himself to the nationalistic Czech movement, which culminated in 1918 in the establishment of a new republic consisting of Bohemia, Moravia, Silesia and Slovakia (see CZECHO-SLOVAK REPUBLIC; WORLD WAR). He spent several months in the United States in the interest of his people, arousing widespread sympathy for them.

MASCAGNI, *mahs kahn'ye*, PIETRO (1863–), an Italian composer known chiefly for his popular and spirited opera *Cavalleria Rusticana*. He was born in Leghorn, of poor parents. An uncle helped to pay for his musical studies at the Milan Conservatory, but the young man did not remain there long, as he seized an opportunity to travel with an operatic troupe. In 1890, while he was struggling to make a bare living, he wrote the opera that won him lasting fame and the Prize of Rome. *Cavalleria Rusticana* is presented season after season to enthusiastic audiences, but the other works of the composer did not fulfil the expectations of his admirers. His critics say that he is lacking in technic and that the brilliance of his one marked success blinds the public to faults of workmanship. Mascagni's other operas include *Iris*, *Isobel* and *Parisina*.

MASE'FIELD, JOHN (1875–), an English poet who has written in a fascinating way of the sea and has pictured with vivid realism the life of the poorer classes. He was born in England on a farm, and at the age of fourteen ran away to taste the joys of life on the sea. He traveled all over the world, gaining a wealth of experience that colors such fine sea poems as *Salt-Water Ballads*, *A Mainsail Haul* and *On the Spanish Main*. In the course of his adventures Masefield worked in a New York saloon, and he also mingled intimately with the people of the East Side London slums. He acquired firsthand knowledge of the sufferings and experiences of the submerged classes, and these experiences are reproduced with a relentless pen in *The Everlasting Mercy* and *The Widow in the Bye Street*. Masefield delivered a series of lectures in Canada and the United States in 1915–1916, arousing interest everywhere. During the World War he devoted himself generously to relief work. Among his other writings are *Captain Margaret*, *The Daffodil Fields* and *Lollington Downs* (poems); *The Tragedy of Nan*, a play; and *Jim Davis*, a story for boys.

MASHONALAND, *mah sho'nah land*, once an independent negro government in South Africa but since 1890 under British influence and now one of two provinces forming Southern Rhodesia (see RHODESIA), Matebeleland being the other. The natives are of the intelligent Bantu stock, and are peaceful and agriculturally inclined. There are nearly 500,000 natives and about 13,000 whites in the province.

MASK, a covering for the face, used either as a disguise or as a protection. Masks have been worn since ancient times, and their use in the drama originated in the festivities of the Greeks in connection with the processions and ceremonies attending the worship of Dionysus or Bacchus. In Greek tragedy, which grew out of this worship, masks were common from the first, and later they were used in comedy. They were sometimes only coverings for the face and sometimes covered the whole head. The head masks had huge open mouths, provided with metallic mouthpieces for the purpose of strengthening the voice of the speaker, a device which was necessary because of the size of the ancient theaters. In the Roman drama, also, the mask was common. The use of masks at balls and masquerades originated in Italy, where the domino, or half-mask, was worn by the women and was especially popular.

MASON, JAMES MURRAY (1798–1871), an American who became famous in connection with the Trent Affair (which see), was born in Fairfax County, Va., and educated in the law at the University of Pennsylvania. He was elected to the state legislature, to the national House of Representatives for one term and finally to the United States Senate, where he served from 1847 to 1861. In the latter year he withdrew to assist the secession movement, having been a faithful advocate of the Southern cause and the author of the famous Fugitive Slave Law. In 1861 he was appointed representative of the Confederacy abroad, and, while sailing for Europe in the British steamer *Trent*, was captured with his colleague, John Slidell, and taken to Boston. After being released, he went to London, where he endeavored to win recognition for

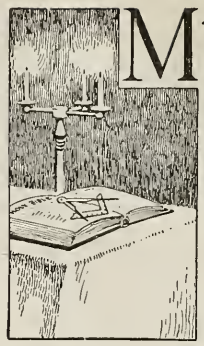
the Confederacy, but without success. He returned to America after the war and lived in Canada until 1868, when he removed to Virginia.

MASON, JOHN (1586–1635), an Englishman who in American history was the founder of New Hampshire. He received a patent (grant) of the territory when he was governor of Newfoundland, as a reward for a voyage of exploration along the coast.

MASON AND DIXON'S LINE, the line which separates the states of Maryland and Pennsylvania. From the time of the grant of the latter territory to William Penn in 1681, there were disputes between the family of Penn and that of the Lords Baltimore, the possessors of Maryland, as to the boundary between the two territories. An agreement was formed in 1763 by which the line was fixed by two English surveyors, Charles Mason and Jeremiah Dixon. Milestones, marked on one side with *M* and on the other with *P*, were set up along the whole of this boundary line. Mason and Dixon's line is commonly spoken of as the boundary between the *South* and the *North*, owing to the fact that it was, before the Civil War, the dividing line between the slaveholding and the free territory.

MASON BEE, a bee distinguished from others by the manner in which it constructs the small earthen cells in which it lives. These are made of sand, pebbles, chips, sawdust and other substances, firmly glued together and smoothed on the inside. They are usually made in groups of from ten to twenty. In these the larvae are deposited, with the honey and pollen stored for their food. These bees are of comparatively small size, are dark in color, and live in families instead of colonies. See BEE.

MASON CITY, IOWA., the county seat of Cerro Gordo County, ninety miles northeast of Fort Dodge, on the Chicago & North Western, the Chicago, Rock Island & Pacific, the Minneapolis & Saint Louis, the Chicago Great Western and the Chicago, Milwaukee & Saint Paul railways. The city is in an agricultural and stock-raising region, containing valuable clay and sandstone deposits. It has a large trade in agricultural produce, groceries and fruits. There is a public library, a fine courthouse and an Odd Fellows' Orphans' Home. The place was settled in 1855. Population, 1910, 11,230; in 1917, 14,938 (Federal estimate).



MASONRY, or **FREEMASONRY**, the names commonly applied to the most ancient secret organization in the world. It is, also, the largest in point of membership, is one of the most beneficial, and entirely without ostentation, probably the most influential. The members are known to one another as Free and Accepted Masons—in some jurisdictions, Ancient Free and Accepted Masons (A. F. A. M.).

Principles. The fundamental principle of Masonry is a declared belief in God and the acceptance of a Book of the Law, which among Christians is the Bible and among Jews is the Old Testament. No lodge can be opened unless the Bible lies open upon the altar. Masons are also expected to believe in the immortality of the soul and in the resurrection, and peculiarly impressive symbols are used to represent these principles. The order also inculcates moral principles, of which the chief are charity, truth, temperance and justice. Though in the constitution of the order there is no provision for the payment of set or regular dues for the relief of members or others, all Masons are expected to relieve to the extent of their ability brother Masons, their widows and orphans, when in distress.

There are various steps, or degrees, in Masonry, but three degrees only are required in order that a man may become a Master Mason. He is then as much a Mason as he ever can be. All further degrees are only added exemplification of the mysteries of Masonry.

History. According to legend the beginnings of Masonry can be traced as far back as the time of King Solomon. However its definite history is known to extend only to the sixteenth century. It is now believed to have arisen from the medieval guilds of masons and architects, the most skilled of whom had organizations, bound together by signs and passwords, which represented the secrets of their trade. However, it was not until the beginning of the eighteenth century that permanent lodges were reëstablished upon the principles which form the basis of the modern organization.

There are bodies of Masons recognized by the organization in the United States, in Canada, England, Ireland, and in several of the countries of Continental Europe. French Masons are not in this fellowship, for since the French Revolution they have not restored to their order a belief in God.

In America there is a Grand Lodge in each of the States of the Union and in each of the provinces of Canada. Subordinate lodges are widely distributed. There are also Grand Lodges in Alaska, Porto Rico and the Philippine Islands, and in the States of Australia and in New Zealand. The total membership in the order in all parts of the world in 1917 was about 2,400,000; of this number over 1,600,000 were in the United States.

MASONRY, Stone. Stone masonry is the foundation art of building, and it has been practiced from very ancient times. We look to-day upon wonderful modern examples of the stone-mason's art and marvel at the intelligence of man in this present age, forgetting that no modern constructor has been able to learn by what skilful means some of the ancients builded. The Egyptians piled such massive stones high up on the pyramids that we will never cease to wonder how they were placed there; at Baalbek, Syria, in the Temple of the Sun, were stones sixty feet long and twelve feet thick, fitted together so perfectly that the joints were not easily seen. The ancients by scientific methods attained massive effects, many of which were beautiful; modern men have forsaken the massive, and have added elements of beauty and a diversity not known in early days.

Even in this day of iron and steel construction stone masonry has lost none of its importance. Not only does it include construction in stone but in brick and concrete, as well; one form is present in every large building.

In building operations in stone the blocks usually are prepared at the quarries and need little if any alteration at the building site. The task of the mason is to lay them in place, and he is assisted by mortar mixers, carriers and helpers.

Classification. Masons and building contractors attach specific names to various styles of walls of stone. Some of these are described below:

Ashlar Masonry. Carefully squared blocks with smooth faces at all points of contact with each other comprise ashlar masonry. If the exposed faces are also smooth the effect is known as smooth, or perfect, ashlar; if the faces are left slightly rough, the name rough,

a b c

VARIOUS FORMS OF MASONRY
a, Squared Rubble; b, Random Rubble; c, Smooth and Rough Ashlar.

or pitch-faced, ashlar, is applied. In ashlar masonry the stones are usually two or three times as long as high (see illustration).

Rubble Masonry. This style is more rustic in appearance. The stones are not smoothed, but weak corners and rough projections are removed. In laying, all interstices are filled with smaller stones and large pebbles and all are bound with mortar. The result is an uneven surface, but it is pleasing to the eye.

Random Masonry is a style in which the stones are squared but are not of uniform size, and therefore do not have the correct lined appearance of the ashlar masonry.

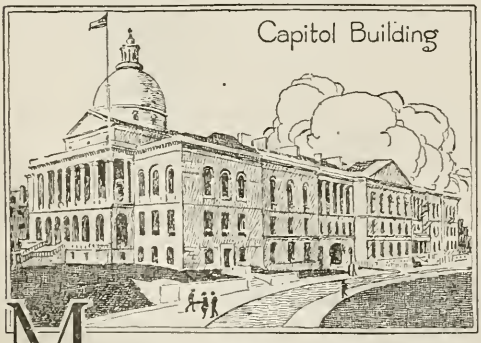
Brick Masonry. See Brick and Brick Laying.

Concrete Masonry. See Concrete.

MASQUE, or **MASK,** a dramatic entertainment much in favor in the courts of princes during the sixteenth and seventeenth centuries, particularly in England. In its earliest form it is perhaps best described as a masquerade, with an arranged program of music and dancing and a banquet. The first masque of this kind in England, according to Holinshed's *Chronicles,* was performed in the early part of the sixteenth century, and masques were frequently introduced into the plays of Shakespeare, Beaumont and Fletcher. The parts in the masques of the sixteenth and seventeenth centuries were usually taken by the first personages of the kingdom; at court the king, queen and princes of the blood often performed in them. Under James I the masque assumed a higher character, more care being expended in its preparation. In the writing of such works Ben Jonson takes an important place, his masques, despite much that is frigid and pedantic, having not a little genuine poetry. Milton's *Comus* is, from the literary point of view, the most beautiful of the productions which bear the name of masque, though it is possibly defective in the matter of spectacle and music.

MASS, in the Roman Catholic Church, the prayers and ceremonies which accompany the consecration of the eucharist, or all that part of the service in which the eucharist is offered. At present the mass consists of four chief parts, (1) the introduction, (2) the *offertorium,* or sacrifice, (3) the consecration, (4) the communion. These four chief parts, of which the latter three are considered the most essential, are composed of several smaller parts, each having its proper denomination. They consist of prayers, hymns, shorter and longer passages of the Holy Scriptures and a number of ceremonies, which, as the essential point of the mass is the sacrifice of the Lord, consist partly of symbolical ceremonies commemorative of important circumstances in Jesus Christ's life, or signs of devotion and homage paid to the presence of the Lord in the host. The order of these ceremonies, and of the whole celebration of the mass, is given in the missal, or mass book.

Mass can be offered only by a priest, and he must have fasted absolutely from the midnight previous till the morning of the service. Each priest may offer three masses on Christmas, but only one on other days, unless there be a lack of priests, when two masses may be offered on Sunday. *Votive mass* is an extraordinary mass, instead of that of the day, rehearsed on some special occasion. *Low mass* is the ordinary mass, performed by the priest without music. *High mass* is celebrated by the priest, assisted by a deacon and sub-deacon or other clergy, and sung by the choristers, accompanied by the organ and other musical instruments. A mass for the dead is called a *requiem.*



MASSACHUSETTS, *mas a chu'sets,* one of the leading manufacturing states in the Union, as well as one of the foremost in material and educational progress. It belongs to the New England group of states, and in early American history was an influential and progressive colony among the original thirteen. The first permanent English settlement north of Virginia was founded in 1620 on a rugged coast of what was later popularly called the Old Bay State, and from that date to the present this region has had an important place in American history. The beautiful bay on which the city of Boston is located suggested the popular name. Massachusetts is the name of a tribe of Indians who roamed its forests in early colonial days.

Location and Area. Massachusetts touches five states—Vermont and New Hampshire on the north, Connecticut and Rhode Island on the south, and New York on the west. The Atlantic Ocean forms all of its eastern and part of its southern boundary. Though it has an average width from north to south of only forty-eight miles, the eastern section expands irregularly, making the extreme northern and southern points about 110 miles apart. From east to west Massachusetts has an extent of about 184 miles. The state is about half the size of Switzerland, and of its total area of 8,266 square miles, 227 square miles are water. Among the states of the Union it ranks forty-fourth in size.

People. Massachusetts is exceeded only by Rhode Island in density of population, the average number of inhabitants to the square mile being 418.8 in 1910. According to the census of that year the population was 3,366,416. On July 1, 1918, according to a Federal estimate, it was 3,832,790. The Irish are numerically the most important of the foreign-born inhabitants, and Canadians come next in order, but over forty races are represented in the population. It is a significant fact that 92.8 per cent of the people are to be found in cities, drawn there by great industries that abound in every municipality.

Surface and Drainage. The eastern part of the state is low, rising by slight undulations to a divide which separates the eastern tributaries of the Connecticut from the streams flowing into the Merrimac, or directly to the ocean. That portion of the state extending southward to Buzzard's Bay is especially low and sandy. An extension of this plain forms Cape Cod Peninsula, which is a distinguishing feature of the topography of the state. This encloses

between the bend and the main coast a large bay known as Cape Cod Bay.

The coast line, which is very irregular, has an extent of nearly 300 miles, not including the shore lines of the islands and smaller inlets. Among the excellent harbors formed by the many indentations are Boston Bay and Buzzard's Bay. To the west of Buzzard's Bay extensions of Narragansett Bay touch the state in two places. South and east of Buzzard's Bay lie several islands, the most noted of these being Martha's Vineyard, Nantucket and the Elizabeth Islands. Besides these, there are many other islands along the coast. A ship canal across Cape Cod Peninsula, completed in 1914, connects Cape Cod and Buzzard's Bay.

This eastern slope culminates in the west in a plateau, which in some places attains an altitude of 1,100 feet. It occupies a large area in the central part of the state, and is a beautiful region, diversified by low ranges of hills which are outlying sentinels of the White Mountains, and by charming valleys in which are found many clear lakes and ponds with wooded shores. The highest elevation is Mount Wachusett, 2,100 feet. East of the Connecticut River the surface slopes gently towards that stream, and in the river valley are a number of low, isolated peaks, of which Mount Holyoke and Mount Tom are the most widely known.

West of the Connecticut River the surface rises to low mountains which, under the name of Berkshire Hills, cross the state from north to south. These are an extension of the Green Mountains and consist of two distinct ranges, the Hoosac Mountains and, farther west, the Taconic range, on nearly the western boundary of the state. These ranges are separated by deep valleys. This combination of hill, valley, stream and lake renders a large part of Massachusetts notable for the beauty of its scenery, and makes it unusually attractive as a summer and vacation resort.

All of the rivers have worn deep channels and flow through comparatively broad valleys. The Merrimac, watering the extreme northeastern part of the state, is navigable for about eighteen miles, but is chiefly important for its water power. Its important tributaries from Massachusetts are the Concord and the Nashua. In the southeastern part of the state, the Taunton, flowing into Narragansett Bay, is the most important stream. The Connecticut crosses the state from north to south and is the largest river. It receives from the east Miller's, the Bachelor and the Chicopee rivers, and from the west the Green, the Deerfield and the Westfield. The Housatonic flows between the Hoosac and Taconic mountains southward into Long Island Sound, and the Hoosac, which rises in the northern part, flows in a northwesterly direction to the Hudson.

None of these streams is navigable except for small boats, but all of them, besides many smaller mountain streams, are important for the water power which they furnish, and the location of such manufacturing centers as Lowell, Lawrence, Haverhill, Waltham and other places is due to the falls in the streams where the towns are situated. The state contains a large number of small lakes, usually known as ponds. Industrially these are of little importance, but they add greatly to the beauty of the scenery, and some of them are sources of water supply for neighboring cities.

Climate. The climate is variable, especially along the coast, with prevailing east winds. In the mountainous regions, the winters are rather severe, with prevailing winds from the north and northwest and a comparatively-heavy snowfall; but in the interior, the temperature is more equable, and the seasons are less extreme. The temperature ranges from 20° below zero to 100° above; the mean annual temperature is 48°; the average rainfall, 44.99 inches.

Mineral Resources. Massachusetts is not rich in minerals, although it has alternated with Vermont in certain periods as the leading state in the production of granite. Hampden County, a little west of the center on the southern boundary, contains extensive quarries of sandstone. Limestone is quarried in the western part of the state and is used principally in the manufacture of lime. Clay suitable for brick, tile and pottery is quite generally distributed over the state, and in some localities there are valuable slate quarries. Emery is also found in profitable quantities, and in this mineral Massachusetts ranks first among the states. The other mineral products, of which there are a considerable number, are of less commercial value.

Fisheries. Massachusetts is one of the leading states in the catching and curing of fish, the total of fishery products landed at

Boston and Gloucester alone, in 1910, being in excess of 160,000,000 pounds, worth $5,000,000. For the entire state the value was more than $7,000,000. Many towns along the coast are almost entirely devoted to this industry. Cod, halibut, herring and mackerel are taken off shore in large numbers, while many fishing fleets make regular voyages to the Grand Banks for cod; Gloucester is the headquarters of the cod-fishing fleets. On the south coast are extensive oyster beds, and other varieties of shellfish are also found in this vicinity. At Woods Hole, on Buzzard's Bay, is one of the most important stations of the United States Fish Commission.

Agriculture. The valleys of the Connecticut, the Housatonic and other streams are fertile and well suited to agriculture, but the slopes of the mountains and parts of the hill country consist of a rocky, unproductive soil and are covered with trees, so that agriculture is not a leading industry in Massachusetts, although the state is dotted with a large number of small, well-tilled farms. Farming is largely confined to the production of milk, cream, garden truck and the raising of poultry, since these products are in great demand in the numerous cities in the state. Corn, oats, hay and tobacco are also produced, the last in an ever-increasing amount. Fruits, such as apples, pears, plums and peaches, are raised in abundance, but the state is especially noted for its cranberries, which are grown on the marshy lands in the southeastern part.

Manufactures. The abundance of water power and the excellent shipping facilities have combined to make Massachusetts one of the most important manufacturing states, and it is exceeded in this line only by New York, Pennsylvania and Illinois. In the production of cordage and twine, cotton and woolen goods and boots and shoes Massachusetts leads all the other states. The great centers of cotton manufacture are Lowell, Lawrence, Fall River and New Bedford, and Lawrence is also an important center for the manufacture of woolen goods. The total output of the cotton and woolen mills is valued at about $400,000,000 annually. The leading cities in the manufacture of shoes are Lynn, Brockton and Haverhill. Waltham contains the largest watch factory in the world. Boston, the largest manufacturing center, is characterized by a great diversity of products.

Machinery, tools, electrical apparatus and supplies, hardware and carriages are also made in large quantities. Another important industry in which the state takes high rank is the manufacture of paper from wood pulp. The great paper mills at Holyoke have attained more than a national reputation for the quality of writing paper which they produce, and much of the best book paper is also made within the state. Other industries of less magnitude, but still important, include the manufacture of rugs and carpets, silks, furniture, silverware and jewelry, and slaughtering and meat packing. The manufacturing centers are widely distributed over the state, though they are most numerous in the eastern portion. The importance of these industries is seen from the fact that even before the World War the value of the products manufactured was not less than a billion and a half dollars.

Transportation and Commerce. There are good harbors at Boston, New Bedford and Provincetown, which admit the largest ocean steamships. Railways extend through the state in every direction, so almost every town has railway communication. These lines either belong to, or are connected with, the great systems extending to the west and south and thus afford access to the great markets and sources of supply of raw materials in those regions. The chief railroad center of the state is Boston; Springfield is also important. Both of these cities are connected with two great centers of communication in a neighboring state, New York and Albany. Within the state there are about 5,000 miles of steam railway. Electric lines connect neighboring towns, and a number of systems have been extended long distances. These lines are multiplying from year to year, and their mileage already exceeds that of the steam railways. Public highways, maintained by a state commission, are unusually good, having a mileage of 18,681 miles in 1915, of which 8,506 miles were surfaced roads.

The commerce of the state is very extensive, the foreign commerce being exceeded only by that of New York. Of this trade Boston is the great center, and it has direct steamer connection with many of the leading ports of Europe. Boston is not only the chief seaport of New England, but it has been for many years one of the principal outlets for the grain and meat of the West. The extensive commerce of Massachusetts is

Items of Interest on Massachusetts

Massachusetts has twenty-five cities of more than 25,000 inhabitants—a larger number than any other state.

Lexington, the scene of the first conflict in the Revolution, has many historical relics and buildings, including the Hancock House, now a museum, which sheltered Samuel Adams and John Hancock the night before the "nineteenth of April in Seventy-five," and likewise the old tavern frequented by the minutemen.

Concord, the oldest interior town in the state, was the scene of the defeat of the British on April 19, 1775; in later years it was the home of many celebrated writers and philosophers, including Emerson, Hawthorne, Thoreau, the Alcotts, Margaret Fuller Ossoli, and William Ellery Channing.

In 1639 the first printing press in America was set up in Cambridge.

The mines at Chester produce more emery than do those of any other state, while Massachusetts as a whole supplies as much emery as do all the other states together.

The first free school in America was established at Dedham, in 1644.

The leading technical schools are the Massachusetts Institute of Technology at Boston and the Worcester Polytechnic School at Worcester. The former is world famous.

The first college for women was founded at Mount Holyoke in 1837.

The white population of the state is divided about equally among native-born with native-born parents, native-born of foreign or mixed parentage, and foreign-born.

Cambridge, a suburb of Boston, was for years the home of Longfellow and Lowell. Craigie House, the Longfellow residence, is preserved as a memorial of the poet.

Tobacco has been raised in the Connecticut Valley since colonial days.

The Berkshire Hills region is sometimes called the "Lake Region of America." Mount Greylock, the highest elevation in Massachusetts (3,538 feet), is in the northern part of the Berkshires.

The Roman Catholics outnumber all the Protestants combined. Of the latter the Congregationalists are the strongest. The Christian Science church has its headquarters in Boston.

Boston is the seat of the oldest historical society in America—the Massachusetts Historical Society. Its library possesses the Parkman collection of rare manuscripts relating to the history of the French in Canada.

The original site of Boston was a small peninsula called Trimountaine because of its three hills. The modern form of this word is *Tremont*.

The islands of Martha's Vineyard and Nantucket have the highest yearly average of wind velocity recorded in the United States—fourteen miles per hour.

Questions on Massachusetts

What other states are in the same degree of latitude? Longitude?

How does Massachusetts compare in size with Texas? California?

Name three important bays. What important cities are located on them?

What fish are principally caught? Where are the oyster beds?

Name five important articles of manufacture.

Locate and describe the Hoosac tunnel.

How does the population of Massachusetts compare with that of Texas? What. is the population to the square mile?

For what is Plymouth celebrated? Concord? Lexington?

When and where was the first university founded in America?

Name some early leaders of the Pilgrims.

What important events at the beginning of the Revolutionary War took place in Massachusetts?

What six places in Massachusetts do you think would be the most interesting to visit?

due largely to the variety and extent of its manufactures. The imports consist largely of wool, hides, fibers and vegetable grasses and other raw materials for the factories, while the exports include cereals, cattle and dressed meats, lumber and cotton from the West and South, and fish and all lines of manufactured goods produced in the state.

Government. The legislature, known as the general court, consists of a senate of forty members and a house of representatives of 240 members, all elected annually. The executive department consists of a governor, lieutenant-governor, secretary, treasurer and receiver-general, auditor, attorney-general, also elected annually. The governor is assisted by a council of eight members, elected annually by districts. The judiciary department comprises a supreme court, with a chief justice and six associates, and a superior court, consisting of a chief justice and twenty-two associates. The judges for these courts are appointed by the governor, with the advice and consent of the council. Below these are the municipal and police courts in Boston and large towns and the district courts. Counties have probate courts and courts of insolvency.

Local government is by township, and it was in Massachusetts that this peculiar form of government originated. The affairs of the town are in the hands of three or five officers, known as selectmen, who, together with other township officials, are elected at the annual town meeting, in which every voter of the town has the right to vote.

Education. The first free school (1635) and the first college (1636) in the United States were in Massachusetts. The state has not only the oldest, but one of the best systems of public schools in the Union (see MANN, HORACE). There is a state board of education of nine members, appointed by the governor. This board appoints a commissioner of education, who is the executive officer of the board, and who has the supervision of all educational work supported in whole or in part by the state. Each town of sufficient size (5,000 to 8,000 inhabitants) employs a superintendent who devotes his entire time to the schools of that town. Smaller towns combine to form superintendency unions for the employment of superintendents.

The state maintains a number of trade schools and special schools for instruction in household arts. There are ten normal schools for the training of teachers. There is no state university, but there is a state agricultural college at Amherst. Chief among the higher institutions of learning are Harvard University, Amherst College, Williams College, Massachusetts Institute of Technology, Worcester Polytechnic Institute, Clark University (including Clark College), Boston University, Holy Cross College, Boston College and Tufts College. Among the colleges for women are Mount Holyoke College, Wellesley College, Smith College, Radcliffe College, which is closely allied with Harvard University, Wheaton College and Simmons College. In addition to these colleges and universities the state contains a large number of secondary schools, colleges and professional schools.

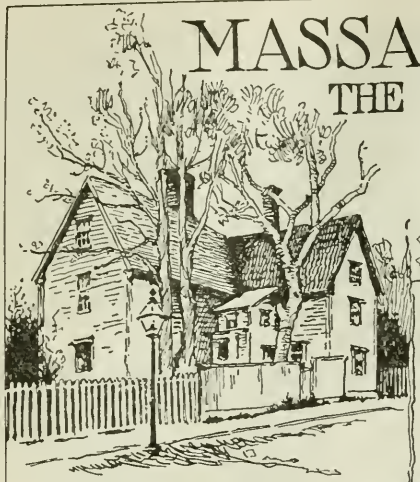
Institutions. The principal schools for the deaf are located at Boston, Northampton and Randolph. There is a large school for the feeble-minded at Waltham, and a hospital school for crippled children at Canton. The blind are educated at the Perkins Institution and Massachusetts School for the Blind in Boston. The hospitals for the insane are at Danvers, Medfield, Northampton, Taunton, Westboro and Worcester. There is a reformatory for men at Concord and one for women at Sherborn. The state prison is at Boston. Other institutions include a leper colony on Penikese Island; the state infirmary at Tewksbury, the state farm at Bridgewater, a hospital for epileptics at Monson, a prison camp and hospital at Rutland, a hospital for inebriates at Foxborough and several industrial schools for boys and girls, such as the Lyman School for Boys at Westborough and the Industrial School for Girls at Lancaster.

Cities. Massachusetts has more large towns than any other state in the Union. There are forty municipalities with populations over 15,000, and 103 with more than 5,000 people in 1910. The first ten, in order of size, are Boston, the capital; Worcester, Fall River, New Bedford, Lowell, Cambridge, Springfield, Lynn, Lawrence and Somerville.

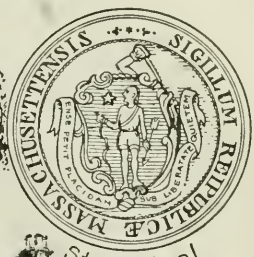
History. The coast of Massachusetts was probably explored by the Norseman about A. D. 1000; by the Cabots in 1497; by Bartholomew Gosnold, who attempted to make a settlement on the Elizabeth Islands in 1601, and by John Smith in 1614. But a permanent settlement was not made until 1620,

MASSACHUSETTS

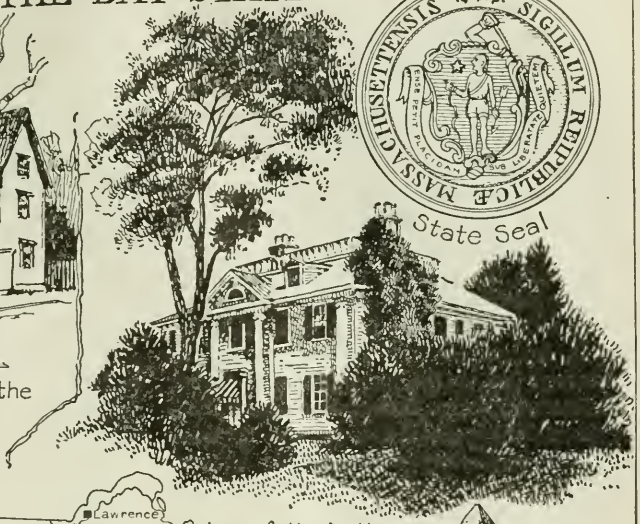
THE BAY STATE



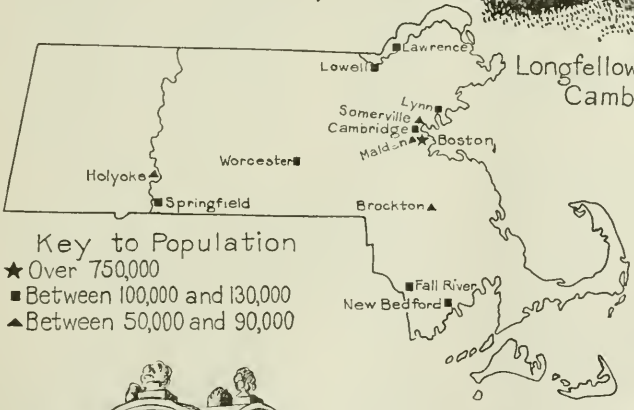
Hawthorne's "House of the Seven Gables," Salem



State Seal



Longfellow's Home, Cambridge

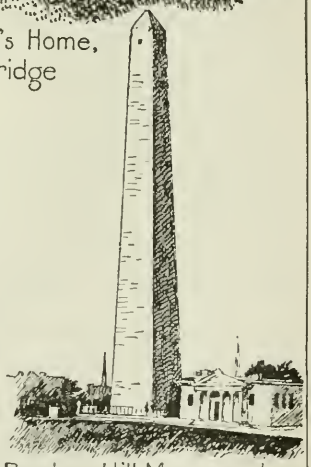


Key to Population

★ Over 750,000

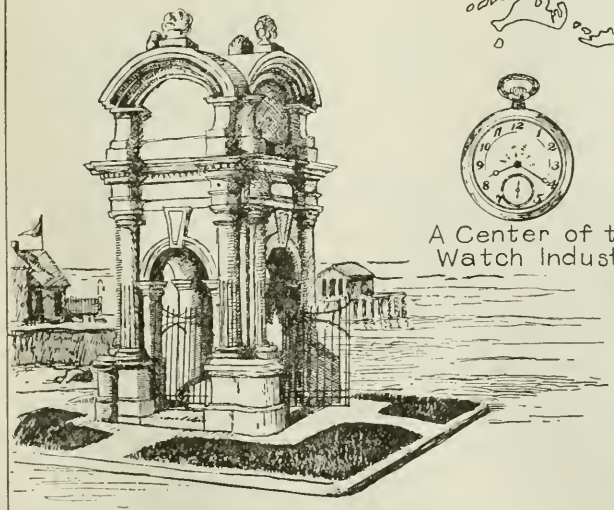
■ Between 100,000 and 130,000

▲ Between 50,000 and 90,000

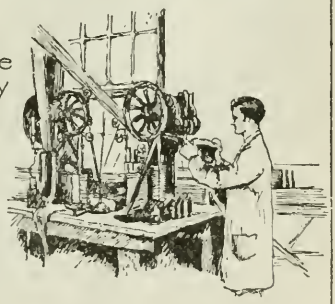


Bunker Hill Monument

A Center of the Watch Industry



Canopy over Plymouth Rock



Sewing Shoes in a Shoe Factory

when about one hundred English Separatists, known as Puritans in England, who had gone several years before to Holland, vainly seeking a home there, sought to found one in the New World, and landed at Plymouth. In 1630 another company of Puritans, also from England, settled at Salem, and this village, with other settlements, made soon at Boston and elsewhere, formed the Massachusetts Bay Colony.

Two contrary principles were conspicuous in the life of the Massachusetts Bay Colony, one an insistence upon political self-government, the other a rigid adherence to religious intolerance. However, some of its leaders were among the most admirable figures in early American history. Religious intolerance led to the banishment of Roger Williams and Anne Hutchinson about 1636, the persistent persecution of the Quakers and, later, of the supposed witches. Numerous Indian wars caused great suffering during the seventeenth century. In 1692 Plymouth and Massachusetts Bay were united under a new charter, less liberal than the preceding ones.

During the eighteenth century the colony of Massachusetts experienced rapid development, which was impeded only by the troubles with the French and Indians, the strife with the king for the maintenance of its charter, and minor boundary disputes with neighboring colonies. Massachusetts led in the pre-Revolutionary struggle, furnishing not only ideas but leaders. It was the scene of some of the most important of the early events of the war. Notable among these were the battles of Lexington, Concord and Bunker Hill, the Boston Massacre and the Boston Tea Party. The first state constitution was adopted in 1780, and it abolished slavery within Massachusetts. The heavy taxes which were imposed on account of the Revolution led to a rebellion in 1786, known as Shays's Rebellion, but this was soon suppressed.

Massachusetts was among the first to ratify the Constitution (January, 1788), but during the early years of the Republic the state was strongly Anti-Federalist. After 1797, however, Federalism predominated until the downfall of the party, partly on account of the Hartford, Convention, with which Massachusetts was closely associated. The antislavery movement of later years practically started in Massachusetts, and during the Civil War the state furnished to the Federal army about 160,000 men, and to the navy at least 30,000 men, its governor, John A. Andrew, being one of the most conspicuous of the "war governors." Since the Civil War the state has been prominent in all reform movements, especially with regard to education, temperance legislation and conditions of the laboring classes, especially of women and children. It has been almost uniformly Republican in national politics. In 1917 a convention was called to frame a new constitution.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Adams
Amesbury
Berkshire Hills
Boston
Brockton
Brookline
Cambridge
Cape Cod Canal
Chicopee
Connecticut River
Everett
Fall River
Fitchburg
Gardner
Gloucester
Haverhill
Holyoke
Holyoke, Mount
Hoosac Tunnel
Lawrence
Leominster
Lowell
Lynne
Malden
Marlboro
Martha's Vineyard
Merrimac River
Nantucket
New Bedford
Newburyport
North Adams
Northampton
Peabody
Pittsfield
Plymouth
Quincy
Revere
Salem
Somerville
Southbridge
Springfield
Taconic Mountains
Taunton
Waltham
Westfield
Woburn
Worcester

HISTORY

Boston Massacre
Boston Tea Party
Bunker Hill, Battle of
Hartford Convention
King Philip
Lexington, Battle of
Massachusetts Bay Colony
Massasoit
Mayflower
New England Confederation
Old South Meeting House
Pilgrims
Plymouth Colony
Plymouth Rock
Shays's Rebellion
Witchcraft

EDUCATION

Amherst College
Boston University
Clark University
Harvard University
Mann, Horace
Massachusetts Institute of Technology
Radcliffe College
Smith College
Tufts College
Wellesley College
Williams College

BIOGRAPHY

Adams, John
Adams, John Quincy
Bradford, William
Dudley, Thomas
Eliot, Chas. W.
Eliot, John
Emerson, Ralph Waldo
Endicott, John
Everett, Edward
Garrison, Wm. Lloyd
Hawthorne, Nathaniel
Hutchinson, Anne
Hutchinson, Thomas
Longfellow, Henry W.
Lowell, James Russell
Phillips, Wendell
Revere, Paul
Sumner, Charles
Warren, Joseph
Webster, Daniel
Whittier, John G.
Williams, Roger
Winthrop, John

MASSACHUSETTS BAY, an indentation in the coast of Massachusetts, between Cape Ann on the north and Cape Cod on the south. The bay is about fifty miles long, from north to south, and about twenty-five miles wide. Cape Cod Bay is a southern extension.

MASSACHUSETTS BAY COLONY, the colony established by a body of English Puritans at the present site of Salem, Mass., in 1628. The first colony consisted of a party of sixty, under the leadership of John Endicott. This company was, from the very first, practically independent of English control, and authority was formally transferred to America in 1630. Massachusetts Bay Colony suffered from sickness, internal dissension and poor management, and later, from the most vigorous religious persecution in American history, causing the establishment of other towns and colonies, notably New Hampshire, Rhode Island and Connecticut. Massachusetts Bay Colony is honored as having established the first American college (see HARVARD UNIVERSITY) and the first American printing press.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, a scientific and industrial school of high grade, established in Boston in 1865. The original plan upon which this school was founded provided not only for the study of principles, but for the training of students in their practical application to various professions and occupations, and it was the first school of high grade established in the United States upon this plan. It now maintains the following courses of study, each extending over four years and leading to the degree of Bachelor of Science: electrical, civil, mechanical, chemical and sanitary engineering, mining engineering and metallurgy, architecture, chemistry, physics, biology and public health, general science, geology and geodesy, naval architecture and marine engineering and electro-chemistry. The work of each of these departments assists and strengthens that of all the others. There are also postgraduate courses in most of these departments.

The institute has a number of laboratories constructed on a very large scale, so that much of the work done in them assumes the proportion of that in actual industrial establishments. This enables the students to solve many problems in a practical way and thus to fit themselves for taking prominent positions in engineering or industrial works. The number of instructors is nearly 300, and the number of students is about 1,800; among these are found representatives from all states in the Union and from about thirty foreign countries. The library contains 122,000 volumes.

MAS'SAGE, or *ma sahzh'*, a form of medical treatment in which the body of the patient, or some particular part of it, is stroked, rubbed, kneaded, pinched, pressed and squeezed by the hands of a skilled attendant. The effect of this treatment is to assist and stimulate the circulation and to increase the waste-removing action of the lymphatic vessels. The nutrition, not only of the parts acted upon, but of the whole body, is thus improved, swellings are reduced and inflammation decreased. The process is performed upon the naked skin by the bare hands of the operator, who needs strong, firm, soft hands and must be carefully trained. Moreover, he should have a sufficient knowledge of anatomy to be able to locate with the fingers a single muscle or group of muscles for treatment, and to trace the direction of the larger vessels and nerve-trunks and act upon them directly. The treatment has been remarkably successful in cases of nervous disorders of a hysterical kind, and in cases of wasting through imperfect nutrition dependent upon disturbances of stomach, bowels or liver. Facial massage as an aid to beauty is also in great vogue. See OSTEOPATHY.

MAS'SASOIT (1580–1661), a "good Indian" and father of a bad one, was chief of the Wampanoags. When the whites first knew this tribe, its numbers were small and the people were feeble and ready to make an alliance with the whites. The treaty was not broken for fifty years, and Massasoit was always faithful. His home was near the site of the present town of Bristol, R. I. At his death his son Philip became king. See KING PHILIP.

MASSENET, *mas nay'*, JULES EMILE FREDERIC (1842–1912), a French composer. He studied at the Paris Conservatoire and in 1878 became a professor there. He composed several operas, of which the best-known are *Herodias*, *Don César de Bazan* and *Thais*. All are included in grand-opera repertoires. They are notable for their fine instrumentation. He is also well known as a song writer.

MAS'SILLON, OHIO, a city in Stark County, sixty-five miles south of Cleveland and eight miles west of Canton, on the Tuscarawas River and the Ohio Canal and on the Baltimore & Ohio, the Pennsylvania, the Cleveland & Marietta and the Wheeling & Lake Erie railroads. It is in a bituminous coal field and has quarries of valuable white sandstone. The industrial establishments in-

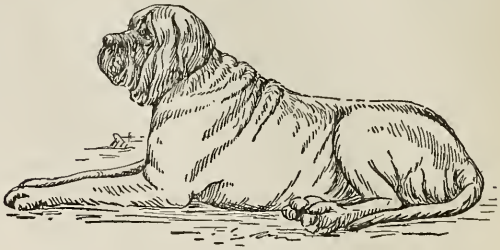
clude foundries, rolling mills, machine shops, glass works and rubber factories. A state hospital for the insane is located here; there is also a Federal building, a library and a hospital. The place was founded in 1825, was incorporated as a village in 1853 and as a city in 1868. Population, 1910, 13,879; in 1917, 15,509 (Federal estimate).

MASTER'S DEGREE, a degree conferred by most modern universities upon condidates who have completed a year's course of study in addition to the regular courses prescribed for the bachelor's degree. The specific title awarded depends upon the nature of the course, as *Master of Arts* (A. M. or M. A.), *Master of Science* (M. S.) and *Master of Laws* (LL. M.). The latter is conferred only on lawyers. The master's degree is between the bachelor's and the doctor's degrees in rank.

MAS'TERSINGERS, in German, *Meistersingers,* were literary guilds which flourished in Mainz, Strassburg, Augsburg, Nuremberg and other German cities in the fourteenth and fifteenth centuries. They had their origin in meetings of German burghers who gathered together on winter evenings to sing the songs of the minstrels. In course of time these burghers began to write their own songs, and eventually they were organized under a charter and coat of arms granted by Charles IV. The various guilds would hold contests at which competitors sang their own compositions, and prizes of money or wreaths of flowers were awarded. A series of rules dealing with literary form were drawn up, which worked against the development of any real poetic talent. About the only great poet among the Mastersingers was Hans Sachs (which see). After the sixteenth century the organization gradually went out of existence, but a solitary guild lingered at Ulm until 1839.

MASTICATION, *mas ti ka'shun,* the process of dividing the food by the combined action of the jaws and teeth, the tongue, the palate and the muscles of the cheeks. By it the food, besides being finely divided, is mixed with the saliva. Imperfect mastication is a source of indigestion. See DIGESTION; FLETCHERIZING.

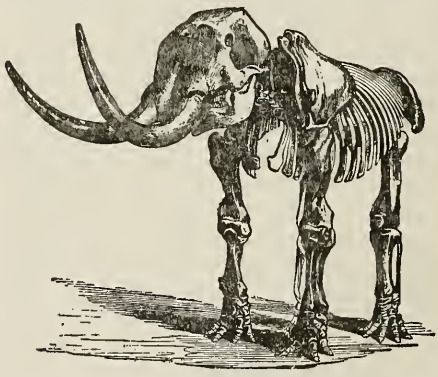
MAS'TIFF, a large dog of the hound group. The mastiff is a noble-looking dog, with a large head, a broad muzzle, thick lips, which hang down on each side of the mouth, hanging ears and smooth hair. The height of the shoulders usually ranges from twenty-five to thirty inches. The usual color is some shade of buff, with dark muzzle and ears.



MASTIFF

Mastiffs are good watchdogs, and are also prized as pets. See DOG.

MAS'TODON, an extinct genus of elephants, the fossil remains of which first occur in the Miocene rocks of the Tertiary period, persist through the Pliocene and Post-Pliocene epochs (see GEOLOGY). In general structure, the mastodons bear a close resemblance to the existing species of elephants. Their chief peculiarities consist in the form and structure of the teeth and in the curious mammillary processes from



MASTODON

which the name is derived. The geographical range of the mastodons included North America, Europe and Asia. An American specimen measured eighteen feet in length and eleven feet and a half in height.

MATABE'LE, a Zulu race or tribe, inhabiting Matabeleland, a part of the British colony of Rhodesia, South Africa, between the Limpopo and the Zambesi, north of the Transvaal. Into this section they removed from Natal in 1827, under the leadership of their chief, Moselikatse. They are estimated to number about 240,000.

Matabeleland came under British influence in 1888. Five years later a native re-

volt was put down, as was also another in 1896. After this there was peace, the natives being given a share in the government.

MATAN'ZAS, Cuba, a seaport and capital of the province of the same name, on Matanzas Bay, fifty miles east of Havana. It has a large, safe harbor, and the town ranks in commercial importance next to Havana. There is steamship connection direct with New York City. The town is the oil-refining center for the whole island. The chief exports are sugar, molasses, coffee and tobacco. Population, 1916, 65,468.

MATCHES, small splints of wood, one end of which is dipped into a composition which takes fire by friction or other means. One of the first forms of match was the brimstone match, which consisted of a thin strip of dry pine wood, with a pointed end dipped in sulphur. These matches were lighted with tinder ignited by a flint and steel. In 1827 the ordinary friction or lucifer match was introduced. The head of this match contained a mixture of chlorate of potash and sulphide of antimony, which had been previously dipped into melted sulphur. These matches were ignited by being drawn through a piece of folded sandpaper. Improvements on the lucifer match consist principally in producing a composition which will ignite with less friction and in covering this with some substance that protects it from the humidity of the atmosphere. For many years sulphur was a prominent ingredient of the heads of matches, but owing to its disagreeable odor it has now been discarded in favor of paraffin. Among other ingredients, white phosphorus was also formerly used for match heads, but because of its ill effects on the workmen, it has been forbidden in most countries engaged in match manufacture.

Pine or poplar wood is used in the manufacture of modern matches, the work being done by machinery. The wood is first freed from all knots and cross-grained sections, then dried and sent to the factory, where it is cut into two-inch planks. The planks are cut into pieces the length of a match, and these pieces are then cut by knives or dies into strips containing splints for matches or into individual matches, according to the plan of the plant. These splints are placed in cast iron plates which form an endless chain that moves along over a heated block, where they are warmed so that the paraffin into which the end is dipped will not harden on the surface. From the warming block the splints pass over shallow tanks or pans containing the various substances that make the head, in the order in which they should be added. As they pass along, the ends of the matches are dipped successively into each of these pans. The heads are dried by blasts of air, and the matches are then dropped in quantities into boxes which the machine places on the table. The boxes are then covered and packed for shipping.

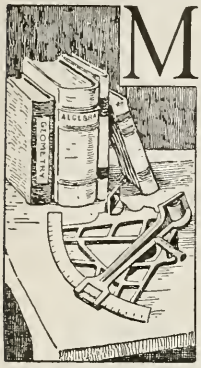
Safety matches are made by placing a part of the substance for the head on the match and the remainder on the box. The match cannot be ignited unless the head is rubbed over this prepared surface.

MATE, an officer in a vessel of the merchant marine next below the captain in rank. On a large vessel there are two or more mates, designated as first mate, second mate, and so on. Each has specified duties, and is responsible to the captain for faithful execution of them.

MATE, *mah'tay,* or **PARAGUAY TEA,** a plant of the holly family, raised in Paraguay, Brazil and some other South American countries. Its leaves are extensively used in the place of tea. The plant is in the form of a large shrub or small tree, with smooth leaves and small flowers. The tea is made by placing the dried leaves in a vessel and pouring boiling water upon them. The drink is highly prized by the people of South America, but is usually nauseating and distasteful to others. Like ordinary tea, it has a high percentage of caffein. The term *mate* was originally the name of the vessel in which the drink was made.

MATE'RIALISM, in philosophy, that system which denies the existence of a spiritual or immaterial principle in man, called the mind, or soul, distinct from matter. The first theory of materialism was advanced by the early Greek philosophers, who believed that everything in the universe, even the souls of men and the gods, was made by the combination of infinite numbers of atoms, according to mathematical proportions. Since its origin, the theory has been modified many times, and modern materialism is closely associated with some theories of evolution. It denies the existence of the mind or soul as a spiritual entity and seeks to account for the activities of the mind by attributing them to the various physiological processes in the brain. Materialism is the opposite of idealism.

MATE'RIA MED'ICA, the Latin term for *materials of medicine,* is the collective name given to the materials with which physicians attempt to cure or alleviate the numerous diseases of the human body. See MEDICINE.



MATHEMAT'ICS, a general term for a number of branches of learning that deal with magnitudes, numbers and quantities and their relations. In the primary grades small pupils learning the elementary facts of arithmetic are studying mathematics, just as truly as the college student who solves intricate problems in trigonometry and calculus. Between primary and college mathematics there are many other mathematical subjects of varying grades of difficulty.

Divisions of Mathematics. The field is a broad one, but may be divided into three main departments, as follows:

(1) *Arithmetic,* that part of the science which deals with numbers, their nature, their properties and computations by means of them. It in turn includes three general divisions: first, the discussion of abstract number, that is, the abstract relations of magnitude existing between objects of the same kind; second, notation, by which those relations are expressed; third, the operations or computations by means of those symbols, to determine new or unknown relations.

(2) *Analysis,* that part of the science of mathematics in which the quantities upon which operations are to be performed are denoted by letters or other general symbols, and the operations themselves are indicated by special signs. Analysis includes four general subjects: *algebra,* which treats of the relations and properties of numbers by means of the symbols of analysis; *analytical geometry,* in which the symbols and processes of algebra are applied to geometrical quantities and processes; *calculus,* which is that part of the science of mathematics which treats of the nature, the values and the relations of a certain number of variable quantities by means of algebraic symbols and processes, and, finally, *hypergeometry* an imaginary field in which quantities of more than three dimensions are considered, their relations being determined and expressed by algebraic symbols.

(3) *Geometry,* that branch of mathematics which treats of the relations, properties and measurements of solids, surfaces, lines and angles.

Pure and Applied Mathematics. Every branch of mathematics can be divided into two parts, pure, or abstract, and applied, or practical, or mixed. *Pure* mathematics treats only of theories and principles, without regard to their application to concrete things. *Applied,* or *mixed,* mathematics considers only those phases of mathematical theories and principles which have direct or practical application to objects or actions in the material world. The principles of applied mathematics have been of invaluable service in the investigation of such physical phenomena as heat, electricity, sound and optics; of kinematics in mechanics; of surveying and geodesy; of navigation, and of astronomy. In fact, almost every discovery in science during recent times has been first evolved through the medium of mathematical formulas.

History. The science of mathematics, as we know it, was first developed by the Greeks, although the Hindus, Babylonians, Egyptians and Phoenicians had all made some progress in the understanding and organization of the science. There is evidence that some of the most fundamental principles of algebra and the beginnings of a notation had been discovered in Egypt as early as 3000 B. C. It was nearly 2,500 years later that geometry was first formally organized, but during the next 300 years it was rapidly developed by Pythagoras, Plato, Euclid, Archimedes and Apollonius. For many centuries after the Roman conquest of Greece, mathematical progress was confined almost wholly to the Orient. During that time the Hindus, represented especially by Aryabhatta and Brahmagupta, began the investigation of the theory of numbers, made considerable progress in algebra, arithmetic, geometry and trigonometry, and first developed the present system of notation, which is often wrongly attributed to the Arabs.

The sixteenth century witnessed the first important mathematical progress in Europe, the advance beginning in Italy. Shortly afterward, there was also an awakening in France, and before the end of the century, through the labors, especially, of Descartes,

Kepler and Pascal, the science of algebra and elementary geometry had attained almost perfection, the theory of numbers had been wonderfully developed and analytical geometry had appeared. About the same time Leibnitz and Newton simultaneously expounded the theory of calculus, thus vastly extending the domain of mathematics and eventually revolutionizing all science. During modern times little addition has been made to the knowledge of the fundamental principles of mathematics, but they have been applied in a multitude of new ways and forms.

Related Articles. For additional information consult the following titles:

Algebra	Geometry	Napier, John
Archimedes	Kepler, Johann	Newton, Sir Isaac
Arithmetic	Laplace, Pierre	Plato
Calculus	Mensuration	Pythagoras
Descartes, René		Trigonometry
Euclid		

MATH'ER, Cotton (1663–1728), an American minister and writer, the eldest son of Increase Mather, was born in Boston. He was graduated at Harvard College in 1678, and in 1684 was ordained minister in Boston, as colleague of his father. The subject of witchcraft interested him greatly, and in 1689 he published his *Memorable Providences Relating to Witchcraft and Possessions,* which was used as an authority in the persecution and condemnation of nineteen victims burned for witchcraft at Salem in 1692 (see Witchcraft). In 1693 appeared the *Wonders of the Invisible World,* a work intended to convince every one of the reality of witchcraft. Between that time and his death he produced many other works, among them the *Magnalia,* an ecclesiastical history of New England, and *Parentator,* a life of his father. He died with the reputation of having been the greatest scholar and author in America.

MATHER, Increase (1639–1723), one of the early presidents of Harvard College, was born at Dorchester, Mass. He was graduated at Harvard and was ordained a minister. In 1685 he was chosen president of the college, and four years later was sent to England as agent of the province of Massachusetts to procure redress of grievances. He held conferences with King James II and with William and Mary and returned to Boston with a new charter providing for the government of the province. For an account of his son, see above.

MATTER, that which occupies space and through which force is manifested. It is also that which makes itself known to us by our bodily senses, though there is believed to exist one kind of matter, at least, which is too subtle to be perceived by the senses (see Ether). Roughly speaking, matter exists in one of three states—solid, liquid or gaseous—but these are not marked off by any distinct line.

Related Articles. Consult the following titles for additional information:

Gas	Liquid	Solid	Physics

MAT'TERHORN, or **MONT CERVIN**, one of nature's most splendid spectacles, a mighty peak in the Pennine Alps, on the boundary between the Swiss canton of Valais and Italian Piedmont. The peak, 14,782 feet above the sea, rises in the form of an immense rocky horn, the northern side of which is almost vertical. Vast glaciers are found on the slopes. Matterhorn was first ascended in 1865, by an exploring party led by Edward Whymper, a British mountain climber. Four of the party were killed in making the descent. Since then the mountain has been frequently ascended.

MATTHEW, *math'u,* Saint, an evangelist and apostle, the son of Alpheus. He was, previous to his call, a publican, or officer of the Roman customs, and, according to tradition, a native of Nazareth. After the ascension of Christ we find him at Jerusalem with the other apostles, but this is the last notice of him in scripture. Tradition represents him as preaching fifteen years in Jerusalem, then visiting the Ethiopians, Macedonians, Persians and Syrians, and finally suffering martyrdom in Persia.

MATTHEWS, *math'uze,* [James] Brander (1852–), an American author and dramatic critic, noted for his charming personality and style, and for his brilliant and sympathetic analysis of literature and life. He has contributed a most valuable addition to American literature by his works of fiction, his literary and dramatic criticisms and his other essays. Matthews was born in New Orleans, La., and was graduated from Columbia University and Columbia Law School; instead of practicing law, however, he at once entered upon his career by writing for the magazines. In 1892 he was appointed professor of literature at Columbia, and in 1900, professor of dramatic literature. Prominent in his long list of published works are the following: *Introduction to the Study of American Literature; The His-*

toric Novel; Tom Paulding, a story for children; *Vignettes of Manhattan,* containing sketches of New York life; *In the Vestibule Limited* and *The Decision of the Court,* two comedies, to be read rather than acted; *Studies of the Stage* and *Development of the Drama.* Professor Matthews was the first president of the simplified spelling board.

MATTOON', ILL., in Coles County, seventy-five miles southeast of Springfield, on the Illinois Central and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. It is in an agricultural region, where broom corn is extensively cultivated. The important industrial establishments are railroad shops, and manufactories of brooms, flour, farm implements, carriages and other articles. The principal buildings are a Carnegie Library, a hospital, a Federal building and an Odd Fellows' Home. Population, 1910, 11,456; in 1917, 12,746 (Federal estimate).

MAUMEE', a river in Indiana and Ohio, formed by the junction of the Saint Joseph and the Saint Mary's rivers at Fort Wayne, and emptying into Lake Erie. It is about 150 miles long and flows through the northwestern part of the state. The city of Toledo is situated near its mouth, and the river is navigable for twelve miles.

MAUNA KEA, *mau'nah ka'ah,* the highest peak in the Pacific Ocean, an extinct volcano on the island of Hawaii. The name means *white mountain,* for most of the year its summit is snow-covered. Its lower slopes are clothed with vegetation. Mauna Kea has the form of a huge mound, and is 12,823 feet in altitude. It is a part of Hawaiian National Park.

MAUNA LOA, *mau'nah lo'ah,* a celebrated volcano near the center of the island of Hawaii. It is the largest active volcano in the world, being 13,675 feet high and having a crater a mile and a half in diameter. In 1916 it was made a part of Hawaiian National Park. See TRAVELS IN DISTANT LANDS, subhead *Hawaii.*

MAUPASSANT, *mo pa sahN'*, HENRI RENÉ ALBERT GUY DE (1850-1893), a French author, one of the world's greatest writers of short stories. After his graduation from the College of Rouen, he served as a clerk in the Navy Department, but he gave much attention to writing, and under the instruction of Flaubert he became steadily more skilful. Among his collections of tales are *Mademoiselle Fifi, Tales of the Day and Night, Yvette* and *Father Milon,* and his most famous single tale is *The Necklace.* He wrote also a number of novels, among which are *A Life* and *Pierre and Jean.* His work is all morbid, but it is characterized by a wonderful art and by psychological insight.

MAURITIUS, *maw rish'e us,* formerly ILE DE FRANCE, is a British island in the Indian Ocean, 550 miles east of Madagascar. It is oval in form, about 720 square miles in area and is surrounded by coral reefs. The island is composed chiefly of rugged and irregular mountains. Between the mountains and along the coast are large, fertile plains and rich valleys. The climate is pleasant during the cool season, but it is oppressively hot in summer. The principal products are sugar, rice, maize, cotton, coffee, manioc and vegetables. Control is vested in a governor and a legislative council.

Mauritius was discovered in 1505 by the Portuguese, who retained possession of it until 1598, when it passed to the Dutch. The French took it about 1710, and it was captured by the British in 1810. The capital and principal town is Port Louis, on the northwest coast, is fortified and in 1916 had a population of 59,295. Population of the island, 384,253, in 1916. Only about 4,000 are white.

MAUSOLEUM, *maw so le'um,* a name applied to any tomb of artistic design, built above ground and constructed usually of marble or granite. The name is derived from the tomb of Mausolus, an ancient king who was buried near the Aegean Sea in 353 B. C. His widow erected one of the most beautiful burial places the world, ancient or modern, has ever seen. It became one of the seven wonders of the ancient world. See SEVEN WONDERS OF THE WORLD.

MAX'IM, the family name of two brothers who gained fame as inventors of war devices.

Hiram Stevens Maxim, Sir (1840–1916), was born at Sangersville, Me., but eventually became a naturalized British citizen because he believed the United States had not been fair to him. After leaving school Maxim worked as a coach builder and machinist, and later worked in New York for a shipbuilding company. He took out patents for improvements in steam engines, an automatic gas engine and an improved incandescent lamp, but his fame rests chiefly on the Maxim machine gun, which he perfected in Europe about 1880. The United States declined to

purchase his patent. Later he went to England, where he developed a large-power aeroplane. He also experimented in explosives and ordnance materials. He was made Chevalier of the Legion of Honor, and in 1901 was knighted.

Hudson Maxim (1853–), brother of Sir Hiram, was born at Orneville, Me. He devised a process for printing daily papers in colors, and was the first manufacturer of smokeless gunpowder in the United States. He developed the Maxim-Schupphaus smokeless powder used by the United States government, and invented also the explosive maximite, and the Hudson Maxim automobile torpedo. See TORPEDO.

MAXIMIL'IAN (1832–1867), an archduke of Austria and later emperor of Mexico. In 1863 he was induced by Napoleon, also by a deputation of Mexican notables, to accept the throne of Mexico. With this intention he entered Mexico in 1864. Having become involved in financial and political difficulties, Maximilian, with the approval of Napoleon, resolved to abdicate, but he was induced by the Conservative party to remain. The French army which had supported him withdrew, at the stern demand of the United States government, and after a brief period of fighting the emperor and two of his chief generals were captured and executed.

MAX'WELL, WILLIAM HENRY (1852–), an American educator, the author of a widely-known series of English grammars. He was born in Ireland, and was educated at Queen's College, Galway. Maxwell went to America in 1874 and was engaged as teacher in Brooklyn night schools. Later he became assistant superintendent, then superintendent of the Brooklyn public schools. On the consolidation of Brooklyn with New York in 1898, he was elected superintendent of public schools for Greater New York.

MAY, the fifth month in the modern calendar, and the third in the ancient Roman year. There is some doubt as to the origin of the name, but the theory that it is derived from *Maia,* the name of the Roman goddess of spring, seems plausible. May is truly a month in which spring reigns triumphant. Flowers, leaves and grass are in their freshest and richest garb, and drab winter is forgotten. Some say, however, that *May* comes from *Majores,* the Latin for *older men.* They remind us that among the Romans the month of May was sacred to the older men, while June was sacred to the younger men, or *Juniores.* May has always had thirty-one days. Its gem is the emerald, and its flower the hawthorn.

Special Days for Celebration. The first of May, or *May Day,* has been associated with out-of-door festivities from the days of ancient Rome. The Romans were accustomed to hold yearly processions in honor of Flora, goddess of flowers, between April 28 and May 3, and it is supposed that the beautiful village festivals of medieval England had their origin in this custom. The English maypole, set up on the village green the night before May Day, was bedecked in the morning with flowers, which were brought from the woods by happy young people. Especially joyous was the beauty who was chosen queen of the May, and who honored her subjects by dancing with them around the maypole. Tennyson's *May Queen* gives a charming picture of this form of merry making. (A portion of the poem will be found in these volumes in the article READING.) Dancing about the maypole is sometimes introduced very effectively into modern entertainments and school programs.

A distinctively-American celebration occurs on the thirtieth of May, when the graves of dead Union soldiers are decorated and special patriotic services are held (see MEMORIAL DAY). May thirtieth is observed universally throughout the Northern states, but Confederate soldiers are honored on various other dates between April and June. In Canada *Empire Day* (which see) is celebrated on the anniversary of Queen Victoria's birth, the twenty-fourth of May.

Anniversaries for Celebration. The following birthdays of notable persons occur in May:

Joseph Addison, May 1, 1672.
George Inness, May 1, 1825.
Jacob A. Riis, May 3, 1849.
Horace Mann, May 4, 1796.
Hubert Howe Bancroft, May 4, 1832.
Robert E. Peary, May 6, 1856.
Robert Browning, May 6, 1812.
John Brown, May 9, 1800.
James G. Bennett, Jr., May 10, 1841.
Gabriel D. Fahrenheit, May 14, 1686.
Florence Nightingale, May 15, 1820.
Honoré de Balzac, May 16, 1799.
Edward Jenner, May 17, 1749.
Alfonso XIII, May 17, 1886.
John Stuart Mill, May 20, 1806.
Albrecht Dürer, May 21, 1471.
Wilhelm Richard Wagner, May 22, 1813.
Thomas Hood, May 23, 1799.

Linnaeus, May 24, 1707.
Queen Victoria, May 24, 1819.
Ralph Waldo Emerson, May 25, 1803.
Edward Bulwer-Lytton, May 25, 1803.
Dante, May 27, 1265.
Julia Ward Howe, May 27, 1819.
Louis J. R. Agassiz, May 28, 1807.
Patrick Henry, May 29, 1736.
Walt Whitman, May 31, 1819.

The following important events occurred in May:

Battle of Manila Bay, May 1, 1898.
First Liberty Loan offered for subscription by Secretary McAdoo, May 2, 1917.
Assembling of the French States-General, May 5, 1789.
Sinking of the Lusitania, May 7, 1915.
Capture of Ticonderoga by Ethan Allen, May 10, 1775.
Death of "Stonewall" Jackson, May 10, 1863.
Minnesota became a state, May 11, 1858.
Nomination of Lincoln, May 18, 1860.
Italy declared war on Austria, May 23, 1915.
Empire Day first observed in Great Britain, May 24, 1904.
Constitutional Convention began its work, May 25, 1787.
Wisconsin became a state, May 29, 1848.
Death of Joan of Arc, May 30, 1431.
Johnstown flood, May 31, 1889.
Battle of Jutland, May 31, 1916.

MAYA, *mah'ya*, a race of Indians living in Yucatan and the adjacent regions of Mexico and Central America, at the time of the Spanish invasion (about 1520). They were partially civilized, resembling in their habits the Aztecs of Mexico. They raised vegetables, kept bees and were remarkably skilful in cloth weaving and feather work. The men wore armor in battle, and in times of peace they carried on trade in their sailing vessels, using a kind of money made from shells and pieces of copper. Before the time of the Spanish conquest Yucatan had been covered with cities, whose vast ruins astonished the whites and gave evidence of long occupancy by the Mayas. The language of the Mayas is spoken by their descendants, who number over 1,000,000.

MAY APPLE, a common plant of North America, sometimes called the *mandrake*. It belongs to the barberry family. Two large leaves are borne on a stem a foot or more high. From the fork between them grows a large, handsome flower, with waxy petals, which produces a yellowish, slightly acid, pulpy fruit, about the size of a pigeon's egg. From the root a powerful drug is prepared.

MAY BEETLE. See JUNE BUG.

MAY'FLOWER, the small sailing vessel which the Pilgrims chartered in 1620 to convey them to America. It was a boat of only 180 tons. Two vessels, the *Mayflower* and the *Speedwell*, started from Delfthaven on the historic journey, but the latter, unseaworthy, turned back after several days. The *Mayflower*, after sixty-three days sailing, reached America December 11, 1620 (new style calendar, December 21), with its 102 Pilgrim pioneers.

Related Articles. Consult the following titles for additional information:

Massachusetts — Plymouth, Mass
Pilgrims — Plymouth Rock

MAY FLY, DAY FLY, or SHAD FLY, names applied to a small insect of very interesting habits. The name *day fly* refers to the brevity of the adult stage, but it is not true that the insect lives only a day. It may live a week or more, when fully developed, and in the immature stage it exists for one, two or three years, according to the species. The eggs fall from the body of the mother may fly to the surface of a stream, lake or pond and sink to the bottom. From each egg is hatched a tiny six-legged creature called the nymph, which is soft of body and wingless. It remains under water during the whole of its existence as a nymph. When ready for the change it rises to the surface, splits open its skin and flies away on delicate wings that have all the time been forming.

Nearly all may flies undergo a second molting after acquiring wings, the period between molts being called the *subimago* stage. This may last from a few minutes to twenty-four hours, and is experienced by no other group of insects. The adult insect is very fragile, and the mouth parts are either lacking or so immature as to be useless. So far as known the adult may flies take no food, and reproduction seems to be the only purpose of the short mature stage.

MAY'HEM, an old form of *maim*, with practically the same meaning. As a legal term it refers to the wilful maiming of an adversary, as when one in a fight may inflict a wound by biting a hand or an ear of his opponent. Any deliberate injury which would make a person less able to defend himself is mayhem. If one man conspires with another to cut off a finger to escape military service, both are guilty of mayhem.

MAYO, CHARLES HORACE (1865-), and WILLIAM JAMES (1861-), two brothers who rank among the foremost surgeons of America. The elder was born at Le Sueur, Minn., the younger at Rochester, and both were edu-

cated in the schools of the latter city. William took his medical training at the University of Michigan, and Charles received his at the Chicago Medical College. In 1889 the brothers became part of the staff of the new Saint Mary's Hospital, at Rochester, and they made that institution one of the most famous in the world. Eminent surgeons have journeyed from all parts of Europe to observe their wonderful skill in operations of all kinds, as many as fifty visitors often being present on one day. A remarkably large proportion of their operations have been completely successful, even of those which had never before been attempted. In 1915 the brothers presented the University of Minnesota with an endowment of $2,000,000 and their surgical laboratory (see MINNESOTA, UNIVERSITY OF).

MAY'OR, the chief executive of a city in all English-speaking countries. He is usually elected by majority vote, and serves from one to four years, with possibility of reëlection. His duties include the enforcement of the ordinances of the city and recommendation to the board of aldermen or commission of measures for the betterment of the community. Some mayors serve without pay; large cities pay salaries, sometimes extravagant remuneration considering the type of men who frequently secure the office. The highest-salaried mayor in the United States is that of Chicago, who receives $18,000 per year. Montreal's mayor receives $10,000 the highest salary paid in Canada.

In some countries of continental Europe, particularly Belgium, Holland and Germany, for many years the mayors, or burgomasters, have been advanced to their posts through years of education for the particular duties of the office.

Related Articles. Consult the following titles for additional information:
City Manager
Commission Form of Government

MAZARIN, *maz a raN',* JULES (1602-1661), a French statesman and cardinal, an Italian by birth. He entered the Pope's military service and distinguished himself by diplomatic ability, for which he was rewarded with two canonries and the appointment of nuncio to the court of France. Here he gained the favor of Richelieu and accepted service from the king. He became a naturalized citizen of France and was made a cardinal, and in 1642, when Richelieu died, Mazarin succeeded him as Prime Minister. On the death of Louis XIII, he won over the queen regent and made himself master of the nation. The Parlement of Paris denounced his increasing taxation, while the nobility dreaded his supremacy, and the combination of these malcontents resulted in the civil war of the Fronde (see FRONDE). As the immediate result of the conflict, Mazarin had to go into exile, but finally returned to his position at court in 1653, remaining supreme until his death.


MAZARIN

MAZE. See LABYRINTH.

MAZEP'PA, IVAN STEFANOVITCH (1640-1709), a famous leader of the Cossacks. He was of a noble Russian family, and entered the service of John Casimir, king of Poland. Discovered in an intrigue with the wife of a Polish noble, he was fastened upon the back of his own horse, which was then driven out into the steppes. The horse carried him back to his home, but he was ashamed to remain there and joined the Cossacks in the Ukraine. Through his ability he became their leader, and he was made prince of the Ukraine by Peter the Great. Later, however, Mazeppa, believing that it might be possible to gain complete independence for the Cossacks, joined Charles XII of Sweden, and after the Battle of Pultowa he was obliged to flee. His history has furnished a subject for paintings, novels, poems and dramas. The most famous of the poems is Byron's *Mazeppa.*

MAZZINI, *mat se'ne,* GIUSEPPE (1808-1872), an Italian patriot, born at Genoa. He early began writing literary and political essays for periodicals, and as his writings grew more distinctly liberal in tone, the government suppressed several of the papers in which they appeared. Mazzini afterward joined the Carbonari, and as a result of his share in their disturbances he was imprisoned in Savona for some months. On his release he was exiled to Marseilles, but was compelled by the French government to retire into Switzerland. During the following five years he planned and organized various unsuccessful revolutionary movements, until, in 1837, he was expelled by the Swiss authorities and

sought refuge in London. During the revolutionary movements of 1848 he proceeded to Italy, served for a time under Garibaldi, and when the Pope fled from Rome became a triumvir in its short-lived republic. Afterwards he continued to organize various risings in Italy, and the successful expeditions of Garibaldi were due in part to his labors. His republican principles prevented him from accepting a seat in the Italian parliament, to which he was several times elected. The society of Young Italy was organized by Mazzini (see YOUNG ITALY).

MEADE, *meed*, GEORGE GORDON (1815-1872), an American soldier, born of American parents at Cadiz, Spain. He was graduated at West Point in 1835. After serving in the Seminole War, he became a civil engineer and was employed in government surveys. He reëntered the engineering branch of the army in 1842 and served in the Mexican War under General Taylor. He became a captain before the outbreak of the Civil War in 1861 and in August of that year was commissioned brigadier-general of volunteers. He served prominently through the Peninsula Campaign, and was also present at the second Battle of Bull Run; in command of a corps at Antietam he was wounded. For his gallantry Meade was commissioned major-general of volunteers.

GEORGE GORDON MEADE

He performed notable service at Fredericksburg and Chancellorsville, in covering the retreat of the Federal army, and in June, 1863, succeeded Hooker in command of the Army of the Potomac, just at the crucial point in Lee's second invasion of Pennsylvania, and fought at Gettysburg (see GETTYSBURG, BATTLE OF). Though winning a notable victory, he failed to pursue the Confederates promptly and thus incurred the censure of some military critics. Meade commanded the Army of the Potomac in Grant's Virginia campaign of 1864-1865, as a major-general in the regular army. After the war he commanded one of the military districts of the South during reconstruction days and then retired to private life.

MEADOW LARK, an American bird, called a lark because of its pleasing song, but it is not a lark. It belongs to the orioles. It is a medium-size bird, with a bronze mottled plumage above and a bright yellow belly, with a rich, black, crescent-shaped collar across its breast. Its home is in the damp meadows, where it builds an oven-like nest in a hole in the ground. There are four to six eggs. It is one of the earliest of spring birds in the north.

MEADVILLE, *meed'vil*, PA., the county seat of Crawford County, 105 miles north of Pittsburgh, on the French Creek and on the Erie, the Northwestern Pennsylvania and the Bessemer & Lake Erie railroads. The city is in a fertile region and contains railroad shops, iron works, planing mills, silk mills, chemical works and manufactories of automatic tanks, cans, corsets and vises. Allegheny College and Meadville Theological School are located here. There are four music schools, two hospitals and a library. It was settled in 1788 and was made a city in 1866. Population, 1910, 12,780; in 1917, 13,968 (Federal estimate).

MEALY BUG, a scale insect so called because of the white powder which covers its body. It is a tropical or sub-tropical insect, though it is occasionally found in some parts of the Southern United States, where it often does great injury to oranges. Other species are also enemies to greenhouse plants throughout the temperate regions. They are often accompanied by ants, which help to scatter them in greenhouses by carrying the young bugs to new feeding grounds. They may be exterminated by the use of a kerosene-soap emulsion, well diluted.

MEASLES, *me'zlz*, a contagious disease prevalent in childhood, characterized by a skin rash. It is occasionally contracted by adults, but is most common between the ages of one and five. Most people are immune to second attacks, but there are exceptions to the general rule. From one to two weeks elapse between the time of exposure and the appearance of the first symptoms. These include headache, rise of temperature toward evening, lassitude and discharges from the eyes and nose. On the fourth day small red pimples break out on the face and neck, the rash spreading later to the other parts of the body. Measles pimples have the color of a raspberry and occur in patches; those of scarlet fever are spread uniformly over the skin and

are the color of a boiled lobster. Measles is less dangerous than scarlet fever, but is more easily contracted. It is spread by secretions from the mouth or nose, and one may acquire it by touching objects previously handled by an infected person.

Though measles is not dreaded to the degree that many other diseases are, it frequently leaves behind it impaired vision or hearing, and an attack calls for careful nursing. Neglect may lead to bronchial trouble or pneumonia. A physician should be called, and the patient should be kept under his supervision. Treatment consists in protecting the eyes, keeping the patient warm and comfortable, and keeping the bowels active. A light diet is desirable. If the rash does not come out well the physician will prescribe hot drinks or other remedies. Complete isolation of the patient until a cure is effected is very important.

German Measles. This name is applied to a disease resembling ordinary measles, but of a milder nature. The rash is rose-colored and is sometimes limited to the face, neck and shoulders. An attack calls for about the same sort of nursing as is given in ordinary measles. Isolation of the patient is important, as the disease is highly contagious.

MEASUREMENTS. See MENSURATION; METRIC SYSTEM; WEIGHTS AND MEASURES; CYLINDER; CIRCLE.

MEASURING WORM, a name given to the small caterpillars of certain moths. They are long and rather slender, and their feet are grouped at the extreme ends of their bodies. Fastening their fore feet, they bring the hind feet close up to them, thus looping the body above; then raising the head and fore part of the body, they thrust it forward to its full length. From this habit they take the name given above, as well as the names *loopers* and *inch worms.* Some have the habit of thrusting their bodies out from a branch and remaining immovable in almost perfect imitation of a broken twig. Some measuring worms are extremely destructive pests. See PROTECTIVE COLORATION AND MIMICRY.

MEAT, a term applied to the flesh of poultry, cows, hogs, sheep and other animals used as food. Ordinarily a distinction is made between the flesh of these animals and that of fish, the latter being designated simply as *fish.* Meat consists of muscular and connective tissues, bone and fat. Muscular tissue is made up of bundles of hollow tubes, or fibers, joined together by connective tissue. The fibers in tender cuts are shorter than those found in tougher parts, such as portions of the animal which exercise a good deal. The flesh of young animals is also more tender than that of old ones.

Composition and Digestibility. Besides water, the chief constituents of meat are protein and fat. Nearly all the protein and ninety-five per cent of the fat in animal food are digested under normal conditions, and there is no difference in the completeness of the process in tough and tender cuts. There is, however, a difference in time required for digestion. Pork, which has a high percentage of fat, is digested more slowly than beef or mutton; veal is also somewhat long in digesting. Chicken breasts are among the most easily-digested meats. Generally speaking, the meats with comparatively little fat and with short fibers are most quickly assimilated. While more of the content of meat is digested than of vegetables, the fact that meat is more concentrated and has less waste should be considered by those with a tendency to constipation. Such persons will do well to eat sparingly of meat. It should also be remembered that undigested protein causes the formation of hordes of putrefactive bacteria in the intestines, resulting in a release of poisons in the system. Overeating of meat, which means eating more than the system can assimilate, is believed to be the cause of cancer, tuberculosis and many other diseases. Rheumatic persons should also be light meat eaters, as meat may produce uric acid in the system.

Fuel Value. The fuel value of meat, as of all other foods, is measured by the calorie, or amount of heat necessary to raise the temperature of one pound of water four degrees F. Fats are the best heat-making foods, having a fuel value of 4,040 calories per pound. Proteins have a value of 1,820 calories per pound. Meats are therefore good fuel foods. The average values of mutton, pork and beef are respectively as follows: 1,695, 1,580 and 1,040. Beans or eggs are good substitutes for meat, as both have a high percentage of protein. For detailed directions as to buying and cooking meat, see the article DOMESTIC SCIENCE, subhead *Meat.*

Related Articles. Consult the following titles for additional information:

Bacon	Fat	Mutton
Beef	Food	Pork
Calorie	Meat Packing	Proteins

MEAT PACKING. Soon after 1850 young Gustavus Swift borrowed $20 from his father to buy a cow. He had an idea if he could buy, slaughter and sell it to the neighbors, he could make some money—and he did. This was the beginning of one of America's greatest packing companies, and the industry of meat packing, whose possibilities were thus perceived, has developed into one of the world's most stupendous commercial enterprises and employs hundreds of thousands of men.

The United States is the world's center of the meat-packing business. If Adam had lived until now and could have started in the year 1 of the Jewish calendar to count silver dollars at the rate of one a minute, he would still lack many hundred million dollars of having handled enough money to buy the 90,000,000 cattle, hogs and sheeps in the United States, even though he worked eight hours every day. As practically all of these animals now being fed on the farms will sooner or later be converted into meat for the table, it is possible from this illustration to get some conception of the vastness of the packing industry and of the great aggregations of capital required to carry it on.

There are nearly 1,650 packing establishments, great and small, in the United States which are conducted under Federal supervision. In the development of the great industry there has been a tendency to concentrate packing plants at various centers, selected by reason of their geographical location or their commercial advantages. As sixty-four per cent of the population of the country lives east of Chicago and seventy per cent of the live stock is raised west of that city, Chicago is the logical center of the packing industry, particularly so when its superior shipping facilities are considered.

Other important centers are Kansas City and Saint Joseph, Missouri, South Omaha, Neb., and Fort Worth, Texas. Live stock trains are driven at express speed to these slaughtering and packing centers, and are often given the right of way over passenger trains. Every hour that an animal is entrained means loss of weight and consequently loss in profit to the owner on the farm. When each trainload reaches its destination the stock is placed in cattle yards and is then inspected and purchased by buyers in the employ of the great packing companies. In this there is often keen competition.

Few people realize the immensity of the slaughtering and meat-packing business. One of the large companies has eight great plants between Chicago and Denver. Its annual capacity is nearly 4,000,000 cattle, including calves, 8,000,000 hogs and 5,000,000 sheep, representing a slaughtering of 55,000 animals every working day—eighty-eight every working minute and one and one-half every working second. And this is the record in but one of the large plants.

After animals are purchased in the public pen they are driven to the private pens of the purchasing companies. They are allowed to rest twenty-four hours before being slaughtered, then they are given a shower bath and are ready for killing. The animals are killed after passing up inclined viaducts to the top of the building. As they pass from one process to another, their bodies are worked downward, until, when completely dressed, they are sent to the cooling rooms on the ground floor. The work is done with remarkable rapidity. It requires less than six minutes to dress a hog and less than thirty minutes to dress a steer. The division of labor is carried so far that each workman does only one thing and consequently becomes very skilful in his work.

By the use of ice, ammonia or brine the cooling rooms are kept at a temperature a little above freezing. Here the meat remains until the animal heat is entirely removed. Pork requires about three days for cooling, and after that time it is ready for the finishing processes. Beef, however, remains in the cooler at least eight or ten days before it is ready for the market, if it is to be sold as fresh meat, and some of the choicest cuts are kept for two or three weeks. This is to allow the meat not only to cool but to become tender, as well. The process is known as "ripening." Beef that is to be shipped in refrigerator cars is usually loaded after three days, because it can be kept as cool in the car as in the packing house.

Products. The different preparations of beef, pork and mutton are too numerous to mention. They may be classed as fresh meats,

salt meats, smoked meats, lard, tallow and special preparations, such as canned meats, dried beef and sausage. Each class includes a great variety, but the pork products are far more numerous than the others. After the head is taken off the hog, the sides are cut into ham, side, shoulder, loin and spare rib, if the meat is to be used in this country. If designed for export, it is cut to suit the custom of the country to which it is sent. With us, the loin and spare rib are sold as fresh meat, the hams and shoulder are pickled and smoked, the sides and backs are dry salted or pickled for salt pork and bacon, and the head and trimmings are made into sausage.

Shipping. Large quantities of beef, pork and prepared meats are shipped to distant cities and to foreign countries. Prepared meats are shipped in casks, cases and cans, but all fresh meat is transported in refrigerator cars or refrigerator ships. So perfect are these refrigerators that beef shipped from Chicago to Liverpool or any other European port arrives at its destination in a perfect state.

Government Inspection. Before slaughtering, all animals are examined by government inspectors, and any that are diseased or injured are rejected. After slaughtering, all meat is inspected, since some diseases which may escape detection in the live animal are detected in the meat. This rigid inspection is an assurance that all meat that is allowed to be placed on the market is perfectly wholesome.

By-Products. In no industry is there less waste than in meat packing. Everything about the animal is used. The hides are made into leather; glue, soap and oils are made from the hoofs and other parts that are not suitable for meat; the intestines are made into "skins" for packing sausages; the blood and offal are converted into fertilizer; combs, knife handles and buttons are made from the horns and hoofs, the hair of cattle, the wool of sheep and the bristles of hogs are of value in the manufacture of numerous articles. The value of hogs' bristles exported each year is over two million dollars, and this is one of the smallest items among the by-products.

Who Eats the Meat. Australians are the heaviest meat eaters; they consume an average of 240 pounds per year for each person. Argentina, which is becoming a great meat-producing country, consumes 105 pounds per person, just equalling the per capita consumption in the United States. Canada is next, with ninety-five pounds for each person, and Great Britain's consumption is almost as much. Switzerland, Denmark, France, Norway, Germany and Sweden follow with from sixty to seventy pounds per capita; each person in Belgium and Spain demands fifty pounds; Russia consumed over forty pounds per person before the World War, and Portugal and Holland demand thirty-five pounds per person. Italians eat less meat than any other people on the European continent, twenty-five pounds per person satisfying them.

Related Articles. Consult the following titles for additional information:

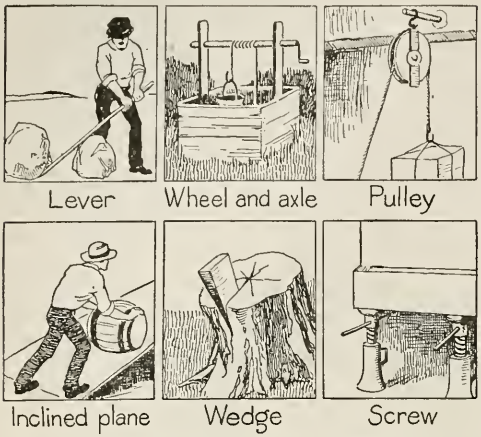
Bacon	Meat
Beef	Mutton
Beef, Extract of	Pork
Cold Storage	Sausage
Lard	Tallow

MEC'CA, or **MEK'KA**, ARABIA, the birthplace of Mohammed and the holiest city of the Mohammedan world. Mecca is the capital of Hedjaz, formerly a province of Arabia, but in 1916 proclaimed an independent kingdom (see ARABIA, subhead *Hedjaz*). It lies in a narrow, sandy valley, about sixty miles east of Jiddah, its port on the Red Sea. The most notable edifice in the city is the great mosque, within which is the Kaaba, a cube-shaped stone building that devout Mohammedans regard as their holy of holies. The city, at the time of the Hajj, or annual pilgrimage to the Kaaba, enjoined by Mohammed on all his followers, is filled with pilgrims, who increase the population by about 100,000. This pilgrimage is the only source of wealth and occupation to the inhabitants of Mecca. Population, about 60,000.

MECHANICAL, *me kan'ik al*, **POW'ERS**, the simple machines or some parts of them on which every machine, however complicated, must be constructed. These simple machines are the lever, the wheel and axle, the pulley, the inclined plane, the wedge and the screw. Each is described under its title in these volumes.

MECHANICS, *me kan'iks*, the term originally used to denote the general principles involved in the construction of machinery. Later the term became separated from all direct connection with practical applications, and it now deals entirely with abstract questions in which the laws of force and motion are involved. In this sense, mechanics is usually divided into *dynamics*, which treats of

moving bodies and the forces which produce their motion, and *statics,* which treats of



THE SIX MECHANICAL POWERS

forces compelling bodies to remain at rest. See Dynamics; Statics.

MECHANICSVILLE, Battle of, a battle fought at Mechanicsville, seven miles from Richmond, Va., June 26, 1862, between a Federal force of about 5,000, commanded by General Fitz John Porter, and a Confederate force of 10,000, under the personal direction of General Robert E. Lee. The Federals were in a strong position and compelled the Confederates to open the engagement. Two attacks were repulsed, but on the morning of June 27, upon the arrival of General Stonewall Jackson with Confederate reënforcements, General Porter retreated to a stronger position at Gaines's Mill. The loss of the Confederates was about 2,000, and that of the Federals, about 360. The battle opened the so-called "Seven Days' Battles" of the Peninsula Campaign.

MECHLIN, *meK'lin.* See Malines.

MECK'LENBURG DECLARATION OF INDEPENDENCE, a set of resolutions concerning which there has been much controversy. It was formerly believed that a series of resolutions declaring for independence from British rule were adopted on May 20, 1775, at Charlotte, Mecklenburg County, N. C., and that they contained phrases similar to those used in the Declaration drawn up by Jefferson. The original minutes of the meeting were said to have been destroyed by fire. After much investigation historians came to the conclusion that a series of resolutions were adopted, but that they were quite different in phraseology from the Jefferson document. The meeting is believed to have been held on May 31.

MECKLENBURG-SCHWERIN, *mek'lenboorK shva reen',* before November, 1918, a grand duchy of the German Empire in the low country bordering on the western end of the Baltic Sea. Its area was 5,068 square miles—a little greater than that of Connecticut; its population 640,000, nearly all of whom are Protestants. Under the Empire the land was owned by the Crown and the aristocracy, but was leased to tenants in perpetuity.

MEDE'A, in Greek mythology, daughter of Aetes, king of Colchis, on the eastern coast of the Black Sea. After helping Jason to obtain the Golden Fleece, she fled with him. To retard her father in his pursuit, so the story goes, she killed her young brother, Absyrtus, whom she had carried away with her, and scattered his limbs on the sea. On arriving with Jason in Thessaly, Medea, through her sorceries, put to death Pelias, Jason's uncle, who had kept him from his kingdom, and together they reigned for years. When Jason, however, deserted Medea for Glauce, the sorceress sent to her rival a poisoned robe, which caused her death, and afterward Medea put to death her own children. She then, in her dragon car, mounted into the air and disappeared. This story is the basis of a famous tragedy by Euripides.

MEDFORD, Ore., in the southwestern part of the state, in Jackson County, beautifully located in the valley of the Rogue River. It is 205 miles south of Eugene and but fifteen miles from the California state line. Medford is the center of a prosperous fruit region, and is a market for apples and pears. In the surrounding region there are extensive pine forests; scenic features of interest in the vicinity include Klamath and Crater lakes. The city possesses a Carnegie Library, a $120,000 Federal building, an Elks' Club and Sacred Heart Hospital. Population, 1910, 8,840; in 1917, 14,932 (Federal estimate).

MEDICAL SCHOOLS, institutions for training men and women for the professions of medicine and surgery. Statistics compiled for the year ending June 30, 1917, show that there were 13,764 medical students in the United States during that year, and of those who were graduated, 3,379 held degrees previously earned in arts or science. Of the number graduated, 153 were women. There

are only two medical schools solely for women, but many of the foremost medical schools connected with universities, such as those of Columbia and Pennsylvania, admit women students. There are ninety-six medical schools in the United States; twenty-eight states maintain such schools as integral parts of the state universities. In fifteen states no other medical schools exist. Four or five of the university medical schools require a four-years' college course as an entrance requirement. Generally speaking, the number of students attending high-grade schools is increasing, and the low-standard institutions are gradually being eliminated. Most of the leading Canadian universities maintain medical departments.

MEDICI, *ma'de che,* a Florentine family which rose to wealth and influence by successful commercial ventures and which continued to combine the career of merchants and bankers with the exercise of political power and a liberal patronage of literature and art. The most famous of the family was Lorenzo de'Medici, called the Magnificent (1449-1492). By his munificence he made himself popular with all classes in Florence and attained the position of an absolute ruler. He encouraged learning and the arts in the most liberal manner; he founded academies and had collections made of books and art relics. The popes Leo X, Leo XI and Clement VII, Catherine, the wife of Henry II of France, and Marie, wife of Henry IV of France, were of the Medici family.

MEDICINE, *med'i sin,* a general term for the science of preventing and curing bodily ills. It is broadly divided into two great divisions, *medicine* proper and *surgery,* but these divisions are very closely related and in many cases overlap. In a primitive stage of civilization diseases were believed to be caused by supernatural beings who must be placated by ceremonies and prayers. Such beliefs gave rise to the witch doctors and medicine men of savage tribes. In course of time it was recognized that diseases arose from natural causes, but each disease was held to be a principle distinct from its effects, and each disease was supposed to have a special remedy—something that would actually cure the disease.

Such views led to the adoption of various systems of treatment. For instance, one school held that only vegetable remedies should be used in the treatment of diseases; another school upheld the virtues of the bath as a universal panacea for all human ills. A third maintained that diseases are cured by substances having, in small doses, an action on the body similar to that of the disease, so that one might treat diseases by a series of fixed and specific formulae, all depending on this single principle. Finally, there is a school that upholds the theory that diseases are cured by contraries, that is, by remedies having an action on the body the reverse of that of the disease.

Modern medical practice, however, has been revolutionized by the general acceptance of the germ theory of disease—that the majority of diseases are the result of certain microorganisms which gain entrance into the body through the air, food and drink. The experiments of the French chemist Pasteur, carried on in the latter part of the nineteenth century, proved the truth of this theory, and modern methods for the prevention and cure of infectious diseases are therefore based upon it. Outside of quinine, a cure for malaria, there are scarcely any known drugs that are specific remedies for specific diseases. The general tendency is to produce a serum which will counteract the disease in question, the serum in each case containing germs of that disease. To prepare curative or preventive serums it is necessary to isolate the special organism that causes the disease. Physicians have discovered the germs causing typhoid, diphtheria, cerebrospinal meningitis and a few other dangerous diseases, and these are now treated by means of serums, but their search for influenza, scarlet fever and measles germs has not as yet proved successful.

The fight against infectious diseases has been vastly more effective since people have learned the importance of sanitation and personal hygiene. In modern medical practice emphasis is placed on sane, healthful living, and a vigorous campaign is waged against patent medicines and the indiscriminate use of drugs. Fresh air, simple, nourishing food, exercise and a cheerful mind are recommended as modern aids to health. Undoubtedly the general interest now being taken in physical culture, ventilation, dieting, temperance and

the like is tending to reduce the death rate and decreasing the number of invalids.

Related Articles. The general scope of medicine and surgery cannot be covered in a brief article, but the more important branches of the subject will be found treated under the following titles:

Acetanilid	Dogbane	Nightshade
Aconite	Drowning	Nux Vomica
Allopathy	Elixir	Orthopediks
Aloe	Emulson	Osteopathy
Anesthetic	Epidemic	Pepsin
Antidote	Epson Salts	Pharmacopoeia
Antipyrene	Ether	Pharmacy
Antiseptic	Extract	Phenacetine
Antitoxin	Fennel	Physical Culture
Arnica	Fletcherizing	Quarantine
Arsenic	Fomentation	Salol
Asafetida	Foxglove	Sanitary Science
Astringent	Gargle	Sarsaparilla
Bacteria	Gelsemium	Sassafras
Bandage	Gentian	Scammony
Bay Rum	Germ Theory	Sedative
Belladonna	Glauber's Salt	Seidlitz Powders
Bloodroot	Granulation	Serum Therapy
Boneset	Hartshorn	Sorrel
Caffeine	Hellebore	Spikenard
Calabar Bean	Hemlock	Squill
Calomel	Hernia	Stethoscope
Camphor	Homeopathy	Stramonium
Cassia	Hospital	Strychine
Castor Oil	Hydrotherapy	Styptic
Chamomile	Hygiene	Sulphonal
Chiropractic Healing	Hyssop	Surgery
Chloral	Iceland Moss	Tannin
Chloroform	Inoculation	Tartar Emetic
Cinchona	Insanity	Therapeutics
Cocaine	Ipecac	Tonic
Cod-liver Oil	Jalap	Tourniquet
Collodion	Julep	Trephining
Coriander	Laudanum	Tumor
Court-plaster	Laughing Gas	Vaccination
Cowitch	Liniment	Valerian
Croton	Lithotomy	Virus
Cubebs	Marshmallow	Vivisection
Diet	Massage	Wormwood
Digestion	Materia Medica	Wounds
Disease	Morphine	
Disinfectants	Narcotic	
Dispensary	Neurotic	

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Flexner, Simon	Mayo Brothers
Gorgas, William C.	Morton, W. T. G.
Jenner, Edward	Pasteur, Louis
Koch, Robert	Simpson, James Y.

MEDICINE HAT, ALBERTA, a city locally known as the "Gas City" and in the United States as the "town from which bad weather comes," because weather reports note the progress of many winter storms from the direction of this town. The city does not deserve the reputation given it for severity of climate, however, for it has a favorable winter temperature.

Medicine Hat is on the Canadian Pacific Railroad, 180 miles southeast of Calgary and 657 miles west of Winnipeg. It is in a rich farming country, and natural gas is so abundant that it is the fuel of all mills and factories, in which are made furniture, pumps and cement products, in particular. The city has grown from a population of 1,570 in 1901, to 9,269 in 1916.

MEDINA, *ma de'nah*, ARABIA, a holy city of the Mohammedans, about 250 miles north of Mecca, reverenced by the faithful because it contains the tomb of the prophet. Both Mecca and Medina are situated in Hedjaz, formerly a province under the Turkish sultan. In 1916 the independent kingdom of Hedjaz was proclaimed (see ARABIA, subhead *Hedjaz*). Though the pilgrimage to the tomb of the Prophet is not considered by Mohammedans as an imperative duty, yet it is estimated that one-third of the Mecca pilgrims go on to Medina. None except Mohammedans may enter the city. Population, about 48,000.

MEDITERRANEAN, *med i ter a'ne an*, **SEA**, one of the great waterways of the world before history was first written and to-day more important than ever before. The oldest civilizations were on or near its shores, for it is land-locked by Southern Europe, where old Greece and Rome flourished, Asia Minor, where Phoenicia was a great maritime nation, and North Africa, where the old culture of Egypt was carried on its waters to the other continents.

The length of the Mediterranean is about 2,300 miles; its average width is less than 600 miles, but between the Adriatic Sea and Tripoli, it is nearly 1,100 miles. Its area is 813,000 square miles. The Black Sea, through the Bosporus, the Sea of Marmora and the Dardanelles flows into it, as does the Adriatic Sea, east of Italy. Connection with the Atlantic Ocean, at its western end, is through the narrow Strait of Gibraltar, strongly protected by the mightiest natural fortress in the world (see GIBRALTAR).

The depth of the Mediterranean varies from 1,000 to 14,000 feet in the deepest places; at Gibraltar it is 2,500 feet. Many islands, some of them large—like Corsica, Sardinia, Crete and Malta—were historically important many centuries ago. The small islands of the northeastern part, in the Aegean Sea, connect the age of myth with the historical era. At the southeastern corner the Suez Canal opens a waterway from the Mediterranean to the Red Sea.

MEDUL'LA OBLONGA'TA, that portion of the brain which lies below the cerebellum and which forms practically the upper end of the spinal cord. It is pyramidal in shape, about an inch long, and contains a large number of important nerve centers, such as the motor and sensory centers of the cranial nerves and those centers which govern respiration, the action of the heart and many of the functions of digestion, secretion and nu-

trition. Because of this the medulla oblongata is often called the vital knot, a severe injury to this part of the brain resulting in instant death. The medulla is composed of a series of columns which are continuous with the columns of the spinal cord, and it is connected with the cerebellum and the cerebrum by nerve fibers which extend upward to the various brain centers.

Related Articles. Consult the following titles for additional information:

Brain Cerebrum
Cerebellum Nervous System

MEDU'SA, in classical mythology, one of the Gorgons, the only one who was not immortal. In her youth she was a very beautiful maiden, but having boasted to Minerva of her beauty and power, she was turned into a hideous monster, with brazen claws and teeth and serpents for hair. She was killed by Perseus. See GORGONS; MYTHOLOGY.

MEDUSAE, *me du'see,* the name given to certain umbrella-shaped jellyfish because of their long trailing feelers, that suggest the snakes on the head of the Medusa (see above). The tentacles are armed with stinging cells, which in the common medusae of the Atlantic coast are not strong enough to poison bathers, though in tropical waters they are exceedingly annoying. Scientists give the name medusae to the swimming stage in the development of any animal belonging to the Coelenterata, which includes the hydra and the sponge.

MEERSCHAUM, *meer'shawm,* a white, porous substance composed of magnesium, silica and oxygen, which occurs as a fine, white, compact clay. Its name is a German word meaning *sea foam,* and was applied to this substance because early specimens were found on the seashore in round, white masses, resembling petrified sea foam. It is found in Europe, but is more abundant in Asia Minor. It is manufactured into tobacco pipes, which are white before using but which turn gradually to a rich brown. Meerschaum pipes are so prized by smokers that they readily sell for $10 to $15 each.

MEGAPHONE, *meg'a fohn,* a device for increasing the volume of the voice. A common form of megaphone is a funnel-shaped horn used by speakers at expositions, fairs, etc., in making announcements, by advertisers in front of attractions in amusement parks, and by sailors on ships at sea. A megaphone used by partially deaf people is the invention of Thomas Edison. It has two large funnel-shaped receivers which collect the sound waves and direct them into tubes, from which they are carried to the ear.

MEISSONIER, *ma so nyay',* JEAN LOUIS ERNEST (1815-1891), a French painter of historical subjects, was born in Lyons. He first became known as an illustrator of books, but rapidly became famous for the singular perfection of his art. His pictures, which are nearly all upon a small scale, are characterized by great minuteness of execution and by high finish, but are not less remarkable for their excellence in composition and breadth of treatment. Among them are *The Smoker, Napoleon III at Solferino, The Cavalry Charge* and the picture entitled *"1807."*

MEISTERSINGERS, *mise'tur sing'urz.* See MASTERSINGERS.

MEKONG, *ma kong',* RIVER, or CAMBO'DIA RIVER, a large river of Southeastern Asia, which rises in Tibet, flows through part of China, Siam, Cambodia and French Cochin-China, and enters the Chinese Sea by several mouths. Its length is about 2,800 miles, but it is navigable for large vessels for only about 200 miles from its mouth.

MELANCHOLIA, *mel an ko'le ah.* See INSANITY.

MELANCHTHON, *ma lank'thon,* PHILIP (1497–1560), a German theologian and educator, one of the outstanding figures of the Reformation. While professor of Greek at Wittenberg, he met Luther, with whom he became associated in the work of spreading the new religious movement. Melanchthon was quiet and studious, quite the opposite of Luther, and often influenced the latter to adopt more moderate views. Because of his mild disposition, Melanchthon was able to settle peaceably many differences between the Protestants and the Catholics and to do much for the cause of the Reformation. He is the author of the *Augsburg Confession,* which is the standard of faith for the Lutheran Church although much altered at the present time. His works include a Greek and Latin grammar, biblical commentaries, theological and ethical works.

Related Articles. Consult the following titles for additional information:

Augsburg Confession Luther Reformation

MEL'BA, NELLIE (1865-), an Australian soprano vocalist and grand-opera star. She was educated in Europe, and made her début at Brussels in 1887. Her first appearance in America was at New York in 1893, as "Lu-

cia;" after that time she was considered in the front rank of operatic sopranos. In 1882 she was married to an Englishman, Charles Armstrong.

MELBOURNE, *mel'burn*, AUSTRALIA, the capital of the state of Victoria, in population second only to Sydney among Australian cities. It is situated on the River Yarra, about eight miles from its mouth, and occupies an extensive area, which is mostly hilly and undulating, with the Yarra winding through it. The principal streets are wide and well-paved and are lined with handsome and substantial edifices. Among the most noteworthy of the public buildings are the houses of Parliament, the treasury, the law courts, the free library, the mint, the university and the theaters. There are several public parks, a finely laid-out botanical garden and a splendid race course.

The shipping trade is prosperous. The chief exports are gold, wool, hides and leather, cereals and flour, and the chief imports are manufactured goods. By its railway systems, Melbourne is connected with all the principal towns of the Australian continent. The place was founded and named in 1837 and was incorporated in 1842. A Centennial International Exhibition was held there in 1888, in celebration of the founding, in 1788, of the Australian colonies. Population of the city proper in 1911, 140,000; of city and suburbs, 1917, estimated, 695,640.

MELBOURNE, WILLIAM LAMB, Viscount (1779-1848), an English statesman. He succeeded to the premiership in July, 1834, was dismissed in November, but was recalled in the following year. When Queen Victoria came to the throne, it was Melbourne to whom she looked for instruction as to her duties; he was her main political support during the early years of her reign.

MEL'ILOT, or **SWEET CLOVER**, the common name of a group of plants belonging to the Pulse family. These plants resemble alfalfa, having three-lobed leaves and small white or yellow flowers. They have a sweet odor, especially when drying. The yellow melilot grows to a height of three or four feet and is found in damp places. The flowers are used in the manufacture of perfume. This has become a troublesome weed in some districts, owing to its great abundance in pasture land. Increased cultivation of the soil and fertilization will usually prevent its spread.

MELODRAMA, *mel o drah'ma*, originally and strictly that form of drama in which the declamation of certain passages is interrupted by music. The term has now come to designate a romantic play in which effect is sought by startling incidents, striking situations and exaggerated sentiment. Melodrama of the cheaper sort is all too common at present, but occasionally a melodramatic play of real merit is produced.

MEL'ON, a general term for several fruits of the gourd family, some growing on trailing vines, but having also some whose vines are climbers. The most important titles are listed below.

Related Articles. Consult the following titles for description of the melons:

Casaba	Muskmelon
Gourd	Watermelon

ME'LOS, or **MI'LO**, an island belonging to Greece, in the Grecian Archipelago, in the Southwestern part of the Aegean Sea. It is one of the Cyclades, and its area is about sixty square miles. Near the site of the ancient town of Melos is a modern town, Plaka. In 1820 a peasant discovered on the island of Melos the celebrated Venus of Milo, which is now in the Louvre, Paris. Population of the island about 5,000.

MELPOM'ENE, in Greek mythology the muse who presided over tragedy. She was generally represented as a young woman, wreathed with vine leaves and holding in her hand a tragic mask. See MUSES.

MELTING POINT. When a body changes from the solid to the liquid state through the application of heat it is said to *melt* or *fuse*. *Freezing*, or *solidification*, occurs when the body changes from the liquid to the solid state. The freezing point and the melting point are the same for any given substance. Some substances, like wax and glass, have no sharply-defined melting point. They first soften and then pass more or less slowly into the condition of a thick sticky fluid. Most substances occupy a larger volume in the liquid state than in the solid. A few substances, including water, expand when they become solids. When water freezes its volume increases nine per cent—that is the reason water pipes often burst in winter.

As stated above when a body passes slowly from one state to another, there is no rise or fall in temperature. When a solid fuses, or melts, a quantity of heat disappears, and, conversely, when the liquid solidifies, an equal amount of heat is generated as was

before lost. The heat required to melt one gramme of a substance without a change of temperature is called the heat of fusion. See Freezing.

MEMBRANES, *mem'braynz*, those tissues of the body which are arranged in thin layers. Membranes are found covering organs, forming the walls or tubes and lining cavities. The principal classes are *serous, mucous* and *fibrous.*

Serous membranes as the pleura, pericardium and peritoneum, form a sort of closed sac surrounding certain organs and secrete a small quantity of serous fluid, which allows free action to the organs. These membranes are liable to various diseases, as inflammation, diseased growths and hemorrhage. Serous membranes which line the cavities of joints and the sheaths of tendons and ligaments are called *synovial* membranes.

Mucous membranes line all cavities by which matter is taken into the body or expelled from it, as well as all that communicate with the external air as the digestive apparatus and air passages. These membranes have a soft, velvety surface and secrete such a fluid as best serves the organs they line.

Fibrous membranes include the periosteum, covering the bones; the dura mater, covering the spinal cord and lining the inside of the skull; and the membrane found in the spleen.

MEMEL RIVER. See Niemen.

MEM'LING, Hans (1430?-1494), one of the greatest of early Flemish painters. In his study he became a pupil of Van der Weyden, whom he surpassed. The figures of women in his pictures are especially attractive and are noted for the beauty and refinement of their faces. He is also noted for the detail and accuracy of his drawings. Many of his paintings are in Bruges, where he lived. His *Virgin and Infant Jesus* and *Marriage of Saint Catherine* are in the Louvre, Paris. Other works are *The Madonna and Infant Christ Enthroned, Saint Lawrence and Saint John the Baptist,* and *Saint Christopher and the Infant Christ.*

MEM'NON, a king of the Ethiopians, mentioned in the Homeric poems as coming to the aid of Troy against the Greeks. He slew Antilochus, but was himself slain by Achilles. The name was later given to a statue still standing at Thebes, in Egypt, which was one of two known from their size as the *Colossi.* This statue, known as "the vocal Memnon," was celebrated in antiquity as emiting a musical sound every morning at the rising of the sun. The ancients did not know it, but the phenomenon was due to the action of the sun's rays, which rapidly changed the temperature of the damp, porous stone. See Colossus.

MEMORIAL DAY, a day solemnly set apart in the United States to honor the memory of its soldier dead, by decoration of graves with flowers and by appropriate memorial exercises. The first Memorial Day was in 1869, when General John A. Logan, as commander in chief of the newly-organized Grand Army of the Republic, designated May 30 as a day to honor Union soldiers who had died. That date is still retained in the North, but in the South, where the custom is also beautifully maintained, an earlier date, usually April 26, is observed. Since 1889 graves of Spanish-American War victims have received like honors.

The World War furnished over 2,000,000 veterans from the United States, and over 50,000 died on the fields of France, Italy and Russia. Most of these dead will finally rest in American graves. A passing generation instituted Memorial Day; the present and the coming generations will have every reason to continue to honor the valor of those who fell in defense of human liberty, and with grateful hearts will deck with flowers the graves in which they lie.

MEM'ORY, the power of mind by which we retain, recall and re-know mental experiences. A complete act of memory has three phases, usually known as retention, recollection and recognition. If any one of these is missing, the act is of little or no value. Memory is the result of a fundamental law of the nervous system, namely, a tendency of the nerves to act again in the manner in which they have already acted. Memory is not a distinct intellectual power, with a special site or special center in the brain, as formerly supposed. It has a physical as well as an intellectual basis, and as many centers as there are avenues of knowledge. Each sense, each mental power, each train of thought and feeling has its memory.

Laws of Memory. Ideas in the mind are recalled to consciousness according to two methods of association; namely, by contiguity, or simultaneity, and by similarity.

The Law of Contiguity. According to this law, ideas are recalled according to their association in time and place. Ideas which ac-

company each other in close succession are usually reproduced in the order of their occurrence. A child soon learns that fire is accompanied by heat, and the idea of one will recall the idea of the other. The idea of a part suggests the idea of the whole, as a boiler suggests an engine; a wheel, a wagon; a leaf, a tree. The order of sequence is important under this law. We recall with less effort those ideas which occur in the order of logical connection or in the order in which we are accustomed to associate them. One will recall the letters in the alphabet in the order of a, b, c, with little or no effort, but if he attempts to recall them in any other order, a serious effort is necessary. This law of memory closely associates memory with reason and embodies the relation of cause to effect, as lightning suggests thunder; a tree in blossom, the fruit. Conversely, effects suggest causes, as the eating of the fruit may suggest the tree in blossom.

Law of Similarity. According to this law, similar ideas tend to recall each other. A stranger may recall a friend because he resembles him in appearance. One river recalls another; one journey, another, and so on. The law of similarity has a less extensive application than the law of contiguity; yet it is important because it enables many ideas to be reproduced which cannot be recalled by the law of contiguity. Ideas reproduced by similarity do not necessarily occur simultaneously in time and place.

Kinds of Memory. Psychologists frequently recognize two kinds of memory, based upon the two primary laws of association. The memory based upon the law of contiguity is usually known as a logical, or thinking, memory. The careful culture of this memory leads one to associate cause and effect and to depend more upon his powers of reasoning and judgment for arriving at conclusions than upon his ability to recall ideas mechanically. The memory based upon the law of similarity is more of a mechanical memory and tends to arrange ideas in series and then recall them in a certain order, whether or not this order is logical. Many illustrations of this sort of memory are found among school children, such as committing the multiplication table, regardless of the process by which the results are obtained; the memorizing of the rules in arithmetic, grammar and other subjects without a knowledge of their meaning or ability to apply them. Because the mechanical memory is abused, it is often considered an evil, yet it is necessary to the complete development of the memory, and when properly guarded it is a source of mental strength.

Cultivation of Memory. Memory is one of the most important of the mental powers. Without it, it would be impossible to retain knowledge and one would be unable to profit by his experiences. Memory develops early in life, and through childhood and youth it should receive careful attention. Its cultivation can be assisted by adhering to the following principles:

(1) Memory depends upon sensation, perception and thinking. Unless these powers are properly developed, memory will be defective.

(2) The order of the processes in the acquisition of an idea is as follows: (a) Observation; (b) thought (forming concepts); (c) application. In cultivating the memory, these three phases of its use should be carefully considered. Like every other power, memory is strengthened by use, and unless children are required to reproduce their ideas they never form the habit of doing this easily and correctly.

(3) Memorizing selections may be either beneficial or injurious, according to the method employed. If the law of acquisition of ideas is followed and the child understands what is memorized, such exercises are beneficial in strengthening the memory, but if to any extent he is allowed to memorize meaningless words or words which he cannot properly understand and pronounce, he soon acquires the habit of doing this work carelessly and is unable to recall the ideas correctly.

(4) Habits of reading become means of weakening or strengthening the memory. When one reads without thought, the effect upon the memory is injurious; but if he reads thoughtfully, with the purpose of retaining the ideas, and then follows the reading by the reproduction of those ideas, the memory is strengthened. For this reason requiring children to reproduce their exercises in school, either orally or in writing, is a valuable training.

(5) All school subjects are valuable for memory training, but arithmetic, literature, history and drawing, when properly taught, are the best, because they appeal to the powers of observation and to the thought power.

(6) Memory is aided by repetition. If the repitition is so planned that the mental process is not different from the original act of learning, it is a great aid to the memory. Teachers in planning reviews should bear this principle in mind. The review should enable the pupils to recall the subjects in the order in which the different topics were learned, and it should never contain more than the mind can grasp and hold at one time.

(7) The memory image, however vivid, is always fainter than the original; therefore, care should be taken to see that the child obtains as clear and complete ideas as possible.

(8) Childhood is the age for developing and strengthening the memory During the school life of the child it is well for him to memorize some things which he does not fully understand, because as the reasoning powers develop and he extends his field of knowledge, these subjects will be fully apprehended.

(9) The mechanical memory is essential to the child and in some cases to the adult. The danger in its use lies in the liability to rely upon it after the logical memory should take its place.

Related Articles. Consult the following titles for additional information:

Association of ideas	Habit	Perception
Attention	Interest	Pyschology
	Concept	Sensation

MEMPHIS, *mem'fis,* an ancient city of Egypt, on the west bank of the Nile, about twelve miles south by west of Cairo. It is said to have been founded by Menes, the first king of Egypt, but this is doubted. It was a large and splendid city, and after the fall of Thebes was the capital of Egypt. The pyramids and tombs of Sakkara and the colossal statue of Rameses II are the chief objects of interest on the site.

MEMPHIS, Tenn., the fortieth city in size in the United States, the largest in the state, and the county seat of Shelby County, is situated on the Mississippi River, in the extreme southwestern part of the state, less than ten miles from the Mississippi boundary. It was founded in 1820 and named for ancient Memphis, in Egypt. The population in 1910 was 131,105, of whom 52,441 were negroes; in 1917 a Federal estimate gave the city 151,877 people.

The city has ten railroads—the Illinois Central, the Yazoo & Mississippi Valley, the Southern, the Chicago, Rock Island & Pacific, the Saint Louis & San Francisco, the Louisville & Nashville, the Nashville, Chattanooga & Saint Louis, the Mobile & Ohio, the Missouri Pacific and the Saint Louis & Southwestern. There are two large passenger terminals, and two belt lines for freight transfer. Two large iron bridges, the second completed in 1917, cross the river here.

Memphis has sixteen parks and squares, ranging in size from Riverside, 427 acres, and Overton, 335 acres, to Auction Square and Annesdale Park, each one-half acre. There are thirteen state and four national banks, three public libraries, five denominational and numerous private hospitals and a Federal building which cost $1,500,000 in 1885. In addition, the city has a large county courthouse and a United States marine barracks. There is a state normal school and the medical department of the University of Tennessee, as well as private educational institutions.

Memphis is practically at the head of deep-water navigation on the great river, and over 170 steamboats ply its waters from here. The city is one of the greatest inland cotton markets in the world and has many cottonseed products plants. Equally important are its wood-working factories, and of these there are more than 150. The commission form of government was adopted in 1902.

MEMPHREMAGOG, *mem fre ma'gog,* a lake which is situated partly in Vermont and partly in the Province of Quebec, Canada. Its length is about thirty-five miles, its width from two to five miles. Its waters are discharged through the Magog River into the Saint Francis River in Canada. The lake, on account of its picturesque scenery, is much visited by tourists, and many beautiful summer resorts are located on its banks.

MENDELSSOHN-BARTHOLDY, *men'del sone bahr tole'dy,* Felix (1809-1847), one of the world's best loved composers, was born at Hamburg, Germany. In his ninth year he publicly appeared in Berlin, and in his sixteenth year produced the well-known overture to the *Midsummer Night's Dream.* In 1829 he began an extensive tour through England, Scotland, France and Italy, and on his return to Germany became musical director in Düsseldorf. In 1835 Mendelssohn was chosen conductor of the famous concerts in the Gewandhaus of Leipzig and later received several royal appointments, which made the last years of his brief life a continuous triumph.

His music is delicate and melodious, and because it is not too technical is greatly enjoyed by the general public. His best works are *Songs Without Words* (including the well-known *Spring Song*), the oratorios *Saint Paul* and *Elijah,* the *Midsummer Night's Dream* overture and cantata to Goethe's *First Walpurgis Night.*

MEN'DICANT ORDERS, religious orders whose members take special vows to renounce all worldly possessions. They do not, however, solicit alms or live by begging, though *mendicant* means, literally, *one who begs.* To

the mendicant orders belong the Dominicans, Franciscans, Augustinians, Carmelites and Servites.

MENDOZA, *men doh'sah*, ARGENTINA, founded in 1560, the fifth city in size in the republic, is situated 650 miles west and north of Buenos Ayres, at the base of the Andes Mountains. One of Argentina's national colleges, normal schools for both sexes and an agricultural institute are located here. The city is the meeting point of trade of the country with that of Chile. Population, 1914, 58,790.

MENELA'US, in Greek mythology, the brother of Agamemnon and husband of the beauteous Helen, with whom he received the kingdom of Sparta. His wife was carried off by Paris, son of Priam, king of Troy, and in accordance with a previous oath, the Greek princes joined Menelaus in his effort to avenge the affront. Menelaus himself led sixty ships to the siege of Troy. After its conquest he returned with Helen to his native land in a devious voyage which led him to Cypria, Phoenicia, Egypt and Libya, and thereafter he ruled happily until his death. See HELEN, MYTHOLOGY, subtitle *The Trojan War*.

MENHA'DEN, or **MOSS'BUNKER**, an American salt-water fish of the herring family. It abounds on the shores of New England, where it is taken in large quantities and used for fertilizer and as the source of a valuable oil. Since a method for extracting the bones has been discovered, the menhaden has become a valuable food fish and is preserved in the same way as sardines. This remarkable fish is known in different localities by different names; *pogy, whitefish, bunker, fat-back, yellow-tail* and *bony fish* are but a few of them.

MENINGITIS, *men in ji'tis*, a general term applied to several diseases having their seat in the membranes of the brain and spinal cord. Of these the most serious is *epidemic cerebrospinal meningitis*. It is caused by a germ first isolated in 1887. Lack of sanitation and overcrowding offer especially favorable conditions for its spread. The germ sets up a violent inflammation of the membranes of the spinal cord and the brain, causing terrible pains in the head, and abnormally stimulating the nerves. Sometimes dark spots form on the body, giving rise to the name "spotted fever." Contraction and rigidity of the muscles occur, and the head and neck are drawn back until the spine sometimes doubles upon itself. Delirium, paralysis and death follow in quick succession in unchecked cases.

Fortunately, a specific remedy to control the disease was discovered by Dr. Simon Flexner. After considerable experimentation, beginning in 1905, he produced a serum which has greatly reduced the death rate and has also eliminated the after-effects of cases that recovered. Among these effects were blindness, deafness, paralysis and feeblemindedness.

MEN'NONITES, THE, a Protestant sect, founded at Zurich in 1525. The doctrines spread rapidly through Switzerland, Germany and Austria. As a result of persecution, about 3,000 perished and many went to Moravia and Holland. Menno Simons (1492-1561), a native of East Friesland, gave the society its name through his efforts to unite the sects into which it had broken up. In the latter part of the seventeenth century a number of Mennonites emigrated to America, and settled at Germantown, Pa. In 1871 many more came to the United States from Russia, to avoid conscription for the army of the czar, and settled in Minnesota and Kansas. These people refuse to take oaths and to bear arms. They pay much attention to the ordering of their lives on Christian principles and are cultured, honest and charitable. A total of 58,000 members in the United States and 20,000 in Canada is reported.

MENOM'INEE, meaning *wild rice men*, is the name of a tribe of Algonquian Indians once occupying Northern Wisconsin. Of the remnant, about 1,600 now live on a reservation near Green Bay.

MENOMINEE, MICH., the county seat of Menominee County, fifty-two miles northeast of Green Bay, Wis., on Green Bay at the mouth of the Menominee River, opposite Marinette, Wis., and on the Chicago & North Western, the Chicago, Milwaukee & Saint Paul and the Wisconsin & Michigan railroads and the terminus of the Ann Arbor Railroad car ferry. The city is a great lumber-shipping port, contains many saw and planing mills and manufactures electrical apparatus, shoes, paper, boilers, machinery and other articles. It has a public library, a hospital and a county agricultural college. The place was settled in 1799. Population, 1910, 10,507; in 1917, practically unchanged.

MENSURATION. This word is a noun meaning the act, the process, or the art of

measuring. Mensuration is a branch of geometry and is limited to finding the length of lines, areas of surfaces and volumes of solids, having given certain facts of lines and angles. The underlying principles on which the rules which apply to mensuration are based cannot be entirely understood by the student of arithmetic. Some of these rules may be worked out by arithmetical processes while others require involved application of geometrical formulas.

That part of arithmetic devoted to mensuration is very practical. Common measures of lines, surfaces and solids enter into the calculations of men every day of their lives, and all should be familiar with these common principles.

Definitions. The student should become familiar with the meanings of the terms explained below:

Polygon. A polygon is a plane figure bounded by straight lines. If it has three sides it is a triangle; four sides a quadrilateral; five sides, a pentagon; six sides, a hexagon; seven sides, a heptagon; eight sides an octagon, etc. A polygon having four sides, and called a quadrilateral is also called a rectangle if all the angles of the figure are right angles. It is called a parallelogram if the opposite sides are parallel. The figures A and B below represent a rectangle and parallelogram respectively:

Formula. To find the area of a rectangle it is only necessary to multiply the base by the altitude. The same rule applies to the parallelogram. In the figure above, showing the parallelogram, AB is the base and DE is the altitude. It contains the same area exactly as a rectangle having a base equal to AB and an altitude equal to DE.

Any parallelogram may be divided into two equal triangles, and it follows, then, that the area of one of these triangles is one-half the area of the entire parallelogram. It is evident then, that the area of any triangle is the product of the base by one-half the altitude.

Circle. Cut a circle from stiff paper with a diameter of 4 inches. Mark it off into triangles as shown in the half circle in the second column. The bases of the triangles form what part of the circle? The altitude of each triangle corresponds to what part of the circle? If we are able to find the name of a triangle, can we then find the area of the circle?

The altitude of a triangle is the perpendicular distance from the base to the farthest opposite point. In the triangle above, the line AB is its altitude. Since we know how to

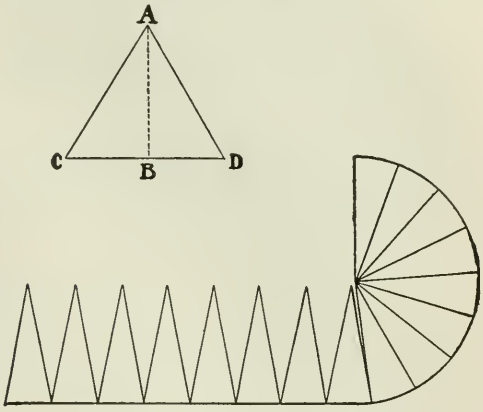


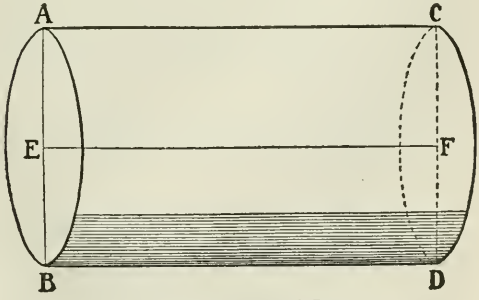
ILLUSTRATION OF CIRCLE

find the area of one triangle, we can find the areas of as many triangles as we have made from our circle. Therefore, to find the area of a circle:

Find the area of one of the triangles and multiply by the number of triangles, or in briefer form, multiply the circumference of a circle by half its radius.

The Cylinder. A cylinder is a round body with equal and parallel circles for its bases and having a uniform diameter. In the accompanying figure the line EF represents the altitude, AB the diameter. The convex surface is the curved exterior.

To find the convex surface of a cylinder multiply the circumference of the base by its altitude. You can easily understand the reason for this rule if you can imagine that



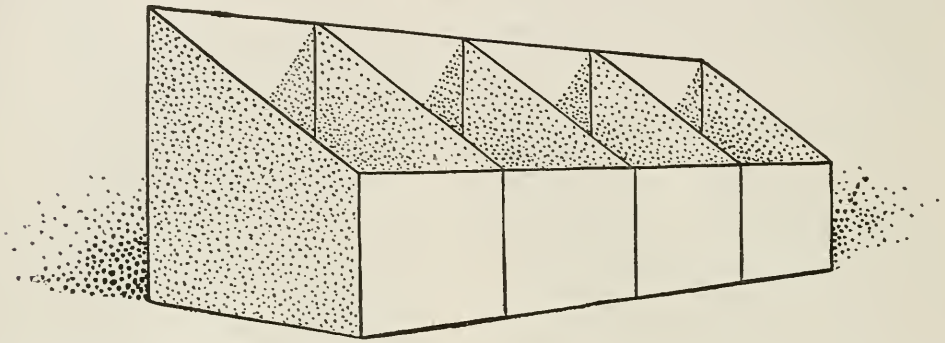
THE CYLINDER

the entire outer surface can be changed in shape so that it lies flat as a rectangle. The area of a convex surface of a cylinder is the same as the area of such a rectangular figure.

To find the volume of a cylinder multiply the area of the base by the altitude. The area of the base is the area of one of the circles forming the base, and above we explained how to find the area of a circle.

Common Measurements. On this and the following pages will be found the principal short rules in use in connection with common measurements.

Measures of Capacity. To find the number of bushels of grain in a bin or box, multiply the length in feet by the height in feet, then by the width in feet and then by 8, striking off the right hand figure. The result obtained will be the number of bushels. For instance. In a bin 10 feet long, 6 feet high and 8 feet wide, $10\times8\times6\times8=384$. .



To find the approximate contents of a round bin or tank, take three-fourths of the square of the diameter, and multiply by the depth and then by $2\frac{1}{2}$, pointing off one decimal place. For example: a tank 6 ft. in diameter and 10 ft. deep contains $\frac{3}{4}\times6^2=10\times2\frac{1}{2}=67.5$ barrels.

In estimating the contents of a cistern, one barrel is equal to $31\frac{1}{2}$ gallons and one hogshead to 2 barrels.

To find the number of barrels a cistern will hold, multiply the square of the diameter of the cistern in feet by the height in feet and divide this result by 4. For instance, if a cistern is 6 feet in diameter and 8 feet deep it will hold $6^2=36$. $36\times8=288\div4=72$ barrels.

To find the number of barrels in a square cistern, multiply the width, height and depth together and divide the product by 4. For instance:

A cistern is 6 feet wide, 8 feet long and 4 feet deep; multiply together equals 192. $192\div4=48$ barrels of $31\frac{1}{2}$ gallons each.

A tank 5 feet square will hold 6 barrels for every foot of depth.

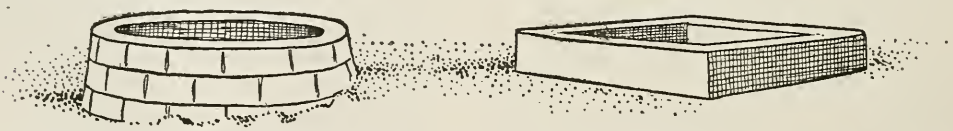
A tank 6 feet square will hold $8\frac{1}{2}$ barrels for every foot of depth.

A tank 7 feet square will hold $11\frac{1}{2}$ barrels for every foot of depth.

A tank 8 feet square will hold $15\frac{1}{4}$ barrels for every foot of depth.

A tank 9 feet square will hold $19\frac{1}{2}$ barrels for every foot of depth.

A tank 10 feet square will hold $23\frac{3}{4}$ barrels for every foot of depth.



To find the medium diameter of a cask or barrel, add to the head diameter $\frac{2}{3}$ of the difference between the head and bung.

Land Measurement. A regular township, according to United States surveys, is 6 miles square and is divided into 36 equal parts or sections, each section containing 640 acres and measuring one mile square (see LANDS, PUBLIC).

To fix permanently these values in the pupil's mind, a few exercises can be given in connection with the study of this diagram, such as:

How many acres of land in $4\frac{3}{4}$ sections?

How many more acres in $7\frac{1}{2}$ sections than there are in 3 sections?

How many acres of land in ½ section?
How many acres of land in 2½ sections?
How many acres of land in 5 sections?
How many more acres in 3½ sections than in 2 sections?

Six N miles

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

W E

1 mile S

To familiarize the pupils with the different divisions of a township, have them make diagrams showing farms located in different parts of the section. Help on this work will be found in the article LANDS, PUBLIC.

Lumber Measurements. Farmers, carpenters, and masons make use of short methods of arriving at results. In making estimates they use the following data:

A board foot, used in measuring lumber, is 1 foot long, 1 foot wide and 1 inch thick.

In computing dimensions of lumber, do not use fractions. A board measures between 5 and 6 inches in width; if nearer 5 call it 5 inches, and if nearer 6, call it 6.

To find the number of feet in a number of 12-foot boards, find the total width of the boards in inches and the sum will equal the number of feet in the pile.

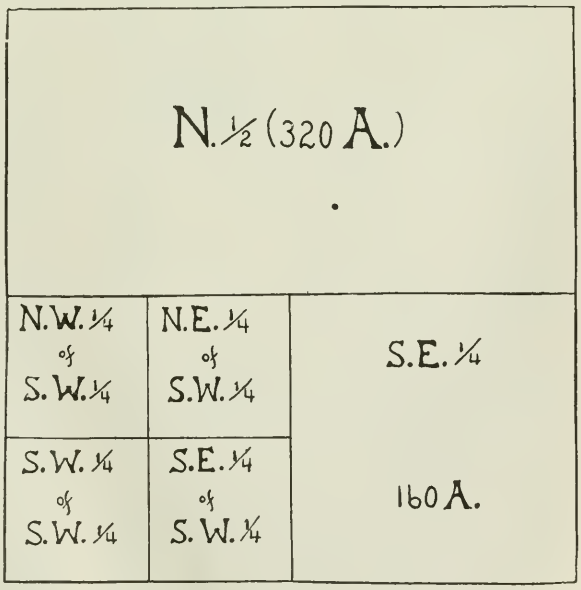
To find the number of feet in a number of 14-foot boards, add to the total widths of the boards 1-6 of the sum obtained.

To find the number of feet in 16-foot boards, add to the sum of the widths of the boards ⅛ of the result. For example: To find the number of feet in 6 boards 8 inches wide and 14 feet long, 6×8=48. 1-6 of 48 =8. 8+48=56 feet. the number of feet contained in the boards.

To find the number of feet of lumber contained in a fence, multiply the sum of the widths of the boards in a portion of the fence by 16½ and if more than 1 inch thick by the thickness, and divide by 12. The result obtained will be the number of feet contained in a rod of fence and this multiplied by the number of rods of fence will give the number of feet of lumber used. To illustrate:

To find how much lumber will be required to fence a square mile of land with three 6-inch boards and one 10-inch board in each panel of fence: 3×6+10=28 inches, total width of boards in each panel. 28×16½÷12 =38½ feet in each rod of fence. The number of rods of fence around a square mile of land equals 1,280 rods multiplied by 38½=49,280 feet, number of feet of lumber in the fence.

To find the number of laths required in a room, find the number of square yards in the room and multiply by 18, for 18 laths are generally used to a square yard.



Measures for Crops. A ton of dry hay is estimated at 500 cubic feet to the ton.

To find the number of tons in a mow, multiply the length in feet by the height in feet and then by the width in feet and divide the result by 500. To illustrate: In a mow 30 feet long, 10 feet high and 20 feet wide there will be $30\times10\times20\div500=12$ tons.

To find the number of tons in a stack, multiply the width in feet by the length in feet by $\frac{1}{2}$ the height and divide by 500. For example: A stack 20 feet long, 10 feet high and 15 feet wide will contain $15\times20\times5\div500=3$ tons in the stack.

To find the contents of a round stack, multiply the distance around the stack in yards by itself and then multiply by 4 times the height in yards, striking off two places from the right of the result thus obtained. This gives the number of cubic yards in the stack and by dividing by 20 will give the number of tons. To illustrate: A stack 20 yards around and 8 yards high will contain $20\times20\times32=12800$. $12800\div20=6\frac{2}{5}$ tons.

To find the contents of a crib in bushels of shelled corn, multiply the number of cubic feet in the crib by 8 and strike off the right hand figure. To illustrate: A crib 18 feet long, 10 feet high and 8 feet wide will contain $18\times10\times8\times8$ or 11520 bushels.

To find the number of heaped bushels of ear corn contained in a crib, multiply the number of cubic feet in the crib by 4 and strike off the right hand figure, as, a crib 15 feet long, 10 feet high and 8 feet wide will contain $15\times10\times8\times4$ or 4800 bushels.

When the sides of the crib are flared, multiply the height in feet by half the sum of the top and bottom widths and then multiply by the length in feet, multiplying the result by 4 and striking off the right hand figure. For example: A crib 12 feet wide at the top, 8 feet wide at the bottom, 14 feet long and 10 feet high will contain $12+8\div2=10$ feet, average width. $10\times10\times14\times4=5600$ bushels.

General Rules in Mensuration. To find the slant height of a cone when the diameter of the base and the altitude are given, extract the square root of the sum of the squares of the altitude and one-half the diameter.

To find the area of the convex surface of a regular pyramid or cone, multiply $\frac{1}{2}$ the sum of the perimeter of the two bases by the altitude.

To find the area of the surface of a sphere, multiply the circumference by the diameter.

To find the volume of a sphere, multiply the convex surface by $\frac{1}{3}$ of the radius.

To find the area of a parallelogram, multiply the base by the altitude.

To find the area of a triangle, multiply the base by $\frac{1}{2}$ the altitude.

To find the area of a trapezoid, multiply $\frac{1}{2}$ the sum of the parallel sides of the altitude.

To find the area of a polygon, divide into triangles and find the sum of their areas.

To find the area of a circle, multiply the radius by $\frac{1}{2}$ the circumference.

To find the circumference of a circle, multiply the diameter by 3.1416.

To find the hypotenuse of a right-angled triangle, when two dimensions are given, extract the square root of the sum of the squares of the three dimensions.

To find the base or perpendicular of right-angled triangle, from the square of the hypotenuse subtract the square of the given side and extract the square root of the remainder.

To find the volume of a pyramid or cone, multiply the area of the base by the altitude and divide by 3.

To find the convex surface of a cylinder, multiply the circumference of one base by the altitude.

To find the volume of a cylinder, multiply the area of one base by the altitude.

To find the volume of the frustum of a regular pyramid or cone, multiply the sum of the areas of the two bases plus the square root of their product by ⅓ the altitude.

To find the contents of an irregular body immerse the body in a vessel full of water, and measure the quantity of water displaced.

To find the area of a rectangle, multiply the length by the breadth.

To find the diameter of a circle, divide the circumference by 3.1416; or multiply it by .318309.

To find the side of a square equal to a given circle, multiply the diameter by .886227 or ½ of $\sqrt{3.1416}$.

To find the diameter of a circle equal to a given square, multiply the side of the square by 1.12838.

To find the side of an inscribed square, multiply the diameter by .707106, or the circumference by .225079.

To find the circumference from an inscribed square, divide the side of the square by .225079.

To find the side of the largest inscribed equilateral triangle, multiply the diameter by .866025.

To find the diameter of the three largest equal circles that can be inscribed in a given circle, divide the diameter of the given circle by 2.155.

To find the contents of a cube, multiply three sides together.

To find the surface of a cube, multiply the square of the length of one of its sides by 6.

Related Articles. Consult the following titles for additional information:

Angle	Cylinder	Rectangle
Arithmetic	Geometry	Rhombus
Circle	Polygon	Sphere
Cone	Prism	Square
Cubic Measure	Pyramid	Triangle

MENTAL DEFECTIVES. See FEEBLE-MINDED, EDUCATION OF THE.

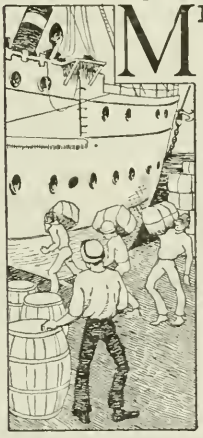
MEN'TOR, the faithful friend of Ulysses, to whom Ulysses entrusted the care of his domestic affairs during his absence in the war against Troy. The education of the young Telemachus fell to his charge, and the wise and prudent counsel which he gave the youth has made his name the synonym for a wise counselor. See ULYSSES.

MEPHISTOPHELES, *mef is tof'e leez*, the name of a demon in the old puppet plays, adopted by Goethe in the first part of *Faust*. Although the name since Goethe's time has been commonly used as a name for the devil, the Mephistopheles of Goethe has few of the characteristics which, in the ordinary belief, belong to Satan.

MERCANTILE AGENCY. See COMMERCIAL AGENCY.

MERCATOR'S PROJECTION. See MAP.

MERCERIZING, *mer'ser ize ing*, a chemical process named from its originator, John Mercer, of Lancashire, England. It is used to give a silky finish to cotton fabrics, and consists in treating the fibers with caustic soda or caustic potash. By treating the cloth under tension the fibers are kept from shrinking. The lustrous effect is caused by reflection of light from the surface of the fabric, and this is brought about by a change produced in the fibers. By mercerizing they become straight and translucent, whereas formerly they were flat, spiral tubes. Mercer obtained his patent in 1850.



MERCHANT MARINE. The combined tonnage of vessels of any nation which are engaged in carrying its commerce on the seas is called its merchant marine. The vessels engaged are among the common carriers of the ocean.

The seas are the great highways of international trade, and those nations which possess large numbers of carrying vessels are the richest and most powerful. The United States may appear to be an exception to this general rule; its merchant marine has been negligible for over sixty years, yet it has prospered in its foreign commerce by being able to engage ships from other nations to carry its products.

Before the Revolutionary War the American ports of Boston, New York and Philadelphia were the homes of more sailing vessels than were owned in Liverpool, London and Glasgow. In 1800 England's tonnage was twice that of the young American republic, and it increased rapidly until Great Britain owned the world's greatest merchant marine. This was natural, and the condition was essential, for Britain's possessions encircle the globe, and there must be facilities for uninterrupted trade relations between the

mother country and its dependencies. British ships are found in every port in the world, while the American flag for many years has been seldom seen in foreign waters.

Before the World War (1914-1919) Germany possessed the second largest merchant marine that sailed the seas, the result of growth of scarcely more than thirty years, yet Germany declared that one of the reasons for the war was to secure "a place in the sun" and the proper expansion of its trade of which its grasping English neighbor would rob it. Before the war ended all people knew the truth. During the last decade German trade had prospered enormously; the World War branded the country with such disgrace that the enormous prestige the nation had gained was practically destroyed.

The United States. There is reference above to the strength of the country's early merchant marine. The Civil War (1861-1865) dealt so severe a blow to its commerce that there never has been complete recovery. Subsidies (see SUBSIDY) were repeatedly solicited, that American enterprise might build ships and sail them without loss, but they were always refused. The World War created a tremendous demand for vessels of all classes; American shipyards were quickly manned, and the building of boats was begun with feverish haste. Hundreds of vessels of both steel and wood were contracted for, and before the end of the war many of them were put into commission. Plans were laid for a merchant marine within a few years which would make it possible to transport American goods to all parts of the world in vessels flying the American flag. To man these vessels, inducements were offered to soldiers newly mustered out of service after the war. The naval training stations also furnished many men and officers.

Losses in the War. Germany's submarine warfare reduced the world's shipping during the World War over 15,000,000 tons. During the same period about 10,850,000 tons were constructed, and 2,400,000 tons of German boats were used by the allied nations or were purchased from neutrals. The net loss in tonnage was therefore about 1,800,000 tons during war. Britain suffered most heavily; its gross loss in tonnage was nearly 11,000,000 tons, and its net loss about 3,500,000 tons. Neutral Norway, which had the third largest tonnage of any country, was the next greatest loser during the war. In 1919 the United States owned one-fifth of the world's merchant marine.

Related Articles. Consult the following titles for additional information:
Commerce High Seas Ship

MERCHANT OF VENICE, THE, one of the most popular and most interesting of Shakespeare's comedies, written in or about the year 1597. The plot was drawn from several sources, among which may be mentioned Marlowe's *Jew of Malta.* The play is in five acts. The story, in brief, is as follows:

Antonio, a merchant of Venice, becomes surety for a friend, Bassanio, who borrows from a Jewish money-lender, Shylock, the sum of 3,000 ducats. The Jew makes a peculiar bargain, to the effect that if the money is not repaid within three months Antonio shall forfeit a pound of flesh. The delay of Antonio's ships makes repayment within the specified time impossible, and Shylock demands his pound of flesh. At the trial Portia, the heroine, in the garb of a lawyer, presides over the case and declares that the Jew may have his pound of flesh, but that he shall forfeit all his lands and possessions if he sheds one drop of Christian blood in taking the pound. Thus he is outwitted in his plot to cause Antonio's death.

Supplementing the main thread of the story are the narrative of the three caskets and the story of Shylock's daughter Jessica, who runs away with a suitor and carries off her father's money.

MERCIER, *mair sya',* HONORÉ (1840-1894), a Canadian politician, born at Saint Athanase, Quebec. He was educated at Jesuits' College, Montreal, and studied law, but engaged in journalism. He sat in the Dominion parliament from 1872 till 1874, became solicitor general, was a member of the legislative assembly of Quebec in 1879 and became attorney-general and premier in 1887, at the head of a coalition of Liberals and Clericals.

MERCURY, *mur'ku ry,* or **QUICK'SILVER,** a metal, heavier than any other excepting the platinum metals, gold and tungsten, and the only metal which is liquid at ordinary temperatures. Because of the extensive range between its freezing and its boiling point and because of its fluidity, it is well adapted for use in barometers and therometers, which allow for its expansibility under heat. At 37.9° below the zero of Fahenrheit, it freezes, and under a heat of 675° it rises in fumes and is gradually converted into a red oxide. Mercury is prepared principally from cinnabar (red sulphide of mercury) by heating,

combined with condensation of the vapors. In its metallic form, as well as in its salts, it is poisonous, and chronic poisoning is liable to afflict persons who work continuously about the metal.

Preparations of this metal are among the most powerful poisons and are extensively used as medicine. In its fluid state, mercury combines readily with most of the metals, to which it imparts a degree of fusibility or softness. This quality of combination makes it a useful factor in methods of extracting metals from their ores. An alloy of mercury and any other metal is called an amalgam. Mercury is sometimes found in its fluid state, but usually it occurs as the sulphide. About one-third of the mercury used in the world comes from Spain, but it is also found in Germany, Italy, China, Borneo, Mexico and Peru. California, Texas and Oregon produce some mercury, the largest supply coming from California.

Related Articles. Consult the following titles for additional information:

Amalgam	Cinnabar
Antidote	Corrosive Sublimate
Barometer	Thermometer

MERCURY, the planet nearest the sun and the smallest of the major planets. Its diameter is about 3,000 miles, which makes the planet about three times the size of the moon. Mercury moves round the sun in a little less than 88 of our mean solar days, at a mean distance of about 35,392,000 miles. At its nearest approach to the sun it is about 29,000,000 miles away, and at its furthest point, more than 43,000,000 miles from it. The period of its axial rotation is 24 hours, 5 minutes and 28 seconds. Its volume is about one-seventeenth that of the earth, and its density is one-tenth greater than that of the earth. When farthest east of the sun, it is visible to the naked eye in spring and autumn, after sunset and before sunrise.

Mercury is a difficult planet for astronomers to study, and very little is known concerning it. At intervals of from three to thirteen years it is seen to pass across the sun's disk, and this transit is always studied very carefully, for it shows clearly the laws that govern the planet's motion. It has an atmosphere less dense than that of the earth.

Related Articles. Consult the following titles for additional information:

Astronomy Planet Earth

MERCURY, in Roman mythology, the son of Jupiter and Maia, and the messenger of the gods; in Greek mythology he is called Hermes. When he was but a few hours old he sprang from the knees of his mother, seized a tortoise shell and stretched strings across it, thus inventing the lyre. Before night he had stolen the oxen of Admetus, which Apollo was tending, and had hidden them so securely that Apollo could not find them. Mercury was obliged to confess where he had concealed the animals, and in return for the two which he had eaten he gave to Apollo his newly invented lyre. Apollo, pleased with the gift, presented Mercury with the caduceus, which became his most characteristic symbol. Jupiter also presented him with a winged cap, winged sandals and a short sword, by means of which he could make himself invisible and could transport himself to any place in the twinkling of an eye. One of Mercury's duties was to conduct the souls of the dead to Hades. He was also the god of commerce and of eloquence.

MERCURY
From the bronze statue by John of Bologna.

MERCURY, Bichloride of. See Corrosive Sublimate.

MERCY, Sisters of, the name given to members of female religious communities founded for the purpose of nursing the sick at their own homes, visiting prisoners, superintending the education of females and performing similar acts of charity and mercy. Communities of Sisters of Mercy are now widely distributed over America and Europe, and the name is borne specifically by a Roman Catholic sisterhood, known officially as Order of our Lady of Mercy.

MER DE GLACE, *mair de glas,* the name of the most celebrated glacier of the Alps. It is situated on the northern slope of Mount Blanc and has an area of sixteen square miles and a length of about nine miles. The lower end is known as the Glacier des Blois, whence it flows into the Arveyron River, in the valley of Chamonix. This glacier is easily ac-

cessible from the village of Chamonix, and consequently is visited by a large number of tourists each season. During the summer and autumn its flow has an average of almost three feet a day. See GLACIERS.

MER'EDITH, GEORGE (1828-1909), an English poet and novelist, one of the great figures of the Victorian Period. He was born in Hampshire and was educated in Germany. After studying law for a time, he turned to literature, and his first venture was a volume of poems, published in 1851. His first novel, *The Ordeal of Richard Feverel,* was published in 1859, and from that date poems and novels appeared steadily, although not rapidly. Among the works which place Meredith among the foremost novelists of the late nineteenth century are *Rhoda Fleming, The Adventures of Harry Richmond, The Egoist, Diana of the Crossways,* and *The Amazing Marriage.* He was a writer of great intellectual power, but too much given to psychological analysis to appeal to the popular taste. Reflective readers, however, find him very stimulating.

MERGAN'SER, a family of fishing ducks with slender, straight bills, hooked at the tip and notched at the edges. The *hooded merganser* is suitable for food, but the flesh of most of the others is strong, because of their fondness for eating fish. The *red-breasted merganser* is about two feet long and has no crest. Together with the hooded merganser it is found in nearly all parts of the northern hemisphere.

MERIDA, *ma're dah,* MEXICO, the capital of Yucatan, twenty-six miles from the port of Progreso, on the Mexican Gulf. It has a Moorish aspect and contains a number of fine squares, a cathedral, a bishop's palace, a government house and good legislative buildings. From Merida is shipped more sisal hemp than from any other city in the world. Most of it goes to the United States. See SISAL. Population, 1910, 62,447.

MER'IDEN, CONN., a city in New Haven County, halfway between New Haven and Hartford, on two lines of the New York, New Haven & Hartford railroad. It has a picturesque location in an agricultural district, not far from lake Merimere. There are extensive manufacturers of silver and plated ware, for which the city is most famous, and hardware, cutlery, and machinery. The city contains the Curtis Library, Connecticut School for Boys, Curtis Home for Orphan Children and Aged Women and Meriden Hospital. Previous to its incorporation in 1806, it was a part of Wallingford. It was chartered as a city in 1867. Population, 1910, 27,265; in 1917, 34,525 (Federal estimate).

MERID'IAN, one of the innumerable imaginary lines passing from pole to pole perpendicular to the equator, on the surface of the earth. They serve to determine the longitude of places and thus to mark their exact position. Every place on the globe has its meridian, and when the sun is above this line it is noon, or midday. The longitude of a place is its distance—usually stated in degrees, minutes and seconds—east or west of any meridian selected as a starting point, just as its latitude is its distance north or south of the equator. At a national conference held at Washington, October, 1884, Greenwich was selected as the geographical and astronomical reference meridian of the world, longitude to be reckoned east and west from this, up to 180°. See LONGITUDE; LONGITUDE AND TIME.

MERIDIAN, MISS., the county seat of Lauderdale County, eighty-five miles east of Jackson, on the Mobile & Ohio, the Queen & Crescent, the Alabama & Vicksburg, the Alabama Great Southern, the Meridian & Memphis, the Southern and the New Orleans & Northeastern railroads. The city is in a cotton-growing region. It contains railroad shops, cotton, cottonseed oil and lumber mills, ice factories and fertilizer works. Here are located the East Mississippi Female College, the Meridian Academy and Lincoln School. The commission form of government was adopted in 1912. Population, 1910, 23,285.

MERIMEE, *ma re ma'* PROSPER (1803-1870), a French novelist, dramatist and historian, best known as the author of *Carmen,* a romance which was the origin of Bizet's popular opera. He filled, in succession, various positions under the French government, was elected to the French Academy and was made commander of the Legion of Honor. Several reports of his researches as inspector of ancient monuments were among his early publications; he also wrote, besides *Carmen,* a standard work on archaeology, several volumes of short stories, the novel *Colomba* and other books of lesser note. See CARMEN.

MERLIN, *mur'lin,* a legendary character who appears in Malory's and Tennyson's stories of King Arthur. Merlin was believed

to be a bard of miraculous powers, whose father was a fierce demon and his mother a Welsh princess. During the battles between the Britons and invading Saxons he predicted in song the history of Britain down to the twelfth century.

MER'MAID AND MER'MAN, in legend, creatures who lived in the sea, possessed human bodies united to the tails of fishes and were supposed to be capable of entering into social relationships with men and women. The typical mermaid was a lovely creature who combed her long, beautiful hair with one hand while she held a looking-glass with the other. The origin of this myth is supposed to rest in the humanlike appearance of certain aquatic animals, such as the seal. The legends of mermaids and mermen have been largely treated in poetry.

MEROVINGIANS, *mer'o vin'je anz,* the name given to the first dynasty of Frankish kings who ruled in Gaul. The grandfather of Clovis, Merovaeus, is supposed to have given his name to the line. Clovis, the first powerful king of the dynasty, was succeeded by weaker kings, and the royal power came in time to be a name only, the real authority being possessed by the mayors of the palace. Childeric III was deposed in 751 by Pippin the Short, who was the founder of the Carolingian dynasty. See CAROLINGIANS.

MERRIMAC, *mer'i mak,* THE. See MONITOR AND MERRIMAC.

MERRIMAC RIVER, a river in New Hampshire and Massachusetts. It rises in the White Mountains, flows south, then east, and empties into the Atlantic near Newburyport, Mass. The immense water power furnished by its falls is responsible for the prosperity of Lowell and Lawrence, Mass., and of Nashua and Manchester, N. H. The Merrimac is about 100 miles in length, and is navigable seventeen miles from its mouth.

MERSEY, *mer'si,* a river whose broad estuary forms the harbor of Liverpool, England. It rises in the northern part of Derbyshire, flows in a general southwesterly direction and enters the Irish Sea through an estuary nearly eighteen miles in length. The river itself is seventy miles long. At Eastman Locks the Mersey is joined by the Manchester Ship Canal (see MANCHESTER).

MERTHYR-TYDFIL, *mur'thur tid'vil,* a city of Wales, situated twenty-two miles northwest of Cardiff. It is the center of the iron and steel industry of Southern Wales and also has the largest coal mining interest in Wales. Population, 1911, 80,990.

MERV, *merf,* an oasis in Ceneral Asia, forming the chief populated region of a great arid district in Russian Transcaspia. The oasis is about 2,000 square miles in area, and is very fertile, producing millet, barley, wheat and rye. Carpets of superior quality and silver goods are the chief manufactures. About 120,000 persons dwell on the oasis.

MESA, *ma'sah,* the name of a small plateau, usually having a flat surface and very steep slopes. The word is the Spanish name for *table.* Mesas are numerous in the southwestern portion of the United States and were formed by erosion (see EROSION). The top of the mesas indicates the former height of the plateau, which is from 200 to 500 feet above the surrounding country. Some of the mesas are covered with vegetation, but most of them are barren. Some of those in Arizona were formerly inhabited by cliff dwellers and contain ruins which are of much interest. Some of them, as Mesa Encantada, or Enchanted Mesa, are regarded by the Indians with superstition. See CLIFF DWELLERS.

MESMERISM, *mes'mer iz'm,* the term applied to a process originated by Dr. Friedrich Mesmer (see below). He at first professed to cure diseases by stroking his patients with magnets, but later he abandoned their use and declared that his operations were conducted solely by means of the magnetism peculiar to animal bodies; hence, this influence exerted by one person over another is sometimes known as *animal magnetism.* His patients experienced convulsions, hysterics, exhaustion, trance states, etc. Scientists who investigated his "cures" decided that the effects were caused by stimulated imagination, and from the interest excited in the subject arose the process known as hypnotism. This is explained under its title.

Friedrich Anton Mesmer (1733–1815), was born at Weil, Austria. After taking a degree in medicine at Vienna, he began to practice, and was soon absorbed in his theories of magnetism. In 1778 he removed to Paris, where the most intense excitement was aroused by his practices. The French government appointed a commission to investigate his work, and among its members was Benjamin Franklin. Eventually Mesmer was denounced as an impostor, and he lost many of his followers. He died in Switzerland.

MESOPOTA'MIA, a name given by the Greeks to an extensive region enclosed by the Tigris and Euphrates rivers, anciently associated with the Assyrian and Babylonian monarchies. At different times it belonged to Assyria, Babylonia, Persia, Greece, Rome and Arabia. It eventually became a part of Turkey in Asia, and is inhabited chiefly by Arabs, Kurds and Armenians. Many of the inhabitants are nomadic, and their chief occupation is cattle raising. During the World War British forces occupied a large part of Mesopotamia, and through their efforts the country became a fertile and productive district. Old irrigation ditches and new ones were utilized, and occupied Mesopotamia became self-supporting.

MESOZOIC ERA, *mes o zo'ik*, that division of geologic time extending from the Paleozoic to the Cenozoic Era and including the Triassic, Jurassic and Cretaceous systems. See PALEOZOIC ERA; CENOZOIC ERA; GEOLOGY, and the systems named.

MESQUITE, *mes ke'tay*, a small tree or shrub allied to the acacia. It is common in Mexico, Texas and other parts of the southwest of North America, where in dry regions it often appears as about the only conspicuous form of vegetation. It yields a gum resembling gum arabic, but much inferior. Its seeds are sometimes eaten, and from the mucilage of its pods a drink is made.

MESSE'NIA, a country of ancient Greece, in the southern part of the Peloponnesus. It is celebrated for the long struggle of its inhabitants with the Spartans, with whom they waged three wars between the eighth and fourth centuries B. C. In 369 B. C the Spartan yoke was finally shaken off, and Messenia was independent until the Roman conquest in 146 B. C. Messenia is a province in modern Greece.

MESSI'AH, meaning *anointed*, is a term applied in the Old Testament to the priests, to the kings and even to Gentile kings, as persons who had been anointed with holy oil. Its special application in the prophetic books of the Old Testament was to an ideal holy king and deliverer, whose advent they foretold. The whole of the prophetic pictures agreed in placing Jehovah in the central place of the desired kingship. These Messianic prophecies had, at the time of Christ, come to be applied by the Jews to a temporal king who should free them from foreign oppression. They are affirmed by Jesus Christ and His apostles to apply to and be fulfilled in Him; and this is the belief of the Christian church, by which He is called "The Messiah." The rationalistic school of theologians asserts that Jesus laid claim to the dignity, either to meet the preconceptions of his countrymen or because He felt that the truth which He taught was the real kingdom which God was to set up, never to be destroyed.

MESSINA, *mes se'nah*, SICILY, the chief commercial city and seaport of the island, and capital of the province of the same name, is situated on the Strait of Messina, about 200 miles south-southeast of Naples. The harbor is one of the best on the Mediterranean, and the city is of modern aspect, having been rebuilt after the destructive earthquake of 1908. The manufactures consist chiefly of silk goods. The principal exports are silks, linen, coral ornaments, olive oil, oranges, lemons and other fruit, wine, salted fish and fruit essences. Messina possesses a university founded in 1548 and a public library of over 56,000 volumes. The town was founded presumably in the eighth century B. C., but its authentic history begins only with the fifth century B. C. During the Middle Ages it was in the possession of various nations. In 1861 it became a part of Italy. Population, 1915, estimated, 150,000.

MESSINA, STRAIT OF, the channel which separates Sicily from Italy and connects the Ionian Sea with the Tyrrhenian Sea. It is about twenty-four miles in length, about twelve miles across at its broadest part and two miles at its narrowest. As the strait is very deep and the tidal current very strong, navigation is somewhat difficult. It was in the Strait of Messina that in ancient times the two sea monsters, Scylla and Charybdis, were supposed to dwell. See SCYLLA.

METALLURGY, *met'al ur ji*, a most important science dealing with the separation of metals from their ores. It is not of recent origin, for it was well known to the ancients; modern men have only improved upon ancient formulas and methods.

Metals are found in three classes of ores; those in which the pure metal occurs in veins or pockets, either in grains or loose nuggets; those in which the metals occur as oxides, and those in which the metals occur as sulphides. Ores of the first class need but little treatment. This consists in crushing the rock and separating the loose metal from it. This metal is then united into larger masses by

smelting. The oxides constitute by far the largest class of ores, and it is from these that the supply of iron, lead, tin, copper and zinc is mostly obtained. Most of these ores can be reduced by smelting with a flux, as in the case of the manufacture of pig iron (see IRON). The sulphides are more difficult to treat, and some of them require several processes before the metal is obtained.

In general, the treatment of this class of ores is as follows: The ore is crushed, and the metal-bearing portion is separated by running the crushed ore over vibrating tables, over which water is running. The particles containing the metal, being heavier than the others, settle at the bottom and form what is known as the *concentrate*. This concentrate is dried and roasted to drive off the sulphur. The ore is then smelted; it yields an impure metal, which is purified by repeated smeltings. Copper ores containing sulphur are reduced in this manner.

Ores containing gold and silver are often treated by the *amalgamation* process. This consists in dissolving out the gold and silver with mercury. The ore is crushed in a stamp mill, in the trough of which mercury is poured. The gold and silver are obtained from the amalgam by distillation.

Low grade ores containing gold are often treated by what is known as the *cyanide process*. By this process the ore is crushed to a fine powder and subjected to treatment by a strong solution of cyanogen. This dissolves the gold or silver, while the other metals are left unchanged. The metals are then recovered from the solution by various processes. The gold is obtained by running the solution into a vat, in the bottom of which zinc shavings have been placed. The zinc collects the gold, which forms upon it in small nuggets or crystals.

Electrolysis is also extensively employed in metallurgy. By this process the ore or alloy is placed in a strong solution of the metal which it is desired to obtain and is then attached to the positive electrode, while a plate of the metal is attached to the negative electrode. When the electric current is caused to pass through the solution, it dissolves the metal from the ore and deposits it upon the plate attached to the negative electrode. This method is particularly advantageous in obtaining copper from different ores, since that metal yields so readily to electrical action. The process is the same as that employed in electrotyping. See ELECTROTYPING.

METALS. Elementary substances have been divided by chemists into two classes, *metals* and *non-metals*, or *metalloids*, but these merge one into the other by gradations so imperceptible that it is impossible to frame a definition which will not either include some non-metallic bodies or exclude some metallic ones. Metals are opaque, having a peculiar luster, called *metallic*. They are insoluble in water; all are solid, except mercury, at ordinary temperatures; are generally fusible by heat, and are good conductors of heat and electricity. Many of the metals are also malleable, or susceptible of being beaten or rolled out into sheets or leaves, and some of them are extremely ductile, or capable of being drawn out into wires of great fineness. They are sometimes found native or pure, but more generally they are combined as ores with oxygen, sulphur and some other elements.

Fifty-two of the elementary substances are usually regarded as metals, of which the following are the most important; aluminum, antimony, barium, bismuth, cadmium, calcium, chromium, cobalt, copper, gold, iridium, iron, lead, lithium, magnesium, manganese, mercury, nickel, platinum, potassium, silver, sodium, strontium, tin, tungsten, zinc. The ancients knew of only gold, silver, copper, tin, iron and lead. Of the fifty-two, gold, silver, copper, tin, lead, zinc, platinum and iron are the most malleable; gold, which possesses the quality in the greatest degree, is capable of being beaten into leaves $\frac{1}{100000}$ of a millimeter in thickness. In the order of their ductility they are platinum, silver, iron, copper, gold, aluminum, zinc, tin, lead. Platinum wire has been made less than $\frac{1}{1200}$ of a millimeter in diameter.

The majority of the useful metals are between seven and eight times as heavy as an equal bulk of water; platinum, osmium and iridium are more than twenty times as heavy; while lithium, potassium and sodium are lighter. The metals become liquid, or otherwise change their condition, at very different temperatures; platinum is hardly fusible at the highest temperature of a furnace: iron melts at a little lower temperature; silver, somewhat lower still, while potassium melts below the boiling point of water and becomes vapor at a red heat. Mercury is liquid at ordinary temperatures and freezes

only at —39° F. All the metals, without exception, combine with oxygen, sulphur, and chlorine, forming *oxides, sulphides* and *chlorides,* and many of them also combine with bromine, iodine and fluorine. Several of the recently discovered metals exist in exceedingly minute quantities and were detected only by spectrum analysis.

Related Articles. Each of the important metals is described in these volumes, and to these the reader is referred. See, also, Metallurgy.

METAMORPHIC, *met a mor'fik,* **ROCKS,** in geology, rocks of any age, whose original texture has been altered and rendered less or more crystalline by subterranean heat, pressure or chemical agency. See Metamorphism; Geology.

METAMORPHISM, . *met a mawr' fiz'm,* the term used by geologists to indicate the changes in structure and composition which rocks have undergone since their formation. While metamorphism does not apply to the decomposition of rocks, it may apply to their construction from decomposed material, as in the formation of sedimentary rocks from material that has been washed down from the hills and mountains. The most marked results of metamorphism are found in the oldest rock strata which have been changed by volcanic and other forces. The following are the changes resulting from metamorphism: (1) Hardening, as in the case of sandstones and other soft sedimentary rocks; (2) change in composition and structure, as in the case of shales and slate; (3) crystallization, as in the formation of marble from common limestone. The agencies effecting these changes are heat, chemical action, moisture and pressure. Of these, heat and pressure are the most important. See Geology.

METAMORPHOSIS, *met a mawr'fo sis,* in zoölogy a term applied to those alterations in form which an animal undergoes in the process of its development from the egg to the mature individual. A typical metamorphosis is seen in the life history of the butterfly. The fertilized egg hatches into the larva, or caterpillar, which, after reaching a certain stage of maturity, shuts itself into a hard case called a chrysalis. This is the pupal stage. In this condition it remains quiescent for some time, then breaks forth from the chrysalis transformed into the imago, or perfect butterfly, which lays the egg that begins again the circle of life. While the metamorphosis of an insect is the typical form, yet many of the higher order of animals show similar changes. Among the amphibians, for instance, the frog lays eggs which become tadpoles that in time turn to adult frogs. Similar changes may be recognized in the vegetable world. See Insects; Caterpillar.

METAPHOR, *met'a for,* a figure of speech, founded on the resemblance which one object is supposed to bear, in some respect, to another, and expressed by transferring a name or epithet from an object, to which it properly belongs, to another, so that a comparison is implied, though not formally pointed out. It is in effect a simile without any word expressing comparison. Thus, "that man is a fox," is a metaphor; but "that man is like a fox," is a simile. "I am the vine, ye are the branches," is one of the strongest of metaphors. Also we say, "A man *bridles* his anger;" "Opposition *fires* courage." See Simile; Figure of Speech.

METAPHYSICS, *met afiz'iks,* a term generally applied to mental science, as distinguished from physical science. Metaphysics is of a higher order than all natural sciences, for its province is the consideration of the nature and validity of general notions, such as *matter, space, time, motion, cause* and *effect* and many others that are presupposed in all scientific investigation and theory. The physical scientist, for example, assumes that we live upon a sphere which is suspended in space and upon which all phenomena are governed by the law of cause and effect. But the metaphysician is not content merely to assume the existence of space and the reality of the law of cause and effect; he *analyzes* these notions and determines their nature and value. Metaphysics is distinct from the science of psychology, for psychology deals only with the nature of the operation and laws of mental action, while metaphysics is concerned with the ultimate value of the general forms of thought peculiar to human consciousness.

ME'TEOR, a name originally given to any atmospheric phenomenon, but now more usually applied to the phenomena known as shooting stars, falling stars, fire balls or bolides, aërolites, meteorolites or meteoric stones. It is generally believed that these phenomena are all of the same nature and are due to the existence of a great number of bodies, some of them very small, revolving round the sun, which, when they happen to

pass through the earth's atmosphere, are heated by friction and become luminous. Under certain circumstances portions of these bodies reach the earth's surface, and these are known as meteorites, or meteoric stones. These stones consist of known chemical elements. They have this peculiarity, that whereas native iron is extremely rare among terrestrial minerals, it usually is present in meteorites. It is known as meteoric iron. Exceptionally large showers of meteors appear in August, from the ninth to the fourteenth day, and in November, on the thirteenth and fourteenth, every year. The November showers exhibit their greatest brilliancy every thirty-three years.

METEOROL'OGY, a comparatively-new science, which treats of conditions relating to weather and climate. The word is derived from two Greek words which mean *things in the air* and *discourse*. This science is the working tool of the "weather man." He has become so well acquainted with the apparent vagaries of the weather that what he says is entitled to respect. (This is more fully referred to in the article WEATHER BUREAU.)

The present degree of perfection of meteorological science has been reached through observations made under the auspices of the governments of many nations. In making these observations, the conditions given the greatest weight are temperature, barometric pressure and humidity. Upon temperature and barometric pressure depend the prevailing winds, which bring either fair or foul weather. The weather forecasts of a country are made known by a weather map, which appears daily. This map shows the area of low pressure and the area of high pressure, which are marked respectively *low* and *high*. The direction of the wind is indicated, as are the places where rain or snow is falling. Places of equal temperature are connected by isotherms, and those of equal pressure, by isobars. All of these points of information are indicated by the use of symbols, which are described in explanatory notes.

By comparing the map under construction with the preceding one, the forecaster learns in what direction the areas of low pressure are moving and how far they have traveled during the interval. From this comparison, from the information contained in the last reports of the stations and from his experience, he is able to predict with a fair degree of certainty the weather for the various localities in his district for the next twenty-four or forty-eight hours.

Related Articles. Consult the following titles for additional information:

Barometer	Isobars	Weather
Climate	Isotherms	Bureau
	Storms	

ME'TER, the arrangement of words in rhythmical units, in poetry. The term is also applied to the unit of measure itself. A metrical line is divided into a number of units, called *feet*. In certain languages, particularly in Latin and Greek, the versification depends on the length of the vowels in the syllables in these feet; in English, however, as in the other Germanic and in the Romance languages, the meter depends on the number of syllables in a line and takes no account of the length of their vowels. The most common meters in English are the following:

Iambic. In this each foot consists of two syllables, an unaccented, or short, syllable, and an accented, or long syllable; as—

I can'/not sing'/the old'/en songs';

Trochaic. In this an accented syllable is followed by an unaccented; as—

Tell' me/ not' in/mourn'ful/ num'bers;

Dactylic. In this an accented syllable is followed by two unaccented; as—

Wel'come ye/chiefs' of the/High'landers;

Amphibrachic. In this one accented syllable comes between two unaccented; as—

Forev'er/my child'ren/remem'ber/your count'ry.

A line is designated according to the number of feet as follows: one of two feet is called *dimeter;* of three feet, *trimeter;* of four feet, *tetrameter;* of five feet, *pentameter;* of six feet, *hexameter;* of seven feet, *heptameter.*

ME'TER, the unit of length in the metric system of weights and measures. Its length is one-ten millionth of the unvarying distance from the equator to either pole, which is 39.37+inches, or 3.28+feet. This measure was adopted as France's standard of linear measure in 1799, but its use was not made obligatory until 1837. See METRIC SYSTEM.

METH'ANE, MARSH GAS, or **FIRE DAMP**, a gas which is a compound of carbon and hydrogen, produced by decaying vegetable matter under water, and therefore found in the gases which bubble up through stagnant water. It is colorless and odorless and burns with a blue flame. It is found in many coal mines and from its explosive nature has been productive of great damage.

METHODISTS, *meth'od ists,* a general name applied to the members of those religious bodies which have their origin in the society founded in 1739 by John Wesley (which see). Wesley called his organization the United Society, but outsiders applied the name Methodists to its members, because of the methodical way in which they ordered their lives. As the numbers increased, other societies were formed, and Wesley subdivided them into classes, placing a leader over each class. Each leader had his circuit, and several circuits were presided over by a clergyman, while Wesley was at the head of the organization. In 1741 lay preaching was introduced, and in 1784 the denomination became independent of the Church of England, the first act securing this independence being the consecrating of two men for missions in North America. In doing this, Wesley assumed power not granted him by the Church. At the conference held in Baltimore that year, the name *Methodist Episcopal Church* was assumed. Since that time various other branches of Methodism have been founded, though the Methodist Episcopal branch is by far the strongest.

The Methodist Protestant Church grew out of a desire to have laymen admitted to the Church councils. In 1943 the Wesleyan Methodist Connection was organized by a following which was strongly opposed to slavery, and this was the beginning of a division of sentiment which led, at about the time of the Civil War, to the separation of the Church in the United States into two great divisions, the Methodist Episcopal Church, most of whose followers were opposed to slavery, and the Methodist Episcopal Church South, composed almost wholly of slaveholding members or members that were in sympathy with that institution. At present there is a strong movement for the union of the Northern and Southern branches of the Church.

The Free Methodist Church was also organized in New York in 1860, and the African Methodist Church, designed particularly for colored people was organized in Philadelphia in 1816, but it did not receive any considerable membership until after the Civil War.

The chief doctrines of the Church are a belief that all men are sinners; that God the Father loves all men and hates sin; that Christ died for all men to make sure the salvation of all who believe in Him; that the Holy Spirit is given to all men to incline them to repent and believe in Christ; that all who repent are forgiven, regenerated and adopted as children of God, and that all who persevere to the end shall be saved in Heaven forever.

The governing body of the Church in the United States is a general conference, composed of the bishops and other general Church officials, of ministerial delegates and lay delegates elected by each conference, the number being apportioned in accordance with membership. This body meets every four years and legislates concerning all lines of Church activity. It also elects the general officers, such as bishops, secretaries and editors of the leading publications. The Church has always been active in missionary work, and maintains missions in all parts of the world. The number of communicants in the English-speaking world is about 20,000,000, of whom over 7,608,000 are in the United States. About one-half of these belong to the main body of Methodists.

METHODS OF TEACHING, plans of procedure so as to obtain results in the instruction of children. Since all learning is by mental activity of the learner, methods of teaching are founded upon the principles and laws of psychology, and the teacher should have a thorough acquaintance with these. The close relation of mind and body also make it necessary that the teacher have some knowledge of the child's physical condition. She should at least understand the relation of effort to fatigue and the effect of fatigue upon the system, the plastic condition of the nervous system and the order of development of the mental powers. At school age the intelligence of children depends largely upon their home and neighborhood associations; hence, if she would be successful, the teacher must also become acquainted with the child's environment.

Presentation of Subjects. Attention is essential to learning. If the child is to acquire an idea, he must concentrate his mental powers upon it, and this requires an act of

will. But before the child wills to give his attention to an object, he must feel that a knowledge of it will satisfy some want; that is, he must have an interest in it. The teacher's success depends upon her ability to awaken this interest. In her presentation of subjects, she should be guided by a few general principles. These are:

(1) Interest is common to all children, but often needs to be directed by the teacher.

(2) Children are most easily interested in what they know something about; therefore, in selecting subjects for young children, the teacher should have due regard for what they already know. It would be difficult to interest a beginning class of a rural school in a large building or a city street which they had never seen, and it would be equally difficult to interest a similar class of a city school in a cornfield if they had never visited the country.

(3) Children are not interested in what they cannot understand; therefore, each lesson should be a preparation for the one to follow, and the grade of work should be kept well within the capacity of the pupils.

(4) Interest leads to attention, and attention requires effort and is followed by fatigue. Most lessons in primary grades should not exceed ten or fifteen minutes in length. With older pupils the time can be extended, but in all cases, when interest begins to wane the exercise should he changed.

(5) The arrangement of the lesson should be logical, so that pupils will have no difficulty in seeing the relations of the parts to each other, and the presentation should be such that the connection with the previous lesson is equally clear.

(6) The teacher's explanation should be in simple language and should contain such illustrations as will appeal to the pupil's experience. Descriptions should be clear, vivid and lifelike.

Formal Steps in Learning. The pupil must take three formal steps in every complete act of learning, namely, the formation of the individual idea or notion; the formation of the class idea, or the general notion, and the application of the general notion to individual notions or ideas. In other words, these steps are the acquisition of knowledge, the classification of knowledge and the use of knowledge.

The Individual Notion. All ideas obtained through the senses or by concrete illustrations are distinct, as the idea of a chair, a house or a good deed. They are obtained by the observation of individual objects or by the hearing of particular instances of what others have done, and they contain the qualities belonging to each of these objects or instances, respectively. Their acquisition is the first formal step in gaining knowledge, and during the first ten years of his life, the child's mental energies are very largely occupied in acquiring individual notions.

The General Notion. Unclassified knowledge is of but little use, and the child soon begins to compare his ideas. In so doing, he discovers their resemblances and differences. If he is acquainted with a cat and unacquainted with a dog, upon his first seeing a dog he may call it a cat, because he notices that each has four legs and fails to notice the points of difference. With further observation of dogs and cats, he discovers that they have more points of difference than of resemblance, and he forms a conclusion that a dog is not a cat. He has now arranged his idea of dog and cat in two groups, each of which includes certain qualities that do not belong to the other. In a similar manner, he classifies all his other ideas. Each class idea is a general notion. Its formation requires the use of all mental powers and is much more difficult than the formation of individual notions.

A general notion includes only those qualities common to all the objects of the class to which it applies; that is, it is abstract. The notion *man* includes only those qualities common to all men, and it cannot be perceived by the senses, but as soon as the idea comes into consciousness, it is applied to an individual, and its existence is seldom noted. For these reasons general notions are not easily understood.

The teacher should assist the pupil in the formation of general notions. The first step is to see that the pupil acquires correct and well-defined individual notions; the second is to prevent the formation of conclusions without sufficient observation, and the third is to show the pupils the value and importance of a good stock of general notions. The principles and rules of arithmetic are good illustrations of general notions. From the beginning of the study of number, the teacher should lead the pupils to discover these principles and to construct the rules.

Application of the General Notion. When a new idea is received, it is compared with ideas already in the mind and classified. If a child has formed the general notion *fruit*, the first time he examines a quince he will compare it with this idea and decide that it is or is not a fruit. His conclusion will be right or wrong

according to the correctness of his general notion and the care with which he examines the object (see APPERCEPTION). This is the third formal step in the act of learning and is essential to the success of the other two. It is the measure by which they are to be judged. Use is the only true test of knowledge. Unless the pupils can apply their rules of arithmetic to the solution of real problems; unless they can apply their definitions in language to selections which they have not before seen, the teacher may be certain that their general notions are not well defined. Failure to apply general notions usually follows the memorizing of rules and definitions without first discovering them experimentally. Within the range of their capacity pupils should have a large amount of work requiring the application of the general notions which they have formed to new individual notions.

While these mental processes and formal steps have, for the purpose of treatment, been considered separately, it should be remembered that they all belong together, but that at one time the teacher should give particular attention to one, and at another time to another, as the conditions require.

Method and Devices. Careful distinction should be made between method and devices. The method is a systematic plan of teaching, based upon the laws governing mental development. A device is a scheme for assisting a pupil or a class to understand a principle or for holding the attention on a subject which of itself is not of particular interest. Blocks for teaching numbers, objects and pictures for teaching language, are devices to assist in carrying out the method selected by the teacher. Devices are useful and necessary, but they should always be chosen with care and so used as to assist in carrying out the method adopted. The danger attending their use is that they will be continued too long and will be given too much prominence.

Related Articles. Consult the following titles for additional information:

Attention	Interest
Concept	Language, Methods of Teaching
Deductive Method	Memory
Feeling	Perception
Geography, Method of Teaching	Psychology
Habit	Reason
Imagination	Sensation
Inductive Method	Will

METHYL ALCOHOL. See WOOD ALCOHOL.

METHYLATED, SPIRIT, or WOOD SPIRIT, *meth'i la ted,* spirit of wine, containing ten per cent of wood naphtha, which contains a large proportion of methylic alcohol. The naphtha communicates a disagreeable flavor, which renders it unfit for drinking. It is of much use in the arts and in the manufacture of paints and varnishes.

METONYMY, *me tahn'i mi,* the name given to a figure of speech in which a thing is referred to by some other name than its own. This substitution is based on some relationship between the thing which is named and the thing by which it is described. The following forms of metonymy are the best known:

(1) *The use of the container for the thing contained:*

"The bottle is the drunkard's enemy." Here the bottle is used for that which it contains—drink.

(2) *The use of the sign for the thing signified:*

"Fight for your altars and your fires." Here church and home are referred to by symbols.

(3) *The use of effect for cause:*

"Gray hairs demand our respect." Here old age, which causes gray hair, is referred to. See FIGURES OF SPEECH.

MET'RIC SYSTEM, a system of weights and measures based on the decimal system, whose standard of measurement is the meter. The system takes its name from this unit. The metric system was originated by the French; it was adopted by France in 1799, but its use has been obligatory there only since 1837.

American children—and men and women, too—who are accustomed to the familiar English system of feet, pounds, yards, gallons, and other measurements derived from them do not look with favor on the metric system, believing it to be of intricate design and most difficult to understand and use. This belief rests upon lack of understanding, and there is little desire to acquire a different mental attitude. The Greek and Latin terms employed as prefixes in names of metric measures appear too formidable to admit of familiarity. Once prejudice is overcome, the manifold advantages of the system become apparent.

Americans and Canadians have a decimal system of money; the dollar is the unit, and tenths and hundredths of a dollar are simple to comprehend. The French have the franc, which they also divide into hundredths; the

peso of Spanish-American countries, the lire of Italy, the milreis of Brazil and the monetary units of many other countries are on the same decimal system. This being so manifestly convenient, as Americans know by experience with their own system, it must be admitted that a like decimal system carried into all measurements must possess advantages fully as great.

Basis of the System. Let us examine the foundation of the metric system. For *measures* of *length*, or *extension*, instead of the yard, we substitute the meter. This, in a term easily understood, is 39.37+ inches, and is one ten-millionth of the distance from the equator to one of the poles of the earth. Could you go to a store and buy a meter of cloth with a clear mental view of the length of the piece you would receive? You certainly understand that.

Measures of length below the meter are easily computed on the decimal system. The Latin *centum* refers to hundredths. Referring again to familiar things, the *cent* is the hundredth part of a dollar, a *centime* the hundredths part of a franc. A *centimeter* is the hundredth part of a meter. The prefix *decem* refers to tenths, *milli* to thousandths. For measurements greater than the meter *deka* refers to ten; *hekto*, hundred; *kilo*, thousand; *myria*, ten thousand. We are now ready for a table of linear measure:

10 millimeters = 1 centimeter
10 centimeters = 1 decimeter
10 decimeters = 1 meter
10 meters = 1 dekameter
10 dekameters = 1 hektometer
10 hektometers = 1 kilometer
10 kilometers = 1 myriameter

The term myriameter (10,000 meters) is seldom heard in English-speaking countries, but the kilometer became familiar to readers of war news from 1914 to 1919. A kilometer is approximately three-fifths of a mile, a measure as easy to comprehend as the term mile. If you live on a farm, how many kilometers are you from town?

Surface, or Square, Measure. As the meter is the unit of linear measure, the square meter is the unit of square measure. Any boy or girl can therefore construct the metric table or square measure. For ordinary measurements, instead of the term *one hundred square meters* the word *are* is used, and for *one hundred ares* the term *hektare* (10,000 square meters) is employed. When measuring very large areas, however, such as a state or province, the term *square kilometers* prevails.

Cubic Measure, or Measure of Volume. The unit is the cubic meter, that is, a solid each of whose edges is a meter in length. The table of cubic measure is easily constructed. Sometimes, as in measuring wood, the cubic meter is called a *stere* (pronounced *stair*).

Liquid Measure. The unit, instead of the familiar quart, is the *liter*. Technically it is a cubic decimeter of distilled water at its greatest density, which is at a temperature of 39.2° F at sea level. It is equal to 1.056 quarts, or about one and one-twentieth quarts. Forget the word quart and center the mind upon its metric equivalent; the following table then can easily be understood:

10 milliliters = 1 centiliter
10 centiliters = 1 deciliter
10 deciliters = 1 liter
10 liters = 1 dekaliter
10 dekaliters = 1 hectoliter
10 hektoliters = 1 kiloliter
10 kiloliters = 1 myrialiter

The Unit of Weight. The unit of weight is the *gram*. It is the weight of one cubic centimeter of distilled water at its greatest density, which is at a temperature of 39.2° F., at sea level. The English equivalent of the gram is 15.432 grains. The table for measures of weight follows:

10 milligrams = 1 centigram
10 centigrams = 1 decigram
10 decigrams = 1 gram
10 grams = 1 dekagram
10 dekagrams = 1 hektogram
10 hektograms = 1 kilogram
10 kilograms = 1 myriagram
10 myriagrams = 1 quintal
10 quintals = 1 tonneau

Table of Equivalents. For comparison of the principal weights and measures used in Canada and the United States with those of the metric system, the double table below is of value:

Metric System		English Measurements
LENGTH		
Meter	= 1.093 yards	Yard = 0.9144 meter
	= 3.281 feet	Foot = 0.3048 meter
	= 39.370 inches	Inch = 0.0254 meter
Kilometer	= 0.621 mile	Mile = 1.609 kilometer

Square Meter	= 1.196 square yards
	=10.764 square feet
Square centimeter	= 0.155 square inch
Square kilometer	= 0,386 square miles
Hektare	= 2.471 acres
Cubic Meter	= 1.308 cubic yard
	=35.314 cubic feet
Cubic centimeter	= 0.6103 cubic inch
Stere	= 0.275 cord
Liter	= 1.056 U. S. liquid quart or
	[0.878 English liquid quart]
	= 0.908 dry quart
	= 0.264 U. S. gallon or
	[0.220 English gallon]
Hektoliter	= 2.837 U. S. bushels or
	[2.75 English bushels]
Gram	= 15.432 grains
	= 0.032 troy ounce
	= 0.352 avoirdupois ounce
Kilogram	= 2.2046 pounds avoirdupois
Tonneau	=2204.62 pounds avoirdupois
Carat	= 3.08 grains avoirdupois

SURFACE

Square yard	=0.836 square meter
Square foot	=0.092 square meter
Square inch	=6.45 square centimeters
Square mile	=2.590 square kilometers
Acre	=0.405 hektare

VOLUME

Cubic yard	= 0.764 cubic meter
Cubic foot	= 0.028 cubic meter
Cubic inch	=16.387 cubic centimeters
Cord	= 3.624 steres

CAPACITY

U. S. liquid quart	=0.946 liter
Dry quart	=1.111 liter
U. S. gallon	=3.785 liters
[English gallon	=4.543 liters]
U. S. bushels	=0.352 hektoliters
[English bushels	=0.363 hektoliters]

WEIGHT

Grain	= 0.0648 gram
Troy ounce	=31.103 grams
Avoirdupois ounce	=28.35 grams
Pound	= 0.4536 kilogram
Short ton	= 0.907 tonneau

Extent of Use. The metric system, in whole or in part, is by law used in forty-three countries of the world. In the United States, Canada, Australia and Great Britain its use is permitted by law, but is not obligatory. Business houses in any of these countries which ship goods to countries using the metric system must employ it in all such transactions. Therefore if a young man enters an exporting house he must become thoroughly familiar with it.

There have been attempts to establish this decimal system of weights and measures as the only lawful one for the United States, but little encouragement has been given. The first effort was made by Thomas Jefferson in 1790; the second, by John Quincy Adams in 1821. Later several men less notable have proposed such a law.

Related Articles. Consult the following titles for additional information:

Arithmetic	Kilometer
Gram	Meter
Kilogram	Weights and Measures

METRONOME, an instrument consisting of a weighted pendulum moving on a pivot and set in motion by clockwork. Its purpose is to mark, by its vibrations, the quickness or slowness with which musical compositions are to be executed. There is a sliding weight attached to the pendulum rod, by the shifting of which the vibrations may be made slower or quicker, an accompanying scale indicating the number of audible beats per minute. This device is helpful in practice work, for it enables the student to play in exact time.

METROPOLITAN MUSEUM OF ART, the leading institution of its kind in the United States, located in New York City, on the Fifth Avenue side of Central Park. Art treasures of priceless value are housed in a beautiful building, for which the New York legislature made the original appropriation of $500,000. The first section was completed in 1879, and in 1902 the central portion, designed by Richard Morris Hunt, was completed at a cost of $1,200,000, paid by the city. Other costly additions were subsequently made, and the total value of the structure is now estimated at about $20,000,000. The art treasures form one of the world's great collections. They include representative paintings of the European and American masters, antiquities, sculpture, rare vases and specimens of ancient glassware, pottery, medieval armor, jewelry and musical instruments. The museum has been enriched by many generous bequests, including the Benjamin Altman collection, valued at $15,000,000. Among the prized possessions of the museum is a Raphael Madonna, the *Colonna,* donated by J. P. Morgan, who was a famous art collector.

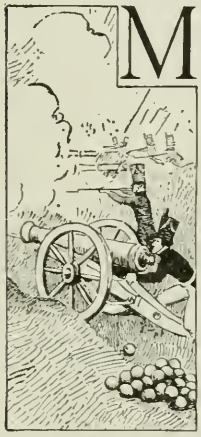
METTERNICH, *met'tur niK,* Clemens Wenzel Nepomuk Lothar, Prince (1773-1859), an Austrian statesman. He represented Austria as ambassador at various European courts between 1801 and 1809. In the latter year he became minister of foreign affairs. In 1813, after the French reverses in Russia, Austria declared war against

France, and from this period the policy of Austria, and in a great measure that of the other leading Continental powers, was shaped by Metternich. His policy was always reactionary and strictly opposed to the feeling of nationality which was growing up in Germany. He continued in power till, by the revolution of 1848, he was driven from office and had to flee to England, where he remained till 1851. He then returned to Vienna, but never regained his influence.

METZ, *mets*, a great fortified city in Alsace-Lorraine, triumphantly entered by the French at the close of the World War, after it had been in German hands for nearly half a century. It is situated at the confluence of the Moselle and the Seille, eighty miles northwest of Strassburg. The city consists of an older portion, with narrow streets, and a well-built newer part, which has beautiful open squares and fine buildings. Among the most noteworthy structures is the Cathedral of Saint Stephen which was begun in the thirteenth century. The manufactures comprise leather, shoes, woolens, cottons, hosiery, hats, muslin and glue. From the middle of the sixteenth century, Metz belonged until 1870 to France. On October 27, 1870, Bazaine, with the French army, surrendered here to the Germans, and the city was included in the cession of territory to Germany at the peace of 1871. Subsequently its fortifications were greatly strengthened. In the vicinity of Metz the Americans made one of the greatest drives in the fall of 1918 (see WORLD WAR). Population, 1910, 68,600.

MEUSE, *muze*, a river of Europe in the vicinity of which occured some of the most desperate fighting of the World War. American forces were engaged in this sector when the war ended (see WORLD WAR). The Meuse rises in France, in the southern part of the department of Haute-Marne, and flows through France, Belgium and the Netherlands, and after joining the Waal flows into the North Sea. Its length is 498 miles, and it is navigable for about 355 miles. It is connected with the Moselle and the Oise by canals. On its banks are the French cities of Sedan and Verdun, and the Belgian cities of Liége and Namur.

MEYERBEER, *mī'er bayr*, GIACOMA (1791-1864), a German composer and music director, best known for his brilliant opera *Les Huguenots*. He was born at Berlin, of Jewish parentage, and displayed unusual talent as a pianist in childhood. His preference, however, was for composing, and he began his career with operatic compositions. Unsuccessful at first, he won public favor in 1831 with *Robert le Diable*, following this in 1836 with his masterpiece, *Les Huguenots*. Both of these were presented at first in Paris, and they are decidedly French in atmosphere. In 1842 Meyerbeer was made royal music director at Berlin, holding this position until 1849, when he returned to Paris. The same year he produced in Paris another success, *Le Prophète*. His last opera, *L'Africaine*, was completed shortly before he died. The four operas mentioned were long popular, but *Les Huguenots* is the only one heard at the present time.



MEXICAN WAR, THE, the war between the United States and Mexico in the years 1846-1848. Many people have termed it a war which should never have been fought, but history justified it, aside from its primary cause. The fundamental cause was the desire of the pro-slavery party in the United States to secure additional slavery territory. This led to an early recognition of the independence of the Republic of Texas, in 1837, to the long agitation in favor of the annexation of Texas in spite of Mexico's earnest opposition, an end which was accomplished in 1845, and, finally, to a dispute over the boundary of Texas.

As a Mexican state, Texas had been bounded on the south by the Nueces River, but when admitted to the Union it claimed, and was supported by the United States in the claim, that the Rio Grande was its natural boundary. In 1845 James K. Polk became President, and his open ambition was to gain for the United States all the territory of California, Oregon, New Mexico and Texas. He therefore ordered General Taylor, who had been stationed at the Nueces River with 3,000 men, to cross that river and proceed to the Rio Grande. This was answered by a counter-advance by the Mexicans into the disputed territory. On April 23, 1846, a small body of Americans was de-

feated by a force of Mexicans. Immediately President Polk sent a message to Congress, declaring that a state of war existed "through the act of Mexico herself." Congress accepted this partial view of the matter, and on May 13 declared war.

On May 8 General Taylor met a body of about six thousand Mexicans at Palo Alto and administered a severe defeat, though his own troops numbered only about 2,000. The Mexicans fell back upon Resaca de la Palma, but were again defeated on the following day. Taylor's spring campaign ended May 18, when he occupied Matamoros. There he remained until September, when he advanced upon Monterey, which fell after a short siege, September 24. Meantime, American

troops had occupied New Mexico and upper California, and had taken possession of important territory around Chihuahua.

These American successes, however, were not sufficient to lead the Mexicans to overtures of peace; consequently, in the following spring General Scott was sent to the front with a new force. He also took 10,000 men from General Taylor's army. Scott landed at Vera Cruz on March 7, 1847, and conducted a continuous bombardment until March 27, when the city surrendered. The Mexican general, Santa Anna, though formerly exiled for his failure to accomplish the subjugation of Texas, had now returned and was in supreme command of the Mexican troops. He decided to march against Taylor, whose force had been depleted. He reached the vicinity of Monterey, February 20. Taylor retired to Buena Vista, where he inflicted a severe defeat three days later, with a loss of about 800, the Mexican loss being fully twice as many.

Two months later Scott left Vera Cruz, stormed the mountain pass of Cerro Gordo and pressed on, driving the Mexicans before him, toward Puebla. There the Americans rested until August, when they moved forward about 11,000 strong. On August 19 and 20 three severe battles were fought about ten miles from the city of Mexico, at Contreras, San Antonio and Churubusco. In all, the Americans were far outnumbered, but by the greatest skill and bravery they gained decisive victories. After an armistice of about three weeks, Scott advanced to the city's gates and won a brilliant victory at Molino del Rey. On September 13 he stormed the heights of Chapultepec and on the next day entered the Mexican capital in triumph.

The war was ended by the Treaty of Guadalupe Hidalgo, which was signed February 2, 1848. A notable feature of the contest was the training which it furnished to young officers who later played conspicuous parts in the great Civil War. Among these were Stonewall Jackson, George B. McClellan, George G. Meade, U. S. Grant, Robert E. Lee and Jefferson Davis. It also resulted in the elevation of General Taylor to the Presidency in the following administration.

The United States has never been correctly understood in Mexico among the masses of the people. The Mexican War is but a memory, but the hatred then engendered has been handed down through the years. The peons do not realize the power of the great republic, nor its magnanimous disposition towards them. The ruling classes under Diaz for a generation lived in peace with their northern neighbor, but since the revolution of 1910 banditry and brigandage have made Americans particular objects of their enmity. The Carranza government has not endeavored in good faith to suppress lawlessness near the border.

Related Articles. Consult the following titles for additional information:
Buena Vista, Battle of
Chapultepec, Battle of
Churubusco, Battle of
Guadalupe Hidalgo, Treaty of
Mexico (history)
Monterey, Battle of
Palo Alto, Battle of
Polk, James Knox
Resaca, de la Palma, Battle of
Texas (history)

MEXICO, a republic of North America, the nearest southern neighbor of the United States. These two great republics are closely related by historic and economic ties, but there is lacking a mutual spirit of friendliness and sympathetic understanding. One of the problems of the near future is improvement in the political relations between the United States and Mexico. Behind the events that have done so much to irritate Americans within recent years there is a background of misery, poverty and ignorance that calls for tolerance and forbearance.

Location and Area. The map of Mexico suggests very strongly the cornucopia, or horn-of-plenty, used in heraldry and architecture to signify liberality and abundance. At the southeastern tip of the horn is the peninsula of Yucatan, extending in a northerly direction into the Gulf of Mexico. Running parallel with the northwestern coast of Mexico is the fingerlike projection of California, known as Lower California. The United States and the Gulf of Mexico form the northern boundary of the republic; the Gulf, the Caribbean Sea and British Honduras are east, and the Pacific Ocean and Guatemala form the western and southern boundary. Over 750 miles of the northern boundary is formed by the Rio Grande, the dividing line between Texas and Mexico. The length of the entire international boundary is 1,833 miles. Including the coast islands Mexico has an area of 767,198 square miles, nearly three times that of Texas and about one-fourth that of the United States.

The People. Mexico is inhabited chiefly by whites of Spanish descent and by Indians and mestizos, or people of mixed white and Indian blood. The whites form about one-fifth of the total population, and the other two classes are nearly equal in number, the mestizos slightly predominating. There are about 100,000 foreigners in Mexico, representing the United States, several European countries, Guatemala and the Orient. Officially the population in 1910 was 15,115,612, and in 1912, 15,501,684, but an accurate census cannot be taken in a country where superstition and ignorance are so prevalent. A government official with a book to record information is an object of suspicion to Mexicans of the lower classes, and these are the most numerous elements in the population.

Unfortunately, the civilizing process in Mexico has worked for the degradation of the masses. Those Spanish traits of character that seem merely picturesque in a romance or a grand opera—indifference to modern progress, indolence, love of that which appeals to the emotions—have tended to keep the people in a deplorable state of poverty and sloth. These conditions are aggravated by the general disorganization of the country and a climate that is far from stimulating. The lower classes for generations have been content to live in their huts of sun-dried brick, comfortless and unsanitary, and to subsist on a diet of corn cakes and black beans.

Cities. Mexico City, the capital, is the largest and finest city in Mexico. Here, as in many of the other large cities, one may find hotels where living conditions are tolerable or even comfortable, due to European and American influence. The most important of the other cities are Guadalajara, Puebla, San Luis Potosi, Leon, Monterey, Merida, Vera Cruz, Oaxaca, Orizaba, Morelia, Pachuca, Zacatecas, Saltillo, Aguas Calientes, Tampico, Chihuahua and Juarez.

Surface and Drainage. Mexico, roughly speaking, is composed of a large central plateau, or tableland, above which rise mountain peaks; two border ridges, the Sierra Madre Oriental on the east, and the Sierra Madre Occidental on the west, and narrow coast lands at the foot of the plateau. The principal summits which rise above the plateau are of volcanic origin. Some few of these are semi-active or dormant, but the greater number of them are extinct. The chief of these volcanoes are Orizaba, or Citlaltepetl (Star Mountain), 18,250 feet high, the loftiest point in the country; Popocatepetl (Smoky Mountain), 17,520 feet high, the most famous of Mexican volcanoes; Ixtaccihuatl (White Woman), 16,960 feet high; Nevado de Toluca, 14,950 feet; Malinche, 13,460 feet; Cofre de Perote 13,400 feet, and Jorullo, 4,330 feet. This last volcano is famous because it is said to have risen above the plain in a single night of its eruption in 1759. Most of these vol-

canoes are situated near the southern border of the great plateau. The three first named are above the limit of perpetual snow, which is here almost 15,000 feet.

The total coast line of Mexico is about 6,300 miles in extent. The ports on the Atlantic side are most of them insecure, and many of them are mere roadsteads. On the western coast there is, however, a series of magnificent ports from Acapulco to Guaymas, many of which are scarcely, if at all, frequented. This is accounted for by the fact that they are separated from the industrial center of the country by lofty mountains, and transportation is therefore difficult and expensive. The largest river of Mexico is the Rio Grande del Norte, which forms part of the boundary between the United States and Mexico and belongs to each country. The other rivers are for the most part insignificant, as many of them are but rapid torrents, which descend from the central plateau to the sea, overflowing at some seasons of the year and drying up at others. The lakes of Mexico are numerous, but of little importance. Some of them have no outlet. Chapala, which is mostly in Jalisco, is the largest.

Climate. Mexico lies between latitude 14° 30′ and 32° 40′ north and is therefore for half of its length in the Torrid Zone. The peculiar structure of the surface, however, causes the greatest diversity of climate. The Mexicans divide their climate into three zones—the hot lands, along the coast, extending to an elevation of about 3,000 feet; the temperate lands, from 3,000 to 6,000 feet above the sea level, and the cold lands, 7,000 feet or more above that level. In the first of these zones the mean annual temperature is from 78° to 82° F., and the sea-coasts are exceedingly unhealthful. In the temperate zone the temperature is from 62° to 70°, and in the cold lands, from 59° to 63° F. In many parts of the temperate and cold lands the climate is delightful.

The rainfall is exceedingly uneven. Over most of the plateau it is not more than twenty-five inches, while in some other parts of the country it is as high as 120 inches. Earthquakes are not infrequent, but they usually do little damage.

Agriculture. Mexico is a country of vast natural resources. There is a great variety of useful native trees and plants, and many others have been introduced. In the forests along the coasts may be found palms and acacias, rubber trees, mahogany, ebony and ironwood trees, while in the higher zones evergreen oaks, pines, firs and spruce flourish. The principal agricultural products are sugar cane, coffee, cacao, vanilla, beans, potatoes, corn, tobacco, indigo and the agave, or American aloe, some species of which are cultivated for their fibre, known as sisal hemp, and some for the juice, which, when fermented, forms the national beverage of Mexico, known as *pulque*.

In porportion to the richness of the country the average output of farming products is small. This is due to several causes, notably, disturbed conditions, primitive methods of cultivation and need of irrigation. With peace, a fairer distribution of land holdings and the introduction of tractors and other improvements, Mexico ought to be in time a happy and flourishing country.

Stock raising is an important industry, especially in the north. The cattle are small and of rather inferior quality; the horses are small and hardy, and the sheep produce a coarse and inferior quality of wool. Much has been done, however, to improve the breeds of all of the domestic animals.

Mineral Resources. In its mineral resources Mexico is one of the richest countries in the world. When conditions are normal it leads the world in the production of silver, and although the gold-mining industry has received comparatively little attention, on account of the great expense involved, it is known that there is gold in great abundance. Among the other minerals are copper, lead, quicksilver, tin, sulphur, salt, cobalt and antimony. In fuel, Mexico is deficient. Much of the coal used is brought from England and the United States, although there are coal beds in the country which, if they were not so far from lines of transportation, would furnish fuel in plenty. Petroleum has been produced in immense quantities within recent years, Tampico being the main center of the industry. The British navy was largely dependent for oil on the Tampico fields during the World War. The exploitation of the silver mines and oil fields has been brought about by foreign capital to a large extent.

Manufactures. Though Mexico has never been a manufacturing country of great importance, considerable progress was made during the quarter century of peace previous to the revolution of 1911. Since then

industrial conditions have been far from normal. In 1912 there were in operation 148 cotton mills, 440 tobacco factories and hundreds of establishments engaged in the production of sugar products and spirits. Various other commodities used in the household are produced in normal times, and attention is also given to such distinctively Mexican products as broad-rimmed hats, ornamented saddles, jewelry, leather articles and embroidery. The Indians are skilled in weaving, feather work and other handcrafts.

Transportation. Mexico has about 16,000 miles of steam railway, but the trackage and rolling stock are in a very bad condition because of the inability of the government to protect the lines from bandit raids. Mexico City has rail communication with all the other important cities and is a busy center in normal years. The rehabilitation of the railroads will be one of the most important tasks of the government when stable conditions prevail.

Commerce. Among the exports of Mexico, the precious metals are by far the most important, constituting on an average over one-half of the total exports, or about $95,000,000 out of about $150,000,000. The other important exports are petroleum, sisal hemp, copper, lead, coffee, woods, tobacco and animal products. The imports of the country, which are smaller in value than the exports, are largely foodstuffs, cotton and woolen manufactures, wrought iron and machinery. By far the greater part of the exports go to the United States, which furnishes more than one-half of the imports in normal years. The United Kingdom is the second in rank.

Education. In most of the states of Mexico education is free and compulsory, but as the compulsory education laws are by no means enforced, illiteracy is very common. Little has been done toward the education of the Indians, and even the foreigners, except those who are prominently engaged in trade, are uneducated. The schools are supported partly by the central government, partly by the state governments and partly as charitable institutions. Mexico City is the seat of the national university, founded in 1553 and reorganized in 1910.

Government and Religion. Mexico is a Federal republic, consisting of twenty-eight states, two territories and a Federal District, in which is situated Mexico City. The republic has been governed under two constitutions, the first adopted in 1857, and the second in 1917. The chief executive power is vested in the President, who is elected by direct popular vote for a term of four years. There is no Vice-President. The administration is carried on under the direction of the President and a Council, by seven Secretaries of State (Foreign Affairs, Interior, Finance and Public Credit, War and Marine, Communications, Public Works, and Industry and Commerce), and three Departments of State (Judicial, Educational and Public Health).

The legislative power is vested in a Congress of two houses—a Senate and House of Representatives, the Senate consists of fifty-eight members, two from each state and two from the Federal District. Representatives are elected for two years by universal suffrage, one member for 60,000 inhabitants. Senators are returned in the same manner as Representatives, and all members of Congress receive $3,000 a year. The Congressional session is from September 1 to December 31, and during the recess there is a permanent committee consisting of fourteen Senators and fifteen Representatives appointed by the respective houses.

The judiciary consists of a Supreme Court, with fifteen judges chosen for a period of six years; three Circuit Courts, with three judges; and District Courts, with thirty-two judges. Each of the separate states has its constitution, government, judical department and laws, as in the United States.

Roman Catholicism is the prevailing religion, but there is no state Church. All religions are tolerated, but no religious body can own landed property. There are several Protestant churches and missions, but the Protestant membership is exceedingly small.

History. Before 1521 Mexico was inhabited by the Aztecs and was ruled by native emperors. This race had attained a remarkable degree of civilization, and interesting remains of their architecture are extant in the teccallis, or pyramids, of Cholula, Puebla and Papantla. In 1521 Mexico fell into the hands of the Spaniards under Cortez. Cortez called it New Spain and was created its captain general. Many Spaniards emigrated from Spain, and in time New Spain came to include a vast territory to the north of the present Mexico. The first viceroy was appointed in 1535, and from that time for al-

most three centuries the country remained a Spanish possession. The spirit of discontent caused by the selfishness of the Spanish rule manifested itself in open rebellion, when, in 1808, the unsettled state of affairs in Spain offered an opportunity. This rebellion, begun by a priest, Hidalgo, was continued with more or less vigor, and in 1821 the independence of Mexico was assured. After an unsuccessful attempt to secure a Bourbon prince for the throne, Iturbide, the chief of the insurgents, caused himself to be proclaimed emperor, in May, 1822. In the following year, however, he was forced to abdicate, and in 1824 a constitution, modeled in part on that of the United States, was adopted and a Federal republic was proclaimed.

Since the acquisition of independence Mexico has had a most unsettled history, and has been the scene of almost incessant civil wars. A revolution in Texas in 1835 procured the independence of that territory, and eleven years later a dispute regarding the boundary of Texas led to a war with the United States. By the treaty which closed this war, New Mexico, which included part of the present Arizona and New Mexico, all of Utah and Nevada and part of Upper Colorado and Wyoming, were given up to the United States. In 1862-1863 a French army entered Mexico, and under the protection of Napoleon III, Maximilian reigned as emperor from 1864 to 1867. In 1867 the republic was again proclaimed with Juarez as president. In 1876 Porfirio Diaz overthrew Juarez and assumed the Presidency of the republic. For more than thirty-four years he ruled with such ability that the Mexican government was more stable than it had ever been before, and great material progress resulted. He maintained his authority until 1911, when Francisco Madero headed a revolution which forced the resignation and flight of Diaz from Mexico. After Madero became President, in October, 1911, Mexico was in a state of continual turmoil. Diaz was too despotic, but Madero was too indulgent. Within a few months new revolutions were in progress in various parts of the country, and Madero was overthrown, imprisoned and finally assassinated in February, 1913.

Victoriano Huerta, Madero's Minister of War, assumed control as provisional president. He attempted to secure recognition from the United States, but this was denied on the ground that he did not secure his position by lawful means. Huerta had control of the central part of Mexico, but Madero's sympathizers, who styled themselves *Constitutionalists,* organized a strong revolution under the command of Venustiano Carranza in the north and Zapata in the south. Francisco Villa was Carranza's chief aid.

Huerta was unable to control affairs and foreign relations became intolerable. In April, 1914, members of the United States navy who landed at Tampico to purchase supplies were arrested. The insult to the United States was so flagrant that Admiral Mayo, in command of the fleet in Tampico harbor, demanded that Huerta salute the American flag as an apology. This he refused to do, and, on April 21, the American forces entered Vera Cruz, where they remained until November 23. Nineteen American marines were killed and seventy-five wounded in the capture of the city.

At this juncture the diplomatic representatives of Argentina, Brazil and Chile in Washington offered their services as mediators between the two governments. The offer was accepted and the mediators met at Niagara Falls, Ontario. They continued in session for nearly two months and finally decided that a new provisional president would be elected by representatives of Huerta and Carranza. Before this election could be brought about, however, the military success of the Constitutionalists compelled Huerta to resign and flee from the country.

Within a year from the downfall of Huerta the country had five different presidents. Villa revolted from Carranza and organized so strong a following against him that for a time it seemed that the army of Carranza would be destroyed. But gradually Villa's forces began to disintegrate and Carranza obtained such control over the country as to lead President Wilson to recognize his government, October 19, 1915.

During the early part of 1916 the United States and Mexico were on the verge of war. The massacre of American citizens on both sides of the international boundary by Villa bandits and the raid on Columbus, N. M., on March 8, caused President Wilson to order American troops into Mexico in pursuit of the bandits. General Pershing, with a force of 4,000 men which was later increased to over 6,000, went in pursuit of the bandits. About 100,000 of the National

GENERAL VENUSTIANO CARRANZA
Former Judge and Governor, and Friend of Madero. Leader of the Constitutional forces, then President of the Republic.

GENERAL FRANCISCO VILLA
Rose to power from a bandit career, became an army leader, and returned to banditry.

GENERAL VICTORIANA HUERTA
Successor to Francisco Madero by usurpation of authority, whose acts threatened war with the United States. He styled himself "Provisional President."

NATIONAL PALACE, MEXICO CITY
The residence and business offices of the President of Mexico.

Guard were mobilized and sent to the border, where they remained until December, when several regiments were ordered home. Although the United States had repeatedly called Carranza's attention to the depredations, he was either unable or unwilling to make any effort to check them. But he strenuously objected to the presence of the United States troops in Mexico, and to avoid friction the movements of General Pershing's forces were greatly restricted. Neither Villa nor any considerable number of his followers were captured. An attack upon a company of General Pershing's men by Carranza's troops complicated matters still more.

In July the South American diplomats again attempted mediation, with the result that commissioners from the de facto government of Mexico and the United States met in New London, Conn., September 6. It was finally agreed that the American troops should be withdrawn from Mexico, provided the Carranza government would protect the border. In compliance with this agreement, orders for their withdrawal were given in January, 1917. About 50,000 of the National Guard were left in Texas, New Mexico and Arizona, to assist the regular army in patrolling the border.

There was little border trouble during the period when America participated in the World War, but the attitude of Carranza, who was elected President on March 11, 1917, was apparently not friendly, and there was much irritation in the United States because of unrestricted German propaganda in Mexico. This was violently anti-American, and helped to keep the two republics apart in sympathy. The defeat and capitulation of Germany opened the way to a better understanding. With the elimination of trade restrictions Mexico may work back to better economic conditions; early in 1919 there was in view an adjustment of certain difficulties regarding the exploitation of the oil wells.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Aguas Calientes
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Chihuahua
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Popocatepetl
Puebla
Rio Grande
San Luis Potosi
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Tampico
Vera Cruz
Yucatan

HISTORY

Aztec
Carranza, Venustiano
Cortez, Hernando
Diaz, Porfirio
Huerta, Victoriano
Iturbide, Agustin de
Juarez, Benito Pablo
Madero, Francisco
Maximilian
Mexican War
Montezuma
Pershing, John J.
Santa Anna
United States, subhead History
Villa, Francisco

MEXICO, Gulf of, a large bay or gulf of the Atlantic Ocean, on the eastern coast of North America. It is oval in form and is nearly surrounded by a continuous coast line of the United States and Mexico, about 3,000 miles in length. Its tide rises between thirty and forty inches. Among the important rivers which empty into the gulf are the Mississippi, the Rio Grande, the Colorado of Texas and the Appalachicola. The most important ports on the gulf are Key West, Tampa, Pensacola, Mobile, Galveston, Tampico and Vera Cruz. The Gulf Stream issues from it by the Florida Straits (see Gulf Stream) and then turns northeast.

MEXICO CITY, the capital of the republic of Mexico, and the largest Spanish-speaking city on the North American continent. Its site is picturesque and unusual, for it is built on a plateau rising from an immense valley, on the edges of which great mountains and volcanoes lift their towering peaks. It is the outgrowth of an Aztec village founded in 1325. The city is located 263 miles from the Gulf port of Vera Cruz and 290 miles from Acapulco, on the Pacific. It is distinctly Spanish in appearance, as a result of the long Spanish rule in Mexico, and has many fine streets and public squares.

The principal buildings are the cathedral, which forms one of the sides of the central square, the Plaza Mayor, and is one of the most magnificent churches in America; the national palace; the National Museum of Natural History and Antiquities, which contains a remarkable collection of Aztec relics; the national library, which contains over 200,000 volumes; the mint, and the School of Mines. There are also numerous convents, hospitals, churches and theaters. The manufactures include linens, silks, gold and silver ware, hats, carriages and soap. Most of the trade is in the hands of foreigners. Mexico City has a mild and healthful climate, and since the introduction of an improved system of drainage and sewerage, the death rate, previously very high, has decreased. There is railroad connection with most of the Mexican state capitals and ports. Population, 1910, 471,066.

MEZZOTINT, *med'zo tint,* or *mez'o tint,* a particular manner of engraving on copper or steel, in imitation of painting in India ink, the lights and shadows being scraped and burnished out of a prepared dark ground. The surface of the plate is first completely covered with minute incisions, so that it would give in this condition a uniform black impression. The design is then drawn on the face, and the dents are erased from the parts where the lights of the piece are to be, the parts which are to represent shades being left untouched or partially scraped, according to the depth of tone. (See ENGRAVING; ETCHING).

MEZZO-RILIEVO, *med'zo re lya'vo,* meaning *middle relief,* is the term applied in sculpture to figures that project one-half their thickness from the background. It is higher than bas-relief and lower than *alto-rilievo.* In *mezzo-rilievo* the figures are fully rounded, but there are no portions which are detached from the surface. (See ALTO-RILIEVO; BAS-RELIEF.)

MIAMI, FLA., the county seat of Dade County, in the southeastern part of the state, 366 miles south of Jacksonville and sixty-six miles south of Palm Beach, on the Florida East Coast Railway, which was built to this point in 1896. The city is on Biscayne Bay, which is separated from the Atlantic Ocean by a line of small islands. The climate is tropical, and the surrounding country is rich in fruits which grow only in warm climates. From Miami large quantities of oranges, grapefruits and so-called winter vegetables are shipped to Northern markets. The town is noted as a winter resort for Northern people, who are accommodated in many hotels and boarding houses. Permanent population, 1910, 5,471; in 1917, claimed, 17,000.

MI'CA, familiar to everybody in the form of windows in the firebox of coal stoves, is the name of a group of minerals composed largely of aluminum and silica, with various proportions of potassium, sodium, iron, magnesium or some other mineral. It is also incorrectly called *isinglass* (which see). The leading characteristic of the group is their formation into layers, which can be split into very thin plates, sometimes not more than $\frac{1}{800000}$ of an inch in thickness. Mica is always found surrounded by other rocks. It is separated from these and then cut into blocks, which are then split into sheets of such thickness as are desired for the various uses to which the stone is put. Sometimes plates as large as eighteen inches in diameter can be obtained. Mica is used for windows where glass would be injured by jarring or by heat. It is also used in the manufacture of dynamo electric machines. The most extensive quarries in the United States are at Grafton, N. H. India produces about half of the world's supply, Canada and the United States the remainder.

MICA SCHIST, *shist,* white or black rock composed of mica and quartz, arranged in layers, therefore easily broken into slabs. The whitish variety gives to the White Mountains their name. Mica schist is not valuable as a building stone, except in foundations.

MICHAEL, *mi'ka el,* or *mi'kel,* SAINT, in Jewish theosophy, the greatest of the angels, one of the seven archangels, Michael, Gabriel, Raphael, Uriel, Chamuel, Jophiel and Zadkiel, which "stand before God." The first three, the principal ones, are often represented together in Christian art. In the New Testament Michael is spoken of as the guardian angel of the Church.

MICHAELMAS, *mike'el mas,* the feast of Saint Michael the Archangel. It falls on September 29 and is supposed to have been established toward the close of the fifth century. In England, Michaelmas is one of the regular periods for settling rents. The Lord Mayor of London is elected on Michaelmas day.

MICHELANGELO BUONARROTI, *me kel ahn'je lo bwaw nahr raw'te* (1475–1564), an Italian sculptor, painter, architect and poet, one of the greatest artists of all time. He was born at Caprese, in Tuscany, of the ancient family of the Counts of Canossa. He studied drawing under Domenico Ghirlandaio and sculpture under Bertoldo at Florence, and, having attracted the notice of Lorenzo de Medici, he was for several years an inmate of his household. When the Medici were sent into temporary disgrace and exile, Michelangelo, as one of their retainers, was forced to flee from Florence and took refuge in Bologna, where he remained for a few years.

MICHELANGELO

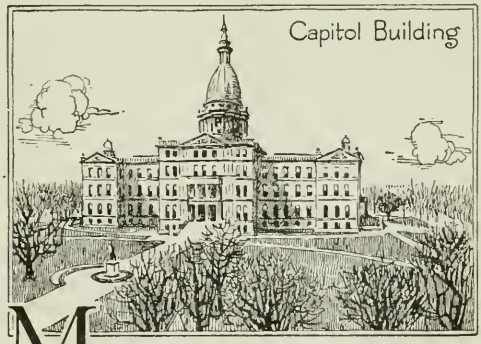
After his return to Florence, in 1501, he received from the city a commission to execute a colossal statue of *David,* and his creation was a wonderful piece of work for a young man of twenty-six. It is now one of the masterpieces of the Academy of Fine Arts at Florence. In 1505 he was induced by Pope Julius II to settle in Rome. Here he sculptured the monument of the Pontiff (including seven statues, among which was the famous one of *Moses*), now in the Church of San Pietro in Vincoli, and he painted the ceiling of the Sistine Chapel, his frescoes representing the creation and the principal events of sacred history.

In 1530 Michaelangelo took a leading part in the defense of Florence against Charles V, being employed to build the fortifications around the city. Three years later he began his great picture in the Sistine Chapel, *The Last Judgment,* which occupied him eight years. His last considerable works in painting were two large picture, the *Conversion of Saint Paul* and *The Crucifixion of Saint Peter,* in the Pauline Chapel.

As late as 1546 he was obliged to undertake the continuation of the building of Saint Peter's, by the order of Pope Paul III, and he planned and built the dome, but he did not live long enough to see his plan finished. Many alterations were made in it after his death. The remainder of his life was devoted chiefly to architecture. He undertook the building of the Piazza del Campidoglio and the completion of the Farnese Palace, besides working on many other edifices. His style in architecture is distinguished by grandeur and boldness, and in his ornaments the untamed character of his imagination frequently appears, preferring the uncommon to the simple and elegant. His poems, which he considered merely as pastimes, contain, likewise, convincing proof of his great genius.

MICHELET, *me shlay',* JULES (1798–1874), a French historian and miscellaneous writer, born in Paris. In 1821 he was called to the chair of history in the Collége Rollin, where he was also professor of ancient languages and of philosophy till 1826. After the revolution of 1830 he was appointed chief of the historical section of the archives of France, and in 1838 he became professor of history at the Collége de France. He lost all his offices at the political change in 1851, because he refused to take the oath of allegiance to Napoleon III. His principal historical works are *Introduction to Universal History, Beginnings of French Law* and *History of France,* in nineteen volumes.

MICHELSON, *mi'kel son,* ALBERT ABRAHAM (1852-), an American physicist, the winner of the 1907 Nobel prize in physics. He was born in Germany, but emigrated early in life to the United States, and was educated at the United States Naval Academy. After his graduation, he spent several years in the navy, then resigned to pursue his studies in Europe. Upon his return he became professor of physics in the Case School of Applied Sciences, at Cleveland, Ohio. From 1889 to 1892 he was professor of physics in Clark University, after which he became head of the department of physics in the University of Chicago. Professor Michelson is known at home and abroad for his research work and discoveries. In 1882 he gave new figures for the velocity of light through a vacuum. A few years later he invented his inferential refractometer, an instrument with which he would measure the wave lengths of light. He is a member of numerous learned socities in America and in Europe.



MICHIGAN, *mish' i gan,* a north central state, lying in the Saint Lawrence River basin. It consists of two peninsulas, the larger of which is shaped like the left hand. The southern boundary of the state is at the wrist, the tip of the middle finger is at the Strait of Mackinac, with Saginaw Bay between the thumb and fingers. Such is roughly the form of the southern peninsula. Lake Michigan is on the west and north of it, and Lake Huron, Lake Saint Clair and Lake Erie, with their connecting rivers, are north and east. Ohio and Indiana are south. The northern peninsula, the smaller section of the state, is between Lake Superior and lakes

Michigan and Huron, and for nearly half its length is north of Wisconsin.

The state as a whole is famed in several respects, and to its fair reputation both peninsulas contribute. The northern is fabulously rich in iron and copper, and it has yet vast timber tracts. The state manufactures over half of America's yearly output of automobiles, and one county (Allegan) furnishes nearly eighty per cent of the peppermint grown in the United States. Until within recent years its second city, Grand Rapids, manufactured more furniture than any other town in the world.

The area of Michigan, including about 200 small islands, is 57,980 square miles (of which 500 square miles are water). The state is over 7,000 square miles larger than England, and nearly five times as large as Belgium. The greatest length of the upper peninsula from east to west is 318 miles, and from north to south, 164 miles. The greatest length of the lower peninsula from north to south is 277 miles, and from east to west, 197 miles. The population in 1910 was 2,810,173; it was then eighth among the states in number of people, and is twenty-second in size. The number of persons to the square mile in 1910 was nearly 50. A federal estimate in 1918 credited the state with 3,133,678 inhabitants. The popular name for Michigan is THE WOLVERINE STATE, though sometimes it is called THE PENINSULAR STATE. The state flower is the apple blossom.

Surface and Drainage. The western section of the upper peninsula has a rough, hilly or slightly mountainous surface. It does not contain any high peaks, but is characterized by unevenness of land and a thin, rocky soil, with a low degree of fertility. It is traversed by the Porcupine and the Mineral mountains, the highest elevation being Porcupine Mountain, which is 2,023 feet in altitude. In the eastern part the northern peninsula is low, the site of an old lake bed.

The lower peninsula is generally level or undulating, the highest land being found to the southeast and northwest of Saginaw Bay. The highest point in the lower peninsula is southeast of Cadillac, where the elevation is 1,100 feet above Lake Michigan, or 1,700 feet above sea level. A mere depression, through which flow the Saginaw and the Grand rivers, extends from Saginaw Bay to Grand Haven on Lake Michigan. This is nowhere more than seventy-five feet above the level of the lakes, and probably in former times was covered with water. The surface of the lower peninsula is dotted with a large number of small, clear lakes, most of which are surrounded by forests and are noted for their beauty and for abundance of fish. It is estimated that there are more than 5,000 such lakes within the state. In Oakland County alone there are about 500. Along Lake Michigan there are numerous high bluffs and sand dunes.

The rivers are all short and of comparatively small volume. The streams of the upper peninsula flowing into Lake Superior are obstructed with rapids and falls; in length and size they are comparatively unimportant. The other streams in this section are the Menominee, forming a part of the boundary between Michigan and Wisconsin, the Ontonagon, the Sturgeon and the Escanaba, which flow into Lake Michigan. The largest streams of the lower peninsula are the Raisin and the Huron, flowing into Lake Erie; the Saginaw, Au Sable, Thunder Bay and the Cheboygan, flowing into Lake Huron, and the Grand, Kalamazoo, Saint Joseph, Muskegon and Manistee, flowing into Lake Michigan.

Climate. There is a marked difference between the climate of the southern part of the lower peninsula and that of the upper peninsula. The later is in the region of a cool-temperate climate. The summers are cool and the winters are severe, and this portion of the state is subject to heavy falls of snow.

The presence of the lakes equalizes the temperature of the lower peninsula and also exerts a marked influence on the rainfall. The southern half of the lower peninsula has a warm climate during summer and mild to cold in winter; that portion bordering on Lake Michigan and extending as far north as Grand Traverse Bay is influenced by the southwest winds which prevail throughout the year. These winds equalize the temperature of this region, so that for a distance of from five to fifty miles inland, damaging frosts in spring and fall seldom occur. Here the winters are seldom very cold nor the summers very warm, but farther inland the winters are as severe as in other parts of the state. These conditions are especially favorable to the growing of fruit, and this region constitutes the Michigan fruit belt. The average rainfall in the

state is from thirty to thirty-six inches, and it is evenly distributed through the year.

Mineral Resources. There is great diversity of mineral products, and the state is the sixth in the Union in yearly production. The upper peninsula is one of the most important iron-producing regions of the world, ranking, in the amount of ore mined, second only to the Minnesota iron region, and in Keweenaw Peninsula are located great copper mines, which for many years supplied nearly all of the copper produced in the United States and only recently have been outranked by the mines in Arizona and Montana. Michigan is also the leading state in the Union in the production of salt, every year producing more than New York, the second state; the largest mines are around Manistee and Saginaw Bay. There are also large deposits of gypsum about Grand Rapids, and Michigan leads the Union in the production of this mineral. Numerous lake-bed deposits of marl from which Portland cement is made are found throughout the state. There is some coal, graphite, gold, silver, mineral waters, building stone, etc. Clay which is excellent for brick and tile and also suitable for pottery is found.

Agriculture. Contrary to a somewhat widespread opinion that the northern peninsula consists of rocky wastes and swamps, there is to be found some of the best agricultural land in the state.

The soil and climate of the southern half of the state are remarkably well suited to the growing of nearly all crops produced in temperate climates. A region in the central part of the northern portion of this peninsula, however, contains a light, sandy soil that is not particularly well suited to tillage. The leading crops are hay, corn, oats, wheat, potatoes and sugar beets. In the production of the latter, Michigan is the second state in the Union. In the fruit belt large quantities of apples of first quality, peaches, plums, cherries and small fruits are grown, the peach crop varying from 500,000 to 1,000,000 bushels a year. Dairying and the raising of live stock are also important branches of agriculture. The growing of particular crops in localities where soil is especially suited to them is a unique feature of the agriculture of this state. Particularly in the vicinity of Kalamazoo are some of the largest celery and peppermint farms in the country.

Michigan's position among the states in agricultural production in average years is summarized in the following list:

Apples, second (next to New York)
Beans, second.
Beets, third (next to Colorado and California).
Blackberries, fifth.
Buckwheat, third (next to New York and Pennsylvania).
Cherries, fourth.
Currants, second (next to New York).
Ginseng, sixth.
Gooseberries, third (next to Illinois and Missouri).
Maple syrup, fifth.
Mint, first.
Pears, third (next to California and New York).
Peas, second (next to Wisconsin).
Peppermint, first.
Potatoes, fourth.
Raspberries, second (next to New York).
Rye, first.

Manufactures. Manufacturing constitutes an important industry. Formerly the extensive pine forests in the northern part of the lower peninsula led to the establishing of numerous factories for the manufacture of lumber, doors, sash, furniture and other lumber products. Though the supply of lumber in this region has been exhausted, many of the factories are still active, and Grand Rapids is one of the largest furniture manufacturing centers in the world. In the United States it is surpassed only by New York and Chicago. The state leads in maple flooring and beech lumber.

Other manufactures include wagons and carriages, stoves, engines, machinery, automobiles, agricultural implements, cars and other railroad appliances, condensed milk and grist-mill products. In automobiles Michigan is preëminent among the states. There are also large quantities of paper and wood pulp products, Kalamazoo being the chief center of this industry. Slaughtering, meat packing, the tanning, currying and finishing of leather and the manufacture of beet sugar are also important, and a great chemical manufactory is located in Detroit. Detroit is the largest manufacturing center because of its convenient situation for lake navigation and railway transportation.

Transportation and Commerce. An extensive coast line has given Michigan many good harbors; it has greater facilities for water transportation than any other state, and the tonnage of Michigan ships exceeds that of any other state except New York.

The southern half of the state also contains numerous trunk lines of railways, extending east and west and connecting at Detroit and Port Huron with Canadian lines. The upper portion of the lower peninsula has a number of lines extending east and west, with cross lines, so that all leading towns have railway communication. There are 8,950 miles of railroad in the state.

The commerce of the state is extensive. The exports consist of automobiles; lumber and its manufactured products; iron ore, salt, fruit and fish; the catching of the latter is an important industry. The imports are such manufactured articles and food products as cannot be profitably made or raised.

Government. The legislature consists of thirty-two senators, elected from districts, and a house of representatives limited to 100 members. The members of each house are elected for two years. The legislature meets biennially, and is not limited as to length of the session. The governor and lieutenant-governor are elected for two years, as are the secretary of state, the treasurer, the auditor, the attorney-general and the superintendent of public instruction.

The judicial department comprises a supreme court, consisting of eight justices, chosen by popular vote for eight years, and circuit courts, presided over by circuit judges elected for six years. Each county has a probate court, and justice courts are located in every township. The justices of the supreme court are required to reside at the capital, and the justice whose term expires first is chief justice during his last year of service.

Education. The state public schools are under the supervision of a superintendent of public instruction. The schools for each county are in direct charge of a county school commissioner, elected for four years. There are also township boards of education of three members, and each school district has a board of five trustees for graded schools and three for ungraded schools. The number of members on city boards of education is fixed by the charters of the respective cities. The support of public schools is obtained from the state fund, from local taxation and from the sale of state school lands, of which there are still large areas.

The State Normal College is located at Ypsilanti, and was the first normal school established west of New York. Normal schools devoted to the preparation of teachers for the rural schools and for lower grades are at Kalamazoo, Mount Pleasant and Marquette. The state university, one of the best in the Union, is at Ann Arbor (see MICHIGAN, UNIVERSITY OF). The state agricultural college, located two miles east of Lansing, is under the management of the state board of agriculture, and the school of mines is at Houghton. There are also a number of colleges and secondary schools in the state maintained by religious denominations. Among these are Detroit College, Albion College, Adrian College, Alma College, Hillsdale College, Kalamazoo College, Olivet College and Hope College at Holland; Ferris Institute, one of the best of the nation's private schools, is at Big Rapids.

Institutions. The state public school for dependent children is at Coldwater, the school for the deaf and dumb is at Flint, and the school for the blind is at Lansing. The asylums for the insane are at Kalamazoo, Pontiac, Traverse City and Newberry. There is a home for the feeble-minded at Lapeer, and a state soldiers' home is at Grand Rapids. The penal institutions comprise the penitentiaries at Jackson and Marquette, a house of correction at Ionia, and industrial school for boys at Lansing and an industrial home for girls at Adrian.

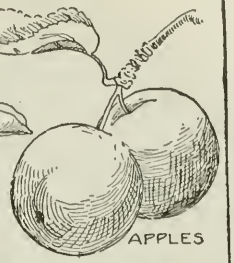
Cities. There were in the state in 1917 thirty-three cities each with more than 8,000 population. Detroit, the largest city, is the seventh in size in the United States. Grand Rapids, the second city, is the forty-third in the Union. The eighty-three counties do not contain many large cities, but the towns are progressive, modern in public utilities, well-governed and prosperous.

History. French Jesuit missionaries and traders had visited Michigan as early as 1610, but the first permanent settlement was founded at Sault Sainte Marie by Marquette and others in 1668. Numerous villages were soon established, and Detroit was founded in 1701. The territory made little progress under French occupation, and in 1763 passed to the English by the Treaty of Paris. During Pontiac's War the garrison at Mackinac was massacred, and Detroit was besieged for over five months, but without success. In 1774 the territory was annexed to Quebec, but by the Treaty of Paris in 1783 it passed to the United States. Thereafter for several years the Indians were restless, and they were not finally subdued until 1795.

MICHIGAN
The Wolverine State

MICHIGAN PRODUCES ONE-SIXTH OF THE WORLD'S COPPER AND ONE-TENTH OF ITS IRON

APPLE BLOSSOM
STATE FLOWER

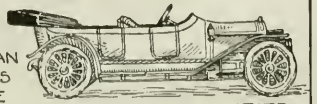


APPLES

GRAPES, RASPBERRIES, BLACKBERRIES
PEACHES AND STRAWBERRIES.

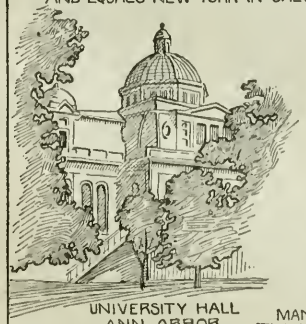
MICHIGAN IS
PRE-EMINENT IN
FRESH FISH, GYPSUM AND PEPPERMINT,
AND EQUALS NEW YORK IN SALT.

SUGAR BEETS

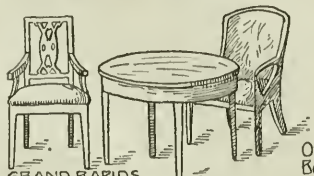


MICHIGAN
MAKES
MORE
AUTOMOBILES THAN ANY OTHER STATE

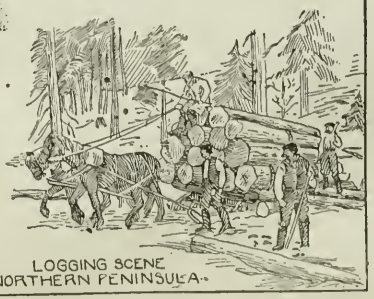
SALT RESERVOIR



UNIVERSITY HALL
ANN ARBOR



GRAND RAPIDS
MANUFACTURES MORE FURNITURE
THAN ANY OTHER CITY IN THE WORLD



LOGGING SCENE
NORTHERN PENINSULA.

KEY TO POPULATION

Over 400,000
Between 100,000 and 125,000
Between 50,000 and 100,000
Between 10,000 and 20,000
Between 40,000 and 50,000
Between 30,000 and 40,000
Between 20,000 and 30,000

Items of Interest on Michigan

The upper peninsula is a land of mining, lumbering, hunting and summer outings; the lower peninsula is an agricultural and industrial region.

The presence of the Great Lakes, especially when the wind is on-shore, tends to temper the climate of the shore regions; in the summer the water is cooler than the land, and in the winter, because the lowest possible temperature is about thirty-two degrees, it is generally warmer.

Though Michigan produces only one comparatively unimportant crop greater than that of any other state, the mild climate of the lower peninsula enables the farmers to raise a variety of products; no state except California seems more favorably situated for fruit-raising.

Michigan produces nearly 28,000,000 quarts of strawberries, blackberries, raspberries, peaches, pears, plums, and cherries.

About 120,000,000 pounds of grapes, and 12,000,000 bushels of apples are raised each year.

In 1909 Michigan produced nearly $10,000,000 worth of beans.

Michigan's mines yield about one-half as much as the farms; this product is nearly evenly divided between copper and iron.

The copper is mined almost exclusively in the Keweenaw Peninsula in Upper Michigan; the richest and probably most famous of these mines is the Calumet and Hecla. Michigan stands third among the copper-producing states, produces one-sixth of the world's annual output. In 1903 Michigan led all other states and alone produced one-tenth of all the iron mined in the world; to-day it stands second to Minnesota, whose production has multiplied six times while that of Michigan has only doubled. It should be borne in mind, however, that the Michigan ores are of higher grade and more valuable than those of Minnesota.

The cement industry of Michigan ranks third among the states of the Union.

Michigan ranks first in the production of gypsum. It also produces about 2,000,000 tons of coal each year.

The Michigan fisheries yield a greater value of fresh-water fish than any other state.

The manufactures of Michigan deserve considerable attention, first, because they are largely dependent on native resources of lumber and minerals, second, because they are well distributed throughout the state and diversified everywhere: for example, the four chief industries of Detroit—lumber, iron, chemicals, and vehicles—account for less than a quarter of the manufactured output of the city, yet Detroit alone produces one-third of all the automobiles made in the United States.

There are more thoroughly competent automobile experts in Southeastern Michigan, in Detroit, Flint and other cities, than in any other like area in the world.

Three-fourths of all the peppermint grown in the United States is supplied by Southwestern Michigan.

There are thousands of small lakes in the state. Over 500 of them are in Oakland County.

The normal school at Ypsilanti was the first in the middle west.

Questions on Michigan

What is the character of the rivers of the state?

How many miles of railroad are there in Michigan?

What was the population of Michigan in 1917?

How does the soil of Northern Michigan compare with that of Southern Michigan?

What effect has the presence of the Great Lakes on the climate?

How does Michigan rank as a producer of sugar beet? Rye, apples, potatoes?

How does Michigan rank as a producer of copper? Of iron? Of cement? Of salt?

What are the leading manufacturing industries of the state? Of the following cities: Detroit, Flint, Port Huron, Grand Rapids, Battle Creek, Kalamazoo?

Michigan was for a time a part of the territory of Ohio and of Indiana, but was made a separate territory in June, 1805, with William Hull as governor. It was the scene of important operations during the War of 1812 (which see, for particulars). A dispute with Ohio concerning a strip of land along the southern boundary of the state led to what is known as the "Toledo War" and a delay in the admission of Michigan to the Union, but the state was recognized January 26, 1837. After that time, for a number of years, Michigan was the victim of a spirit of speculation, which retarded its growth. The capital was removed from Detroit to Lansing in 1847. An amendment to the state constitution was adopted in 1853, prohibiting the manufacture and sale of intoxicating liquors, but this was repealed in 1876. Later a county local option law became effective, and this was succeeded in 1918 by a drastic statewide prohibition law. After several defeats the advocates of woman suffrage won the state for equal suffrage in 1918.

Related Articles: Consult the following titles for additional information:

CITIES

Adrian	Holland	Negaunee
Alpena	Ironwood	Owosso
Ann Arbor	Ishpeming	Pontiac
Battle Creek	Jackson	Port Huron
Bay City	Kalamazoo	Saginaw
Benton Harbor	Lansing	Sault Ste. Marie
Cadillac	Laurium	Traverse City
Detroit	Ludington	Wyandotte
Escanaba	Manistee	Ypsilanti
Flint	Marquette	
Grand Rapids	Menominee	
Hancock	Muskegon	

GEOGRAPHY

Dune	Mackinac Island
Erie, Lake	Michigan, Lake
Great Lakes, The	Saint Clair, Lake
Huron, Lake	Superior, Lake

MISCELLANEOUS

Celery	Iron
Copper	Peppermint

HISTORY

Cadillac, Antoine de la Mothe	Pontiac (Indian chieftain)
Cass, Lewis	Raisin River, Massacre of
Custer, George A.	War of 1812
Marquette, Jacques	
Northwest Territory	

MICHIGAN, Lake, the only one of the chain of the Great Lakes, so called, which is entirely within the United States. For nearly its entire length it lies between the states of Michigan and Wisconsin; in its northern reaches it separates the two peninsulas of Michigan. It is third in size of the Great Lakes, its area being 22,450 square miles—nearly twice that of the state of Maryland. Lakes Superior and Huron are larger.

This lake is 350 miles long, and it has an average width of sixty miles. Its surface is 581 feet above sea level, twenty-one feet lower than that of Lake Superior, and it reaches 289 feet below sea level. Its greatest depth, therefore, is 870 feet. The natural outlet is through the Strait of Mackinac into Lake Huron, but since the completion of the Chicago Drainage Canal the waters of Lake Michigan have turned the course of the Chicago River backward, with the result that a large volume of Lake water reaches the Gulf of Mexico through the Illinois and Mississippi rivers. The above-named canal is the connecting link between the Chicago and Illinois rivers.

Commerce on the lake is extensive. All the large cities on its shores have boat connection with Chicago and Milwaukee; regular steamship lines run from Chicago to Duluth, and these carry to the Chicago field millions of tons of iron ore annually. See Great Lakes, for diagram.

MICHIGAN, University of, a state university established at Ann Arbor in 1837, by act of the legislature, and opened in 1841. It was the first of the American state universities to attain a high standard. The original charter provided for departments of literature, science and art, law and medicine; but as the university is now organized, it maintains a college of literature, science and arts; a college of engineering and architecture; a college of pharmacy; a school of law; a school of medicine and surgery; a homeopathic medical school; a college of dental surgery, and a graduate school. Courses are also given in forestry, marine engineering, highway and construction engineering, aeronautics, wireless telegraphy and public health. In 1912 the graduate school was separated from the other departments. The university is noted for the thoroughness and high standard of its scholarship.

The affairs of each department are managed by the faculty of that department, and those pertaining to the university as a whole, by a senate, composed of members from each of the faculties. This is the first great university to provide for the education of women, becoming coeducational in 1870 and opening all departments to women on equal footing with men. The libraries contain about 384,000 volumes. The faculty numbers between 400 and 500 and the average enrollment exceeds 7,000.

MICHIGAN CITY, Ind., in Laporte County, on Lake Michigan, fifty-six miles

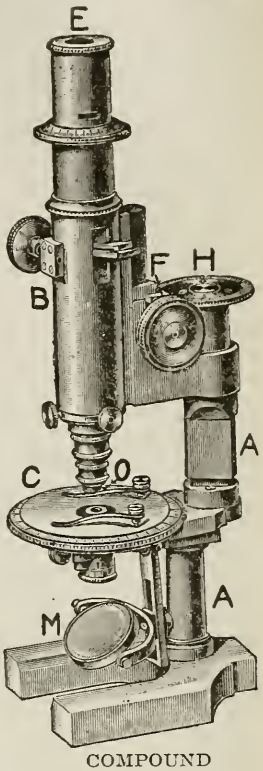
east of Chicago, on the Pere Marquette, the Michigan Central, the Lake Erie & Western and the Chicago, Indianapolis & Louisville railroads. There is an extensive trade in agricultural products, salt and iron ore. The manufactures include railroad cars, chairs, glass, hosiery, knit goods, lumber and lumber products. The Northern Indiana State Prison is located here, also a United States life-saving station. There are large, interesting sand dunes along the lake shore. It is a popular summer resort. The place was founded in 1832 and was incorporated in 1837. Population, 1910, 19,027; in 1917, 21,913 (Federal estimate).

MI'CROBE. See BACTERIA AND BACTERIOLOGY.

MICROM'ETER, an instrument used with a telescope or microscope for measuring very small distances. There are several patterns; the one in most common use consists of a circle divided into squares by cobweb threads. The number of squares covered by the object enables the observer to determine its size. Micrometers on surveyors' instruments usually measure distances by means of a screw with a very fine thread. The turning of the screw moves a plate, and the distance moved is known by the number of turns given the screw.

MICRONESIA, *mi kro ne'shi a,* meaning *small islands,* a name applied to one of the divisions of Oceania, the others being Polynesia, Melanesia and Australasia. The islands of Micronesia include chiefly those lying north of the equator between the 180th meridian and the Philippines. In this group are the Marshall, the Caroline and the Ladrone (or Marianne) islands, all of which were a part of the German Empire at the outbreak of the World War, in 1914. Early in the war they were occupied by Japanese forces; at the peace conference in 1919 the former German colonies north of the equator were consigned to the care of Japan, to be governed by that country under the mandate of the league of nations. Guam, one of the Ladrone group, belongs to the United States. See LADRONE ISLANDS.

MI'CROSCOPE, an instrument for obtaining a highly magnified image of a very small object. The simple microscope consists of a double convex lens, which is placed between the object and the eye. It is usually known as a magnifying glass (see LENS). The compound microscope consists of a stand, *A,* upon which are mounted two tubes, *B,* so fitted that one will slide within the other; a stage, *C,* which holds the object, and under which is a small mirror, *M,* for reflecting the light upon the object. The tube contains the object glass *O,* and the eyepiece, *E.* The rack and pinion, F, enable the tube to be raised and lowered so as to focus the object. *H* is a screw having a very fine thread, which can be used when a delicate adjustment of the focus is required. If the microscope has two tubes, so arranged that it can be used with both eyes, it is called a *binocular.* The magnifying power of the microscope depends upon the power of the object glass and of the eyepiece and the distance between these lenses. The object glass forms a magnified image of the object, and the eye glass can magnify this. By extending the tube so as to increase the distance between the eye glass and the object glass, the power of the microscope is quite materially increased.



COMPOUND MICROSCOPE

MI'DAS, in Greek and Roman mythology, a Phrygian king. One legend tells that in punishment for having decided a musical contest between Pan and Apollo in favor of Pan, he was given ass's ears by Apollo. This deformity he concealed from all except his barber, whom he compelled to swear to tell no man. The barber, however, unable to keep the secret to himself, dug a hole in the earth, into which he whispered it; soon after, reeds grew up over the spot and, as they rustled, announced to all who passed by, "King Midas has ass's ears; King Midas has ass's ears." Another story tells that Midas, having captured Silenus, the companion of Bacchus, returned him to Bacchus and as a reward was promised any gift he might ask.

Midas petitioned that he might have the gift of turning everything he touched to gold, and his request was granted. He soon found, however, that this strange ability brought with it great inconvenience, as all of his food and drink turned to solid or molten gold as soon as it touched his lips. Moved by his distress, Bacchus instructed him to bathe in a certain river, and the golden touch left him. This is one of the best-known tales of the age of myth.

MIDDLE AGES, a term applied loosely to that period in European history which lies between the ancient and modern civilizations. Various dates are given for the beginning of the period: the fall of Rome, 476; the crowning of Charlemagne, 800; the death of Charlemagne, 814; the end of the Frankish Empire, 843. The period is variously conceived to have closed with the Reformation in Germany; with the discovery of America by Columbus; with the invention of printing and with the end of the Thirty Years' War in the Peace of Westphalia (1648). Most authorities, however, begin the period with the fall of Rome and end it with the discovery of America. They usually call the period between the fall of Rome and the Revival of Learning the Dark Ages (which see).

MIDDLETOWN, Conn., sixteen miles south of Hartford, is widely known because it is the home of Wesleyan University, a school founded in 1831. There is in connection with it a divinity school. The town is served by the New York, New Haven & Hartford Railroad, and is on the Connecticut River. There is some river commerce. The industries are important, over thirty different articles being manufactured in large quantities. Population, 1910, 11,851; in 1917, 13,502 (Federal estimate).

MIDDLETOWN, N. Y., in Orange County, sixty-seven miles northwest of New York City, on the Erie, the New York, Ontario & Western and the Middletown & Unionville railroads. It has a considerable trade in farm products and contains hat factories, car shops, cigar factories, glass works, a tannery and factories where automobile tires are made. The state homeopathic hospital for the insane is located here. The place was settled before the Revolution and was named from its central location, half-way between Montgomery and Mount Hope, and between the Hudson and the Delaware rivers. Population, 1910, 15,313; in 1917, 15,890.

MIDDLETOWN, Ohio, in Butler County, thirty-five miles north of Cincinnati, on the Miami River and the Miami & Erie Canal and on the Cincinnati, Hamilton & Dayton, the Cleveland, Cincinnati, Chicago & Saint Louis and the Pennsylvania railroads. There are extensive manufactures of steel, tobacco, paper, bicycles and agricultural implements. The city has an opera house and a Masonic Temple. The commission form of government was adopted in 1914. Middletown was settled in 1794. Population, 1910, 13,152; in 1917, 16,384 (Federal estimate).

MID'IANITES, an Arabian tribe, represented in the Old Testament as the descendants of Midian, son of Abraham by Keturah, and described as engaged at an early period in a commerce with Egypt. They dwelt in the land of Moab, to the southeast of Canaan.

MIDLAND, Ont., in Simcoe County, on Georgian Bay, 120 miles northwest of Toronto. The Grand Trunk Railway and a line of steamers furnish transportation. The town has many factories and mills, grain elevators, iron smelters, engine works, coal docks and a shipbuilding yard. There is a government wireless station here. Population, 1916, 7,500.

MID'SHIPMAN, a naval term which today refers to a student of the United States Naval Academy, formerly known as a naval cadet. The term has a British derivation, and once referred to young men seeking instruction on British men-of-war and who were quartered amidships, on the lower deck. See Naval Academy.

MIDSUMMER NIGHT'S DREAM, A, one of Shakespeare's most beautiful comedies, even more delightful to read than to see presented. Fairies are important among its characters, and its language is at times exquisitely fanciful, but the delicate charm of the play is partly lost when it is acted on the stage. It was written about 1595, but not published until 1600. Within recent years *A Midsummer Night's Dream* has been presented in the open by the Ben Greet players.

MIGNONETTE, *min yun et'*, a flower that is cultivated almost everywhere in gardens during the summer and as a house plant in winter. Its smooth leaves are entire or divided into three parts, and the small, rather unattractive flowers are borne in clusters at the end of the stem. Its name is the French for *little darling*.

MIGRATION OF ANIMALS. Certain animals move either periodically or at irregular times and seasons from one locality to another, sometimes far distant. Occasionally migrations are caused by failure of food or some other condition which forces the animals to leave the region where they are living. The inroads which the Rocky Mountain locusts have made in the United States and the plagues of flies and other insects which have appeared in the East have been owing to this cause. The chinch bug and the army worm are other insects that migrate in search of food and make no effort to return to their original home. This is true also of the peculiar migration of the European lemmings, small, mouselike animals which, every few years, in vast numbers leave their home in the extreme northern part of Europe and travel at night toward the south and west until they are exterminated.

Bird Migration. It is to birds, however, that we must look for the most regular and perfect example of migration. Before food supplies have failed in the warmer parts of the South, many of its birds leave for the North, sometimes traveling several thousand miles and terminating their journey with the region in which they nest. At the approach of cold weather, they return again South, where they spend the winter. In the United States this migration may be said to begin early in February, with the approach of the robin and bluebird, but it does not reach its height until toward the middle of May. The earliest birds come as soon as the weather is warm, with little attention to the season. From then on, the number of species traveling north increases steadily, growing more and more definite in point of time; in fact, the date of the arrival of the warblers and other late species is known almost to a day.

The enormous numbers of these migrating birds, the regularity of their departure and return, the long distances they cover in flight without rest, are among the marvelous things of nature. Many birds migrate openly in the day time, but the large flocks of more timid birds fly only at night, and feed during the day in retired places. Year after year the general routes of migration are the same, following the seacoast and the great water courses until the birds reach their chosen location, when they distribute themselves in all directions. During the spring migration the male birds don their brilliant spring plumage and are easily recognized, but on their return in the fall they are duller in color and are accompanied by the females and the young, also in plumage less easily recognized, so that the fall migration never attracts as much attention as does that of the spring.

Not all species of bird are migrants; in fact, the larger number are not. Those which do migrate are confined to a few groups of high organization, who feed largely upon worms and insects, or who use them as food for their young, or who depend for food upon the wet places that are closed by frost.

MIKADO, *mi kah'doh,* the old official title of the emperor of Japan, a term yet adhered to among Western nations, but now practically obsolete in Japan. The Emperor Yoshihito, who ascended the throne in 1912, is the 122nd mikado, tracing descent to Jimmu Tenno, whose reign began in 660 B. C. The Japanese imperial dynasty is supposed to be the longest unbroken line in history. Each mikado has a personal, but not a family, name, and after his death is given a special title by which he is known in history. The common people call him "Son of Heaven," and the upper classes, "Supreme Master." The popular operetta, *The Mikado,* is a burlesque on the office.

MILAN, *mil'an,* or *mil lan'*, ITALY, the largest city of Lombardy, the second city of the kingdom, and the capital of the province of its own name. It is situated on the small River Olona, in the middle of the plain between the Adda and the Ticino. The city is entered by a number of gates, several of which are magnificent, and the leading streets proceeding from these gates are wide, well-paved and lighted. The chief open square and the center of the life of the city is the Piazzo del Duoma (Cathedral Square), in which is located the celebrated cathedral, which, after Saint Peter's at Rome, is the largest church of Europe (see below). Among the other noteworthy buildings are the Church of Sant' Ambrogio, built on the site

of a church founded by Saint Ambrose in the fourth century; the Church of Sant' Eustorgio; the Church of Santa Maria delle Grazie, in the refectory of which is the celebrated *Last Supper* of Leonardo da Vinci; the royal palace; the archiepiscopal palace; the palace of arts and sciences, with a library of 230,000 volumes and a magnificent collection of pictures, and the Ambrosian Library. The manufactures of Milan include automobiles, silks, cottons, lace, carpets, hats, earthenware, jewelry, gloves and art furniture. The city is the center of the Italian book trade, and has long been the chief financial center of North Italy.

The first distinct notice of Milan occurs in 222 B. C., when it was subdued by the Romans. In the third century A. D. it was second in rank to Rome, and at the close of that century it was made the capital of Italy by Diocletian. In the twelfth century it was the strongest of the city republics and had acquired the leadership of the other cities, and two centuries later it was made a duchy for the family of the Visconti, who gradually became supreme over almost all of Lombardy. Among the most famous rulers of the city were the Sforzas. On the extinction of the Sforza dynasty, Charles V united Milan with Spain. In the early eighteenth century it was ceded to Austria, and under Napoleon it became the capital, first of the Cisalpine Republic and then of the Napoleonic kingdom of Italy. It was restored in 1815 to Austria, from whose rule it was freed only after the Battle of Magenta in 1859. With the rest of Lombardy it was surrendered to Sardinia and became part of United Italy. Population, 1911, 599,200; 1915, estimated, 663,059.

Milan Cathedral, a famous Gothic cathedral in Milan, inferior in size to Saint Peter's at Rome, but in some respects a close rival. Its foundation was laid in 1386 by Gian Galeazzo Visconti, and many of the greatest European architects were employed in its erection. It is built of white Carrara marble, in the form of a cross, with a length of 486 feet and a breadth of 287 feet. The height of the tower is 356 feet. Numerous turrets and pinnacles and more than 6,000 statues adorn the outside. Within it Napoleon was crowned king of Italy in 1805. The view of the Alps, Lombardy and the city from the top of the cathedral is very beautiful.

MILAN DECREE, a decree issued in December, 1807, by Napoleon, and reinforced by a second one of January, 1808, to the effect that any vessel, regardless of nationality, which had been searched by an English ship, or which had paid any duty to the English government, was to be treated as an enemy vessel. This was a part of Napoleon's plan to conquer England by ruining its commerce (see CONTINENTAL SYSTEM). With the downfall of Napoleon's power, the entire system collapsed.

MIL'DEWS, the name of a number of plant diseases, caused by parasitic fungi. The term is applied also to powdery spots on cloth, paper, leather and other substances. There are two classes of mildews that attack plants, the true, or *powdery*, and the false, or *downy*, each due to fungi of different orders. The former live on the surface of flowers, stems and leaves and send minute suckers down into the tissues, thus absorbing the nourishment and often causing the death of the plant. There are about 150 species, which attack almost every kind of plant. Downy mildews form within the tissues of the host and grow outwards, appearing on the outside only to shed the spores. The spores are one-celled, are readily blown about by the wind and spread rapidly. Some of the most injurious of plant parasites are among the downy mildews. They are difficult to destroy, but spraying the affected plant with Bordeaux mixture is helpful. Dry sulphur or the fumes of boiling sulphur will check powdery mildews.

MILE, the unit of linear measure for long distances. It originated with the Romans, with whom a mile (*milliare*) was the distance of 1,000 paces of five Roman feet each. The same measure has been adopted very generally by all the world, although its length varies, and naturally different names are employed because of varying languages. The statute mile of England, the United States, Canada and Australia contains 320 rods of 16.5 feet each, or 5,280 feet. A nautical mile is the one-sixtieth part of a degree of latitude of a sphere of the size of the earth, or 6080.2 feet; a nautical mile is therefore equal to 1.151+ statute miles.

In the following table the mile of various countries, in terms used locally, is compared in length with the American mile of 5,280 feet:

English statute mile	1.
English geographical mile	1.15
French kilometer	0.621
German geographical mile	4.61
Russian verst	0.663
Dutch ure	3.458
Norwegian mile	7.021
Swedish mile	6.644
Austrian mile	4.714
Danish mile	4.682
Swiss stunde	2.987

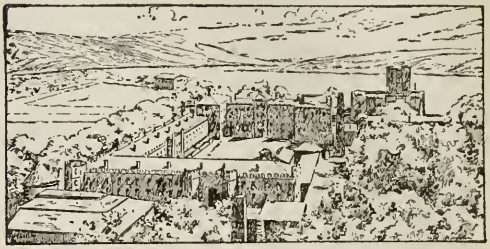
MILES, NELSON APPLETON (1839–), an American soldier, born at Westminster, Mass. He entered the Federal army in 1861 and was promoted through all the grades to be major general. After the Civil War he conducted several Indian campaigns in the west notably that against the Apaches under Geronimo in 1886. He succeeded to the full command of the United States army in 1895 and was in supreme control during the Spanish-American War. In 1900 he was raised to the rank of lieutenant-general and retired three years later. In 1905 he accepted a temporary appointment as commandant of the Massachusetts militia on the staff of the governor.

GENERAL NELSON A. MILES

MILES CITY, MONT., county seat of Custer County, 383 miles east of Helena and 114 miles northeast of Billings, is on the Northern Pacific and the Chicago, Milwaukee & Saint Paul railroads. The city is a great horse market, is a wholesale center, and has a fine park, a hospital and a convent. Population, 1915, 7,621.

MILE'TUS, an ancient city of Ionia in Asia Minor, at the mouth of the Maeander River. It had an extensive trade, and its manufactures of woolen goods were famous. When the Ionian colonies revolted against Persia, Miletus took a prominent part and was consequently destroyed by the Persians in 494 B. C. It was restored later to a certain extent and joined Athens against Sparta in the Peloponnesian War. Saint Paul visited the city once or twice.

MIL'ITARY ACAD'EMY, UNITED STATES, the national institution for the education of officers for the United States army, established at West Point, N. Y., by act of Congress in 1802. Washington, Hamilton and others who had been officers in the American army



UNITED STATES MILITARY ACADEMY

strongly advocated the establishment of such a school immediately after the Revolutionary War, though little was done with their recommendations previous to 1802. Another act of 1808 increased the powers of the school and provided for a larger number of cadets, a title which has now been changed to midshipmen (which see).

Appointments. Each Congressional district and territory, including Porto Rico, Alaska and Hawaii, is entitled to have one midshipman at the academy. The District of Columbia has two. Each state is also entitled to have two from the state at large and eighty are allowed from the United States at large. The appointment from a Congressional district is made upon the recommendation of the Representative in Congress from that district, and those from the state at large upon the recommendations of the Senators of the state. The appointments for the United States at large are made by the President upon his own selection. The appointments from the District of Columbia are made on the recommendation of the District Commissioners and that from Porto Rico on the recommendation of the resident Commissioner. Appointments are made one year in advance of admission. For each candidate appointed two alternates are usually nominated. Four from the Philippine Islands are admitted.

Examinations. On the second Tuesday in January of each year the candidate selected for appointment must appear for mental and physical examination before boards of army officers at such places as the war department may designate. Candidates who pass are admitted to the academy on March 1 following.

Requirements. Each candidate must show that he is well versed in algebra, to include

quadratic equations and progressions, plane geometry, English grammar, composition and literature, descriptive and physical geography and general and United States history.

No candidate will be admitted who is under 17 or over 22 years of age, or less than five feet four inches in height at the age of 17, or five feet five inches at the age of 18 and upward, or who is deformed or afflicted with any disease or infirmity which would render him unfit for military service. Candidates must be unmarried.

Pay. The pay for a midshipman is $600 a year and one-ration a day, or commutation therefor at 30 cents a day. The total is $709,-.50, to begin with his admission to the academy. No midshipman is allowed to receive money or other supplies from his parents or from any other person without the sanction of the superintendent.

Enlistment. Before receiving his warrant of appointment a candidate for admission is required to sign an agreement to serve in the army of the United States eight years from the time of his admission to the academy.

When any person has completed the course of four years satisfactorily he is eligible for promotion and commission as a second-lieutenant in any branch army in which there may be a vacancy, the duties of which he may have been judged competent to perform.

MILITARY SCHOOLS, institutions of learning in which studies in army tactics and military science are added to the regular courses of study. To each of these schools a United States army officer is attached as an instructor. Military schools are not designed to make army officers of their students, but the special instruction given imports a morale, a physical development, a deportment, and a promptness in obedience to orders that is highly desirable. The students of a military school wear uniforms prescribed by the school authorities.

MILITIA. See NATIONAL GUARD; ARMY.

MILK, a fluid secreted by the females of mammals for nourishing their young. It is produced in quantity by sheep, goats and cows, but cow's milk is the only kind used commercially in the United States and Canada. In those countries it is an important article of food in practically every household. The people of the United States alone require ten billion gallons a year, three-fourths of which they make into butter and cheese. The average daily consumption per person is about half a pint.

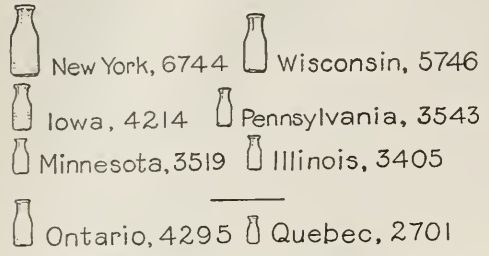
What is Milk? When examined by the microscope, milk is seen to be a whitish fluid containing many minute globules of fat. These are so small that about one million of them are contained in a pint of milk. One hundred pounds of good quality cow's milk contain eighty-seven pounds of water, four pounds of fat, five pounds of milk sugar, about one and three-fourths pounds of casein and albumin and a small quantity of mineral matter. Cow's milk contains about three times as much albumin as mother's milk, and for this reason marketed milk has to be diluted when fed to babies. A milk too rich in albumin causes indigestion and summer complaint. Sugar of milk, also called *lactose,* is a sweetish substance resembling cane sugar. Mother's milk contains seven per cent of lactose, as compared with four and one-half per cent in cow's milk. The latter, when prepared for the baby, has to be sweetened as well as diluted, but the proportion of sugar should never exceed seven per cent.

The yellowish "top milk" that forms on the surface of milk left to stand is called cream (see CREAM SEPARATOR). Cream is merely milk rich in fat, for the little droplets of fat are lighter than the liquid milk and so rise to the surface. When cream is churned butter is formed. It requires five and one-half gallons of good milk to produce a gallon of cream, three and one-half gallons to make a pound of butter, and about one and one-third gallons to make a pound of cheese. *Skim milk* is the name given to milk from which the cream has been removed. It is just as wholesome as ordinary milk, the only difference being in the absence of fat. Skim milk is the cheapest form of albumin that one can purchase.

The mineral content of milk consists of lime, potash, soda, phosphates and small quantities of magnesia and iron, all of which are beneficial to the system. Besides the ingredients mentioned, milk contains a number of ferments. Some of these are in the liquid when it comes from the cow, and some develop as a result of the multiplication of bacteria. Milk sours when certain bacteria convert the milk sugar into lactic acid.

Food Value of Milk. The four main classes of food material necessary for the maintenance of health are protein, fat, carbohydrates and minerals. All of these are

found in milk, which should therefore be regarded as a food and not as a beverage. It is, in fact, a perfect food. It should not be inferred, however, that milk alone is a suitable diet for adults in normal health. It contains so much water that one would have to consume four or five quarts a day to obtain sufficient nourishment, and the system of a healthy person demands bulky food as well as liquids. Another objection is that the protein is present in rather large quantities, and milk should preferably be taken with other foods in order to keep the diet balanced.



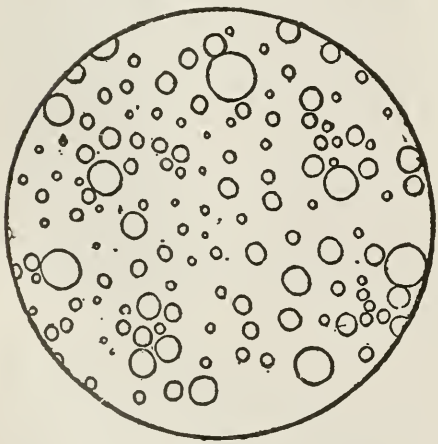
The figures represent millions of pounds, for a five year average.

MILK PRODUCTION PER YEAR

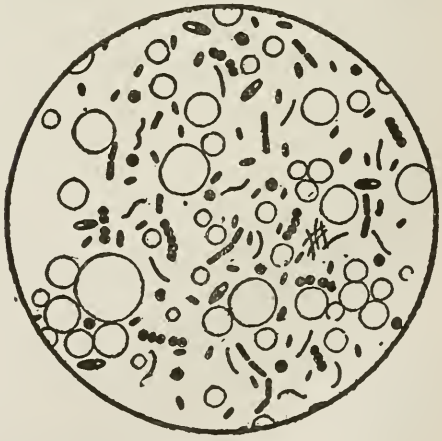
A glass of milk is about equal in food value to two large eggs, or two slices of bread, or two medium-sized potatoes. In a quart of milk there is as much nourishment as in two pounds of chicken, or eight eggs, or three-fourths of a pound of lean round beef. Milk is one of the cheapest foods on the market, one of the most easily digested, and one of the most nourishing. Not only is it agreeable in its natural state, but it is invaluable in cooking, being used in making custards, sauces, pastry, puddings, many beverages and other foods. Its use in making cheese and butter has already been mentioned. Even sour milk is of value, for it is the foundation of cottage cheese and a European beverage called *koumis*.

Care of Milk. Milk is very sensitive to the influence of its surroundings, and from the moment it is drawn from the cow it begins to change. It absorbs odors from the stable, from vegetables, meats and cellars, and because of this the greatest care is necessary in keeping it free from all such influences. When drawn it should be immediately cooled to a temperature of 45° and kept at that temperature by being placed in cans set in cold water or packed in ice. In well conducted dairies all these points are given special attention, and proper apparatus for preserving the milk in the best possible condition is provided. The animals, the stable, the utensils and attendants of a dairy should be kept scrupulously clean; otherwise, however good the quality, the milk will reach the consumer in a tainted condition.

Milk delivered at the home should be taken in as soon as left and be placed on ice. If it is delivered early in the morning before the inmates are out of bed, the milkman should be instructed to leave the bottles in a covered box. No one knows how many stray cats examine unprotected bottles left on porches. Milk conveys tuberculosis, scarlet fever, diphtheria, typhoid fever and other infectious diseases, and one cannot be too careful about keeping it always in a pure condition.



PURE MILK



INFECTED MILK

If there is any suspicion as to the quality of the milk purchased for home use, it should be sterilized; that is, heated for an hour at a temperature of 212° F. (the boiling point). Sterilized milk if kept on ice will remain sweet for several days. Heating milk to a temperature of 155° or 160° for half an hour will kill infectious disease germs, but such milk, called *pasteurized* milk, should be used the same day. The very best milk obtainable, called *certified,* is high-grade milk obtained under sanitary conditions, and inspected and endorsed by a medical milk commission. Such milk is expensive, but absolutely safe for a sick child.

Babcock Test, a method of ascertaining the amount of butter fat in milk. It is so called from the originator, S. M. Babcock, of Madison, Wis. He devised an apparatus consisting of a closed cylindrical box containing a rack to hold bottles. This is mounted in such a way that it can be rapidly whirled. The milk to be tested is poured from one receptacle into another until the butter fat is evenly distributed, and a quantity of it is then mixed with an equal quantity of sulphuric acid in a testing bottle. Milk from several different lots is similarly prepared, and then all the bottles are placed in the revolving rack. This is rotated for about five minutes at the rate of 700 to 1,200 revolutions a minute. Next a little warm water is poured into each bottle, and they are again revolved for about two minutes. If the experiment is successful all of the butter fat in each bottle rises up in the neck, which has a graduated scale showing the percentage of fat.

Related Articles. Consult the following titles for additional information:

Butter	Dairying	Milk, Condensed
Carbohydrate	Fat	Milking Machines
Casein	Food	
Cattle	Koumis	
Cheese	Lactic Acid	

MILK, CONDENSED, fresh cow's milk preserved by partial evaporation of its water content. The milk is brought to the factory and placed in large storage tanks, from which it is drawn off into copper tanks, each having a capacity of about 1,000 gallons. The milk is brought by steam heat to a boiling point and is then drawn off and strained into the sugar mixer, where the proper proportion of granulated sugar is added. The milk is then taken to the vacuum pans, where it is boiled down until three-fourths of the water is evaporated. It requires a temperature of 140° to evaporate the milk in the vacuum pans, and the reduction is rapid.

The condensed milk, a thick, pasty, cream-colored custard, is drawn from the vacuum pans and taken to the coolers, from which it is taken to the packing room and put into little air-tight cans. Condensed milk put up unsweetened, which is called evaporated milk, is also on the market. See DAIRYING; MILK.

Exports of Condensed Milk. There are parts of the world where the cow does not exist, either because of excessive heat or because of the deadly tsetse fly. American condensed milk is finding a rapidly-increasing market in such sections, and also in countries where cows are numerous. In 1918 American firms reported foreign sales as follows, the figures representing pounds:

Cuba	30,000,000
India	35,000,000
Philippine Islands	6,000,000
Straits Settlements	5,000,000
Hong-kong	4,000,000
Japan	3,000,000
Africa	5,000,000

MILKING MACHINE, a mechanical device for milking cows. The object of experiments in the construction of milking machines is to find an apparatus that will lessen labor and at the same time be hygienic. The most satisfactory machine thus far devised produces a pulsating action like that of the hand, by means of a vacuum apparatus. Pipes connect the apparatus with closed cans attached to the cows' udders. Milking machines are usually expensive to set up and to keep in good condition, and they have not as yet come into general use.

MILK SNAKE, or **HOUSE SNAKE,** a snake common in North America, where it often enters barns and other buildings in search of mice, which constitute its principal food. Though it is quick and alert, it is entirely harmless. Its name is derived from the belief once entertained, that it enters dairies and drinks the milk and even that it sucks it from cows. The snake is yellowish white beneath, somewhat darker above, its back being covered with regularly arranged black blotches.

MILK'WEED, the name of a family of herbs that have curiously complicated little flowers, and whose pods are filled with flat seeds, each bearing a tuft of silky down. The plants take their name from their thick and bitter milky juice. In the tropics some members of the family are climbers and are

cultivated for their beautiful flowers. The common milkweed is found in the United States and Canada in fields and lowlands from the longitude of New York west to that of Nebraska. The stems, which are about four feet high, are downy; the leaves are pale, and the numerous purplish flowers grow in clusters at the end of a stalk. The flowers have a sweet, sickening odor. As the plant is propagated both by its seeds and by its creeping roots, it becomes a troublesome weed, which is best eradicated by heavy cultivation.

MILKY WAY, or **GAL'AXY**, a long, luminous, star-filled track which is seen at night stretching across the heavens from horizon to horizon and which, when fully traced, is found to encompass the heavenly sphere like a girdle. This luminous appearance is due to a multitude of stars, so distant and blended as to be distinguishable only by the most powerful telescopes. At one part of its course it divides into two great branches, which remain apart for a distance of 150° and then reunite. In many places smaller branches are given off. At one point it spreads out very widely, exhibiting a fanlike expanse of interlacing branches, nearly 20° broad; this terminates abruptly and leaves a kind of gap. At several points are seen dark spots in the midst of some of the brightest portions; one of the most easily distinguished of these is known as the "coal sack." See ASTRONOMY.

MILL, JAMES (1773–1836), a British philosopher and economist. He began a *History of British India* in 1806 and published it in 1818. In consequence of the knowledge which his researches had given him of Indian affairs, he became chief examiner of correspondence for the East India Company. He wrote articles on social and political subjects; published a treatise on the *Elements of Political Economy*, written largely as an educational work for his son, John Stuart Mill, and an able *Analysis of the Human Mind*.

MILL, JOHN STUART (1806–1873), an English philosopher, was born in London. At the age of fourteen he entered upon a course of political economy. His fifteenth year was spent in France; on his return he studied law for a time, and in 1823 obtained a clerkship in the East India Company, remaining in the company's employment till 1858. He was elected to Parliament in 1865 and used his influence on the side of the advanced Radicals. From 1835 to 1840 he was principal conductor of the *London and Westminster Review*, in which were published many of his articles. In 1843 appeared the first of his two chief works, *A System of Logic, Ratiocinative and Inductive*, the second, *Principles of Political Economy*, appearing five years later. To these he afterward added *On Liberty; Utilitarianism;* the *Examination of Sir William Hamilton's Philosophy*, and a *Study of Auguste Comte and Positivism*. Mill's works on logic and political economy are standard text-books.

MILLAIS, *mil lay'*, JOHN EVERETT, Sir (1829–1896), an English painter, born at Southampton. In his earlier days he was a leader of the Pre-Raphaelite school, but on attaining maturity in art he abandoned the peculiarities for which the school is noted. He drew his subjects from all sources, using landscape, scriptural and mythological themes, as well as those of everyday life. Among his best works are *The Huguenot Lovers, The Boy Princes in the Tower, Spring, Chill October, Ferdinand Lured by Ariel, Marianna in the Moated Grange* and *Ophelia*. In portraiture Millais held first rank and painted a number of the most distinguished men of his day. He was made a member of the Royal Academy in 1883, became a baronet in 1885 and in 1896 was elected president of the Royal Academy.

MILLEN'NIUM, a word meaning *one thousand years*, commonly applied to a period in the future when Christ will return and rule over a world freed from sin. In the twentieth chapter of *Revelation* there is recorded the prophetic vision of Satan bound for a thousand years, after which will come the last Judgment and the end of the world. Upon this passage belief in the Millennium is based. Theologians vary considerably in their interpretation of *Revelation*, and there are many different views as to the Millennium. The term is used in a general way to mean a period of perfection indefinitely in the future.

MILLER, CINCINNATUS HEINE (1831–1913), an American poet, better known as JOAQUIN MILLER, because of a defense he wrote for a Mexican bandit named Joaquin. He was born in Indiana, but went west with his father at an early age and spent some time in the California mining districts. For five years he lived among the Modoc Indians, and after that he attempted with little suc-

cess to practice law in Idaho. In 1863 he undertook the management of the *Democratic Register,* published at Eugene, Oregon, but the paper did not long exist. He was admitted to the bar in Oregon and became district judge in Canyon City. After 1870 he lived in New York, Washington and Oakland, Cal. Miller's first volume of poems, *Songs of the Sierras,* attracted considerably more notice in Europe than it did in the United States. Among his other works are *Songs of the Sun Lands, Songs of the Mexican Seas* and several novels. His poems show descriptive and dramatic power, but lack artistic form.

MIL'LET, the common name for various species of grasses that produce roundish grains. The millets have been valued forage crops for many hundreds of years, and in many parts of the East they are important sources of food supplies. In India and Japan it has been estimated that more than 75,000,000 acres are planted annually. In the United States and Canada millet is raised as a forage plant and to some extent as a food for poultry. It is practically free from attacks of insects and plant diseases.

MILLET

MILLET, *mil lay',* JEAN FRANÇOIS (1814–1875), a French artist, born at Gruchy, near Cherbourg. He worked with his peasant father in the fields until he was eighteen years old. After this he studied drawing at Cherbourg and Paris, living in great poverty. It was not until he was thirty-five years old that he could do more than support himself by the sale of small pictures, but towards the end of his life he reaped the rewards of his steadfast perseverance. In 1849 he left Paris and settled among the peasants of Barbizon, on the edge of Fontainebleau Forest, and devoted himself to transferring their simple, everyday life to his canvasses, which he did with great truth of sentiment and poetic charm. Of his paintings may be mentioned *The Sheep Shearers; The Gleaners,* probably his masterpiece; *The Sower; The Shepherdess with Her Flock,* and *The Angelus.* The last was sold by auction in Paris in 1889 for about $115,000. It is privately owned and is not exhibited.

In the article Painting the reader will find reproductions of The Gleaners and The Angelus, with other details about the artist.

MILL'VILLE, N. J., in Cumberland County, forty miles south of Philadelphia on the West Jersey & Seashore Railroad and on the Maurice River. It is a manufacturing place, containing glass works employing 3,000 people, iron foundries, dye and cotton works and other factories. The city has a large public park at Union Lake, and has a Federal building, a library and a hospital. It was made a town in 1801 and became a city in 1866. In 1913 the commission form of government was adopted. Population, 1910, 12,451; in 1917, 13,813 (Federal estimate).

MIL'NER, ALFRED first Viscount (1854-), an English statesman whose fame rests chiefly on his services in connection with British supremacy in South Africa. He began his public career as a journalist, later was private secretary to the Chancellor of the Exchequer (1887-1889), and from 1889 to 1892 was Under-Secretary for Finance in Egypt. In 1897 Milner was appointed High Commissioner for South Africa and governor of the Cape of Good Hope, and in 1901, during the Boer War, he became governor of the Transvaal and Orange River colonies. The following year he was honored with the title of Viscount. Lord Milner retired from office in 1905, but was recalled to service during the World War. In December, 1916, he was appointed Minister without Portfolio in the Lloyd George Coalition Cabinet, and was made a member of the War Council. When Lloyd George formed a new Cabinet, in January, 1919, after the general Parliamentary election, he appointed Viscount Milner Secretary of the Colonies.

MILO. See MELOS.

MILREIS, *mil rees'* or **MILREA**, *mil re'*, the monetary unit of Portugal and Brazil,

its value in the system of the former being about $1.08 of United States money, and in that of the latter, about 55 cents. In both cases it is divided into one thousand *reis,* and coins in multiples of both the unit and of the subdivisions are issued in both gold and silver. See COINS, FOREIGN.

MILTIADES, *mil ti'a deez* (?-500 B. C), an Athenian general, hero of one of the decisive battles of history. When Greece was invaded by the Persians, he was elected one of the ten generals and drew up his army on the field of Marathon, 490 B. C., where he gained a memorable victory and saved Greece from Asiatic domination. In the following year he persuaded the Greeks to entrust him with a fleet of seventy vessels, in order to follow up his success. With this, to gratify a private revenge, he attacked the island of Paros, but was repulsed and dangerously wounded. On his return to Athens he was impeached and was condemned to pay a fine of fifty talents. Being unable to pay, he was thrown into prison, where he soon after died of his wound.

MILTON, JOHN (1608–1674), an English poet, whose genius is considered second only to that of Shakespeare. He wrote one of the world's finest epics—*Paradise Lost*—and his fame is lasting. Milton was born in London. His earliest education was received from his father and from private tutors, but in 1620 he was sent to Saint Paul's School. There he studied ancient and modern languages, also becoming acquainted with Spenser's writings, which influenced him greatly. At the age of seventeen he entered Christ's College, Cambridge, where he remained for seven years. His *Hymn on the Nativity* was written during his university days. Leaving the university, he went to live with his father, who had retired to Horton in Buckinghamshire, and there he remained for six years. In this retreat he studied classical literature, philosophy, mathematics and music, and he wrote four poems which rank with the greatest lyrics in the language. These are *L'Allegro* and *Il Penseroso,* the masque *Comus* and the elegy *Lycidas.*

JOHN MILTON

In 1637, on the death of his mother, Milton made a Continental journey, in which he visited Paris, where he was introduced to Grotius; Florence, where he met Galileo; Rome, and Naples. Hearing while in Italy that civil war was threatening in England, he returned at once. The home at Horton had been broken up, and Milton settled in London, where he undertook the education of his two nephews, the sons of his sister, and the sons of a few personal friends. Before long he was drawn into the ecclesiastical struggle which was raging, and one treatise after another in defense of the Puritans came from his pen. In the summer of 1643 Milton married Mary Powell, the daughter of a royalist family, but she found his habits austere and his house dull and returned to her father about a month after marriage. In 1645, however, she returned and continued to live with him until her death in 1652.

When, in 1649, Charles I was executed and a republic established, Milton avowed his adherence to it in a pamphlet, *Tenure of Kings and Magistrates,* and was appointed foreign secretary to the commonwealth. In his literary work his eyesight suffered so much that in 1652 he became totally blind. Nevertheless, he continued Latin secretary, with the assistance of Andrew Marvell, and dictated some of Cromwell's most important dispatches. When Charles II was restored a few months later, the blind politician remained in hiding, his books were burned by the common hangman and he himself narrowly escaped the scaffold. He had married a second wife in 1656, who died in 1658, and in 1663 he married a third time.

The last years of his life were spent in seclusion, in the composition of his greatest work, *Paradise Lost.* Blind as he was, his daughters were called on to read to him and to take down his verses, and they accepted the task in no pleasant spirit. They were disrespectful to him, sold his books by stealth and grumbled over his third marriage. Above all these troubles, however, Milton rose triumphant, and his great epic contains many passages which have never been surpassed in English poetry. *Paradise Lost* was published in 1667, *Paradise Regained* and *Samson Agonistes,* a tragedy, in 1671. Besides these works, Milton wrote a number of beautiful sonnets, the one *On His Blindness,* perhaps, the best-known of all English sonnets. His prose writings, though elegant in

style, are often violent in tone, and they have, moreover, little of interest in the present day. *Areopagitica,* a defense of the freedom of the press, is the best of these writings.

MILWAU'KEE, WIS., the thirteenth city in size in the United States, the largest in the state, and the county seat of Milwaukee County, is situated on Lake Michigan, eighty-five miles north of Chicago. The abrupt shores of the lake at this point are from eighty to 125 feet high and are cut by the Milwaukee River, which forms a part of the splendid harbor. The Menominee and the Kinnickinnic, two small streams which flow into the Milwaukee River within the city limits, aid in making the location more picturesque. All these natural advantages have been considered in the building of the city, and the result is that Milwaukee has become one of the handsomest cities of the northwest.

The plan is quite regular, the streets are broad and many miles of them are finely paved and laid with asphalt. The business part of the city is near the lake, while the best residence sections crown the hills and ridges and follow the lake shore northward. A system of electric railways affords communication between all parts of the city, and other systems extend into the suburbs and to resorts along the lake and in the interior of the state. Five great viaducts span the valleys, and the rivers are well bridged. The Chicago, Milwaukee & Saint Paul, the Chicago & North Western and the Minneapolis, Saint Paul & Sault Ste. Marie railroads have lines extending into the city. The Pere Marquette and Grand Trunk have boat connection with the city across Lake Michigan.

Lake Park, which contains about 124 acres, is laid out with drives and walks, and is on the lake shore. Juneau Park, a small tract on the lake front, contains a statue of Leif Ericson and another of Solomon Juneau, the founder of the city. Washington Park, on the west side, contains about 150 acres, and the eight or ten smaller parks bring the total park area to about 950 acres. Milwaukee has a number of fine buildings, and the general appearance of the city is neat and attractive. Among the public buildings are a United States government building, a fine city hall, a public library, the Layton Art Gallery, the last a gift from one of Milwaukee's public-spirited citizens and an auditorium. The finest building in the city and one of the most beautiful in the country is owned and occupied by a great insurance company.

Milwaukee has numerous educational institutions, including Concordia College, Marquette University and the Milwaukee-Downer College for women. It is also the seat of a state normal school and has one medical college, affiliated with Marquette University. The state industrial home for girls is located in the city, and a mile west of its limit is a national soldiers' home, on grounds covering about 400 acres.

Milwaukee's excellent harbor, which is now protected by a breakwater two miles long, has been instrumental in creating the extensive commerce which the city now enjoys, as an important collecting and distributing center for the northwest. Large quantities of iron ore are shipped in from the north. The manufacturing interests of the city are large in proportion to its population. The chief manufactures, in the order of their importance, are metal, clothing, packed meats and leather. Until 1919 the city manufactured vast quantities of beer.

The chief officer of the city is the mayor, who is chosen by the electors, as are the treasurer, controller, attorney and a common council, consisting of one alderman from each ward and twelve aldermen at large. Various boards transact the city business.

History. In 1818 Solomon Juneau built a little log cabin on the east side of the Milwaukee River, and this is considered the first permanent settlement of Milwaukee, although trading posts had been established there before and Jesuit priests had located in the vicinity. A village of Pottawatomi Indians was then in existence at this point. The region around Juneau's house was known as Juneautown. The west side of the river, which was settled by Byron Kilbourn in 1734, was called Kilbourntown, and the region south of the Menominee River was called Walker's Point, for George H. Walker, who settled there in the same year. For a long time there was bitter rivalry among the three villages, but this gradually died out, and Juneautown was organized as the village of Milwaukee in 1837. Two years later Kilbourntown was annexed, and in 1845 Walker's Point was joined, and the three settlements were incorporated as the city of Milwaukee. Solomon Juneau was chosen the first mayor.

Population. The population of Milwaukee in 1910 was 373,857; a Federal estimate of

1917 credited it with 445,008 people. It is a mixed population, in which for many years people of German birth largely predominated; in fact, for many years in its early history, German customs were more in evidence than those of America. During the Civil War a company was formed composed wholly of German turners. More recently Poles, Italians, Russians, Dutch, Scandinavians, Bohemians and other peoples have colonized parts of the town and although certain wards still are solidly German, 71 per cent of the inhabitants are native born.

MIMEOGRAPH, *mim'e o graf.* See COPYING DEVICES.

MIMICRY, *mim'i kri.* See PROTECTIVE COLORATION AND MIMICRY.

MIN'ARET, the tower of a mosque. A mosque has one or more minarets, often as many as four, one at each angle of the enclosure; one mosque, that at Mecca, has seven. The minaret is generally a slender, polygonal or cylindrical shaft of brick or stone. It has several stories, with projecting balconies from which the muezzin calls the people to prayer. It terminates in a tapering cone, crowned by a pinnacle or small dome, and is ascended by a narrow, spiral staircase. Many examples are found in the architecture of the thirteenth and sixteenth centuries in Egypt, Spain, Syria, India and Turkey. See MOSQUE.

MI'NAS BAY, or **BASIN OF MINAS**, the name given to the eastern arm of the Bay of Fundy. It extends for nearly sixty miles into Nova Scotia. The tides in the basin are very strong and have been known to reach the height of sixty or seventy feet. The principal river which empties into the bay is called the Avon. The village of Grand Pré, celebrated in Longfellow's *Evangeline,* is situated on the Bay of Minas.

MIND, the sum of the powers of knowing, feeling and willing, the entire spiritual nature, or the soul. From Aristotle to modern philosophers, many theories as to what mind is, have been advanced, and their elaboration and discussion have presented some of the most difficult problems of metaphysics. The early theories consider the mind as separate from the body, but later theories recognize the intimate relation between mind and body. The study of physiological psychology has shown that mental action is based upon certain physiological conditions. Many psychologists use mind and soul as synonymous terms, while others consider mind the more comprehensive term and restrict the term *soul* to those activities connected with the religious nature. See PSYCHOLOGY.

MINDANAO, *min da nah'o.* See PHILIPPINE ISLANDS.

MINDORO, *min doh'roh.* See PHILIPPINE ISLANDS.

MIND READING. The question as to whether the thoughts of one person can be read by another is one about which there is much controversy and disagreement. A common experiment used to prove the affirmative side consists in having someone find a hidden object. This person usually follows a guide who knows the location of the hidden object. He places the hand of this guide on his forehead or arm, and both concentrate their minds on the same subject, the hiding place. In many instances the seeker does reach the concealed object, and the reason given is that he was guided by the thoughts of the person with whom he is in close contact. Psychologists sometimes call this muscle reading, and explain the experiment by saying that the guide unconsciously indicates the direction by reflex action of his muscles. The seeker is guided by a series of yielding and resisting movements, of which both persons are not directly conscious. Telepathy, as mind reading is scientifically called, is being zealously studied, but no agreement of opinion has yet been reached.

MINE, SUBMARINE. See SUBMARINE MINE.

MINERALS AND MINERALOGY, *min er al'o ji.* Everything that has life or which living things have produced belongs either to the animal or to the vegetable kingdom. Everything which never has lived is classed in the mineral kingdom. Animals and vegetables are composed of many dissimilar parts; minerals are called *homogeneous,* that is, every part of any mineral is exactly like every other part of it. A block of coal may be broken into thousands of small pieces, but every piece is as truly coal as was the original block. Coal, as is true of every other mineral, is composed of component parts, as the chemist discovers on examination; in each little speck of coal these component parts are present in the same proportions as in the larger piece. A grain of gold is as truly gold as is a nugget which weighs many ounces.

Animals and plants have various organs; minerals are inorganic. Animals and plants grow from the inside; minerals grow by additions from the outside. A mineral is defined as "any chemical element or compound occurring naturally as a product of inorganic processes" (Webster). Mineralogy is the science which makes known all facts relating to minerals. It includes the study of all inorganic substances in the earth and on its surface. As distinguished from geology, mineralogy deals with the various mineral bodies as separate substances forming the earth's crust and examines their properties as such, while geology treats them together as building up the crust of the earth. Mineralogy is closely related to chemistry, since without a knowledge of this branch of science, it would be impossible to determine the composition of minerals.

Minerals are classified according to their structure, their chemical composition and their physical conditions. In structure, solid minerals are either crystalline or massive. When the former, they conform to some system of crystallization. Another important test is hardness (which see).

Apparently all minerals once existed in a fluid or molten state and have been changed to their present condition through crystallization, by evaporation of their water content; through condensation, or through heat processes. Salt is an example of the first process, sulphur, of the second; and many rocks, of the third.

Related Articles. All the minerals are described in these volumes, and attention is directed to titles relating to them. Consult the following, also:

Chemistry	Geology
Crystallization	Hardness

MINERAL WATERS, the term commonly, but somewhat erroneously, applied to the spring waters that contain an unusual quantity of such substances as sodium, magnesia, iron, carbonic acid and sulphur. It has not been found practical or useful to classify mineral waters under their chemical elements, but the attempt has been made, springs being described as salt, earthy, sulphur, iron, alkaline or alkaline-saline. Besides the substances which these terms indicate, the waters are frequently impregnated with carbonic acid gas.

Mineral Springs. As these waters have curative properties, mineral springs in various parts of the world have been utilized as spas, or resorts for invalids. In the United States there are a number of these. One at Saratoga Springs, N. Y., has been made a state reservation, and that at Hot Springs, Ark., is under Federal control. Others of note include Glen Springs, Watkins, N. Y.; White Sulphur Springs, W. Va.; French Lick Springs, Ind. In its work of rebuilding invalided American soldiers the government found mineral waters of decided value. These waters are taken internally and are also used for bathing.

MINERVA, *min ur'va*, in classical mythology, the Roman goddess of the intellectual powers. To the Greeks she was known as Athene. She was the daughter of Jupiter and Metis. According to popular legend, before her birth Jupiter swallowed her mother, and Minerva afterwards sprang from the head of Jupiter. Whatever other qualities she might possess, and these were many, she was always the symbol of the thinking faculty, the goddess of wisdom, science and art; but she was also a skilled warrior and the protector of warriors and is therefore usually represented completely armed, her head covered with a gilt helmet. At times, however, as the goddess of the peaceful arts, she appeared in the dress of a Grecian matron. Her distinctive symbols were the aegis and the gorgon's head, and the olive tree was sacred to her. Athens, which was named after her, was the city in Greece most sacred to her, while at Rome, also, she had several temples.

MINERVA

MIN'IMUM WAGE, the lowest wage that can legally be paid. Legislation on this subject is based on the principle that it is detrimental to the worker and to the community alike for people to work for wages too low to enable them to live decently. Accordingly in enlightened countries the movement is growing rapidly to make it illegal to pay less than a living wage. Boards of investigation which gather statistics and other information are a necessary part of this movement.

Up to 1918 minimum wage laws had been enacted in Arizona, Arkansas, California, Colorado, Kansas, Minnesota, Oregon, Utah, Washington and Wisconsin; in 1917 Connecticut appointed a commission to study the question. Massachusetts and Nebraska provide for commissions with power to investigate and report, but they lack power to enforce their findings. The principle of the minimum wage has been most successfully tested in the state of Victoria in Australia, where legislation was enacted as early as 1896. In 1910 wage boards were established in Great Britain, and in 1915 France adopted the principle.

MINING. In its broadest meaning, mining comprehends all the processes whereby the useful minerals are obtained from their natural localities beneath the surface of the earth, together with the subsequent operations by which many of them must be prepared for the purposes of the metallurgist (see METALLURGY). As the term is now generally used, it means the art of obtaining the ores from the earth, while the processes connected with separating the metals from their ores are included under *metallurgy*.

All mineral deposits are divided into two very broad divisions. The first includes the beds, or seams, of iron ore, coal and salt. These are deposits laid out more or less horizontally and parallel to the stratification of the surrounding rocks. The second class includes mineral veins, or lodes. The mining appliances employed are very different in the two classes of deposits. In the first class, it is desirable to make a hole of the shortest possible depth from the surface of the ground to the bed of mineral. A shaft is therefore sunk through valueless beds until the mineral is reached. Machinery is then used to extract the whole of the mineral, due precautions being taken to avoid danger from falls of roof and from noxious gases. In the second class of deposits, the inclination of the mineral vein has to be taken into account, as the deposit varies considerably in inclination and in size. The vein must therefore be studied foot by foot, downward from the top. In some cases a vertical shaft is sunk, and passages, known as *cross-cuts*, or *levels*, are driven from this to the vein at different depths. A vertical shaft presents the advantages of greater ease in sinking, hauling and pumping. In the search for mineral deposits, the best evidence is obtained by putting down bore holes. These are made by various methods and are sent to a depth of a few feet, when required for testing the character of the foundation subsoil, or, in other cases, to thousands of feet, when required in seeking for or estimating the value of deposits of coal, salt and iron.

In order to open up a mine, tunnels, or entries, are driven into the lode or bed whenever the contour of the country admits of this scheme. Shaft sinking involves a larger outlay of capital and greater working cost. In the ordinary method of sinking shafts, the workmen, standing upon the bottom of the pit, blast out the rock and send the excavated material to the surface by means of an engine, rope and bucket. The sides of the shaft are supported by timbering or walling. By the use of steam or electric power for operating the hoisting apparatus, shafts can be sunk to almost any depth desired. The deepest shaft in the world is at the Calumet and Hecla copper mine, Calumet, Mich. It exceeds 5,000 feet. The cutting of a path through the harder rocks, as carried on by the ancient miners, was particularly laborious. Previous to the introduction of blasting, the implements used were of the nature of wedges and hammers. Bit by bit pieces of rock were broken away, the operation being aided by natural fissures in the rock and by the brittleness of the hard material. In this way the ancient miners cut coffin-shaped galleries 6 feet in height. At the present time the galleries, or levels, are usually 7½ feet high and 5 or more feet wide, thus affording greater facility for traveling and for ventilation. In the operation of blasting, use is made of a drill of steel. This may be struck with a hammer, but nearly everywhere rock drills driven by steam, compressed air or electricity are in use. The bore hole, when finished, is then charged. Gunpowder, compressed powder, dynamite and gun cotton are employed. Nitrated gun-cotton has also given admirable results. The fullest benefit of these modern explosives can be obtained only by the use of strong charges fired by electricity, by which it is possible to place a number of bore holes in such a

manner that when fired together they shall help one another. For removing coal, these high explosives are too quick in their action, and blasting powder continues to be used.

Related Articles. Consult the following titles for additional information:

Coal	Minerals and Mineralogy
Gems	Stone Age
Geology	
Metals	

MINISTER PLENIPOTENTIARY, *plen i po ten'shi a ri.* See ENVOY EXTRAORDINARY, subhead *Envoy Extraordinary and Minister Plenipotentiary.*

MINISTER RESIDENT, a diplomatic officer accredited to a country so small that a diplomat of high rank is not needed. The minister resident has all the powers of a minister plenipotentiary. See ENVOY EXTRAORDINARY.

MIN'ISTRY, the name sometimes given to the heads of the executive departments of a government, taken collectively. It is usually synonymous with the term *cabinet*, though in some countries, as in Great Britain, the ministry includes, besides the cabinet, many under-secretaries of departments, who have seats in Parliament. See CABINET.

MINK, a small mammal belonging to the weasel family, whose beautiful thick coat makes it one of the most valuable of the fur-bearing animals. The various species are found in all parts of North America and in Europe and Northern Asia, those of the coldest regions producing the costliest fur. The fur is brown, varying from light to dark, and is thick and glossy. It is used for making muffs, collars, coats, etc. Mink muffs are retailed at about $100 and up, and other garments are priced accordingly, the dark furs being the most expensive.

Minks live in burrows which open near ponds and streams, and they spend part of their time in the water, as they are skilful swimmers. They feed on fish, frogs and other water animals, and to a less extent on birds, eggs and small land animals. Like skunks, they have glands that secrete a liquid of penetrating odor, but it is extremely disagreeable only when the animal is in a rage. American minks are about two feet long; European species are a little smaller. See FUR AND FUR TRADE.

MINNEAPOLIS, *min e ap' o lis*, MINN., one of the "Twin Cities of the Northwest," the county seat of Hennepin County, the largest city in the state, seventeenth in size in the United States, and the world's chief center for the manufacture of flour, is situated in the southeastern part of Minnesota, at about the geographical center of North America and at the head of navigation on the Mississippi. It is 424 miles northwest of Chicago and 581 miles north of Saint Louis. In 1910 the population was 301,408; in 1917, according to a Federal estimate, it was 373,448. With its suburbs and the sister city of Saint Paul, adjoining it on the east, there is formed a community having 600,000 inhabitants.

Its location may be said to have determined its destiny as a great industrial center. Situated in the midst of a rich grain and lumber district, with excellent shipping facilities, and having the Falls of Saint Anthony in the heart of its business district, to furnish unexcelled power, Minneapolis could not be other than prosperous and aggressive. Of the more than twenty railroads that enter it the most important are the Great Northern, the Northern Pacific, the Chicago, Burlington & Quincy, the Chicago & North Western, the Chicago, Milwaukee & Saint Paul, the Chicago Great Western, the Minneapolis & Saint Louis, the Minneapolis, Saint Paul & Sault Ste. Marie and the Chicago, Rock Island & Pacific.

General Description. Minneapolis covers an area of a little over fifty-five square miles, extending on both banks of the Mississippi for ten miles and having an extreme east and west extent of over six miles. The river divides the city into two unequal divisions, known as the East Division and the West Division. Below the Falls of Saint Anthony, which are in the heart of the city, the Mississippi flows through a deep gorge, and within the city limits the river is spanned by nineteen bridges. The city is built upon nearly level ground and is regularly laid out, most of the streets running at right angles.

The streets are noted for their width and cleanliness. Both the East and West divisions are divided into north and south sections. The West Division, which is by far the larger, is divided by Hennepin Avenue, and the East Division, by Central Avenue and Division Street. The streets from these dividing lines are numbered in their order, and those running parallel with the river are also numbered. Hennepin Avenue, Nicollet Avenue, Marquette Avenue and First and Second avenues are the chief business streets for retail purposes. The wholesale and manufacturing districts are located on both

banks of the river and extend as far as the city limits. In the southwestern part of the city there are handsome residential districts.

Parks and Boulevards. One-tenth of the city's area is given over to parks, of which there are more than four score, including many small playgrounds. A boulevard system fifty miles in extent connects the parked areas, and there are beautiful drives traversing them. The system begins with Loring Park, in the center of the city, and includes the parks to the southwest in which are situated lakes Calhoun, Harriet and Cedar and Lake of the Isles, all beautiful sheets of water. Connecting all of these lakes is a boulevard, which continues to the south and east until it reaches the river at Minnehaha Park, in which are located Minnehaha Falls. From Minnehaha Park the boulevard continues along to the Minnesota University campus. A law which provides that property once acquired for parks may never be used for any other purpose has permitted permanent improvements on a large scale. The city, in connection with Saint Paul, has one of the finest systems of street railways in the country, the system covering both cities under one management.

Buildings. The city contains a number of public buildings and business blocks which equal in their architectural features and construction those found in any other city in America. Foremost among these is the county courthouse and city hall, erected by the county and city at a cost of about $3,500,000. This structure occupies an entire block. It is built of Ortonville granite and is finished in marble. It has a tower 350 feet high in the upper story of which is an observatory, from which an excellent view of the city can be obtained. Among other buildings worthy of mention are the new Federal building, covering a city block; the Minneapolis Art Museum; the Auditorium, with a seating capacity of over 2,500; the Plymouth, First National-Soo, McKnight and Security Bank buildings; the Masonic Temple; the Lumber Exchange; the public library, containing 225,000 volumes; the Metropolitan Life Building; the New York Life Building; the Chamber of Commerce; the Radisson, Dyckman, Andrews and West hotels. The city is also noted for its large and beautiful churches. The most important among these are the Roman Catholic Pro-Cathedral, Saint Mark's, Second Church of Christ, Scientist; Wesley Methodist, Plymouth Congregationalist, Park Avenue Congregationalist, Westminster Presbyterian, First Unitarian and the Church of the Redeemer, Universalist. The Buildings of the University of Minnesota, on a beautiful campus on the east bank of the river, are also noteworthy.

Industries. Minneapolis has long been known as the largest center of the manufacture of flour in the world, and its combined mills now have a capacity of nearly 85,000 barrels in twenty-four hours. These mills are situated on both banks of the Mississippi, at the head of the Falls of Saint Anthony. Other leading industries are the manufacture of lumber and timber products, such as furniture, boxes and the like; cooperage, for which the manufacture of flour creates a large demand; the manufacture of underwear and other knit goods, fur goods, foundry and machine shop products and the manufacture and repair of railway cars. A wide variety of commodities used in business and the home are produced, and the yearly output of all enterprises is valued at fully $165,000,000.

As a primary wheat market Minneapolis is the most important in the country and it is the world's greatest center for the distribution of lumber. Besides the lumber manufactured in the city, Minneapolis is also an exchange point for large quantities of lumber manufactured in other places and forwarded for sale.

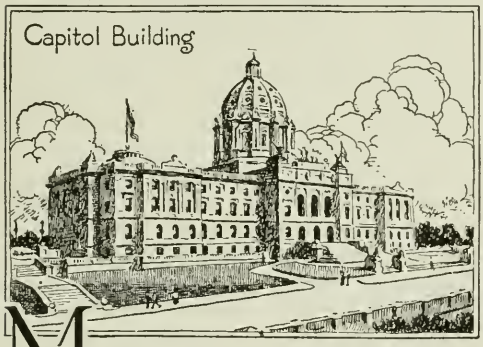
History. Father Louis Hennepin discovered the Falls of Saint Anthony in 1680, and the advantages of the site were pointed out by a traveler who visited the place about a century later. In 1807 Zebulon Pike concluded a treaty with the Sioux Indians, by which the heart of the present city became United States territory. The government erected Fort Snelling (south of Minnehaha Park) in 1819, and four years later a flour and lumber mill was set up. In 1837 the village of Saint Anthony was marked out on the east bank of the river. This was later surpassed by a settlement on the other bank, started in 1850, and chartered as the city of Minneapolis in 1867. Saint Anthony was annexed in 1872, and the city entered upon an era of uninterrupted prosperity. The name *Minneapolis* is a combination of the Indian word *minne*, meaning *water*, and the Greek word *polis*, meaning *city*. The city has one of the lowest death rates in America in proportion to its size.

MINNEHA'HA, an Indian name meaning *laughing water* borne by the heroine of Longfellow's *Hiawatha*. She is portrayed as the daughter of an old arrow maker, and described as

Handsomest of all the women
In the land of the Dacotahs,
In the land of handsome women.

Minnehaha is also the name of a small stream in Minnesota and of a celebrated cascade in that river.

MIN'NESINGERS, the name applied to the minstrel singers who traveled about Germany in the twelfth and thirteenth centuries. They composed the words and music for their songs, which treated chiefly of love, but also religion, nature and historical and political events. Among the minnesingers was Wolfram von der Vogelweide, the author of *Parzival*, upon which Wagner's music drama *Parsifal*, was based. (See MASTERSINGERS).


Capitol Building

MINNESOTA, one of the leading states of the Union in natural resources, situated in the north-central part of the United States and in the geographical center of North America, halfway between the line of perpetual frost on the north and the line of no frost on the south. It is bounded on the north by the Canadian provinces of Manitoba and Ontario, on the east by Lake Superior and Wisconsin, on the south by Iowa and on the west by the Dakotas. The eastern portion of the northern boundary consists of a chain of lakes and rivers, of which the Rainy River and Lake of the Woods are the most important. The eastern boundary is formed almost entirely by Lake Superior and the Saint Croix and Mississippi rivers, and a large portion of the western boundary is formed by the Red River of the North. Its water boundary is about two-thirds that of the entire state line.

Minnesota has several popular names, the most common, GOPHER STATE, referring to the large number of gophers found there. It is also called the BREAD AND BUTTER STATE, because of its great production of flour and dairy goods; again, its motto, "Star of the North," has given rise to the name NORTH STAR STATE. Minnesota is the Indian name for *sky-tinted water*.

Area and Population. Minnesota, with a gross area of 84,682 square miles, is the eleventh state of the Union in size, being slightly smaller than Utah, and exceeding Idaho by about 800 square miles. It has a water area of 3,824 square miles, for hundreds of lakes dot its surface.

In 1910 the population was 2,075,708, making it the nineteenth among the states of the Union. In that year there were 25.7 people to the square mile, a ratio exceeded in twenty-eight other states. According to a Federal estimate, the number of inhabitants on July 1, 1918, was 2,345,287. This state has a high percentage of foreign-born population, Swedes, Norwegians and Germans predominating, in the order named. There are also about 9,000 Indians occupying reservations.

Minnesota is predominately a farming state, with few large cities. The "Twin Cities," Saint Paul and Minneapolis, form a community of about 600,000 souls, but aside from these great centers there are but seven municipalities with a population over 10,000—Duluth, Winona, Hibbing, Virginia, Saint Cloud, Mankato and Stillwater. At least half the inhabitants of Minnesota live under rural conditions.

Surface and Drainage. Notwithstanding its large area, Minnesota contains no lofty mountains or deep valleys. A height of land with an elevation of about 1,700 feet extends in an irregular line approximately east and west through the north-central section. From its slopes, rivers flow in all directions. The highest land is in the Mesaba range, in the northeastern part, where the loftiest summits are about 2,200 feet. The region around Lake Superior is the lowest, having an altitude of about 600 feet. From this low land southward and westward to the valley of the Red River of the North the surface consists largely of rolling land, interspersed with streams and lakes and covered with pine or hardwood forests.

Along the Mississippi are high bluffs, which in the southeastern portion of the state reach an altitude of nearly 1,800 feet. The southern tiers of counties are largely rolling prairies, which merge into high parallel swells in the southwest, sometimes known as *coteaus*, and designated by Longfellow in *Hiawatha* as "mountains of the prairie." The valley of the Red River of the North, which includes the northwestern counties, is level.

The drainage includes three river systems. A small section of the northeastern corner of the state drains through the Saint Louis and a number of short rivers into Lake Superior. North of the height of land the rivers flow into the Rainy River and the chain of lakes which connect with the Hudson Bay system. The central and southern portions, including more than one-half of the area, are drained into the Mississippi. The most important tributary of this stream within the state is the Minnesota, which flows in a southeasterly, then northeasterly, direction entirely across the state. The northwestern section is drained into the Red River of the North, whose tributaries are few, only one, the Red Lake River, being of any importance.

Minnesota contains over 7,000 lakes. The largest one that lies wholly within the state is Red Lake. Of the Lake of the Woods, on the northern boundary, only a small portion belongs to Minnesota. What is known as the lake region extends southwards through the central part and contains thousands of small lakes surrounded by timber, noted for the beauty of their scenery, the clearness of their water and the abundance of fish. Many of these are popular summer resorts. On the western boundary are lakes Traverse and Big Stone, the former the source of the Bois de Sioux, and the latter the source of the Minnesota.

Climate. The climate is cool temperate The summers are characterized by many hot days, followed by cool nights. The thermometer rises to 90°, or even 100°, during July and August. The autumns are remarkably mild and pleasant, frosts seldom occurring before the middle of October. The winters are characterized by clear, cold weather, in which the temperature sometimes falls as low as 40° below zero. The springs are short, the transition from winter to summer being quite rapid. The atmosphere is dry and clear, and the extremes of temperature are therefore not noticed as much as in regions of less variation but of greater humidity. The rainfall for the entire state is about twenty-four inches. It is heaviest in the eastern half and lightest along the western border, but everywhere it is sufficient for agricultural purposes, and is evenly distributed throughout the year.

Mineral Resources. Minnesota is the leading state in the Union in the production of iron ore, and contains what are probably the largest iron mines in the world. These are located in the Mesaba and Vermilion ranges, near the head of Lake Superior. The ore is shipped by rail to Duluth and Two Harbors, and thence it goes by boat to the various points on the Great Lakes, where it is smelted. There are valuable granite quarries at Saint Cloud and Ortonville, on Big Stone Lake. A pink limestone of great value as a building stone is found in Blue Earth and Lesueur counties; a cream-colored limestone is quarried at Red Wing, and a dolomite rock is found near Rochester. A brown sandstone is also found near Sandstone, and in Pipestone County are extensive quarries of red jasper, especially valuable for building and ornamental purposes. At the foot of this quarry is also found the famous deposit of pipestone used for so many centuries by the Indians in making peace pipes. So far as known, this is the only important deposit of this rock in America. Slate occurs in the northern part of the state, and brick clay is quite generally distributed.

Agriculture. Minnesota is one of the leading agricultural states, and it produces large quantities of the best quality of spring wheat, the entire valley of the Red River of the North being especially suited to it. In production of spring wheat Minnesota is exceeded only by North Dakota. Wheat is also grown on much of the tillable land in other parts of the state, so that the entire output is large. Minnesota is also a leading barley state, and produces in addition good crops of oats and corn. Among the vegetables, potatoes are of greatest importance. Hay is raised in large quantities, and dairying and the raising of live stock are important branches of agriculture. In the southern part the more hardy varieties of apples, strawberries and other small fruits are grown successfully, though fruit growing is not a leading industry. On the new lands flax is raised

for the seed, which is used in the manufacture of linseed oil. The fiber to some extent is shipped to manufacturers.

Manufacturers. There is an abundance of water power, and the presence of extensive forests and excellent shipping facilities have combined to develop manufacturing more rapidly than in other states as far west. Minneapolis and Saint Paul are the leading manufacturing centers. The most important line is the manufacture of flour and grist mill products, in which Minneapolis leads the world. Next in importance are lumber products. There are large areas of forest land. The northern part of the state contains the largest forests of white pine found within the Union, and south of these are forests of hard wood, while in various localities are found Norway pine and spruce. The greatest lumber centers are Minneapolis, Cloquet, Stillwater, Brainerd and Little Falls, where logs are not only manufactured into lumber, but are made into furniture, finishing for interiors and other articles of wood. Slaughtering and meat packing, the manufacture of machine-shop products and the production of linseed oil are also important. In all, Minnesota has a total yearly output valued at nearly $410,000,000.

Transportation and Commerce. The state has the advantage of two important water routes, the Mississippi River and the Great Lakes. The development of railways has rendered the Mississippi of less importance than formerly, but the importance of the lake route grows with the development of the country. Duluth, at the head of Lake Superior, has now become one of the most important shipping points of the country. The Northern Pacific, the Great Northern and the Minneapolis, Saint Paul & Sault Ste. Marie railways have lines extending across the southern part of the state and also a line from across the northern and central parts of the state and lines from Saint Paul and Minneapolis connecting therewith. The Chicago, Milwaukee & Saint Paul road has a line extending across the southern section and also a line from Minneapolis and Saint Paul across the south-central part, while the North Western system maintains a line between the two last mentioned. The Minneapolis & Saint Louis Railway maintains a line from the Twin Cities southwesterly to Omaha and another line westerly across the state and to the Missouri River. These, with the numerous cross lines, now give ample railway facilities, with the exception of the far northern counties, which are still sparsely settled. Saint Paul and Minneapolis jointly form the great railway center, not only of Minnesota, but of the northern part of the Mississippi Valley. The total mileage is about 9,000.

The commerce of the state consists of the exportation of its surplus products and the importation of such articles as are not raised or manufactured within its borders. Minnesota is the leading state in the production of spring wheat, flour and iron ore, and these products are shipped in large quantities, the flour going to Europe as well as to American markets. Next in importance are lumber and lumber products, which are generally distributed over the surrounding states. Considerable lumber is also transported down the Great Lakes from Duluth and other ports on Lake Superior, and thus finds its way to eastern markets. Linseed oil and mineral water are also important articles of export. The single item of importation of greatest value is coal, most of which is brought to Duluth by boat, whence it is distributed by the various lines of railway terminating at that port. Manufactured articles constitute most of the other imports. Saint Paul and Minneapolis constitute an important distributing point for the states to the West, and have a large wholesale trade. These conditions give Minnesota an extensive commerce.

Government. The legislature consists of a senate of sixty-three members, elected for four years, and a house of representatives of 119 members, elected for two years. The sessions are biennial, and are restricted to ninety days. The executive department of the government consists of a governor, a lieutenant-governor, a secretary of state, a treasurer and an attorney-general, elected for two years, and an auditor, elected for four years. The judiciary department consists of a supreme court of five judges, elected by the voters of the state, and two commissioners appointed by the court; and of district courts. Each county maintains a probate court, and townships have justices of the peace.

Education. The system of public schools is based upon the district plan, but is unified thoroughly. Education is compulsory up to the age of eighteen, and the illiteracy rate is only three per cent. At the head of the

Items of Interest on Minnesota

The greatest length of the state is 408 miles, the greatest width, 380 miles.

The rich soils of the Red River Valley were formed by the deposits of lake muds in a very large lake which existed at the close of the Glacial Period.

April is the month of ploughing and sowing for the Minnesota farmers, though the sowing of crops extends into May in the northern part of the state; under ordinary weather conditions the harvest begins about the end of August and continues through September.

When Minnesota was first settled the forested area was about 54,000 square miles and the prairie about 32,000 square miles.

The value of the farm lands of the state increased from $414,000,000 in 1890 to $788,000,000 in 1900, and to $1,019,000,000 in 1910.

Minnesota ranks eleventh as an agricultural state with an annual crop worth nearly $200,000,000, of which about one-third is wheat.

From 1900 to 1910 the value of the live stock rose from $86,000,000 to $140,000,000, the greatest increase being in the value of horses and mules.

The state has more than five thousand district schools, over two hundred high schools, five normal schools and the state university, one of the largest in the country.

Minneapolis, the largest city, is the greatest manufacturing center in the world for flour and lumber; the two largest flour mills in the world, making 12,000 and 10,000 barrels daily, are situated here, and about twenty other flour mills are operated by power furnished by the Falls of Saint Anthony.

Saint Paul, the smaller of the Twin Cities, and the capital of the state, with Minneapolis forms one of the greatest railroad centers in the Northwest. Its meat industry includes the largest plant in the Northwest; the manufactures of boots and shoes, saddles and harness, and furs are next in importance. More law books are printed in this city than in any other city in North America.

Duluth, at the head of Lake Superior, ranks second only to New York among the ports of the United States in the volume of its tonnage; it is the great shipping center for iron ore. The United States Steel Corporation has erected here a ten million dollar plant.

Hibbing produces more iron ore than any other mining camp in the world.

Eveleth, in the Mesaba Range, was moved one mile and reëstablished in complete order so that valuable bodies of iron ore, discovered within the original city limits, might be mined.

Questions on Minnesota

How does Minnesota compare in area and population with Massachusetts? New York? California?

How many lakes are there in Minnesota?

What three important river systems drain the state?

What is the physical character of the northern part of the state? Of the southern?

What is the leading industry of Minnesota?

What is the most important crop? How does Minnesota rank as a producer of this crop?

What are the principal rocks quarried in the state?

What is the leading mineral products and how does Minnesota rank as its producer?

What is the principal manufacturing industry?

Name some other important manufactures.

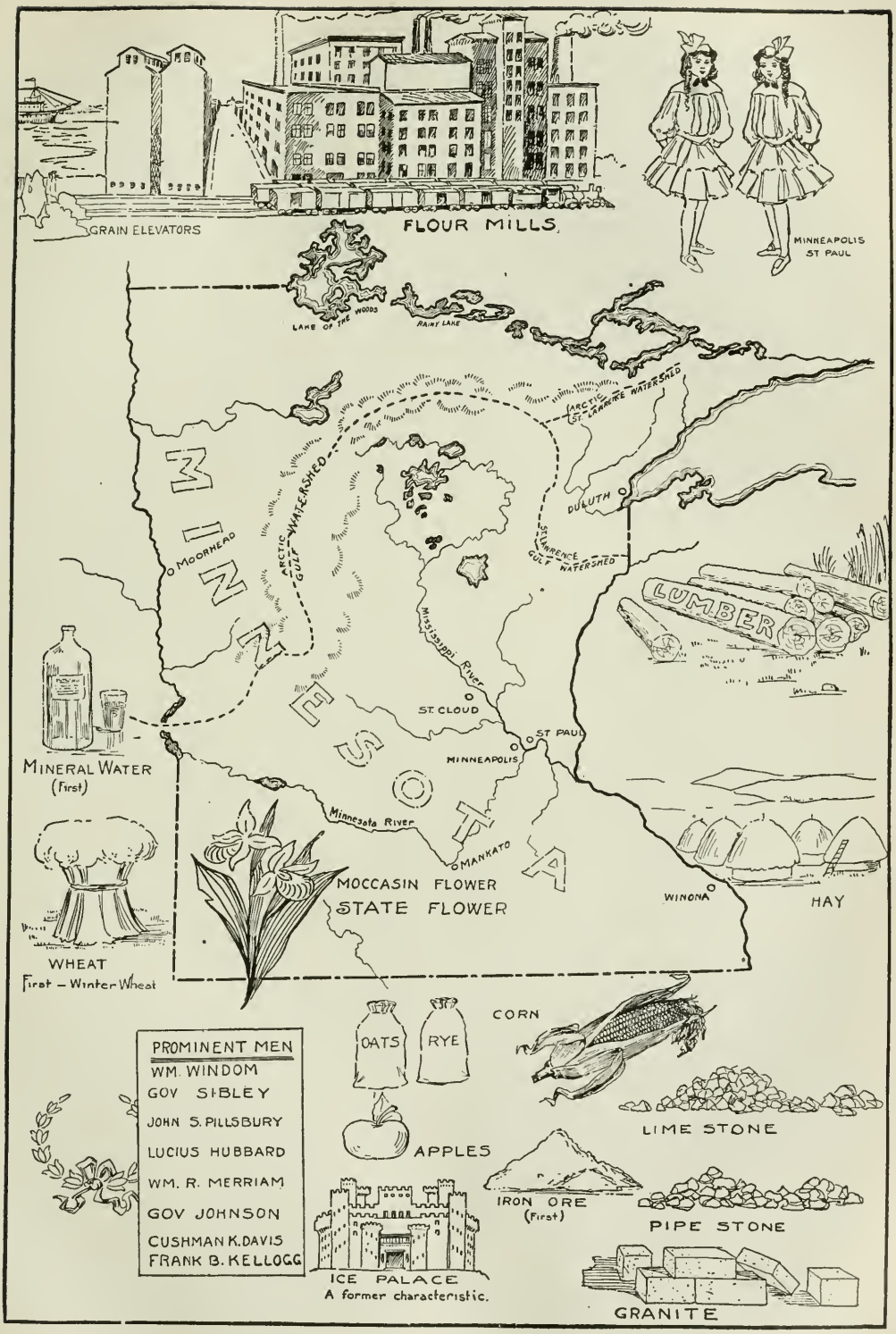
What are the Twin Cities? For what are they famous?

What is the probable future of Duluth as a commercial center?

What are Minnesota's popular names?

To what did Longfellow refer when he spoke of the "mountains of the prairie"?

What is the leading forest tree in the state?


GRAIN ELEVATORS
FLOUR MILLS
MINNEAPOLIS
ST PAUL
LAKE OF THE WOODS
RAINY LAKE
ARCTIC-ST. LAWRENCE WATERSHED
ARCTIC-GULF WATERSHED
MINNESOTA
DULUTH
MOORHEAD
ST. LAWRENCE-GULF WATERSHED
LUMBER
Mississippi River
ST. CLOUD
ST. PAUL
MINNEAPOLIS
MINERAL WATER
(First)
Minnesota River
MANKATO
WINONA
HAY
MOCCASIN FLOWER
STATE FLOWER
WHEAT
First — Winter Wheat
PROMINENT MEN
WM. WINDOM
GOV SIBLEY
JOHN S. PILLSBURY
LUCIUS HUBBARD
WM. R. MERRIAM
GOV JOHNSON
CUSHMAN K. DAVIS
FRANK B. KELLOGG
OATS
RYE
CORN
APPLES
LIME STONE
IRON ORE
(First)
PIPE STONE
ICE PALACE
A former characteristic.
GRANITE

system is the University of Minnesota, at Minneapolis, which has organic connection with all of the high schools and through a system of examinations provides for the admission of graduates of these schools to the university. There is also an organic connection between the high schools and the graded schools and the ungraded schools of rural communities. The state superintendent of public instruction is at the head of the educational system; the schools of each county are under the supervision of a county superintendent. The school fund derived from the sale of school lands is very large, and is constantly growing. In addition to the aid received from this fund, each high school maintaining a course of study which prepares for admission to the university receives from the state an annual appropriation of $1,000. Graded schools and country schools under certain conditions also receive direct state aid.

In connection with the school system is a system of public libraries, which provides libraries for all school districts that are willing to assume a portion of the expense. A thorough system of traveling libraries is also maintained. There are state normal schools at Winona, Mankato, Saint Cloud, Moorhead and Duluth. Other important institutions of learning, maintained by various denominations, are Carlton College at Northfield, Hamlin University at Hamlin, Macalester College at Saint Paul, Gustavus Adolphus College at Saint Peter, and the Shattuck School at Faribault. There are also a number of large parochial schools and colleges in the state, under the management of the Roman Catholic Church.

Institutions. Hospitals for the insane are at Rochester, Saint Peter, Fergus Falls, Anoka and Hastings; schools for the deaf, the blind and the feeble-minded are at Faribault, and the state public school for dependent children is at Owatonna. At Walker there is a tuberculosis sanatorium. The penal institutions include the penitentiary at Stillwater, the reformatory at Saint Cloud, a training school for boys at Red Wing and one for girls at Sauk Center. Alcoholics and drug victims are treated at a state farm near Willmar.

History. The territory of Minnesota was first visited in 1678 by a Frenchman, Duluth, who built a fort at the site of the city which now bears his name. Hennepin discovered the Falls of Saint Anthony two years later, and within two decades settlement had begun in earnest. The region was ceded to Great Britain in 1763, was ceded to Spain in 1783, was retroceded to France in 1800 and was obtained by the United States through the Louisiana Purchase in 1803. The first permanent American settlement was a military post, Fort Snelling, established in 1819, but immigration and occupation practically began only after the treaty with the Dakotas in 1837, by which all of the Indian lands east of the Mississippi were ceded. In 1849 Minnesota became a territory, and it was admitted into the Union May 11, 1858, as the thirty-second state. Development was retarded by Sioux depredations, which culminated in a great massacre in 1862. When these conditions passed and a system of railways opened up the state, rapid growth was possible. The most important issue after the Civil War was the question of redeeming or repudiating bonds which had been issued to promote railway construction. A compromise was reached in 1881. The state has been almost steadily Republican in politics. Much progressive legislation has been enacted in recent years, including child-labor and minimum-wage laws, a mothers' pension act and an anti-cigarette law. In 1919 the state adopted woman suffrage.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Duluth
Faribault
Hibbing
Lake of the Woods
Mankato
Minneapolis
Minnesota River
Mississippi River
Rainy Lake
Red River of the North
Red Wing
Rochester
Saint Cloud
Saint Paul
Stillwater
Virginia
Winona

HISTORY

Hennepin, Louis
Hiawatha
Louisiana Purchase

MINNESOTA, UNIVERSITY OF, a state university, located at Minneapolis. It was established by an act of the territorial legislature in 1851, and was opened for instruction in 1869. The present organization embraces a college of science, literature and arts; a college of engineering and architecture; a department of agriculture, including forestry and home economics; a college of medicine and surgery, including a training school for nurses; schools of mining and analytical and applied chemistry; colleges of law, dentistry, pharmacy and education; an extension department and a graduate school.

The management of the university is vested in a board of trustees, of which the governor, the superintendent of public instruction and the president of the university are members *ex officio*. There are about 600 professors and instructors on the faculty, and the enrollment exceeds 8,000. The university libraries have about 245,000 volumes. The institution is coeducational, and over one-third of its students are women. The university is at the head of the public school system and maintains a thorough supervision over the high schools of the state by a system of inspection and examinations.

In 1915 the Mayo brothers, surgeons of Rochester, Minn., presented the university with an endowment fund of $2,000,000 and their surgical laboratory, to further the research work of the medical department of the graduate school.

MINNESOTA RIVER, a river in the United States which rises in Big Stone Lake, flows through Minnesota and falls into the Mississippi about seven miles above Saint Paul. Its length is about 475 miles, and it is navigable for large steamboats for about fifty miles.

MIN'NOW, a popular name for any small fish. The roach, the golden shiner, the dace and a small carp are some of the fishes generally called minnows. They are the natural food of many larger fish and are generally used as bait for them.

MI'NOR, or **INFANT,** a term in law applied to persons who have not attained their majority, that is, the age of twenty-one years for a male and, in many states, eighteen years for a female, and are under guardianship. Being a minor is no bar to criminal proceedings; but young persons are not punished for offenses if they have not knowledge and discretion to distinguish them to be such. Minors require the consent of parents or guardians to marry. The jurisdiction in respect to them in matters of law is generally vested in probate courts. These courts appoint guardians to take charge of the property of minors, and, in case of the decease of both parents, to take charge of their persons; but during the life of the father he has the guardianship and control of the persons of his children until they are twenty-one years of age. In most states this power rests with the mother in case of the death of the father.

MINOR'CA, an island in the Mediterranean Sea, the second largest of the Belearic group (see BALEARIC ISLES), which belong to Spain. Its area is 293 square miles. The coast is irregular and for the most part steep, but there are a number of good harbors. The soil is not generally fertile, though considerable quantities of wheat, oil, wine, hemp, flax, oranges and lemons are produced. Iron, copper, lead and marble are plentiful. Port Mahon is the capital. Population, 1910, estimated, 42,000.

MINOR PROPHETS, THE, so called from the brevity of their writings, are twelve in number, namely, Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah and Malachi. Their prophecies are found in the Hebrew canon.

MI'NOS, in Greek legend, a king of Crete, the son of Zeus and Europa. According to one version of the legend he was a wise ruler who, after his death, was made a judge in the lower world. Other versions give less favorable accounts of his character and tell of his demanding from Athens young men and girls to be fed to the frightful Minotaur. See MINOTAUR.

MIN'OTAUR, in Greek mythology, a monster with the body of a man and the head of a bull, which fed on human flesh. Minos, king of Crete, kept this monster shut up in a vast labyrinth and fed him on youths and maidens who were sent each year from Athens as a tribute. Theseus killed the minotaur and freed Athens from the terrible curse. See LABYRINTH.

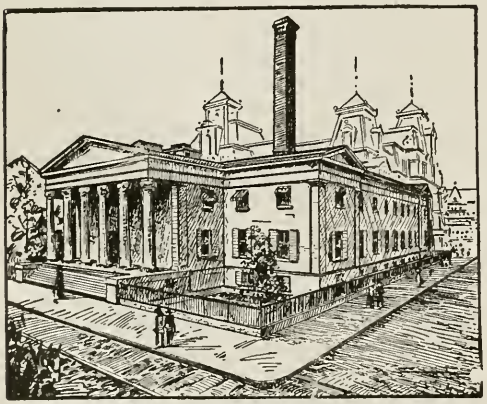
MINSK, RUSSIA, a capital of the province of the same name, on the Svisloteh River, 430 miles southwest of Petrograd. It is the seat of a Greek archbishop and of a Roman Catholic bishop, and contains two castles. It has some manufactures, among which are leather, tobacco and agricultural implements, and it enjoys a considerable general trade. During the World War it was severely damaged by the invading Germans. Population, 1913, 117,600.

MIN'STREL, the name applied to a class of poet musicians who flourished at different times in the Middle Ages and afterward. The first minstrels were men who wandered from place to place exhibiting their talent in poetry and music by composing and reciting verses commemorating heroes and heroic

deeds. These verses were often set to simple music and sung to the accompaniment of the harp. The name is now given to a class of players who disguise themselves as negroes and combine music, comedy, juggling and pantomine and other simple forms of entertainment.

MINT, a building and equipment used for making metallic coins to circulate as money. It is not a modern development, for in Anglo-Saxon days there was a mint authorized by King Canute. This was the beginning of English coinage. It was not uncommon in early days for private individuals to make and circulate coins, but with the extension of trade it became necessary to confine such operations within government control.

United States Mints. Before the Revolutionary War several of the colonies operated small mints, and some of the coinage of the period became famous. In 1792 a national coinage act brought all coinage under government control, conforming to a requirement of the new Constitution which placed upon Congress the duty of coining money and fixing the value thereof. The mint was established in Philadelphia, in 1792. In the same year copper money was coined; silver was coined two years later, and gold coins were



UNITED STATES MINT AT PHILADELPHIA

made in 1795. The development of the country necessitated the establishment of other mints, and two of these are yet so classed—those at Denver and San Francisco. At various times coins have been made at New Orleans, but since 1909 the establishment there has been only an assay office. The mints and assay offices are under the control of a director of the mint, who is appointed to the Treasury Department by the President of the United States. The assay offices are listed in the article ASSAYING.

In Other Countries. The history of uninterrupted British coinage dates from the period of William the Conqueror, who subdued England in 1066. The present mint in London was built soon after 1810, and it supplies coins for all members of the British Empire except Canada, Australia and the Pacific islands. The mints at Perth, Melbourne and Sydney supply Britain's outposts in their part of the world, the Canadian government has been given a branch mint at Ottawa.

Most of the coinage of South America is contracted for in Europe—much of it in Paris—though there are mints in Buenos Aires, Santiago and Lima. There is not a mint on the African continent; there is one in Japan, one in China, one in Mexico and one in Hondurus.

Related Articles. Consult the following titles for additional information:

Assaying	Money
Bullion	Pine-Tree Shilling
Coinage	Seignoirage

MINT, the common name of a large and important family of plants, described under the title LABIATAE.

MINTO, GILBERT JOHN MURRAY KYNYNMOND ELLIOT, Fourth Earl of, (1845-1914), a British soldier and statesman, educated at Eton and at Trinity College, Cambridge. He served with the Turks in 1877 in their war against Russia, and with Lord Roberts in the second Afghan War (1878-79). Later he was military secretary to Lord Lansdowne during his governor-generalship of Canada and was also chief of staff to General Middleton in the Riel rebellion. From 1898 to 1904 he was Governor-General of Canada and from 1905 to 1910 was Viceroy of India. (For portrait, see article GOVERNOR-GENERAL.)

MINUET', an old-fashioned dance of French origin, characterized by slow, stately movements, graceful salutations and refined curtsies. Though founded on an old country dance, it became one of the most popular court dances during the reign of Louis XIV, and was in high favor in court circles in England for several reigns following the Restoration. In America the minuet was a favorite society dance in the colonial period, but is rarely seen now except upon the stage or at entertainments and costume balls.

Several famous musicians have composed minuet dance music, including Mozart, Bach, Handel and Paderewski.

MIN'UIT, or **MINNEWIT**, PETER (1580–1641), a governor of the New Netherlands under the Dutch West India Company (1625-1631). He purchased Manhattan Island and built Fort Amsterdam on the present site of New York City. He later laid the foundations of Fort Christopher (Wilmington) in Delaware, under the auspices of the South Company of Sweden.

MINUTE, *min'it*, a division of time and of angular measure. As a division of time it is the sixtieth part of an hour. As a division of angular measure it is the sixtieth part of a degree. See LONGITUDE AND TIME.

MINUTEMEN, *min'it men*, a term referring to New England Revolutionary patriots in American history who pledged themselves to be instantly ready to respond to a call to arms. The first enrollment of these men was in Massachusetts, following authorization by the provincial assembly in November, 1774.

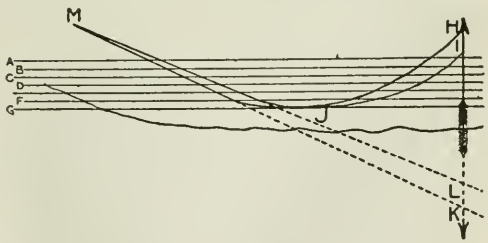
MIOCENE, *mī'o seen*, **PERIOD**, a division of geologic time, occurring between the Eocene and Pliocene periods in the Cenozoic Era (see GEOLOGY). The rocks formed in this period are found around the Gulf of Mexico and northward along the Atlantic coast to Martha's Vineyard. They include sandstone, shell marl, Bermuda earth and other polishing earths. Shales and sandstone of this period occur in California. The order of mammals to which man belongs first appeared in the Miocene Period.

MIRABEAU, *me ra bo'*, GABRIEL HONORÉ RIQUETI, Count de (1749–1791), a French statesman and revolutionary leader. On the assembling of the States-General in 1789, Mirabeau, elected for Aix, soon became prominent. When the king required the third estate to vote apart from the other two orders, it was Mirabeau who counseled resistance, demanded the withdrawal of the troops, consolidated the National Assembly and defied the king's orders. As a practical statesman, Mirabeau desired action, and for this reason he attempted to form alliances with Lafayette, the Duke of Orleans, Necker and, finally, with the queen. In 1790 he became president of the Jacobin Club, and a year later was elected president of the National Assembly. Because of his fearlessness in championing popular rights he was often called "the tribune of the people."

MIRACLE, *mir'a k'l*, a term used in theology to denote a suspension of, or deviation from, the known laws of nature, brought about by the direct interference of a Supreme Being. It is an occurrence which is strange, marvelous, inexplicable, and it is usually connected with some moral purpose. Examples of Bible miracles are the supplying of manna while the Israelites were in the Wilderness; the fall of the walls of Jericho; the raising of Lazarus, the feeding of the 5,000 and Christ's resurrection.

MIRACLE PLAY, a form of drama which was in vogue in Europe in the Middle Ages. The miracle plays were based on episodes in the lives of the saints, and were originally performed in the churches as a part of the religious service. Later they were given by tradesmen's guilds in the market places and elsewhere. In England they were in greatest favor in the thirteenth century. There have been modern revivals of this form of religious play and of a similar form, the mystery (which see).

MIRAGE, *me rahzk'*, a phenomenon which may be described as the appearance of an object in the sky, when in reality, of course, it could not possibly be there. It is due to the reflection of rays of light by a layer of atmosphere of different density from that in which the object is situated (see LIGHT, subhead *Reflection of Light*). A mirage is an optical illusion, and is usually seen on deserts, where the intense heat of the land causes the layers of atmosphere near the ground to be much rarer than those above. In the figure, the rays *ABCDEFG*, striking the object *H*, are refracted downward, and they are not reflected back until they strike the surface of the layer *J*. This



acts like a mirror and reflects the rays to *I*. The observer at *M* sees the object at *L* and *K*; consequently, it appears inverted, as though it were reflected in a pool or lake. This illusion is very deceptive and often leads travelers to think that they are near

bodies of water when no water is present. Sometimes objects are seen inverted in the sky without any apparent cause. This is because some intervening object occurs between the observer and the object which produces the image. The most perfect mirage is produced when the sun is near the horizon, just at sunrise or sunset, since at those times the sun's rays are nearly horizontal and the refraction and reflection are nearly perfect. It is because of this that people living in valleys can often see the summits of mountains at morning or evening which are invisible during the remainder of the day.

MIRAMICHI, *mir a me she',* a river of New Brunswick. It rises in two branches, flows in a general easterly direction and empties into Miramichi Bay. It is 135 miles from the headwaters of the largest tributary to the mouth of the main stream. The Miramichi is abundantly stocked with salmon, and its basin contains extensive forests in which wild game are found. The section is a sportsman's paradise.

MIR'ROR, a smooth surface capable of reflecting regularly a great proportion of the rays of light that fall upon it. In the ordinary sense, a mirror is a pane of glass coated on the back with an amalgam of mercury and tin. The mirrors used by the ancients were made of thin polished bronze, either set in a case or fitted with a handle. At a later period they used mirrors made of obsidian, a stone closely resembling black glass and capable of taking a high polish.

A *plane* mirror is one having a flat surface. Plane mirrors are those in common use in homes and public buildings. The image seen in a plane mirror is of the same size as the object and appears as far behind the mirror as the object is in front of it, but with the sides reversed. The right hand of your image when seen in a mirror is where your left hand would be were you facing in the same direction. The image seen by one observer is not that seen by another. In Fig. 1 let *MN* represent the mirror and *E* and *F* represent two observers. *AB* is the object and *A'B'* the image. The observer at *E* can see the image in the direction of the rays *EA'* and *EB'*, while the observer at *F* would see the image in the direction *FA'* and *FB'*.

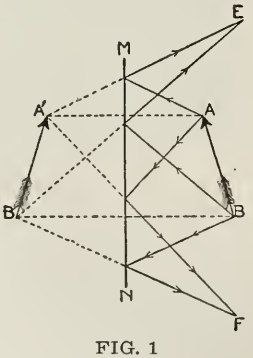


FIG. 1

A *concave* mirror, like a lamp reflector, is a section of the inside of a hollow sphere. When parallel rays of light strike a concave mirror, they are reflected to a common point, called the *focus*. The focus is in front of the mirror and directly opposite its center. Concave mirrors show two kinds of images. When the object is farther away from the mirror than the point which would form the center of the sphere of which the mirror is a part, the image formed is inverted and smaller than the object. It appears on a screen in front of the mirror, as shown in Fig. 2. The rays of light from the object, *AB*, are reflected to *a* and *b*, while the rays *Ab* and *Ba*, which strike the mirror perpendicularly, are reflected back upon themselves. The rays *Aa* and *Bb* are reflected respectively at *aA'* and *bB'*. These reflected rays cross each other at *F*. The rays *Ab* and *Ba* cross at *C*. If the screen is placed at the point where these two sets of rays meet, it receives the image *A'B'*. If the screen is moved either toward the mirror or away from it, some of the reflected rays are lost and the image becomes indistinct. When the object is nearer the mirror than the center of the sphere of which the mirror forms a part, the image appears back of the mirror and is erect and magnified. This effect can easily be produced by using a common lamp reflector and holding the finger or some other object in front of it.

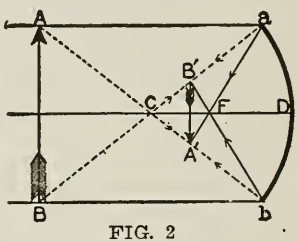


FIG. 2

A *convex* mirror is formed from the section of the outside of a sphere. The image formed by such a mirror is always seen back of the mirror and is erect and smaller than the object. Most hand mirrors are slightly convex. We notice that the image in such a mirror is distinct and considerably smaller than the object. A convex mirror transforms the image of a thin and tall person into one appearing short and very short. See LIGHT, subhead *Reflection of Light.*

MISDEMEANOR, *mis de meen'or*, an infraction of the law less serious in its nature than felony. Misdemeanors are punished by inflicting fines or short jail sentences. See CRIME; FELONY.

MISFEASANCE, *mis fe'zants*. See MALFEASANCE.

MISHAWAKA, *mish a waw'ka*, IND., in Saint Joseph County, four miles east of South Bend, on the Saint Joseph River, and on the Grand Trunk and the Lake Shore & Michigan Southern railroads. The various manufactures include windmills, machinery, agricultural implements, furniture, organs, and woolen and rubber footwear. It is one of the oldest towns in the state, having been settled in 1828. It was known as "Saint Joseph Iron Works" until the present name was given ten years later. There is a Carnegie Library, a Federal building, completed in 1915, and a hospital. Population, 1910, 11,886; in 1917, 17,083 (Federal estimate).

MIS'SAL, the book of the Roman Catholic Church containing the complete service for mass throughout the year. Pope Pius V in 1520 revised the missal and its use was required in all churches which could not show that their own service-book had been in uninterrupted use for 200 years. Clement VIII in 1604 and Urban in 1634 revised the missal, the latter revision being still in use. Slight modifications were made in 1884 and 1898 by Leo XIII.

MISSIONARY, RIDGE, *mish'un a ry*, BATTLE OF. See CHATTANOOGA, BATTLES OF; CIVIL WAR IN AMERICAN.

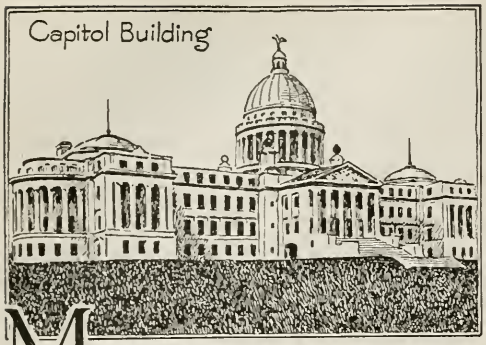
MISSIONS AND MISSIONARIES. Missionaries devote their lives to the enlightenment and conversion of peoples, in the interest or under the auspices of some religion or religious organization. The first great Christian missionary was Saint John the Baptist, who preached the coming of Christ. Jesus commissioned his apostles to preach the gospel to all nations. They and their successors obeyed implicitly, and the result was the marvelous spread of the great religion, which soon had found its way over all parts of Europe.

A new impulse was given to missions by the discovery of the New World. Almost every merchant ship that sailed for the West Indies, Mexico, Peru and Brazil was accompanied by zealous missionaries, eager to spread the Christian religion in the new lands. The powerful order of Jesuits turned their attention to the East, and the celebrated Francisco Xavier, a member of the order, met with remarkable success in India. Thence Christianity was introduced into Japan, from which, however, it was forced to retire, because of the terrible persecutions waged against its missionaries. Father Ricci, another Jesuit, succeeded by the end of the sixteenth century in establishing a foothold in Peking. Roman Catholic missions since the early part of the seventeenth century have been thoroughly organized and have spent enormous sums of money in carrying their religion into all parts of the world. The Catholics of the United States have, since 1884, helped materially in supporting the missions for Indians and negroes, besides contributing generously to the foreign fund. The most active missionary body is the Society of Jesus, or the Jesuits. It is estimated that there are now more than 60,000 Catholic workers, and that there is scarcely any part of the world not visited by them with considerable regularity.

Protestant Missions. The earliest Protestant foreign mission appears to have been one which was established by the French in Brazil in 1555. Shortly after the settlement of New England in 1620, John Eliot took a deep interest in the North American Indians, and in 1646 he began a regular mission among them. It was not, however, until the eighteenth century that the true missionary spirit became general. The English took the lead and were speedily followed by the Danes and, especially, the Moravian Germans. The missionary idea spread among the various Protestant denominations, and all of them now have societies which contribute workers and money annually. The total number of societies engaged in these missionary enterprises is over 550, and they are represented in the field by about 18,000 missionaries and nearly 100,000 native helpers. In modern times the missionaries have not confined themselves solely to the teaching of their religion, but have paved the way for it by the establishment of schools, the medical treatment of the sick and suffering natives and by teaching right methods of living to all whom they could interest.

Related Articles. Consult the following titles for additional information:

Augustine, Saint
Eliot, John
Grenfell, Wilfred T.
Hennepin, Louis
Jesuits
Livingstone, David
Marquette, Jacques
Patrick, Saint
Paul, Saint
Xavier, Francisco



MISSISSIPPI, *mis i sip'i,* once popularly called THE BAYOU STATE, now known as the MAGNOLIA STATE, is thirty-first in size among the states of the American Union, and the twenty-first in number of people. Its area is 46,865 square miles, and its population in 1910 was 1,797,114. This increased to 2,001,466 in 1918, according to a Federal estimate. It is the only state in which there are more negroes than white people. In 1910 the negroes numbered 1,009,487.

Surface and Drainage. The highest land is in the northern part of the state, where the greatest altitude is 602 feet. A low watershed, extending north and south, divides the state into two river basins—the eastern, which is drained into the Gulf of Mexico, and the western, drained into the Mississippi. This ridge is of rolling land broken into valleys, through which streams flow. To the west of it the land slopes into the bottom lands of the Yazoo and the Mississippi. These lands are low and level. To the east of the ridge the surface consists of rolling prairie. Over 7,000 square miles of the surface consist of bottom lands which are so low that most of them have been reclaimed by the construction of levees. These levees, built by Federal and state aid, are now so well constructed that no disastrous floods have been experienced in years. These bottom lands exceed 7,500 square miles in extent, or about one-sixth of the area of the state. The Yazoo bottoms occupy a greater part of this area. Bluffs, varying in height from 100 to 300 feet, rise on the east of these lands. See LEVEE.

The principal streams watering the eastern part of the state are the Tombigbee, the Pearl and the Pascagoula, all flowing into the Gulf. The chief tributaries of the Mississippi are the Yazoo, the Big Black, the Tallahatchie, the Sunflower and the Homochitto. There are no lakes except those directly connected with the rivers. Drainage districts are rapidly being developed to reclaim the rich lands along the creek bottoms tributary to these streams.

Climate. Mississippi has a semi-tropical climate. The summers are long, but the intense heat which would otherwise prevail is tempered by breezes from the Gulf, and the thermometer seldom reaches 100°, while the mean for the summer is about 81°. The winters are short and mild, the mean temperature being about 45°. The Gulf coast is of exceeding beauty and is popular both as a winter and as a summer resort. The northern part of the state is much cooler in winter than the southern. In the north, ice usually forms and snow is not uncommon. The average rainfall is about fifty inches for the entire state, but it is much greater in the southern than in the northern part. The heaviest rains occur in late winter or early spring, and are caused by the meeting of the warm winds from the Gulf and the cold winds from the north. The rainfall is well distributed throughout the year.

Mineral Resources. The mineral resources are not abundant. Coal and limestone suitable for making hydraulic cement occur in the northeastern counties, gypsum is found in the central part, and clays and phosphate rock are quite generally distributed, though they are used only for local purposes. There is some lignite, and some prospecting for oil is being done. The state contains a large number of mineral springs, some of which have become somewhat famous as resorts.

Agriculture. Agriculture is the leading industry. The soil is highly fertile, and the climate is remarkably well suited to the production of all crops adapted to a semi-tropical and warm temperate climate. The bottom lands are especially fertile, suitable for the raising of sugar cane in the southern part and cotton, corn and hay in other regions. Cotton is the chief crop in point of value, and occupies fully one-half of the acreage planted (see COTTON). Among the cereals, corn and oats are the most important, the corn crop nearly equalling that of cotton in value. The alfalfa belt in the north east is the equal of any in the United States, and the hay industry is growing rapidly. Wheat, potatoes, hay and peas are also raised in large quantities, and in the southern part

of the state attention is given to the raising of oranges, figs and other fruits which grow in a semi-tropical climate. In fig production it is next to California. In pecans it is second only to Texas, and it is fourth in sweet potatoes. Rice is produced on the bottom lands, though it is not an important crop. Cattle and hogs are taking a leading place, because of the short winters and abundant grazing.

Manufactures. Mississippi is not primarily a manufacturing state, yet since 1890 the manufacturing industries have developed rapidly. The most important of these is the manufacture of lumber and timber products. Over 32,000 square miles of the state are covered with forest. In the southern section the yellow pine prevails, while in the central and northern forest areas are found a large number of species of hard wood, such as oak, hickory, locust and walnut, all of which are valuable for timber. The second industry in importance is the manufacture of cottonseed oil and cake. This is followed by cotton ginning; then in their order come the production of turpentine and resin, the manufacture of cotton goods and the manufacture of cars and other railway appliances.

Transportation and Commerce. The state contains 4,470 miles of railway (1918). Important trunk lines extend north and south through the eastern, central and western portions of the state. There are also lines crossing the northern, southern and central parts from east to west. All these are connected by cross lines, so the principal towns have railway communication. There are also about 150 miles of electric railway. The Mississippi constitutes a valuable waterway for all of the counties on the western border.

Education. Separate schools are maintained for white and colored pupils, and in all of the larger towns these continue for nine months in the year. In the rural districts the terms are shorter. There is an optional county compulsory school law. The administration of the schools is in the hands of a state board of education, composed of the secretary of state, the attorney-general and the superintendent of education. The county superintendents are elected by popular vote at the general elections. The state is well provided with higher educational institutions. The State University (co-educational) is located at Oxford, and offers courses in arts, law, medicine, education and engineering. The Agricultural and Mechanical College, at Starkville, offers courses in agriculture, science, civil, electrical and mechanical engineering, education, and commerce. This college is in session the year round. The Industrial Institute and College, at Columbus, was the first collegiate institution in the United States to be established by a state government exclusively for women. It maintains a standard college course of high merit, and in addition gives the students valuable training in home-making, and the industrial arts. These three institutions have a combined enrollment in college classes of over 2,700 students. There is a State Normal College at Hattiesburg which trains teachers for work in the rural schools. Besides these there are a number of privately-endowed colleges—Mississippi College (Baptist) is at Clinton; Millsaps College, (Methodist) is at Jackson. For women exclusively there are Whitworth College (Methodist) at Brookhaven; Hillman College (Baptist) at Clinton; Blue Mountain College (Baptist) at Blue Mountain; Woman's College (Baptist) at Hattiesburg; Grenada College (Methodist) at Grenada; and All Saints' College (Protestant Episcopal) at Vicksburg.

Forty-nine counties now maintain Agricultural High School receiving Federal and state aid.

Negro education is receiving increasing attention. Alcorn Agricultural and Mechanical College, at Alcorn, maintained by the state and Federal governments, is doing excellent work along practical lines, as are Tougaloo University, at Tougaloo, and Rust University, at Holly Springs, which are supported by private funds, and are training the race more along the conservative lines of cultural learning. A number of other local institutions, inspired by the vision and ideals of Booker T. Washington, have sprung up over the state in the last few years, and are rapidly raising the racial standards.

Institutions. The state schools for the deaf and dumb and for the blind, are at Jackson. The state school for delinquent youths is at Columbia. The hospitals for the insane are at Meridian and Jackson. The state hospital for the tubercular is at Magee. Several general hospitals at various points receive state aid. There is a Home for Confederate soldiers and their wives at Beauvoir, the former estate of Jefferson Davis, on the Gulf coast near Biloxi.

Items of Interest on Mississippi

In addition to the mainland, Mississippi includes a number of islands, Ship, Horn, Cat, Petit Bois, and others, lying in the Mississippi Sound.

Most of the state lies in the Gulf Coastal Plain.

A feature of the surface is a strip of land between the Mississippi and the mouth of the Yazoo River, known as the Yazoo Delta; it extends from north to south about 175 miles and covers an area of 7,000 square miles; with the exception of a few flat ridges running from north to south, it is so low that it requires an unbroken line of levees fifteen feet high to protect it from overflows.

The coast line is eighty-five miles long.

Most of the rivers flowing into the Gulf are obstructed by sand bars and are navigable only during high-water from January to April.

The most fertile soil in the state is the alluvium of the delta, deposited during the overflows of the Misissippi; the black loam of the prairies and the silt of the bluff or hilly belt are also exceedingly productive; throughout the southern portion sand is a common element, while in the north there is more lime.

The prevailing winds are from the southeast, but the rain-bearing winds are generally from the southwest.

The Mississippi fisheries have never been important; the census report shows an actual decrease. This is partly due to natural causes, but more probably to a decision of the Supreme Court of the United States, by which the jurisdiction of the fishing grounds around Pear Island was transferred from Mississippi to Louisiana.

Oysters represent more than one-half of the fisheries' products, and shrimp nearly one-sixth of the total value.

Sugar cane and sorghum cane are grown to some extent, but not nearly as extensively as in Louisiana.

Sweet potatoes, white potatoes and onions are minor crops.

Grapes, limes, blackberries and strawberries are native, and in parts of the state are cultivated; horehound, ginger and mistletoe are also found.

Peaches and other orchard fruits are increasing in importance.

The lack of coal, of a good harbor, and of an adequate supply of labor has discouraged most kinds of manufacturing.

The total value of the factory product is about $80,000,000 a year, of which more than three-fourths is represented by lumber and timber products, cotton goods, cottonseed oil and cake.

The improvements at Gulfport and Ship Island, which now has one of the best ports on the Gulf, have already had noticeable effects on commerce and industry.

Biloxi, one of the oldest towns in the state, is now one of its principal winter resorts.

That part of the Gulf of Mexico near the shore is called Mississippi Sound. It lies inside long, narrow and low islands a few miles off the shore.

Questions on Mississippi

How does the area of Mississippi compare with that of Alabama? Texas?

What part of the population is negro? Where are they most numerous?

In a general way describe the peculiarities of surface?

Which section has the best soil?

What is the length of the coast line?

Why is the Pontotoc ridge important?

Name five of the important rivers.

What portion of the total area is still timber land?

What are chief influences on the climate?

What is the principal product of the fisheries?

What is the principal crop? What can you say of the state as a cotton-producing region?

What conditions seem to have discouraged manufacturing?

What is the name of Jefferson Davis' old home? To what present excellent use is it put?

There is no state penitentiary. Prisoners are kept on state farms and worked under modern conditions by a state board.

Cities. There are nine cities in the state each having a population exceeding 8,000. The three largest are Jackson, Vicksburg and Meridian, in the order named.

Government. The legislature consists of a senate of forty-five members and a house of representatives of 138 members, the members of each being elected for four years. The regular sessions occur every two years, on the even-numbered years. The executive department consists of a governor, a lieutenant-governor, a secretary of state, an attorney-general, a treasurer and an auditor, each elected for four years. The first and the last two named cannot succeed themselves or one another. The state judiciary consists of a supreme court of six judges, appointed by the governor and senate for eight years, and circuit and chancery courts, over which judges are appointed for terms of four years. Applicants for registration for voting must be able to read the state constitution or show that he understands it when it is read to him.

History. The first European to pass through the region was the Spaniard De Soto, in 1541, but he left no settlements. La Salle took possession of the country in the name of France, in 1682. The first colony was established at Biloxi, in 1699, by d'Iberville. The territory did not prosper under French rule and was ceded to Great Britain in 1763. The colony flourished until 1781, when the southern part of it, known as West Florida, was subjugated by the Spanish. By the Treaty of 1783, the northern boundary of West Florida was placed at 31°, and a long dispute ensued until 1795, when Spain released its claim to territory north of that line. In 1798, the territory of Mississippi was organized; on December 10, 1817, it was admitted as a state. Jackson, the capital, was founded in 1821.

By treaties of 1830 and 1832 the lands of the Indians in the northern and central parts were ceded to the state and opened to settlement. In 1832 a new constitution was adopted. The state took radical ground against the anti-slavery cause, and adopted the ordinance of secession January 9, 1861. One month later Col. Jefferson Davis, who had

just resigned as Senator from Mississippi, was elected President of the Confederacy. In or on the borders of Mississippi were fought the battles of Shiloh, Corinth, Port Gibson, Vicksburg and other smaller engagements, and much of its best territory was devastated. During the reconstruction period, the state suffered severely from the extravagance and corruption of the government imposed upon it. It was among the first to establish a provisional government by executive order, but it was not recognized as a state until after the ratification of a liberal constitution and the acceptance of the Fourteenth and Fifteenth Amendments, on February 17, 1870. A new constitution was adopted in 1890.

In 1914 the constitution was amended to permit a jury to reach a civil verdict on the vote of nine jurors. In the same year public hanging as penalty for murder was prohibited, and a law was passed making the desecration of the United States flag or the flag of the Confederacy or of the state a misdemeanor. The initiative and referendum are in effect.

Related Articles. Consult the following titles for additional information:

CITIES

Biloxi	Hattiesburg	Meridian
Columbus	Jackson	Natchez
Greenville	Laurel	Vicksburg

RIVERS

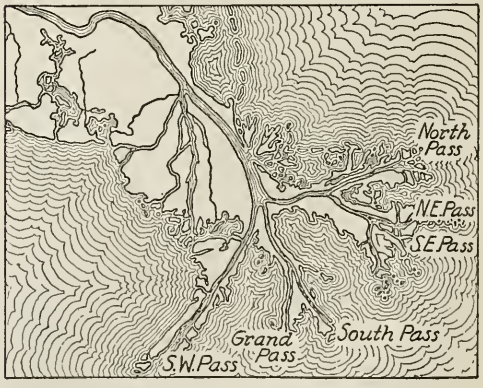
Mississippi	Tombigbee	Yazoo

MISSISSIPPI, UNIVERSITY OF, a coeducational state institution, situated a Oxford. The university was opened in 1848, but during the Civil War work was suspended. The university gives undergraduate courses in arts, science, pedagogy, philosophy, mining and civil and electrical engineering, maintains law, medical and summer schools, and confers graduate degrees in arts and philosophy. It is affiliated with the high schools of the state, and students from approved schools are admitted without examination. The students number over 600, and there are over 30 members in the faculty. The library contains 30,000 volumes.

MISSISSIPPI RIVER, the greatest river of North America and one of the largest and most important in the world. The name was derived from an Indian term meaning *father of waters.* It was discovered by a Spaniard, De Soto; was once controlled by the French by reason of a settlement, New Orleans, in its lower course; and from 1783 to 1803 it formed the western boundary of the United States. The stream flows almost across the country from north to south, is the natural entire eastern or western boundary line of six states and forms a considerable part of the boundaries of four other states. Its course runs over 400 miles east of the geographical center of the country.

Source and Course. Close to its source are many small glacial lakes. When Lake Itasca, in Northern Minnesota, was discovered in 1832 that body of water was declared to be the source of the Mississippi; this belief existed undisputed until 1910, when a geological survey of the entire region led to the decision that the source might as truly be Little Elk Lake, which empties into Itasca through Excelsior, or Elk, Creek, and Elk Lake.

After leaving Itasca Lake it flows southward through a number of lakes and over a series of rapids until it reaches the Falls of Saint Anthony, at Minneapolis. At Saint Paul is the head of navigation. Within the next 600 miles it receives the Wisconsin, the Iowa, the Illinois and the Missouri as tributaries. The Missouri is really the main stream, as its length, before the rivers unite, is much greater than that of the Mississippi before the junction. From Saint Louis, a little below their confluence, the Mississippi becomes a broad, rapid, muddy river, liable to overflow its banks. Lower down it receives in succession the Ohio, the Arkansas



DELTA OF THE MISSISSIPPI

and the Red rivers, and it finally enters the Gulf of Mexico through a large delta with several "passes," 110 miles below New Orleans.

The combined length of the Missouri and the Mississippi is about 4,200 miles; the

whole area drained is about 1,257,000 square miles. It is estimated that the volume of water discharged into the Gulf of Mexico is about 670,000 cubic feet per second. The Mississippi with its tributaries affords about 14,000 miles of navigable waterway. The volume of the river is usually smallest in October and greatest in April, and the low-lying lands are subject to damaging floods during the spring freshets. At many places attempts have been made to secure the river within its banks and to save the country from loss and suffering by building dikes, or *levees*. The sediment carried down, however, is continually raising the bed of the river, and thus breaks have been frequently made in these levees.

A Highway of Commerce. Before the advent of numerous railroads the great river was an important factor in the development of the middle west. "Life on the Mississippi" filled a romantic page in the country's history in the period of development before and after the Civil War, but later the stream declined in commercial importance. Only within recent years has the realization of this economic loss been brought prominently before the people. All waterways have taken on a new importance since on occasion railroads have been unable to meet all demands upon them, and especially is this true of the Mississippi. The greatest of all inland projects is one which contemplates making seaports of all cities on it banks south of the mouth of the Illinois River and also the city of Chicago, by what is known as the Lakes-to-the-Gulf Waterway, through the Chicago Drainage Canal and the Illinois River. Vast sums will be required to bring this plan to a reality, but powerful reasons for promoting the enterprise were advanced when in an emergency in 1917–1918 the country's railroads were unable to take care of the vast freight traffic that had to be moved quickly. This waterway was then much needed.

Power Dams. The current of the river is from one to two and a half feet per second at low water; to utilize this natural power dams have been built at various places. The greatest of these is at Keokuk (described in an article relating to that city); the most northerly is at Bemidji, thirty-two miles below Lake Itasca, and others are at Grand Rapids and Brainerd. Between Brainerd and Minneapolis, 150 miles, in which distance the river falls 444 feet, there are six power dams. The Keokuk dam is arranged so there is no obstruction to navigation.

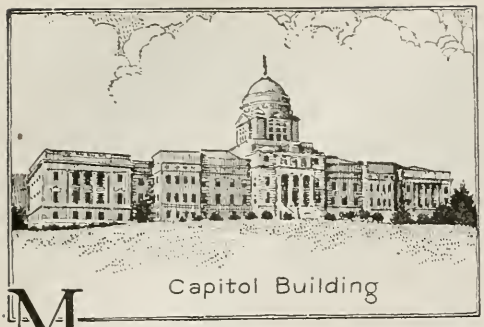
The Missouri-Mississippi System. Together the Missouri and the Mississippi rivers constitute the greatest river system in the world, with a length of about 4,200 miles —over 500 miles greater than that of the Nile and 900 miles longer than the Amazon.

Related Articles. Consult the following titles for additional information:

Delta	Jetty
Eads, James B.	Levee
Flood	Missouri River

MISSISSIPPI SCHEME, a financial scheme projected by John Law, a Scotsman, at Paris, in 1717. Part of the scheme was for the colonization and development of the Mississippi Valley, but combined with this there was a banking plan and a scheme for the management of the national debt, the whole being supported by the French government. Such were the hopes raised by this undertaking that the shares were sold at ten, twenty, thirty and even forty times their value. People came from all parts of France, and even from foreign countries, in order to invest in the company, and there was a general mania of speculation. The state took advantage of the popular frenzy to issue increased quantities of paper money, which was readily accepted by the public creditors of Law's company. The value of the paper money depreciated, and the shares fell in price. Law, the originator of the bankrupt company, fled from France, and the state acknowledged itself debtor to the shareholders.

MISSOULA, Mont., third in size among the cities of the state and the county seat of Missoula county, is 125 miles west of Helena, on the Hell Gate River and on the Northern Pacific and the Chicago, Milwaukee & Saint Paul railroads. The city has a beautiful location near snow-capped mountains, in a region which by irrigation has been made exceedingly productive of various fruits and grains. Lumbering and mining are also carried on, and there are railroad shops, planing mills, flour mills and other works. It is the seat of the state university and has the Sacred Heart Academy and a business college. There are two hospitals, a Carnegie Library and a Federal building. Missoula was settled in 1864 and was incorporated in 1887. Population, 1910, 12,869; in 1917, 19,075 (Federal estimate).



Capitol Building

MISSOURI, *mi soo'ri,* or *mi zoo'ri,* one of the states of the great Middle West, noted for its wealth of agricultural and mineral resources. Its popular name, THE BULLION STATE, is derived from the nickname of Senator Thomas Hart Benton, who was known as *Old Bullion* because of his interest in currency problems. Missouri lies in the heart of a rich agricultural district, with the Mississippi River a natural boundary on the east. Eight states adjoin it—Iowa on the north, Illinois, Kentucky and Tennessee on the east, Arkansas on the south, and Oklahoma, Kansas and Nebraska on the west. The state lies between the geographical center of the United States and its center of population.

Area and Population. With an area of 69,420 square miles, of which 693 square miles are water, Missouri is eighteenth in size among the states of the Union. It is between Oklahoma and Washington in area, exceeding the latter by only 300 square miles, and is about the size of all New England. In 1910 the population was 3,293,355; on July 1, 1918, it was 3,448,498, according to a Federal estimate. Only six states surpass it in number of inhabitants, but seventeen exceed it in density of population. The number of people to the square mile was 47.9 in 1910. Missouri has over 160,000 negroes, and among residents of foreign birth Germans predominate.

Surface and Drainage. The Missouri River divides the state into two unequal sections. That portion north of the Missouri is mostly rolling prairie, diversified by occasional hills and valleys and containing growths of timber along the streams. The portion south of the Missouri is naturally divided into three physical regions—the western plain, which is continuous with the plains of Kansas and is undulating; the Ozark Plateau, a region of elevated hilly or mountainous country, extending across the state from east to west and continuous with the Ozark Mountains in Arkansas and Oklahoma, and the lowlands in the southeastern part. This section contains much swampy land, and to make it available for farming a land reclamation act was passed in 1914, providing for its drainage. The Ozark Mountains are not very high, seldom exceeding 2,000 feet above sea level.

The principal rivers are the Mississippi, which borders the state on the east, and the Missouri, forming the upper part of the western boundary and then flowing across the state in a southeasterly direction to join the Mississippi a few miles north of Saint Louis. The chief tributaries of the Missouri from the north are the Platte, the Grand and the Chariton, while the Wyaconda and the Salt drain the northeastern portion directly into the Mississippi. South of the Missouri and flowing into it are the Osage, the Gasconade and the Lamine, while south of the Ozark Plateau and flowing into Arkansas are the White, the Black and the Current, which is a tributary of the Black. The Maramec rises in the heart of the Ozarks and flows easterly into the Mississippi. The Saint François drains the southeastern plain into the Mississippi and forms a portion of the western boundary.

Climate. Situated in the interior of the continent, midway between the northern and southern limits of the United States and too far from the oceans or the Great Lakes to be influenced by them, Missouri has a continental climate and suffers from extremes of heat and cold. The summers are hot, especially in the southeastern part of the state, where the thermometer often reaches 100°, or higher. The Ozark Plateau, however, has a fine climate. The northern portion has somewhat cooler summers and more severe winters. The average temperature for January ranges from 35° in the southeastern to 20° in the northern part; while the July temperature varies from 80° to 95°. The annual rainfall varies from about fifty inches in the southern counties to thirty-five inches in the north. This is irregularly distributed through the year, and in some sections droughts are frequent.

Mineral Resources. Missouri is one of the great mineral states, leading all the others in the production of zinc, lead, tripoli and

barytes. Lead is the most valuable mineral, and zinc is second. The production of these two minerals forms more than half the total mineral output of the state. The lead industry is centered in the southeastern part, particularly in Saint François and Madison counties, while the zinc deposits are chiefly in the southwest, in the vicinity of Joplin and Webb City. Coal mining is third in rank among the mineral industries. The coal deposits occupy a large portion of the state north and west of a line joining Springfield and Hannibal. These are a continuation of the coal fields of Kansas and Iowa. They give employment to about 10,000 miners, and have an average yield of nearly 4,000,000 tons. The Ozark Plateau also contains extensive beds of iron ore, which are most prominent in the vicinity of Iron Mountain and Pilot Knob. These are not thoroughly worked, because of high shipping expense. Granite, limestone, clay and other materials suitable for building purposes are widely distributed. Industries connected with clay are particularly important.

Agriculture. The northern, western and southeastern parts of the state have a deep, fertile soil and are especially suited to the growing of corn, grass, hay and other crops suitable for feeding stock. Corn is the leading cereal grown, and in its production Missouri is surpassed only by Illinois, Iowa and Nebraska. About 7,000,000 acres are planted to corn, and in 1917, a banner year, the yield was 252,000,000 bushels. Wheat is second in importance. The average yield is approximately 30,000,000 bushels, and the grade is superior. Oats, sorghum, rye and potatoes are all raised in paying quantities.

The central section is given largely to stock raising and tobacco. On account of its fine blue grass it rivals Kentucky in high-grade horses. The Ozark region is devoted largely to fruit, poultry and dairying. Apples are generally grown throughout the state. In the extreme southeastern portion considerable attention is given to raising cotton. Throughout the state there are excellent grazing lands, and Missouri is one of the leading states of the Union in the production of live stock, especially mules, cattle and swine. The proximity of the state to the markets in Kansas City and Saint Joseph makes the fattening of cattle and hogs very profitable. Mules and blooded horses are largely exported to other states. Large numbers of sheep are also raised, and the wool crop is important.

The forests contain a good deal of sycamore and red gum; the pine is nearly exhausted.

Manufactures. Because of its central location, its rail and steamship facilities and its accessibility to raw materials, Missouri has developed rapidly as a manufacturing state. It possesses in the city of Saint Louis the fourth manufacturing city of the Union, and in Kansas City a great meat-packing center, second only to Chicago. Slaughtering and meat packing is the leading manufacturing industry, and the making of boots and shoes is next in rank. Other industries, in order of importance, are the manufacture of flour and grist-mill products, printing and publishing, the manufacture of lumber products, foundry and machine shop work, clothing manufacture and coffee roasting. The making of smoking pipes has reached a high standard of excellence, and the state has also blast furnaces, glass works, potteries and paint factories. The average annual value of all manufactured products is in the neighborhood of $575,000,000.

Transportation. The northern half of Missouri is in the region traversed by the great trunk lines of railways, extending east and west across the country. Cross lines connect them and give this portion of the state ample railway facilities. Within recent years the Frisco System has built a great network of roads in South Missouri, with centers at Springfield and Cape Girardeau. The entire mileage of the state exceeds 9,300. Water communication with the Gulf and the ocean is provided by the Mississippi River. While the Missouri is navigable, the development of railways along its course has lessened its importance as a waterway. Electric interurban lines are being extended year by year, and the work of improving the country highways is continuous.

Commerce. The commerce of the state is extensive. The exports are largely live stock, meats, lead, zinc, fruits and vegetables and numerous manufactured products, while the imports consist of food products and raw material for manufactures. Much of the commerce and transportation consists in the transit of commodities across the state from east to west, Saint Louis being one of the great distributing centers for the southwestern part of the United States. It has recently developed into a market of the first class for

horses and mules. Kansas City is a great market for agricultural implements and machinery.

Government. The legislature consists of a senate of thirty-four members elected for four years, and a house of representatives of 142 members, elected for two years. The sessions are held biennially and are practically limited to seventy days. The executive department consists of a governor, a lieutenant-governor, a secretary of state, an auditor, a treasurer, an attorney-general and a superintendent of public instruction, each elected for four years. The governor and the treasurer cannot succeed themselves. The courts consist of a supreme court of seven judges, elected for ten years, three district courts of appeal located at Saint Louis, Kansas City and Springfield, each having three judges elected for twelve years, and circuit courts, presided over by judges elected for six years. Each county has a probate and county court, and there are also justice courts in villages and towns. There are numerous important state boards, such as the equalization board and the public utilities board.

Missouri has enacted legislation providing for the initiative and referendum, nonpartisanship of judges, municipal home rule for cities of over 100,000 population, and the commission form of government for towns and cities desiring it. Juvenile courts are established in all counties. Capital punishment was abolished in 1917.

Education. The public school system is on the district plan. At the head of this system is the superintendent of public schools. The schools in the town are well graded, and the terms are long; many of the rural schools are graded, but have short terms. However, these schools are making steady progress towards a higher standard. There is a compulsory attendance law for pupils between the ages of six and fourteen. In 1914 a special appropriation was made for country high schools and seven junior colleges, specializing in technical or undergraduate courses.

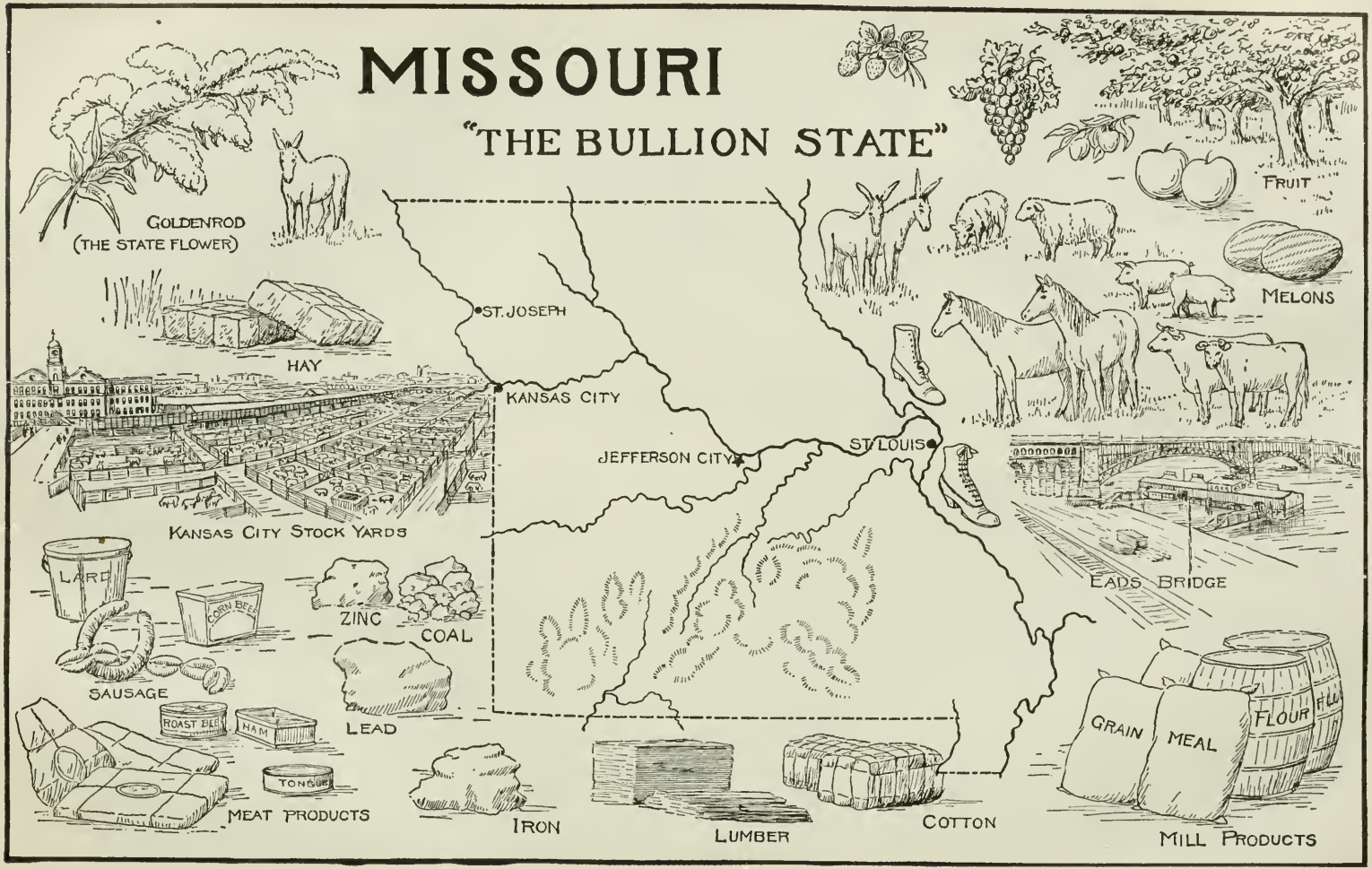
State normal schools are maintained at Warrensburg, Kirksville, Cape Girardeau, Springfield and Maryville. At Jefferson City is Lincoln Institute, for the training of colored teachers. The University of Missouri is located at Columbia; many of the high schools of the state are affiliated with it, and, through this arrangement, with other universities as well. The other important universities are the Washington University at Saint Louis, a nonsectarian institution, and Saint Louis University, a Roman Catholic institution. A school of mines is at Rollo. There are numerous private coeducational colleges.

Institutions. The state school for the deaf and dumb is at Fulton, and the school for the blind is at Saint Louis. The hospitals for the insane are located at Farmington, Saint Joseph, Fulton and Nevada, and there is an institute for the feeble-minded at Marshall. The state tuberculosis sanitorium is located at Mount Vernon. A state prison is located at Jefferson City, a boys' reform school at Boonville and a girls' reform school at Chillicothe.

Cities. Missouri has fifteen cities with populations over 9,000. The first five, in order of size are Saint Louis, Kansas City, Saint Joseph, Springfield and Joplin. Jefferson City is the capital. Each is described in these volumes.

History. Missouri was explored in 1541 by Fernando De Soto, the Spanish adventurer. In 1673 Marquette and Joliet passed down the great river, and in 1682 La Salle took possession of the country in the name of Louis XIV. In 1719 the French began to explore the interior. The first permanent settlement was made at Sainte Genevieve, about 1735. The next settlement of any consequence was Saint Louis, founded by Pierre Laclede in 1764. By the Treaty of Paris in 1763, Missouri, together with all territory west of the Mississippi, was transferred to Spain, then ceded by Spain to France in 1800; it formed part of the Territory of Louisiana, purchased by the United States in 1803. In 1812 it was set apart as the Territory of Missouri. At that time there was a population of over 20,000, and the chief occupations were agriculture, fur trading and mining. In 1817 the territorial legislature applied to Congress for permission to prepare a state constitution, and on August 10, 1821, Missouri was admitted to the Union, after a long contest over slavery.

The first capital was Saint Charles, chosen in 1820, but Jefferson City became the permanent seat of government in 1826. Missouri soldiers engaged in several Indian Wars, notably in the Black Hawk War in 1832; the state troops also fought in the


MISSOURI
"THE BULLION STATE"
GOLDENROD
(THE STATE FLOWER)
HAY
KANSAS CITY STOCK YARDS
ST. JOSEPH
KANSAS CITY
JEFFERSON CITY
ST. LOUIS
FRUIT
MELONS
EADS BRIDGE
LARD
CORN BEEF
SAUSAGE
ROAST BEEF
HAM
TONGUE
MEAT PRODUCTS
ZINC
COAL
LEAD
IRON
LUMBER
COTTON
GRAIN
MEAL
FLOUR
MILL PRODUCTS

Items of Interest on Missouri

Missouri lies almost in the center of the Missouri Basin. Its length from north to south is 287 miles, and its average width, about 255 miles.

The Ozark Plateau, often called the Ozark Mountains, is not and never has been a mountain region; it is merely a low plateau, about 2,000 feet above sea level at the highest point, with valleys cut into it.

Missouri has more than one thousand miles of navigable waterways.

The prevailing winds are from the west or southwest; winds from the south and east are warm and moist; from the west and north they bring dry, clear, cool weather.

In number of mules Missouri leads all states except Texas, but in value it is exceeded by Texas and Georgia. Missouri mules and horses are noted as among the best in the United States.

The state is named for the river which flows across it. *Missouri* is the Indian word for *muddy water.*

The goldenrod is the state flower of Missouri.

Missouri leads all states west of the Mississippi in manufactures, and ranks tenth among all the states of the Union.

The enrollment in the public schools of Missouri is over 711,000, and there are nearly 20,000 teachers. About $20,000,000 is expended in a year for educational purposes.

The Baptist, Methodist and Roman Catholic Churches are numerically the strongest religious bodies.

The Missouri Botanical Garden in Saint Louis is the finest institution of its kind in the United States. It was presented to the city by Mr. Henry Shaw.

The Mississippi River is rarely frozen over at Saint Louis. When it does freeze it is partly the effect of ice floating down from the north.

In 1914 the state constructed one of the largest hog serum establishments in the United States.

Over forty per cent of the total area of the state is forested. The hardwoods of the Ozark district are the most valuable for lumber. In the southeast there are cypress swamps.

Hannibal was the boyhood home of Mark Twain. His old home is preserved by the city as a memorial; the cave mentioned in *Tom Sawyer,* which is located south of the city, is a place of great interest.

Missouri's favorite son, Champ Clark, was a candidate for the Democratic Presidential nomination in 1912. He was Speaker in the House of Representatives from 1913 until March, 1919.

The University of Missouri was the first institution in the world to organize a school of journalism, and its school of education was the first in any state university.

Questions on Missouri

Why is Missouri called "The Bullion State?"

Who was "Old Bullion"?

How does Missouri compare in size with the largest state in the Union?

How does its density of population compare with that of Rhode Island? Nevada?

How were the Ozark Mountains formed?

Describe the drainage system of the state.

How does the climate of Missouri differ from that of a seacoast or lake region?

What is a "continental climate"?

How does Missouri rank in the production of lead and zinc? Where are the chief deposits of these minerals?

What states surpass Missouri in the production of corn?

Name the chief manufactures.

What famous explorers visited the Missouri region in the sixteenth and seventeenth centuries?

What different nations have been in possession of what is now Missouri? In whose administration did it become United States territory?

What Missouri city is the location of a Federal Reserve Bank?

Florida War in 1837 and in the Mexican War in 1846. The people of Missouri were almost equally divided in sentiment on the slavery and secession question, and provided troops for both sides during the Civil War. The Union early in the struggle gained control of the state. Almost immediately after the close of the war, the state entered upon an era of wonderful prosperity. A world's fair was held at Saint Louis in 1904, celebrating the centennial of the Louisiana Purchase. In 1919 the state granted women the privilege of voting for Presidential electors.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Cape Girardeau
Carthage
Columbia
Hannibal
Independence
Iron Mountain
Jefferson City
Joplin
Kansas City
Mississippi River
Moberly
Ozark Mountains
Saint Charles
Saint Joseph
Saint Louis
Sedalia
Springfield
Webb City

HISTORY

Civil War
La Salle, Sieur de
Louisiana Purchase
Missouri Compromise

MISSOURI, *miz zoo'ri,* an Indian tribe, reduced in 1823 to about eighty persons by the inroads of smallpox. The remnant joined the Oto, to whom they were related, and removed to a reservation in Oklahoma.

MISSOURI, UNIVERSITY OF, a state institution of higher learning, founded at Columbia in 1839. It comprises a college of arts and sciences, a college of agriculture, an extension division, a graduate school and schools of journalism, education, commerce, engineering, law, medicine and mines and metallurgy. The school of mines and metallurgy is located at Rolla. Besides the campus and buildings the university owns a farm of about 800 acres. It was the first university in the world to organize a school of journalism. The regular enrollment is about 4,000, and the faculty numbers over 300. There is a library of 200,000 volumes.

MISSOURI COMPROMISE, the name given to an act of Congress, approved March 6, 1820, by which Missouri was admitted to the Union as a slave state, but slavery was forever prohibited north of the southern boundary of Missouri, namely 36° 30′ north latitude. At the same time, but by a separate bill, Maine was admitted as a free state. The act was the outcome of a long period of discussion between the slavery and the anti-slavery parties. Up to that time the number of free and slave states had remained equal; therefore, the admission of Missouri as a free or a slave state would disturb this equilibrium. Many bills were introduced by each party after 1819, and the bill as finally passed was the result of numerous amendments and resolutions. Its passage was largely due to the influence of Henry Clay, then Speaker of the House. In the following year another bill was passed, delaying the admission of Missouri to the Union until that state through its legislature had declared that no law would be passed which would abridge the rights guaranteed to all citizens by the Federal Constitution. This was to prevent the insertion of a proposed paragraph in the state constitution prohibiting the immigration of free negroes.

MISSOURI RIVER, a great river of the United States, generally regarded as the principal tributary of the Mississippi. In reality, it is the longer stream. Measuring from its source to the mouth of the Mississippi the Missouri is the longest river in the world. It is formed by the junction of the Jefferson, the Madison and the Gallatin rivers, which rise in the Rocky Mountains and unite near Gallatin City, Mont. After the junction of these three streams, the newly formed river flows first north, then east across Montana, and enters North Dakota, through which it flows in a curve southeast into South Dakota. After traversing South Dakota, it forms the northeastern boundary of Nebraska, and after a turn toward the south, it forms the dividing line of Nebraska from Iowa and Missouri. It flows between Kansas and Missouri as far as Kansas City, when it turns east and flows across Missouri to the Mississippi, which it enters twenty miles above Saint Louis.

From the source of the Jefferson, the longest of the three branches of which it is composed, to its mouth at the Mississippi, the Missouri River is 2,950 miles long, and with the Lower Mississippi it is 4,200 miles long. It is a swift and turbid stream. Its chief tributaries are the Yellowstone, the Cheyenne, the White, the James, the Big Sioux, the Platte, the Grand and the Osage, and the chief towns on its banks are Kansas City, Leavenworth, Atchison, Omaha, Council Bluffs, Sioux City, Pierre, Bismarck and Great Falls.

MIST. See FOG.

MISTLETOE, *mis' 'l to,* a parasitic, evergreen plant which grows on many trees, especially on the oak and the cypress. It is a bushy growth of yellowish-green twigs,

each bearing two rough, green leaves, with small, yellowish flowers between the leaves and at the forks of the stem. In the winter the plant is covered with small, soft white berries. Mistletoe is found in Europe and in the United States, but while the two plants are very similar in appearance, they are not closely related. In olden times the mistletoe was regarded by the Druids with great veneration. The priests gathered the plant only with a golden knife on the sixth day after the first new moon of each year and, dividing it with great ceremony, distributed it among the people, who wore it sacredly as a charm to keep off evil. It is still a favorite Christmas decoration, and in both Europe and America it is a playful custom to claim that a man has a right to kiss a woman whom he discovers under the mistletoe on Christmas eve.

MITCHELL, Donald Grant (1822–1908), an American author, better known as Ik Marvell. He was born at Norwich, Conn., received his education at Yale and after working for some years on a farm, traveled in Europe. For a time after his return he studied law, but soon gave up that profession and turned to literature. His most popular book, *Reveries of a Bachelor,* appeared in 1850, and this was followed in the next year by *Dream Life.*

MITCHELL, John (1869-), a labor leader, formerly president of the United Mine Workers of America. He was born in Will County, Illinois, received a limited education, later studied law and for a time was employed in Illinois coal fields. After 1885 he was closely connected with the labor union movement and after 1890 continuously held some office in the United Mine Workers of America. He was elected its president in 1899 and was continuously reëlected for several years. From 1900 to 1914 he was one of the vice-presidents of the American Federation of Labor. During this period he was at various times a member of the state workmen's compensation board in New York, and in 1915 its chairman, and in the latter year became chairman of the New York state industrial commission. After 1917 he was president of the New York State food commission, chairman of the Federal food board for New York, president of the New York state council of farms and markets and a member of the Federal milk commission for the Eastern states.

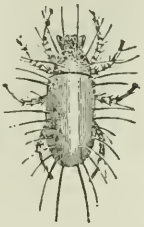
JOHN MITCHELL

MITCHELL, S. D., settled in 1881, is the county seat of Davison County, seventy miles west of Sioux Falls, on the James River and on the Chicago & North Western and two divisions of the Chicago, Milwaukee & Saint Paul railroad. The city is in a fertile region which produces wheat and live stock, and it contains a creamery, railroad and machine shops, grain elevators, brickyards, lumber yards and other establishments. It is the seat of Dakota University, and has a Carnegie Library, a Federal building, an Elks' Home and a large Catholic hospital. Population, 1910, 6,515; in 1917, about 7,500.

MITCHELL, Silas Weir (1829–1914), a distinguished American physician, who achieved fame as a writer of essays and fiction. Doctor Mitchell's specialty was the treatment of nervous diseases. His "rest cure" system has been adopted generally for such treatment. He wrote essays voluminously on a great variety of medical topics, and published, among other medical books, *Injuries of Nerves and Their Consequences; Wear and Tear, or Hints for the Overworked,* and *Lectures on Diseases of the Nervous System, Especially in Women.* In general literature, Doctor Mitchell began as a writer for children, but soon met with even greater success with his finished essays and strongly written novels. *Characteristics; Circumstances; Doctor North and His Friends; The Adventures of Francois; Youth of Washington. Westways and Hugh Wynne, Free Quaker,* later volumes, are among the most popular. The last mentioned, a story of Washington and the Revolution, is generally considered his best.

MITES, small animals belonging to the same class as the spiders. Some are so small as to be invisible to the naked eye, while others are a half-inch long. Their mouths are fitted for boring and sucking the juices of the body they infest, for most of them are parasitic. Upon the body of the mite are scales, hairs or bristles of different forms, according to species. Some infest mammals, birds or animals of lower orders, and others feed upon plants. The spinning mites, or *red spiders,* as they are often called, leave a tiny thread

wherever they go, and when numerous they will cover a plant with a whitish mass. *Itch mites* burrow into the skin of man and other animals, and *gall mites* produce the peculiar formations seen on leaves and twigs of plants. While some mites destroy the eggs of injurious insects and so are beneficial, the majority of them are injurious, and some do decided damage, not only directly by their parasitism, but in some instances, also, by spreading disease.



MITE

MITHRIDATES, *mith ri da'teez*, (135–63 B. C.), king of Pontus, on the shore of the Black Sea. He received a Greek education, spoke twenty languages, and was regarded by the Romans as their most formidable adversary. He commenced his career of conquest soon after attaining his majority, and became master of nearly all of Asia Minor and of Greece. His supremacy in the East brought him in conflict with Rome, to whom he was forced by Sulla, with his outnumbering legions, to submit. After the death of Sulla, in 78 B. C. Mithridates levied an army with a determination to expel the Romans from Asia. But he was defeated by Lucullus, followed by the victorious Romans into his own states and driven to seek refuge in Armenia. In 67 B. C. he won a complete victory over the Romans; following up his success, he rapidly recovered the larger part of his dominions. The Romans then invested Pompey with absolute power in the East, and by his overwhelming numbers, in 66 B. C., the forces of Mithridates were completely routed near the Euphrates. The king retired beyond the Caucasus, and when his troops, headed by his son Pharnaces, marched against him, he killed himself.

MITHRIDATES

MIZ'PAH, a Hebrew name signifying *watchtower*, given to several places in Biblical literature. In a modern connection it is chiefly interesting as the name given to a heap of stones set up in Palestine by Jacob and his brethren as a sign that they invoked the watchfulness of God over the covenant between Jacob and Laban. For the words of the covenant, "The Lord watch between me and thee," etc. (*Gen.* XXXI, 49), are implied in the word "Mizpah" as used to-day as an inscription for memorial rings.

MO'ABITES, the descendants of Moab, Lot's son, who occupied the fertile plateau lying east of the Dead Sea. They belonged to the same Semitic stock as the Hebrews and spoke practically the same language. They were numerous at the time the Israelites crossed their plains on the way from Egypt to Canaan. Moab and Israel were, throughout their history, mutually hostile and intermittently engaged in warfare. On becoming king of Israel, David, descendant of Ruth, a Moabitish woman, subjugated Moab. Later Moab was tributary to Assyria and Babylon and to Rome. After they were conquered by Nebuchadnezzar, the Moabites disappeared from history as a nation, though they continued to exist as a race.

MOABITE STONE, THE, a stone bearing an ancient inscription, found in 1868 by a German missionary in the country east of the Dead Sea. It is of black basaltic granite, about three feet five inches high, one foot nine inches in width and the same in thickness, with rounded top and straight base. the inscription, in thirty-four lines, dates from about 860 B. C. and is the oldest extant writing in the Hebrew-Phoenician language. It records the deeds of Mesha, king of Moab, and wars with Omri, king of Israel, and his successors. Unfortunately the stone was broken by native Arabs into numerous pieces before it could be transported, but it was repaired and now is in the Louvre, Paris.

MO'BERLY, Mo., in Randolph County, 125 miles northwest of Saint Louis, on the Wabash and the Missouri, Kansas & Texas railroads. The Wabash has division headquarters and shops here, and there are also brickyards, flour mills, a shoe factory, ice factories, foundries, machine shops, planing mills and other factories. The city is near deposits of coal and fire clay and has a valuable trade in farm and dairy produce. It contains the Saint Mary's Academy, a Carnegie Library, a Y. M. C. A. building, a Federal building and two hospitals. Population, 1910, 10,923; in 1917, 13,047 (Federal estimate).

MOBILE, *mo beel'*, ALA., the state's only seaport and the county seat of Mobile County, on Mobile Bay, at the mouth of the Mobile River, twenty-six miles from the Gulf

of Mexico. It is on the Louisville & Nashville, the Southern, the Mobile & Ohio, the Alabama, Tennessee & Northern and the New Orleans, Mobile & Chicago railroads. In 1915 the Federal government completed the building of locks on the Warrior and Tombigbee rivers at a cost of $11,000,000 to facilitate the river trade. The city contains the Medical College of Alabama, the Academy of Visitation, Saint Mary's School, the Magill and Evangelical Lutheran institutes and Spring Hill College (Jesuit). There are numerous libraries, and the charitable institutions include the United States Marine Hospital, a city hospital, Providence Infirmary and several orphanages. Of the churches, the Cathedral of the Immaculate Conception is the most noteworthy building. Other prominent structures are the old courthouse, the tower, the Federal building, the Cotton Exchange and the Chamber of Commerce. There is a large export trade in cotton and cotton products, lumber, coal, live stock, fruits and naval stores. The manufactures include lumber and lumber products, foundry goods, flour, cotton products, tobacco products and brick. The cultivation and the shipping of vegetables are also important industries. The commission form of government was adopted in 1910.

The first settlement was made by the French in 1702, about twenty miles up the river. It was ceded to England as a part of West Florida in 1763, was captured by the Spaniards in 1780 and was given to the United States in 1814. In 1864 Admiral Farragut defeated the Confederate fleet in the bay of Mobile and compelled the surrender of forts Gaines and Morgan. The city itself passed into Union hands April 12, 1865. Population, 1910, 51,521; in 1917, 59,201 (Federal estimate).

MOBILE BAY, Battle of, a battle of the Civil War, fought August 5, 1864, between the Federal fleet under Rear Admiral David G. Farragut and a greatly inferior Confederate fleet, supported by land batteries. The entrance to Mobile Bay was protected by Fort Morgan and Fort Gaines, and it had also been blocked with torpedoes and piles, except for a narrow passage directly under the guns of Fort Morgan. Farragut directed the course of his fleet through this narrow passage, and at the same time he conducted a continuous bombardment of the forts. Being confronted by unforeseen obstructions, Farragut was obliged to steer directly across the bay, which was thickly laid with torpedoes. Though these scraped the bottoms of the boats, only one exploded. A fierce battle ensued with the Confederate ram *Tennessee* and a few minor gunboats, and the Confederates were finally compelled to surrender. This exploit was one of the most daring of the war.

MOBILE RIVER, in Alabama, formed by the union of the Alabama and the Tombigbee, which unite about forty miles above the town of Mobile. The Mobile is navigable for large steamboats. It enters Mobile Bay by two mouths.

MOCCASIN FLOWER. See Lady's Slipper.

MOC'CASIN SNAKE, a very venomous serpent, frequenting swamps in many of the warmer parts of North America. It is about two feet in length, is dark brown above and gray below. In the North, the copperhead is often called the moccasin.

MOCKING BIRD, a beautiful thrush, the sweetest of American feathered songsters. It has not only a charming song of its own, but such powers of mimicry that it can imitate the songs of other birds. The bird is about ten inches long, is gray above and white underneath. The wings and tail are nearly black and have white markings. The birds are numerous in the Southern states and in summer range as far north as Massachusetts. Their favorite habitat is the roadside, the meadow and the garden, but rarely the woods. They are favorite cage birds in Southern homes, where they have been taught to whistle many tunes. The nest is built near the ground of twigs, leaves, grasses, cotton and soft roots. The eggs are pale greenish-blue, blotched with brown.

MODJESKA

MODJESKA, *mo jes'ka* Helena (1844–1909), a Polish actress, born at Cracow. At the age of seventeen she married Modrzejewski, a government official of Cracow, and when she went on the stage she abbreviated the name to Modjeska. After the death of her husband she married, in 1868, Count Bozenta

Chalpowski, and after 1876 made her home in the United States. She made tours through the United States and England in 1883, and again in 1889 and 1890, starring with Edwin Booth. Although she never used English with ease, her fine natural gifts gained for her a foremost rank as an actress of tragic rôles. Her favorite parts were Imogen, Beatrice, Juliet, Rosalind, Lady Macbeth, Camille, Mary Stuart and Cleopatra.

MO'DOC, a subdivision of the Klamath Indians. The women were skilful weavers, and the men were warlike and sold their captives as slaves to other tribes. After a series of conflicts with the whites, during which treachery was shown, the tragic end of the Modoc came in 1873. They had killed General Canby at a peace conference and retired to the lava beds, where, after a bitter fight, they were starved out and compelled to surrender. Only about 275 remain; these are on the Klamath and Quapaw reservations.

MO'GUL, a word with the same meaning as Mongol, but now applied specifically to the sovereigns of Delhi, who are called Great Moguls, or Grand Moguls. They are descendants of Baber, the Mongol conqueror who established an empire in Hindustan in 1526.

MO'HAIR, the hair of the Angora goat. The goats, originally confined to Asiatic Turkey, have been introduced into the United States, Australia, Africa and New Zealand. The typical mohair fiber is about seven inches long, is fine, soft and silky and usually pure white. At the annual spring clipping each animal yields from two to four pounds of wool. The alpacas and cashmeres made from this wool are light in weight, smooth and lustrous.

MOHAM'MED, or **MAHOM'ET** (about 570-632), the founder of Mohammedanism, or, more properly, Islamism. He was born in Mecca, Arabia, and, rendered an orphan by the death of his parents, was brought up by an uncle, Abu Talib, who educated him in business. When he was in his twenty-fifth year, a rich widow, named Khadija, engaged him as agent and eventually, though fifteen years his senior, married him. Mohammed had from his youth a propensity to religious contemplation, and each year retired to a mountain cave and lived for a time in solitude. At the age of forty he announced his belief that he had been called to divine service.

Abu Bekr, a man of high standing, persuaded ten of the leading citizens of Mecca to follow him. Mohammed instructed those who came to him in doctrines which purported to have been revealed to him by the angel Gabriel. He was persecuted, and his followers were few. A plot was set on foot to kill him, and, warned of the danger, Mohammed left Mecca, accompanied by Abu Bekr and his family and fled to Medina, where there were many converts. This migration, or *hegira*, as Mohammedans call it, occurred in the year A. D. 622, and from this date the Mohammedans reckon time. Many adherents of the new faith followed the leader to Medina, and from this time onward Mohammedanism spread rapidly. When the number of his followers had sufficiently increased, Mohammed resolved to make his doctrines compulsory with the sword. A long series of battles ensued. The whole of Arabia was conquered. Preparations for the conquest of Syria and for war with the Roman Empire were begun, when Mohammed died at Medina. He was a man of extraordinary insight, and he knew human nature; though he had almost no book learning, he was familiar with Bible narrative and with Eastern legends, and he possessed an elementary notion of what is fundamental in all religion. See MOHAMMEDANISM.

MOHAMMED V (1844-1918), a sultan of Turkey. He was a brother of Abdul Hamid, whom he was chosen to succeed in 1909 after the National Assembly had deposed that unscrupulous monarch. Mohammed, or Mehmet, as he was called, was kept in imprisonment thirty-three years by Abdul, who wanted his son, not his brother, to succeed him. Not until 1908, when a constitution was granted Turkey, was Mehmet allowed any freedom; and when, in the following year, he was called to the throne he was unfit to be more than a figure-head, a rôle he played throughout his reign, which saw the most critical period in Turkish history. In the course of those nine years Turkey became a German vassal; Italy took Tripoli; Turkey lost through the Balkan War most of its European possessions; in the World War it lost Arabia and Mesopotamia, and finally, its place as a power in the world.

MOHAMMEDAN ARCHITECTURE, the style adopted by the followers of Mohammed in building their mosques, palaces and tombs. The Arabs did not originate a distinctive

architectural style; the style which is identified with them was developed by their architects from styles in countries they conquered. Examples of this are seen in Egypt, Persia, Turkey, India and in Spain, where the order is called Moorish. Conspicuous features of Mohammedan or Sarasenic, architecture are the minaret and the pointed arch. The domes are sometimes in groups of three or more and are frequently enriched externally with colored tiles or other decorations. The minarets are slender towers of considerable height, rising in stages, or stories, each surrounded with a balcony, from which the muezzin summons the people to prayer. The arch is of the pointed variety, sometimes of the horseshoe form. Flat surfaces are freely ornamented with a profusion of scroll work and conventional foliage, often in intricate and beautiful designs, called arabesque. Stucco is much used in ornamentation, and brilliant coloring is especially characteristic. In Egypt Mohammedan art began with the mosque which Amru erected at Old Cairo, about A. D. 641. As repaired and altered, it may be considered as a good specimen of Moslem architectural art uninfluenced by Christian traditions. See ALHAMBRA; TAJ MAHAL; MOSQUE.

MOHAMMEDANISM, *mo ham'e dan iz'm*, the name commonly given in Christian countries to the religion established by Mohammed. The proper name of the religion is *Islam*, which means "entire submission to the will of God." The declaration of faith is, "There is no God but Allah, and Mohammed is his prophet." This religion embraces:

(1) Belief in God, who is without beginning or end, the sole Creator and Lord of the universe, having absolute power, knowledge, glory and perfection.

(2) Belief in His angels, who are sinless beings, created of light.

(3) Belief in good and evil Jinn (genii), who are created of smokeless fire and are subject to death.

(4) Belief in the Holy Scriptures, which are His uncreated word revealed to the prophets, and of which there now exist, but in a greatly corrupted form, the Pentateuch, the Psalms and the Gospels; and in an uncorrupted and incorruptible state the Koran, which takes the place of and surpasses all preceding revelations.

(5) Belief in God's prophets and apostles, the most distinguished of whom are Adam, Noah, Abraham, Moses, Jesus and Mohammed, Mohammed being the greatest of them all, the last of the prophets and the most excellent of the creatures of God.

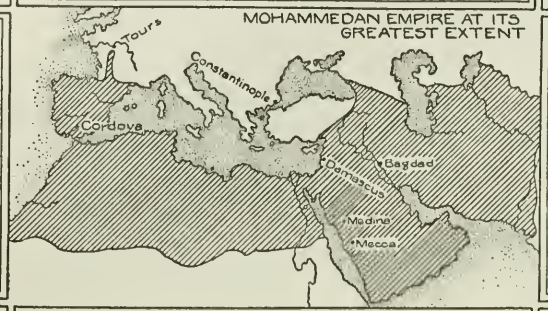
(6) Belief in a general resurrection and final judgment and in future rewards and punishments, chiefly of a physical nature.

(7) The belief, even to the extent of fatalism, in God's absolute foreknowledge and predestination of all events, both good and evil.

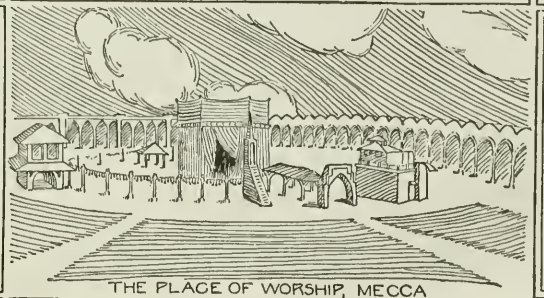
The practical part of Mohammedanism teaches certain observances or duties, of which four are most important. The first is prayer, including preparatory purifications. At five stated periods each day, with his face turned in the direction of Mecca, the Moslem must offer up certain prayers held to be ordained by God, and others ordained by his prophet. Prayers may be said in any clean place, but on Friday they must be said in the mosque. Second in importance stands the duty of giving alms; next the duty of fasting. The Moslem must abstain from eating and drinking, and from every indulgence of the senses, every day during the month of Ramadan, from the first appearance of daybreak until sunset, unless physically incapacitated. The fourth important religious duty of the Moslem is making at least once in his life, if possible, the pilgrimage (el-Hadj) to Mecca, after which he becomes a Hadji. The distinctions of clean and unclean meats are nearly the same as in the Mosaic code. All intoxicating liquors are strictly forbidden. Music, games of chance and usury are condemned, so are portraits, both painted and carved. Charity, honesty in all transactions, truthfulness (except in a few cases) and modesty are indispensable virtues. After Mohammed's death Abu Bekr, his father-in-law, became his successor. Disputes then arose, a faction holding that Ali, the son-in-law of Mohammed, was by right entitled to be the prophet's successor. This led to the division of the Mohammedans into the two sects known as Shiites and Sunnites. The former, the believers in the right of Ali to be considered the first successor, constitute at present the majority of the Mussulmans of Persia and India; the latter, considered as the orthodox Mohammedans, are dominant in the Ottoman Empire, Arabia, Turkestan and Africa. The total number of Mohammedans to-day is estimated to be 220,000,000.

MOHAVE, *mo hah'vay*, a tribe of Indians noted for their strength and fine physical proportions. They live on a reservation along the lower Colorado River in Northern Arizona, where they build log houses of

MOHAMMEDANISM



MOHAMMED THE PROPHET



THE PLACE OF WORSHIP, MECCA

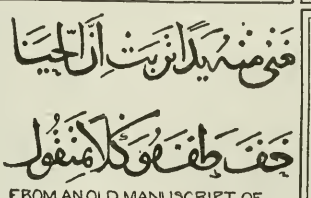
Chronological Summary

Birth of Mohammed	570
The Hegira	622
The Return to Mecca	630
Death of Mohammed	632
Omar Captures Jerusalem	637
Saracens Conquer Africa and enter Spain	711
Saracens Repulsed at Constantinople	717
Saracens Repulsed at Tours	732
End of Mohammedan Expansion	750
Harun-al-Raschid, Caliph	786

AN ARAB WARRIOR

THE MEUZZIN (CALL TO PRAYER)

ARABIAN WOMAN TIME OF MOHAMMED



FROM AN OLD MANUSCRIPT OF THE KORAN

MOHAMMED'S SIGNATURE

H·M·HAINES

brushwood covered with sand, and raise corn, pumpkins, melons and beans. They make fine pottery and excellent baskets. The Mohaves are a reticent, slow, contented tribe, adhering closely to their old manners and customs. They tattoo themselves and cremate their dead.

MO'HAWK, the chief tribe of the Five Nations, or Iroquoian confederacy, which formerly lived in the lower valley of the Mohawk River. They were among the earliest Indians to meet the Dutch and French settlers and soon secured firearms from the former. Armed with these weapons, they became a tremendous power in the confederacy, but their position brought them quickly into conflict with the whites, by whom they were repeatedly defeated in battle. During the Revolution they sided with the British until, under Brant, they were driven into Canada, where they now live principally as farmers in Ontario. See FIVE NATIONS, THE; IROQUOIAN INDIANS.

MOHAWK, a river of the United States, the principal tributary of the Hudson in the state of New York. It rises in Lewis County, flows in a southeasterly direction and into the Hudson at Cohoes. Its length is about 160 miles. It affords abundant water power and flows through beautiful scenery.

MOHE'GAN, an Algonquian tribe closely related to the Mohicans of New York (see MOHICAN). They lived in Connecticut along the Thames River. The Pequot were a branch of the Mohegan, but at the time of the Pequot War, the Mohegan sided with the whites, to whom they gradually lost their power, and they have disappeared or become mixed with negroes and low whites.

MOHICAN, *mo he'kan*, a powerful Algonquian tribe, pictured with vividness in Cooper's *Last of the Mohicans*. They lived in New York along the Hudson, where they waged fierce warfare with the Mohawks. Today they are represented by a small group known as the Stockbridge Indians, who live upon a reservation near Green Bay, Wis. The Mohicans were strong and well-built and considerably advanced in civilization.

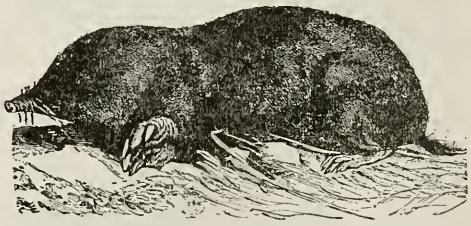
MOKI, *mo'ke*. See HOPI.

MOLAS'SES, a thick, dark-colored syrup, obtained in the manufacture of sugar. Several varieties are known to the trade, such as *West India, New Orleans, golden drip* and *sugar house*. The last named is the product of refineries, and is separated from the sugar in the drying machines. Molasses is used in some localities as a substitute for sugar. It also enters into the manufacture of rum. See SUGAR.

MOLD, minute vegetable growth of a low type, especially such vegetable organisms as appear on articles of food when neglected and on decaying substances. It is the slight furlike, almost cobwebby substance so frequently seen on bread and other vegetable products. Mold starts from a small particle called a spore. This swells and bursts, sending out hairlike threads, which develop into a minute spore case, in which many thousands of spores appear. In this way molds multiply. Molds will not develop where the air is very dry, nor where the air is cold.

MOLDING, in architecture, a term applied to a non-structural architectural detail employed to refine the contour of various parts of a building. Moldings occur as grooved or ornamental strips on cornices, door facings and window jambs, as encircling embellishments of capitals and bases. The Greeks were the first to appreciate the value of molding as an architectural finish, and they were masters in the use of it. In vast interiors the splendor of the architectural effect is much enhanced by the ripple of light and shade made possible by the alternate concave and convex surfaces of the plain moldings or by the regular and rhythmically recurring patterns distinguishing those of another type.

MOLE, a little animal which, in its search for worms or larvae, burrows just under the surface of the ground, thus pushing up the



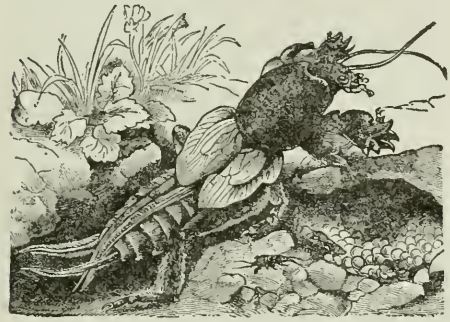
MOLE

earth in little ridges. The common mole is found in America from Canada to Florida and all over Europe, except in the extreme south and north. It is five or six inches long and has a large head. It has no external ears, but, contrary to popular belief, has eyes, though very minute ones, which are almost concealed by soft, short fur. The animal's strong, slender snout and short sturdy front

legs are well adapted to its manner of life. The male builds an underground house of many chambers, from which runways extend in all directions.

There are several species of moles in North America. One has a star- or fringelike arrangement of the cartilages about the nose, and for this reason it is called the *star-nosed mole.* There are no moles in the tropics, South America or Africa, though certain other burrowing insectivorous animals, sometimes called moles, are found in those regions.

MOLE CRICKET, a large cricket whose front legs resemble somewhat the front legs of a mole and whose habits are similar to those of the latter animal. The common brown mole cricket of the United States is about



MOLE CRICKET AND EGGS

one and a half inches long. As in its burrowings it often bores through the roots of plants, it sometimes devastates gardens. A larger species is found in South America.

MOLECULE, *mol'e kule,* a chemical term referring to the smallest particle, or unit, into which any substance can be divided without losing its identity. A drop of the compound called water contains countless molecules, each of which is a particle of water, and this particle, when no further division is possible, is a molecule. When it is broken up into its elements, or decomposed, it ceases to be water, but is found to be composed of two parts of hydrogen and one part oxygen—or, scientifically stated, two atoms of hydrogen and one atom of oxygen. This accounts for the symbol H^2O, the chemical formula for water.

Molecules, then, are composed of atoms. Any change in the proportionate number of atoms in a molecule changes the physical character of the molecule and therefore creates a change in the physical substance. For illustration, if there are three atoms of hydrogen and one atom of nitrogen in a molecule the resulting substance is ammonia. See Atom; Chemistry.

No person ever saw a molecule of any substance; it is a physical unit too small ever to be observed, hence, though real, we consider it almost as a theoretical thing.

Molecular Forces are the forces which bind together the atoms into molecules and which regulate the relations of the molecules themselves, so that the body made up of them assumes the solid, liquid or gaseous state.

Molecular Weights are the relative weights of molecules, and these are determined by chemists and are always the same for any given substance.

MOLIERE, *mo lyair',* (1622-1673), the assumed name of Jean Baptiste Poquelin, the greatest of French dramatists. His father was a tradesman connected with the court, and the son received a good education. When the father became unable to perform his duties, the son took the position, but gave it up for the career of actor, assuming the name by which posterity knows him. After achieving success in the provinces with *The Madcap, The Loving Spite* and other plays, he settled in Paris in 1658. In the following year his reputation was enhanced by the production of *The Absurd Précieuses,* a delicate satire on the prevailing language, thought and dress. Continuing to produce new plays and performing the chief comic parts himself, he became a favorite, both with court and people, though his enemies—rival actors and authors—were numerous. Louis XIV was so well pleased with the performances of Molière's company that he attached it to the court and gave its owner a pension. In 1662 Molière made an unfortunate marriage with Armande Béjart, an actress twenty years younger than himself, and this union embittered the latter part of his life.

Among his works, other than those mentioned, may be noted *The School for Husbands, The School for Wives, Don Juan, The Misanthrope, Tartuffe, Physician in Spite of Himself, The Miser, Scapin's Knaveries* and *The Imaginary Invalid.* Molière died of apoplectic stroke, a few hours after playing in *The Imaginary Invalid.* Public burial was forbidden by the archbishop of Paris, on the grounds that Molière was an actor and a reviler of the clergy; but his body was laid in Saint Joseph's churchyard. A century after his death the French Academy set up in their hall a bust of him with

the inscription, "Nothing is lacking to his glory; he is lacking to ours." As a player he was unsurpassed in high comic parts; and in the literature of comedy his name is, after Shakespeare's, the greatest among the moderns. He borrowed freely from Latin, Spanish and Italian writers, but whatever materials he appropriated he so treated them as to make the result entirely his own.

MOLINE, *mo leen'*, ILL., founded in 1829, is in Rock Island County, adjoining Rock Island, on the Mississippi River, and on the Chicago, Rock Island & Pacific, the Chicago, Burlington & Quincy and the Chicago, Milwaukee & Saint Paul railroads. Moline, Rock Island and Davenport, Iowa, the latter across the Mississippi River, form a great municipality of over 100,000 people. Coal is mined in the vicinity. The principal manufactures are automobiles, elevators, milling machinery, scales, pianos, organs, plows and other agricultural implements, wagons, engines, and foundry and machine shop products. One of America's greatest plow works is here. The city has a Federal building, a Carnegie Library and three hospitals. The commission form of government was adopted in 1911, but abandoned in 1919. Population, 1910, 24,199; in 1917, 27,976.

MOLLUSCA, *mah lus'ka*, a large family of soft-bodied animals, most of which live in shells. It includes oysters, mussels, clams, snails, slugs, barnacles, cuttle-fish and innumerable other forms. Of the 20,000 species, some live on dry land, others in streams and still others on the sea coasts or in the ocean depths. Some of them are capable of burrowing (notably clams), others of swimming, while still others crawl or skip over the sand, and some, among them, oysters and mussels, are fixed and stationary. Many are vegetarians, while others feed on an animal diet. Yet, notwithstanding their very wide range of shape and habit, they possess in common many structural details. The mollusca are invertebrates (they have no backbones); they have no jointed legs or arms, and they are commonly covered with a hard shell of one, two or more parts. Although some are like worms in appearance, the bodies of these species are not made up of rings or sections. Most of them have heads and some have eyes, but the eyesight is very poor. The eyes of the land snails are at the end of long tentacles, which protrude from the shell as the animal moves about.

The mollusk has a respiratory system, certain species breathing by means of hairlike processes near the mouth, others through gills. It has a heart and a circulation of colorless blood. There is a ladderlike nervous system on the under side and a well-defined alimentary canal, the latter consisting of mouth, gullet, stomach and intestine. Many of these animals, snails among them, have a sort of "foot," or creeping disk, by means of which they go about. The clam has a tongue-shaped projection by means of which it burrows into sand or mud, and the mussel, an equally useful equipment by means of which it plows its way into the water bed. A large part of the mollusk forms what is called the mantle, which secretes the substance forming the shell.

Mollusks inhabiting single shells, such as snails, are called *univalves;* those with double shells, such as oysters and clams, are *bivalves.* Bivalve shells are held together at one side by a strong hinge made flexible with a ligament. Univalve shells are shaped either like a cup or like a cone wound spirally around an imaginary axis. The shells occur in an almost limitless number of forms, some of which are exceedingly delicate, beautiful in shape and marvelous in color. Many are very small. Outside the shells are rough; inside, the walls are of the smoothness of satin, and many are lined with an iridescent coat of pearl.

Related Articles. Consult the following titles for additional information:

Argonaut	Limpet	Scallop
Chitons	Mussel	Sea Squirts
Clam	Nautilus	Slug
Conch	Octopus	Snail
Cuttlefish	Oyster	Squid

MOLOKAI, *mo lo ki'*, a notable leper island of the Hawaiian group, somewhat over 260 square miles in area. All persons on the islands found to be affected with the disease are sent by the government to Molokai and are kept entirely isolated from the healthy part of the community. Population in 1910, 2,112. See LEPROSY.

MOLTING, the act or process by which birds renew their plumage, snakes and many insects their skins, many animals their hair and deer their antlers. Some animals experience a complete change of this kind once each year; a few have a principal molt and an incomplete one in that period. By it old tissues are discarded and new ones are attained; light summer protection is reinforced to meet the cold of winter, and in spring

cast off for the warm season; skin is shed by insects in the process of metamorphosis (which see).

In nearly all instances the process is so gradual that the animals experience no serious inconvenience during the molting season; that there is a physical effect, however, is known from the fact that, while molting, most canaries will not sing, some wild animals become quarrelsome, and in others a lassitude prevails. The height of the molting period in temperate latitudes is in August or early September for birds, though males have a spring molting preceding the mating season, and in early spring for animals with hair. Caterpillars usually molt five times before they enter the pupa state.

MOLT'KE, Helmuth Carl Bernhard, Count von (1800–1891), a Prussian general. He entered the Danish army in 1819, left that service for the Prussian three years later and became a staff officer in 1832. In 1835 he went to Turkey, superintended the Turkish military reforms and was present during the Syrian campaign against Mehemet Ali. He returned to Prussia, and from that time his rise was steady. In 1858, as provisional director of the general staff, he acted in unison with Bismarck in the vast plans for military reorganization which so greatly increased the strength of the Prussian army. The success of the Danish War (1864) was attributable to him, as was also the success of the Austro-Prussian War of 1866; and the Franco-German War justified him in his method of drawing up a plan of campaign and directing movements from a distance, instead of joining the army in the field. In 1871 he was made field marshal, and in the following year he was given the title of count. He was retired from the position of chief of the general staff in 1888.

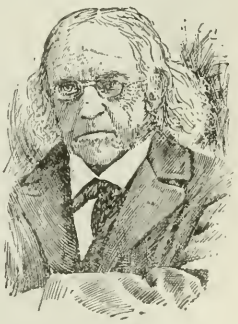
VON MOLTKE

Helmuth Johannes Ludwig von Moltke (1848–1915), a nephew of the famous field-marshal, was born in Mecklenburg-Schwerin. He served in the Franco-German War, and was an adjutant under the elder Moltke. In 1906 he was appointed chief of the general staff and general of infantry. Early in the World War General von Moltke failed to achieve the supreme purpose of Germany, the capture of Paris, and after the Battle of the Marne he was superseded by General von Falkenhayn. See World War.

MOLUC'CAS, or **SPICE ISLANDS,** a name applied to the widely scattered group of the Malay Archipelago lying between Celebes and Papua. The combined area of the islands is 21,516 square miles. They are divided into three residences, Amboyna, Banda and Ternate. The southern part is governed directly by the Dutch, while the northern is ruled through native sultans. The islands are nearly all mountainous and mostly volcanic, and earthquakes are by no means uncommon. Nutmegs, cloves, cocoanuts, mace and sago are exported to Europe. The Moluccas have been for centuries alternately in the possession of the Spaniards, Portuguese and Dutch. At present they belong to the Netherlands. The natives belong to Malay and Polynesian races. Population, about 400,000.

MOMEN'TUM, the quantity of motion possessed by a moving body. Momentum equals the mass multiplied by the velocity. A stone weighing 200 pounds and moving 20 feet per second will have a momentum of 20 times 200 pounds, or 4,000 pounds. The unit quantity of momentum most commonly employed is that possessed by a body of the mass of 1 pound, moving with a velocity of 1 foot per second. The C. G. S. (centimeter-gram-second) unit is the momentum possessed by a body of one gram mass, and one centimeter per second velocity.

MOMMSEN, *mohm'zen,* Theodor (1817-1903), a celebrated German historian and archaeologist. In 1852 he became professor of Roman law at the University of Zürich, and two years later he was given a similar position at the University of Breslau. He went to Berlin in 1858 as professor of ancient history and remained there until his death. In the Prussian parliament, of which he was a member from 1873 to 1882, he became prominent as an advocate of liberal movements and as an



MOMMSEN

opponent of much of Bismarck's policy. Mommsen's *Roman History* is one of the most notable contributions ever made to history.

MO'MUS, in classical mythology, the god of mockery and censure, who was expelled from heaven for his free criticism of the gods. Momus is generally represented raising a mask from his face and holding a small figure in his hand. His mother was Nox, goddess of night.

MONACHISM, *mon'a kiz'm.* See MONASTICISM.

MONACO, *mon'a ko,* the smallest independent principality in the word, with an area of eight square miles, at the extreme southeast of France, less than five miles from the Italian border. It is Italian in tradition, but French in language, and since 1860 has been under the protection of the French government.

There is little of Monaco except the capital, Monaco, the famous Monte Carlo, center of the world's interest in gambling, and the village of Condamine (population about 11,050). The town of Monaco is situated on a rocky height projecting into the sea and is a renowned watering-place; its population is 2,250. Monte Carlo, which is about a mile to the east of Monaco, consists of numerous hotels and villas which have sprung up near the gardens of the gambling casino. Its permanent population is 9,650.

The prince of Monaco was formerly absolute, but since 1911 a constitution has been in force providing for a national council and a ministry to make and enforce the laws. The people are exempt from taxation, as the revenue is almost entirely derived from the enormously profitable rents of the gambling establishments at Monte Carlo. Population, 1913, 22,956.

MONARCHY, *mon'ar ky,* a state or government in which governing power is vested in a single person, by whatsoever name he may be distinguished. A government in which the subjects have no rights or powers as against the ruler is popularly termed a *despotic,* or *absolute,* monarchy; when the ruler is subject to any law, either written or unwritten, or shares his powers with a legislative body, the government is popularly called *constitutional,* or *limited,* monarchy. The ruler in either case is an hereditary monarch. Great Britain is an example of a limited monarchy of the most advanced type. Russia and Turkey formerly were types of an absolute monarchy. See GOVERNMENT.

MONASTERIES, *mon'a ster iz.* See MONASTICISM.

MONASTICISM, *mo nas'ti siz'm* a religious system under which those persons live who have renounced worldly things and who, either separately or in communities, devote themselves to the attainment of spiritual perfection. Men and women who live the monastic life are called *monks* and *nuns.*

Although monasticism is generally associated in men's minds with the Christian religion, it is not peculiar to Christianity, nor did the monastic idea originate there. Manifestations of it occurred centuries before the Christian Era, among the Buddhists and Brahmins of India and among the followers of Pythagoras in Greece and in Egypt.

The first Christian hermits we know of were men who, in the middle of the third century, fleeing from the persecutions of Decius and a corrupt society withdrew to the wildernesses of Arabia or Egypt. Among the earliest of these were Paul of Thebes, who lived in a mountain cavern and fed upon the fruit of neighboring palm trees, and Anthony (Saint Anthony), who also lived a solitary life, first in the Nile country and later in the desert by the Red Sea. When the fame of Anthony's wisdom and sanctity spread abroad, many came to him seeking spiritual guidance. In response to their appeal he became a sort of leader or abbot. He is called the Father of Christian monasticism. Anthony's followers were organized into a brotherhood by Saint Pachomius. Henceforth the majority of those who lived the monastic life were not solitaries, but cenobites; however, they retained the title monk (*monachus,* a solitary).

Monasticism was introduced into Europe in the fourth century and spread rapidly. Saints Basil, Jerome, Augustine, Ambrose and Martin were among its zealous promoters there. In the sixth century Saint Benedict, an Italian monk, instituted many reforms in monastic life, founded numerous monasteries, for men and for women, imposed upon each member a vow to remain in one monastry for life and gave his monks a discipline, which, with modifications, has been the rule of monastic life in Western Europe ever since. It included rigid self-denial of all bodily comforts and of course the three fundamental monastic vows of poverty, chastity, obedience.

In the seventh and eighth centuries the Benedictine monasteries, which housed many Irish monks, were the chief civilizing and christianizing influence in Central and Northern Europe. They were the centers of learning. The monks were the teachers of the world. In the next century a new era began in monasticism with the establishment of "Orders," large organizations of monasteries under a single head. The first Order was that of Cluny, which had 2,000 branch monasteries, located in many lands.

The beginning of the twelfth century saw an entirely new development in monasticism, the establishment of the knightly Orders. These arose out of the religious wars waged against Mohammedanism. They included the military Orders—the Knights Hospitalers, the Knights Templars, the Teutonic Knights and about eighty others—and the Orders of Ransom, among which were the Trinitarians and the Order of Our Lady of Mercy, the object of these latter being to free Christian slaves from Moslem captivity. Many thousands of Christians were redeemed by them. About a hundred years after the first military Orders were established there arose the great mendicant Orders, so called because their members lived entirely by begging. These were the Franciscans, the Dominicans, Carmelites and Augustinian Hermits. Many members of these Orders, in spite of their strict vows, became prominent as poets, philosophers, writers and preachers. The great theological lights among them were Albertus Magnus and Thomas Aquinas among the Dominicans, and Duns Scotus and Roger Bacon of the Franciscans. The last of the great religious Orders to be founded was The Society of Jesus, better known as Jesuits, established in 1534 to combat the assault of Protestantism on the Catholic Church. It is the model according to which all religious orders have ever since its founding been conducted.

The Reformation, which was naturally hostile to monasticism, curbed its growth. Subsequent government restrictions acted as a further hindrance to its development on the European continent. In the United States and Great Britain to-day full freedom is allowed in the establishment of monastic institutions, and in those countries monasticism is flourishing. In the former country there are about 4,415 brothers, 3,788 priests and 55,575 nuns belonging to Catholic orders.

MONASTIR, Serbia, an important garrison city in the southern part of the country, situated in a valley eighty-five miles northwest of Saloniki, with which it has rail connection. Next to Belgrade it is the largest city of Serbia. Monastir has several mosques and schools, large army barracks, an arsenal and a military hospital. In normal years the people carry on an active trade in grain, woolens, tobacco and skins. The chief manufactures are carpets and gold and silver ware. Previous to the Balkan Wars (1812-1913) the place was the capital of a Turkish province. It was ceded to Serbia in 1913. In December, 1916, it was captured by the Bulgarians and held until the close of the war. Population, about 60,000.

MONCK, Charles Stanley; Viscount (1819-1894), a British statesman, born at Templemore, Ireland, and educated at Trinity College, Dublin. He began his career as a lawyer, and in 1852 was elected to Parliament. From 1855 to 1858 he was Lord of the Treasury. In 1861 he was appointed Governor-General of Canada, serving until 1868. (For portrait, see article Governor-General.)

MONCTON, *mungk'ton*, N. B., Westmorland County, on the Petitcodiac River, which flows into the Bay of Fundy, and on the Intercolonial and Grand Trunk Pacific railways, eighty-nine miles northwest of St. John. Moncton has an excellent harbor, in which there is a depth of water varying thirty feet between high and low tide. The principal manufactures include lumber, stoves, woodenware, cotton and woolen goods, wire fences, lamp chimneys, barrels and railroad cars. The city has the main repair shops of the Intercolonial Railway and is the eastern terminus of the Grand Trunk Pacific, which extends westward across the continent. Oil and gas wells are being developed. Population, 1916, 14,000.

MONDAY, *mun'da* (the moon's day), the second day of the week. In English history, the Monday after Easter has been called *Black Monday* since Easter Monday in 1360, when cold, mist and darkness hung over the camps of Edward III outside Paris. *Plough Monday* in England, which began as a fête-day for medieval ploughmen, is the first Monday after Epiphany, and is officially celebrated. *Blue Monday* is a colloquial epithet applied to any day when one's spirits are depressed.


Money unused has no value

MONEY, a measure of value and the medium of exchange, devised by man to facilitate commerce. If you have even a very moderate amount of it you can secure everything necessary to your reasonable physical requirements. Lacking money, it serves as a standard on which to base your value in the commercial world. You offer your services to a man at so many grains of gold per day; the number is determined by what that weight in gold will buy of the things you need. Of course you set your price in dollars instead of grains, but the real measure of value is the latter. The dollar is merely a convenient form in which the real measure is circulated.

One View of Money. In Dickens' *Dombey & Son* a pathetic little character is motherless Paul, aged five. His father expected that he would grow up to perpetuate the name and fame of Dombey & Son, and there were constant references to business in the father's talks to the boy, not much of which could he comprehend. One day Paul curiously inquired (quoting from the novel):

"Papa! what's money?"

The abrupt question had such immediate reference to the subject of Mr. Dombey's thoughts that Mr. Dombey was quite disconcerted.

"What is money, Paul?" he answered.

"Yes," said the child, laying his hands upon the elbows of his little chair, and turning the old-young face up towards Mr. Dombey's; "what is money?"

Mr. Dombey was in a difficulty. He would have liked to give him some explanation involving the terms circulation-medium, currency, depreciation of currency, paper, bullion, rates of exchange, value of precious metals in the market, and so forth; but looking down at the little chair, and seeing what a long way down it was, he answered: "Gold, and silver, and copper. Guineas, shillings, half-pence. You know what they are?"

"Oh yes, I know what they are," said Paul. "I don't mean that, Papa. I mean what's money, after all."

Heaven and Earth, how old his face was as he turned it up again towards his father's!

"What is money after all!" said Mr. Dombey, backing his chair a little, that he might the better gaze in sheer amazement at the presumptuous atom that propounded such an inquiry.

"I mean, papa, what can it do?" returned Paul, folding his arms (they were hardly long enough to fold), and looking at the fire, and up at him, and at the fire, and up at him again.

Mr. Dombey drew his chair back to its former place, and patted him on the head. "You'll know better by-and-by, my man," he said. "Money, Paul, can do anything." He took hold of the little hand, and beat it softly against one of his own, as he said so.

But Paul got his hand free as soon as he could; and rubbing it gently to and fro on the elbow of his chair, as if his wit were in the palm and he were sharpening it—and looking at the fire again, as though the fire had been his adviser and prompter—repeated, after a short pause:

"Anything, papa?"

"Yes. Anything—almost," said Mr. Dombey.

What Money Really Is. Money need not possess the familiar form in which we know it; indeed, for a long time it did not. At various times it has been beads, leather, iron, copper, cattle, silver and gold in bulk. There are at least two reasons why these are not desirable as money—they are difficult to handle and they fluctuate in value. In ancient days the owner of an ox might desire to exchange it for clothing, but he might travel far before he found a seller of cloth who was willing to be encumbered with an ox. What was lacking was some valuable medium which the first man could quickly get in exchange for the ox and which the clothing man would as quickly receive.

There are six essentials which must be bought and sold; these are food, water, clothing, shelter, human intelligence, or skill, and human strength, or labor. Money is of no real use except as it enables a person to exchange his labor or his intelligence for food, raiment and shelter, or to exchange the food, raiment and shelter which he has saved, and stored up, for the labor and intelligence of others, or to exchange his commodities for the commodities of others.

The measuring quality of money is that quality which enables a man to determine in commerce how many loaves of bread he may equitably give for a pair of shoes, or how many hours of labor he needs to give to the dentist who repairs his teeth. Every commodity changes in value in accordance with the needs and desires of men. A pure diamond was worth $100 a carat a few years ago; its value has doubled. Let the demand for diamonds as ornaments cease, and the value would decrease to practically noth-

ing, for they have few utilitarian uses. A good season produces a great wheat crop, and the price of bread goes down; a great coal strike comes, and the price of coal goes up. A standard measure of value must therefore be based upon a more stable commodity—one which fluctuates the least; it must possess the quality of being universally accepted as a good token of exchange—that is, it must be known as a promise which will not be repudiated and which will always pay for the essentials of life, and it must be practically a stable measure, or standard, of value. It must have those qualities which make it so stable that it will not be quoted at one price to-day and at another next month, for the currency you possess to-day must possess equal value at any future day.

The Stability of Gold. In modern times gold has been this commodity, and for these reasons the most enlightened nations use gold as their money standard. The unit of the gold coinage of the United States is the gold dollar, containing 25.8 grains, nine-tenths pure gold. You have a gold piece on which is stamped "Ten Dollars," and it passes for that value everywhere. If you melt it you can take it to the goldsmith or to the government and get ten dollars for it. It has an intrinsic value equal to the value stamped upon it; you are assured that that will always be true.

Fifty years ago—soon after 1870—a silver dollar contained 100 cents worth of silver, and was worth as much melted as in the form of a dollar. But the value of silver began to decrease, and within a dozen years there were times when the silver in a dollar was worth less than fifty cents in gold. All countries experienced the same fluctuation, and as a result most of them adopted gold as their single standard of value. Gold was made the basis of all money standards, and silver was relegated to use in the minor coins —coins of less value than a dollar—called "token money;" they contain less metal than the value stamped upon them. Now nearly all great countries have adopted gold as a basis of their money systems; Mexico and numerous South American countries still maintain the silver standard, as also does China.

Minor Coins. The minor coins of the United States and Canada are listed in the following table. The values in the last column are only approximately correct, for they vary slightly from year to year.

UNITED STATES

COIN	GRAINS	FINENESS *	FACE VALUE	VALUE OF PRINCIPAL METAL
Silver				
Dollar	412.5	.900	$1.00	$ .50
Half-dollar	192.9	.900	.50	.23
Quarter-dollar	96.45	.900	.25	.116
Dime	38.58	.900	.10	.046
Copper				
Five cents	77.6	.750	.05	.002
One cent	48.	.950	.01	.001

CANADA

Silver				
Dollar	360.	.925	1.00	.44
Half-dollar	180.	.925	.50	.22
Quarter-dollar	90.	.925	.25	.112
Dime	36.	.925	.10	.044
Five cents	18.	.925	.05	.02
Bronze (copper tin and zinc)				
One cent	87.5		.01	.002

*Fineness .900 means that only 900 out of every 1,000 grains are the metal which gives the coin its value. The balance of the metal in United States silver coins is copper, in the five-cent piece nickel, and in the one-cent piece tin and zinc.

Silver dollars are legal tender for any amount unless other provision is made in the contract; the smaller silver coins are legal tender up to $10; and the nickel and copper five-cent and one-cent pieces are legal tender up to twenty-five cents.

How Money is Issued. In the Middle Ages almost every nobleman and many of the cities, besides the rulers of the nations, had the right to coin money. We can imagine the hopeless confusion. Many of the coins were debased, that is, they were actually worth less than the stamp said they were. A poor nobleman would take twenty cents worth of silver, put a stamp on it and call it one dollar's worth. To remedy this situation the privilege of coinage was gradually reserved to the ruler of the country. To-day the money of the world is coined by the governments only. Some paper money, to be sure, is issued in the name of national banks, but it is printed by the government, which also limits the quantity and places safeguards around its circulation, to insure its redemption at face value.

Paper Money. Just as the introduction of stamped metal coins was a great improvement over the use of cattle and camels as money, so the use of paper money for large sums was a great advantage over the use of metal. A thousand dollars' worth of gold or silver makes a large pile; the same amount

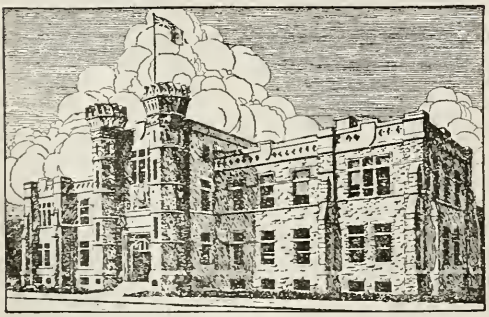
in paper money may be less than a handful. The paper money of the United States and Canada may be listed as follows:

UNITED STATES	SECURED BY
Gold Certificates, $10, up	Equal amount of gold in the United States Treasury.
Silver Certificates, $1, $2	Equal amount of silver dollars.
United States Notes, $5, up	Gold reserve.
National Bank Notes, $5, up	National bonds.
Federal Reserve Notes	Gold and commercial paper.
CANADA	
Dominion Notes 25c to $5	Gold and bonds
Bank Notes, $5, up	All bank assets.

Related Articles. Consult the following titles for additional information:

Banks and Banking
Bimetallism
Cent
Check
Coining
Coins, Foreign
Crown
Dollar
Eagle
Farthing
Fiat Money
France
Guinea
Interest
Legal Tender
Livre
Milreis
Mint
Note
Penny
Peso
Piaster
Pine-Tree Shilling
Ruble
Rupee
Rural Credits
Shekel
Shilling
Sovereign
Talent
Wampum
Yen

MONEY, IN CANADA. It is only in recent years that the Canadian system of coinage has become fully developed. Until 1906 all Canadian coins were minted in England. The Ottawa branch of the Royal Mint was established in 1907 but it was not until 1910 that a law was passed by Parliament authorizing



THE ROYAL MINT, OTTAWA

the government to provide a gold currency, for the country in denominations of $20, $10, $5 and $2.50, and it was not until May, 1912, that the first $5 and $10 pieces were issued by the Mint. The British sovereign continues to be legal tender for $4.86 2-3, but in fixing the standard for the new Canadian gold pieces these are made to correspond exactly in intrinsic value with the gold coinage of the United States. Gold pieces are accepted at face value in almost every part of the world, because their face value is their real value. The Canadian $5 and $10 gold pieces have five and ten dollars' worth of metal in them.

The Canadian silver pieces, on the other hand, do not contain silver worth the face value of the coins; it is the government's stamp on the coins and the acts of Parliament making them legal tender that gives them value. "Legal tender" is a new phase in our study; what does it mean? Simply that Parliament has passed an act authorizing a debtor to offer and requiring a creditor to receive certain coins in payment of debt. The words "legal tender" originally meant simply the "offer to pay in currency authorized by law," but in the course of time they have come to mean the money itself. The Dominion government issues five, ten, twenty-five and fifty cent pieces in silver. The Currency Act of 1910 also authorized the issue of a silver dollar.

There are two kinds of paper money in circulation in Canada; these are the currency notes issued by the national government and the notes of the chartered banks. The government is authorized by statute to issue legal tender notes to the amount of $30,000,000 against a reserve of 25 per cent and in excess of $30,000,000 against a reserve of 100 per cent in specie. These government notes are divided into two kinds, the "legal tenders" and "bank legals." The legal tenders are in denominations of $1, $2, $4, $5, $10, $20, $50, $100, $500, and $1,000. According to the latest returns, the total issue of these notes is about $20,000,000. The Dominion government also issues "bank legals;" these are bills in large denominations, generally $5,000, which the banks use among themselves for the purpose of the clearing house. They get these bills by depositing gold species for them in the government treasury and hold them for use in clearing or for conversion into gold the moment it is required. The second kind of paper money is the ordinary bank note.

MONEY ORDER, a form of check, except that it is issued by the Postoffice Department,

for the transmission of money from one person to another. It differs otherwise from a check in that it can be transferred by endorsement but once; it is payable only at a designated postoffice, if presented more than thirty days after date of issue, but at any money-order postoffice in continental United States if presented in less than thirty days; it cannot be issued for a sum in excess of $100. The rates charged for issuing these orders are as follows:

AMOUNT	COMMISSION
Not exceeding $2.50	3 cents
Over $2.50 to $5.00	5 "
" $5 to $10	8 "
" $10 to $20	10 "
" $20 to $30	12 "
" $30 to $40	15 "
" $40 to $50	18 "
" $50 to $60	20 "
" $60 to $75	25 "
" $75 to $100	30 "

A money order must be presented for payment within one year. Most towns containing only 300 people are designated as money order offices.

Express money orders are issued by express companies in competition with the government money orders, at rates comparable with the latter.

MONGO'LIA, a vast and indefinite tract of country, the original home of the Mongols, formerly a province of the Chinese Empire and later of the republic, is now both a province and a protectorate, for there was a virtual division of the territory in 1912. The southern part, bordering China proper, is called Inner Mongolia, and it belongs wholly to China; the northern part, bordering on Siberia, is Outer Mongolia, and is practically an independent country, whose emperor (1919) is Hutuktu. In 1913 an agreement was reached between China and Russia respecting Outer Mongolia. China recognized its independence, and Russia agreed to China's suzerainty—or political control—there. China is therefore protector of the new government. Both China and Russia agreed not to colonize Outer Mongolia.

The area of combined Mongolia is estimated to be about 1,367,600 square miles; the population, estimated, 1,800,000.

MONGO'LIAN RACE, or **YELLOW RACE**. See RACES OF MEN.

MON'GOLS, a race of Asiatics who first came into prominence under Genghis Khan (which see), who united the rival hordes. After his death, in 1227, his sons and grandsons followed up his conquests, and in 1237 they invaded Russia, devastated the country with horrible cruelty and in two divisions passed into Poland and Hungary. At Pesth the Hungarian army was routed with terrible slaughter, and at Liegnitz, in Silesia, Henry, duke of Breslau, was defeated in a bloody battle, April 9, 1241 (see KUBLAI KHAN). The principal seat of the great khan was transferred to China; the other countries were governed by subordinate khans, all of whom were descended from Genghis, and several of whom succeeded in making themselves independent. The division of the empire politically and the adoption of new religions (Buddhism in the East and Mohammedanism in the West) led to the disintegration of the Mongal power.

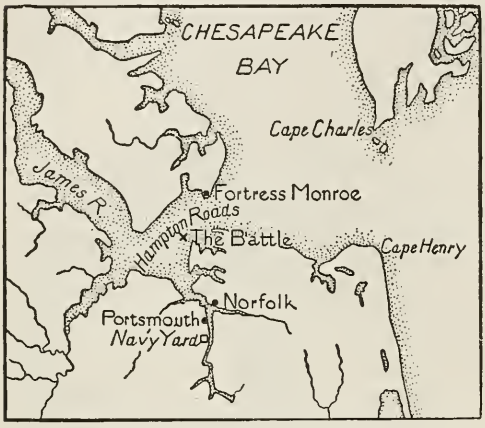
In 1368 the empire of the Mongols in China was overturned by a revolution, which set the native Ming dynasty on the throne. Driven northward to their original home, the eastern Mongols split up into small independent tribes, and finally they were subdued and absorbed by the Manchu conquerors of China. Among the western Mongols appeared a second formidable warrier, Timur, also called Tamerlane, or Timur Beg (see TIMUR). After Timur's death in 1405, his vast empire held together but a short time. In the early part of the sixteenth century, the Mongols lost all importance in world history, became split up into a number of separate tribes and fell under the power of neighboring peoples. Their name still lingers in the Chinese province of Mongolia (see above), but Mongolian tribes are found far beyond its boundaries.

MONGOOSE, or **MUNGOOSE**, a small, reddish-gray animal of India, remarkable for its skill in destroying rats and other vermin. It is able to kill even the most poisonous snake without injury to itself. It has been introduced in Europe for the purpose of exterminating pests, but its destruction of harmless small animals, of poultry and domestic pets makes it a questionable benefit. The importation of Mongoose into the United States is prohibited.

MON'ITOR, the name of a genus of large Old World lizards. Some species in Egypt attain a length of six feet. They usually inhabit the neighborhood of rivers and lakes and feed upon the eggs of crocodiles, turtles and aquatic birds. The important species are the *Nile monitor*, common all over Africa, and the Ceylonese *kabara-goya*. The name

monitor is attributable to the belief formerly held that these lizards gave warning of the approach of crocodiles.

MON'ITOR AND MER'RIMAC, two curiously shaped war vessels which were engaged in battle on March 9, 1862, in the American Civil War. The Merrimac was equipped with a peaked roof sloping upward from the deck; the entire exterior was heavily ironclad. No wooden vessel could successfully compete with it, and the *Merrimac* sank Federal vessels at will. On the evening of March 8 a "cheesebox on a raft" appeared



HAMPTON ROADS AND VICINITY

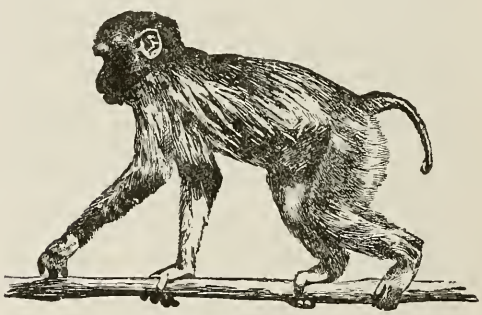
at Hampton Roads to challenge supremacy. The new craft, the *Monitor,* had a flat deck built not far above the waterline; in its center was a revolving turret large enough to hold two cannons. The entire vessel was covered with 9-inch armor.

The following day the *Monitor* met the *Merrimac* in battle. After a contest of four hours, in which neither vessel was seriously injured, both vessels withdrew. This battle proved conclusively the utility of armor plate and revolving turrets upon war vessels and revolutionized naval construction. Wooden vessels were thereafter useless in war. The *Monitor* sank in a windstorm soon after the battle, while proceeding to Beaufort, N. C. The *Merrimac* was later sunk by its own crew, to keep it from the Federals.

MONK. See MONASTICISM.

MONK, *munk,* or **MONCK,** GEORGE, Duke of Albemarle (1608–1670), an English general, famous for the prominent part he took in the restoration of Charles II. In the struggle between Charles I and the Parliament, Monk joined the royalists; but after imprisonment he joined the Covenanters and served Cromwell faithfully and with distinction till the latter's death. Then he seems to have decided at once upon the restoration of the Stuarts. To create a majority for Charles II, he called together the Presbyterian members who had been expelled from Parliament in 1648. The king rewarded his restorer with the dukedom of Albemarle, the Order of the Garter and a pension.

MONKEY, a name given to any of the family of four-handed mammals, but generally restricted to the smaller, long-tailed species. They bear a very remote resemblance to human beings, and in their actions are more like humans than are any other lower animals. Children are always delighted when they can observe a cage of monkeys. Different kinds are found in Asia, Africa and South America. Monkeys usually live in trees, and their food, which is chiefly vegetable, is stored by most species in their cheek pouches. Of the American species, all of which have thirty-six teeth, as against thirty-



PIG-TAILED MONKEY

two in the Old World species, the *howling monkey* is the largest and fiercest.

It has a long beard and a long tail. The spider monkey, or *coaitia,* is the most graceful American monkey. Its tail serves as a hand, for not only can the monkey swing by it, but it has also a keen sense of touch. The *capuchin* also has a long prehensile tail, covered with hair to the tip. The *sakis* have bushy tails and short beards. The *sapajous,* the kind usually seen with organ grinders, are smaller and are the most intelligent of American monkeys. The monkeys of the Old World have nostrils opening at the end of the nose.

Monkeys live in pairs; the male has one wife, and no "affinities," it is declared. The food of monkeys is fruit and insects, small

reptiles, young birds and eggs. Some do not thrive in captivity. There is no doubt that monkeys communicate with each other with ease; Prof. Garver once spent a year among forest monkeys in Africa in the endeavor to learn something of their language. Pet monkeys are believed to try to talk to their masters, and they show affection to members of the household in human ways. Large monkeys are called apes.

Related Articles. Consult the following titles for additional information:

Ape Baboon Sapajou

MONMOUTH, Battle of, an important engagement in the Revolutionary War, fought at Monmouth, N. J., June 28, 1778. The Americans were commanded by Washington and the British by Clinton. It was in this battle that Gen. Charles Lee with 6,000 men was ordered to attack and crush the left wing of the British army. Lee retreated without striking a blow, and it was only by the arrival of Washington that a disastrous rout was prevented (see Lee, Charles). The result was a drawn battle, though practically an American victory, and Clinton made his escape to New York.

MONMOUTH, *mon'muth,* Ill., the county seat of Warren County, on the Minneapolis & Saint Louis, the Rock Island Southern and the Chicago, Burlington & Quincy railroads. The city is in an agricultural region which also contains valuable deposits of coal and clay. The principal manufactures are pottery and other clay products, agricultural implements and flour. There is also a considerable trade in dairy products and live stock. Monmouth College is located here, and the city also has a county library, a courthouse, a Federal building and a hospital. The place was settled in 1836 and was incorporated in 1852. Population, 1910, 9,128; in 1917, 10,346 (Federal estimate).

MONMOUTH, James, Duke of (1649-1685), the natural son of Charles II, was always acknowledged by Charles as his son. After the Restoration, he was created duke of Monmouth and was married to the daughter and heiress of the earl of Buccleuch. In 1679 he was intrusted with a command in Scotland and defeated the Covenanters at the Battle of Bothwell Bridge, but gained the disfavor of the king by his mercy to the conquered and was soon afterward sent overseas. A few months afterward he returned without leave and became the center of the popular movement in which the lives of Lord William Russell and Algernon Sidney were sacrificed. Monmouth was exiled to Holland. On the accession of James II, he was induced to attempt an invasion of England. His small body of undisciplined troops was totally defeated at Sedgmoor, and the duke himself was captured and beheaded, after abject appeals to the king for mercy.

MONOCOTYLEDONS, *mono kot e le'donz.* See Cotyledon; Botany.

MONOMA'NIA, the name of a form of insanity in which the mind of the patient is absorbed by one idea or impulse and he seems to be insane only in the one direction; in fact, in every other respect he may be of decided ability. Dipsomania and kleptomania are regarded as two phases of monomania.

MONOMET'ALLISM. See Bimetallism.

MONONGAHELA RIVER, one of the two rivers which unite at Pittsburgh, Pa., to form the Ohio River. It is formed by the union of West Fork and Tygart rivers, in West Virginia, runs north into Pennsylvania and unites with the Allegheny at Pittsburgh. Its length, not including its branches, is about 150 miles, and it is navigable for large boats for sixty miles from its mouth.

MONOP'OLY, the sole or exclusive right of enjoying certain privileges which affect all the people. In its strict sense monopoly belongs to an economic era which has passed away. The spread of freedom has tended to the abolition of monopoly, whether vested in individuals in corporations or in companies engaged in foreign commerce.

But while monopoly as once understood has passed away, new tendencies have been setting in. Under this more modern system, it has been the aim of the competitor to secure as far as possible, the exclusive sale of the commodity in which he deals, and when the single competitor has not been strong enough to accomplish this, he has sought to attain his object by combination with a group of those engaged in the same business. The modern so-called *trust* is the outcome of such efforts; and the great danger attendant on such gigantic combinations has been the establishment of monopolies injurious to society (see Trusts). Laws have been enacted to destroy such combinations. The copyright and patent laws virtually establish monopolies, but merely as an inducement for original research; such activities are wholesome and benefit mankind.

There are certain enterprises which are *natural monopolies*, that is, which of their nature preclude competition if the best interests of people are to be served. The transportation service and telephone service of a city are such monopolies. There is a strong movement in favor of the municipal control of these enterprises.

Related Articles. Consult the following titles for additional information:

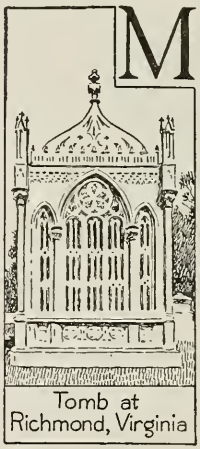
East India Company
Hudson's Bay Company
Municipal Ownership
Trusts

MONO-RAIL, SUSPENDED, a peculiar elevated railway erected between Elberfeld and Barmen, Germany. The cars are suspended from a single large central rail, which is supported by steel trusses. This German system is said to excel experimental lines elsewhere in Europe. The points claimed in favor of this system of local transportation are that there is little or no danger of derailing the cars, that the trains can be operated with less power, and that sharper curves can be used than would be possible on the ordinary two-rail system.

MON'O THEISM, belief in the existence of one God, as opposed to polytheism, which is belief in many gods. It may also be contrasted with dualism, and with monolatry, which latter is a belief in many gods but the worship of one. All primitive religions are polytheistic; even savages worship a "supreme" being, imagining him surrounded by lesser divinities. It is probable that from such a polytheistic belief monotheism developed; the inferior deities being gradually eliminated and the superior one retained, the concept of his nature becoming modified as man developed and grew more enlightened. The greatest of monotheistic religious systems are Christianity; Judaism, or the religion of the Hebrews; Mohammedanism, and the religion of Zoroaster.

MON'OTYPE. This is the best representative of a class of machines which cast and set type singly, instead of in a line. The monotype has two distinct parts—the perforating apparatus, operated by a keyboard, and the type-casting and setting machine. The operation of the keys perforates a paper tape about four and one-half inches in width, and this perforated tape guides the machine in casting the type. The matrices are arranged in rows in a square frame which can move on its bed back and forth and from side to side. By these movements any matrix desired can be brought into position for casting its character. The frame holding the matrices is operated by compressed air and is brought into position by means of a series of plugs, which are pressed up or down as the perforated tape is fed into the machine. The perforations in the tape correspond to the characters required in the composition and secure the casting of these characters by elevating and depressing the plugs necessary to bring the proper matrices under the casting apparatus.

The casting and setting apparatus of the monotype are quite complex, and the machine requires more than ordinary mechanical skill for its successful use. However, in the hands of a skilled operator, it does a wide range of work, as it can set a number of different sorts of type in the order called for. While the operation of the monotype is slower than that of the linotype, it is more desirable for book and magazine work, because it can set so many different sorts of type. See LINOTYPE.


Tomb at Richmond, Virginia

MONROE, JAMES (1758–1831), an American diplomat and statesman, the fifth President of the United States, and the fourth Virginian to attain the office of chief executive. Of his predecessors, Adams alone was not a native of Virginia. Monroe entered upon his Presidential career matured by years of practical experience. He had helped fight the war for independence, had served three terms in the Continental Congress, had been elected United States Senator and governor of Virginia, been minister to three European countries, and had held the office of Secretary of State throughout Madison's administrations. During his own administrations (he served two terms as President) the United States took its place among the nations as a country whose independence could no longer be questioned, and in this security of its national life the young nation made great strides in commercial and industrial expansion. It was sufficiently strong to announce a new foreign policy, that the United States would protect democracy in the Amer-

ican continents from European aggression. The promulgation of the Monroe Doctrine, as this policy is called, is undoubtedly one of the great events of American political history.

Birth and Youth. Monroe was born in Westmoreland County, Virginia, on April 28, 1758. The Monroes had been living in Virginia for more than a century, and the father and mother of James were well known in the county. The former was of Scotch and the latter of Welsh descent. James was sent to the College of William and Mary when he was sixteen, but before he had been there many months he left the institution to join Washington's army. Commissioned lieutenant in a Virginia regiment, he took part in the campaigns about New York City, was wounded at Trenton, and later fought at Brandywine, Germantown and Monmouth. In 1778 he was sent to Virginia to raise a new regiment. Jefferson, then governor of Virginia, commissioned him to gather information about the southern army, and though he attained the rank of lieutenant-colonel, he seems to have been kept from further active service. Monroe was deeply chagrined, but the experience was beneficial to him, in that it was the beginning of a life-long friendship with Jefferson.

His Public Career. Monroe's first public office was that of member of the Virginia assembly, to which he was elected in 1782. The following year he was sent to the Continental Congress. During his three terms in that body he allied himself with those who were distrustful of a strong central government, and when, in 1788, he sat in the Virginia convention called to ratify the new Federal Constitution, he did everything in his power to prevent its adoption. It was therefore as an Anti-Federalist that he was elected to the United States Senate in 1790.

Though opposed to President Washington in political theories, Monroe was appointed minister to France in 1794. In 1796 he was recalled because of utterances which the President deemed indiscreet and dangerous. Monroe did not always use good judgment in his public speeches, and on one occasion he called the unpopular Jay Treaty, recently concluded with England, "a most shameful transaction." His recall caused intense party feeling, and stirred Monroe to write a defense of his course in France. The document, entitled *View of the Conduct of the Executive,* was bitterly resented by Washington.

After three years of retirement, Monroe was elected governor of Virginia, holding office until 1802. Meanwhile, in 1801, his friend Thomas Jefferson had been inaugurated President, and in 1802 Monroe was sent to France to help the American representative at Paris, Robert R. Livingston, secure from France the land about the mouth of the Mississippi. As a result of their efforts, the great Louisiana Territory was purchased (1803). Jefferson retained Monroe in the diplomatic service, sending him to Great Britain and to Spain, but he had little success in either country. He arranged a treaty with England in regard to commercial relations, but could not secure England's promise to abandon the practice of impressing seamen, and Jefferson would not even send the treaty to the Senate. While he was at Madrid Monroe endeavored to secure the transfer of Florida to the United States, but this effort was likewise a failure.

JAMES MONROE

However politicians may have regarded him, Monroe's constituents were unshaken in their faith in him. On his return home he was again elected to the Virginia assembly, and in 1811 was chosen governor. Within a few months he resigned the governorship to become Secretary of State in Madison's Cabinet, where he remained until his own election to the Presidency in 1816. In 1814 and 1815 he also assumed temporary charge of the War Department, and his conduct of affairs during the War of 1812 was widely approved by the people. Especially did he exert himself to guard the national capital from attack. In the election of 1816 Monroe won an overwhelming victory, defeating the Federalist candidate, Rufus King, about five to one. The electoral vote was 183 to 34.

As President. Monroe took up the duties of his new office at a most auspicious time. Although the War of 1812 had its disasters, it had quickened the national spirit of the people, and it was a united, invigo-

Administration of James Monroe, 1817-1825

I. The President
- (1) Birth
- (2) Ancestry
- (3) Education
- (4) Public career
- (5) Rank as a statesman
- (6) Character
- (7) Death and burial

II. An "Era of Good Feeling"
- (1) War ended
- (2) Nation respected abroad
- (3) Party lines practically disappeared
- (4) Prosperity and expansion

III. Important Governmental Events
- (1) Admission of five new states
- (2) Florida purchase, 1819
- (3) The Missouri Compromise, 1820
  - (a) Causes
    - (1) Attempt to restrict slavery in Missouri
    - (2) Balance between free and slave states to be kept
  - (b) The compromise
    - (1) Framers of the measure
    - (2) Subject matter
      - (a) Slavery allowed in Missouri
      - (b) No other slave state north of 36° 30′
      - (c) Maine admitted
- (4) Election of 1820
  - (a) No parties
  - (b) Only one dissenting vote
- (5) Monroe Doctrine, 1823
  - (a) Policy of European nations toward American territory
  - (b) Dangers to United States
  - (c) Immediate causes
    - (1) Relations of Holy Alliance to South American republics
    - (2) Russia in Alaska
  - (d) President Monroe's statement
    - (1) Its form
    - (2) Substance
    - (3) Effect of publication
      - (a) In Europe
      - (b) In South America
      - (c) At home
  - (e) Recognition of South American Republics
- (6) Beginnings of Clay's "American System"
  - (a) To build up home industries
  - (b) Home market for American products
  - (c) Tariff of 1824

IV. Internal Affairs
- (1) Westward expansion
- (2) Visit of Lafayette
- (3) Crisis of 1818 and depression
- (4) Northwest fur trade
- (5) Election of 1824
  - (a) Candidates
  - (b) End of caucus system of nominating
  - (c) Election by the House

Questions on Monroe

Give a short account of Monroe's career before he became President.

What general conditions were responsible for the "era of good feeling"?

Name the five states admitted to the Union during Monroe's adminstration.

From whom was Florida purchased?

Why was that nation so willing to dispose of the territory?

Why did the United States desire the acquisition of Florida?

What were the causes of the Missouri Compromise?

Who were the leaders on both sides of the question?

What were the immediate results of its adoption?

What is meant by the Monroe doctrine?

Why did Monroe make such a statement of principles?

Did its publication have the intended effect?

What was the Holy Alliance and what were its objects?

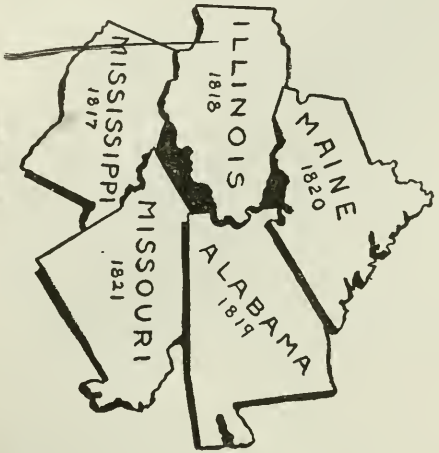
What was the "American System"?

PEACE FOR THIRTY YEARS

1817 JAMES MONROE 1825

"ERA OF GOOD FEELING"

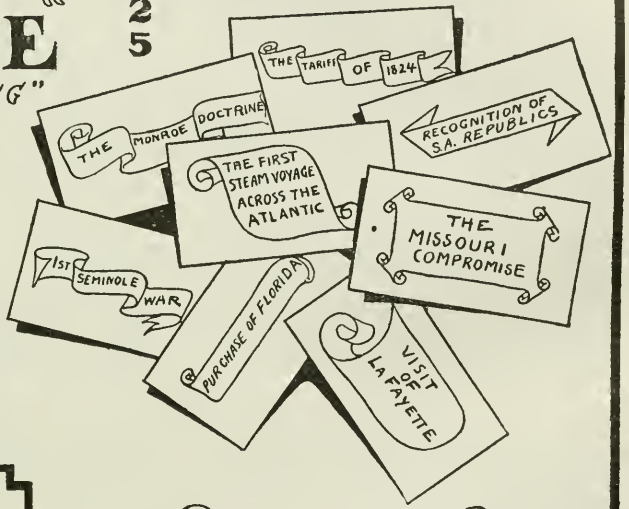
STATES ADMITTED



FLORIDA PURCHASE

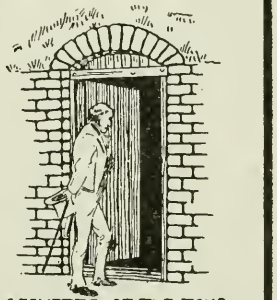
TIME - 1819
AREA- 59000 SQ. MI.
FROM - SPAIN
COST- $5,000,000
OCCASION FOR?

IMPORTANT EVENTS



Missouri Compromise

TIME – 1820
AUTHORS
STATEMENT
RESULTS



LAFAYETTE AT THE TOMB OF WASHINGTON

Monroe Doctrine

TIME – 1823
CAUSE
STATEMENT
RESULTS

rated nation that entered upon the era of peace. The victories of the American navy had gained for the United States the respect of European nations, and the time was past when American rights could be treated with contempt. Moreover, Monroe's administrations were in a political sense an "era of good feeling." Because of their unpatriotic attitude during the War of 1812 the Federalists lost all semblance of power, and the party as such passed out of existence. Theoretically there was but one party, the Democratic-Republican, soon to be known simply as Democratic. New issues, however, were coming to the front, and the era of good feeling was only superficially harmonious.

One of the questions that was being debated was the right of the government to appropriate money for public improvements, such as highways and canals. Henry Clay was the eloquent advocate of this right, and in the next administration he and his followers formed a new party known as National Republican. Monroe in his first message to Congress stated his firm belief that Congress could not under the Constitution construct roads and canals, and thus there was a distinct cleavage on that point. In this administration the slavery question for the first time became a national political issue. When Missouri and Maine, about the same time, applied for admission as states, the Southerners in Congress insisted that Missouri be admitted as a slave state, to keep the balance between free and slave states even. The famous Missouri Compromise of 1820, prohibiting slavery north of latitude 36° 30′, settled for many years the question that was destined finally to be the cause of a great war.

During Monroe's first term there was considerable trouble with the Seminole Indians, in Florida. Andrew Jackson was sent to quell them, and he not only subdued the Indians but nearly brought on hostilities with Spain and Great Britain by a high-handed autocratic attitude. The affair had a happy outcome, however, as eventually Spain agreed to sell Florida to the United States. The purchase treaty was ratified in 1821. Meanwhile, four states had come into the Union—Mississippi, 1817; Illinois, 1818; Alabama, 1819; Maine, 1820. In 1821 Missouri was admitted, after the legislature agreed not to exclude free negroes from the state.

Monroe was reëlected in 1820 with but one dissenting electoral vote, which was given to John Quincy Adams. In 1822, in his annual message, the President recommended that Congress recognize the independence of the republics in South America, and such recognition was promptly accorded. More positive action was felt to be necessary, however, in view of the aggressive attitude of the Holy Alliance, and in December, 1823, Monroe told Congress in his annual message that the United States would deem any attempt to extend the European system to the western hemisphere "dangerous to the peace and safety of the United States." John Quincy Adams, Secretary of State, was largely responsible for the promulgation of this doctrine, but Monroe assumed responsibility for it, and it has gone down in history bearing his name.

It is an interesting fact that one of the last acts of Monroe as President was his signing a bill providing for surveys of national canals. This bill was passed by Congress in 1824, and in spite of the President's convictions on the subject, he felt constrained to yield to public opinion. The attitude of the people on governmental authority was undoubtedly expanding as the nation grew strong and prosperous. In the same year a protective tariff was passed, increasing duties on wool and various other articles produced in the Central and Western states.

The Private Citizen. In 1825 Monroe relinquished the duties of the Presidency to his successor, John Quincy Adams, and retired to private life. He spent a portion of his time at Oak Hill, Virginia, his country estate, and the remainder in New York City. His retirement was varied by his service as regent of the University of Virginia, in 1826, and as member of the Virginia Constitutional convention of 1829. Monroe died on July 4, 1831, exactly five years after John Adams and Thomas Jefferson passed away.

Related Articles. Consult the following titles for additional information:

Adams, John Quincy	Louisiana Purchase
Clay, Henry	Madison, James
Era of Good Feeling	Missouri Compromise
Florida, subhead History	Monroe Doctrine
Holy Alliance	Political Parties in the United States
Jackson, Andrew	Tariff
Jay Treaty	War of 1812
Jefferson, Thomas	

MONROE, La., one of the oldest towns in the state, the parish seat of Ouachita parish, seventy-two miles west of Vicksburg, Miss., on the Arkansas, Louisiana & Gulf, the

Vicksburg, Shreveport & Pacific and the Saint Louis, Iron Mountain & Southern railroads and on the Washita River, which is navigable all the year. The city is in a lumbering and cotton-growing region, and contains cotton compresses, cottonseed oil mills, brickyards, lumber mills and wooden ware factories, a Federal building, a library and a hospital. Population, 1910, 10,209; in 1917, 13,698 (Federal estimate).

MONROE DOCTRINE, broadly stated, the policy promulgated by the United States government of preventing interference by European powers in the political affairs of American nations, and, especially, its opposition to the extension of monarchical institutions in the western hemisphere.

The occasion of the first definite utterance of this policy was in 1823, when it was suspected that a so-called Holy Alliance, consisting of Russia, Austria, Prussia and France, aimed to interfere in America to restore to Spain the colonies which had gained their independence and had been recognized by the United States. In his message of December 2, 1823, President Monroe declared that—

"The American continents are henceforth not to be considered as subjects for future colonization by any European power. With the existing colonies or dependencies of any European power we have not interfered and shall not interfere. But with the governments which have declared their independence and maintained it, and whose independence we have 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."

This doctrine has been differently interpreted at various junctures in American history, but its general spirit has been followed with scarcely an exception for three quarters of a century. Two years after its announcement it was successfully invoked to prevent Spain from transferring Cuba to France or England. The first and only important instance of disavowal or disregard of the doctrine was in the signing of the Clayton-Bulwer Treaty of 1850, in which England and America agreed not to occupy, fortify, colonize or assume any dominion over any part of Central America, but joined in guaranteeing the proposed canal across the Isthmus of Panama. By this act the United States admitted Great Britain to an equal footing with itself in an undertaking purely American in scope and character.

The Monroe Doctrine proved its force and efficiency soon after the close of the Civil War, when the French army, which had established the unfortunate Maximilian upon the throne of Mexico, withdrew at the suggestion of Secretary Seward, supported by a movement of American forces toward the Mexican frontier. Again in 1880 President Hayes announced, in regard to the proposed canal under French control across the Isthmus of Panama, the following policy:

"No European power can intervene for such protection (of the capital invested in the canal) without adopting measures on this continent which the United States would deem wholly inadmissible."

This gained an avowal from the French Cabinet that the government was in no way interested in the enterprise. By far the most important event relating to the Monroe Doctrine prior to 1914 was the Venezuela episode of 1894 and 1895, in which President Cleveland, by a firm avowal of a broad interpretation of the doctrine, led Great Britain and Venezuela to refer their dispute as to boundaries to a friendly arbitrator. After the World War (1914–1919) began it was discovered that Germany had largely colonized a state of Brazil in the hope of establishing a German outpost on the South American continent. It had been done without arousing suspicion of the world as to the real intent of Germany.

In recent years the interpretation of the Monroe Doctrine has been upon much more liberal lines than formerly, and it is now held by many American statesmen that it can be justified only upon the condition that American nations treat European nations honestly and candidly, and that therefore the United States is responsible to a certain extent for the international relations of smaller American republics. The constitution of the League of Nations (1919) accepted the Monroe Doctrine as applicable to the American continents.

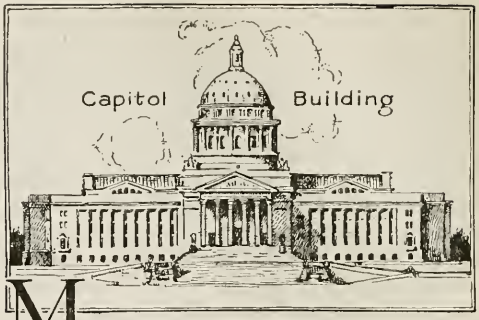
MONRO'VIA, Liberia, a seaport on the west coast of Africa, capital of the only negro republic in the world. It is regularly visited by steamers from European ports, and is the center for the export of palm oil, coffee, dyewoods and rubber. Monrovia is the seat of a Methodist College. It was founded in 1824 and was named after Pres-

ident James Monroe. (See Liberia.) Population, about 6,000.

MONSOON', any periodic wind that changes with the seasons. A typical example is the wind which blows steadily along the eastern coast of Asia over about forty degrees of latitude. In winter this breeze is from the northeast, and is dry; in summer it blows from the southwest and causes heavy rainfall. Monsoons are caused, like land and sea breezes, by the difference in temperature between the land and the water. In summer air near the land surface becomes heated, and it rises, and the air over the water rushes in; in winter the sea air is warmer, and the land air rushes outward. Monsoon winds occur off the coast of Guinea, in Africa and the coast of Mexico, and are very nearly perpetual in the Indian Ocean. See Wind.

MONSTROS'ITY, in anatomy, any departure from natural size or structure. Thus, dwarfs and giants are included in this category, as are albinos, and those with deformities which are very pronounced. Technically, people with even slight variations from normal are so classed, though laymen never so view such cases. Among the latter are those with bones of unusual articulation, imperfect form of any internal organs, cleft palate, harelip or fewer or more than the regular number of fingers or toes.

MONTAIGNE, *mon tane'*, Michel Eyquem de (1533–1592), a famous French essayist, born at the castle of Montaigne, in Périgord. He was a parliamentary counselor from 1557 to 1567, and at one time was gentleman of the king's chamber. In 1571 he retired to his estate and devoted himself to study. In 1580 he traveled in Germany, Switzerland and Italy for his health, which had been shattered by a hereditary disease. After a last visit to Paris, he seems to have dwelt quietly in his chateau. Montaigne's essays have at all times been one of the most popular books in the French language. They embrace an extraordinary variety of topics, which are touched upon in a lively, entertaining manner, with all the raciness of strong, native good sense and handled with a näive disregard of systematic arrangement. Quotations from and anecdotes of the ancients are interspersed with his own remarks and opinions and with stories of himself in a pleasant strain of egotism. There is an English translation of the essays by Florio, made in 1603, and reëdited by Cotton.



MONTANA, *mon tah'nah*, the third in size among the states of the American Union, exceeded in area only by Texas and California. It contains 146,997 square miles, and in 1910 had a population of 376,053, or an average of 2.6 people to the square mile, a density one-fifteenth as great as the average for the United States as a whole. In 1918 a Federal estimate credited the state with a population of 486,376.

The state's northern limit is the international boundary. Alberta and Saskachewan are on the north, Idaho on the west, the Dakotas on the east, and Wyoming and Idaho on the south. The greatest length from east to west is 540 miles—a greater distance than from Chicago to Omaha; the average width is 275 miles. The popular name of Montana is The Treasure State, referring to its attractive scenery and its great resources. The state flower is the bitter root.

Surface and Drainage. The eastern part of the state belongs to the great central plain, and the surface consists almost entirely of rolling prairie, which rises gradually to meet the foothills of the Rocky Mountains to the west. In this prairie region there are occasional isolated buttes, and bluffs occur along the streams. Some of these elevations have been sculptured in a wonderful manner by the winds, and are interesting objects of study. The main range of the Rocky Mountains enters the state on the north about 100 miles east of the western boundary, and extends across the state in a southeasterly direction. To the west of this is the Bitter Root Range, which forms over half of the western boundary. Between these ranges lies a broad basin, whose surface is greatly diversified by numerous spurs and cross ranges. This region is remarkable for the beauty and grandeur of its scenery. In the northern part of the basin are the Kootenais, which extend

northward across the Canadian boundary. Other ranges worthy of mention are the Mission Range, extending north and south, and the Swan Range, east of the Mission Range and nearly parallel with it and culminating in Swan Peak (10,000 feet); east of these are the Big Belt Mountains, containing a number of snow-capped peaks. Near Yellowstone National Park are a number of short ranges. The mountainous portion contains many lofty peaks, some of the most noted being Electric Peak, 11,155 feet; Mount Powell, 12,000 feet and Gallatin, 10,967 feet. The highest point in the state is Granite Peak, 12,850 feet. Glaciers are occasionally found among these mountains, and most of the mountainous region is timbered with pine, spruce, tamarack and hardwood. One of the wonder regions of America—Glacier National Park—is in the northwestern part of the state, joining Rocky Mountains Park in Alberta.

The principal mountain range constitutes the "Continental Divide," which separates the basin of the Missouri from that of the Columbia. That portion of the state west of the Rocky Mountains is drained by the Clark River and its tributaries into the Columbia. The region east of the mountains is drained by the Missouri, which is the most important stream in the state. It rises in the extreme southwestern part of the state and flows northerly, then easterly, till it reaches the eastern boundary. Its chief tributaries are the Yellowstone and the Mussel Shell, flowing into it from the south. All of the streams flows through well-worn channels. The Missouri is navigable to Fort Benton, and the Yellowstone is navigable through the lower part of its course.

Climate. The climate is dry and, considering the latitude of the state, milder than one might suppose. Like other interior regions, Montana experiences a wide range of temperature. In winter it is occasionally as low as 40° or 50° below zero, while in summer it sometimes rises to over 100° above. The mean annual temperature for the state is about 11° for the coldest month and 70° for the warmest. The chinook winds give the region over which they blow much milder winters than it would otherwise have. Because of the dryness of the atmosphere, the changes in temperature are not felt to as great an extent as they are in regions near large bodies of water. The rainfall is light, averaging about twelve to twenty inches for the state. In the northwestern part of the state there is usually enough moisture for successful agriculture; but in other parts irrigation is advantageous, if not absolutely necessary.

Mineral Resources. Montana is one of the richest states in minerals, and the development of its mines has been an important industry. The state contains large deposits of bituminous and lignite coal, copper, gold, silver and precious stones. The great copper region is around Butte and Anaconda. Butte is the largest mining center in the world, producing of copper alone over 4,500,000 tons per year. Montana is next to Arizona in the production of copper, the output being worth in normal years over $80,000,000. Silver and gold are mined in numerous localities, and since the discovery of these metals in the state, Montana has produced many million dollars' worth. The bituminous coal is of good quality, and its annual production is constantly increasing; the mining of sapphires has also become an important industry, and the state contains valuable deposits of high-grade manganese ore.

Agriculture. The extensive use of dry farming has brought under tillage large areas of fertile soil in addition to that in the irrigated districts; the latter areas are constantly increasing. Under both methods abundant crops are raised, and agriculture is making great progress. The region is also well suited to raising live stock. Montana leads in the raising of sheep and the production of wool, its annual output of wool being about 26,000,000 pounds. Because of the mild climate in most regions stock can run at large through the winter without protection; hence, the eastern portion of the state is largely devoted to the live stock industry.

The western part of the state between the mountains usually has sufficient rainfall for agricultural purposes, though here irrigation is of great advantage. The chief crops are corn, hay, wheat, oats, potatoes and barley, in the order named. In the mountain valleys are found large orchards, as this region is remarkably well suited to the apples and other orchard fruits. Horticulture is here becoming an important industry.

Manufactures. The principal manufactures are directly or indirectly connected with the mining industries, and are pros-

perous. The most important consist in the smelting and refining of ore and the production of lumber. The greatest smelting works are located at Anaconda, Butte, Great Falls and Helena. Lumber is manufactured extensively in many towns. Coke is manufactured in the vicinity of the coal mines and is used in the smelters. In some localities there is slaughtering and meat packing, and the manufacture of flour and gristmill products is quite general. The chief agricultural sections are the valleys of the Bitter Root, the Flathead, the Yellowstone and the Gallatin. The latter produces fine barley.

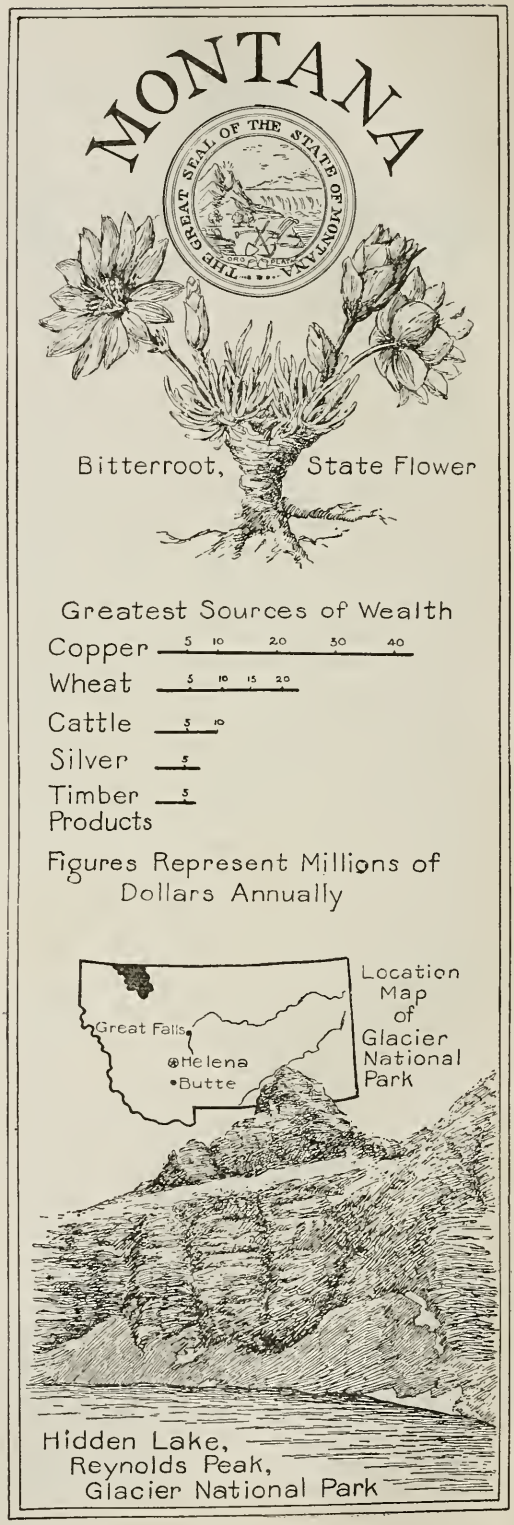
Transportation. Three great trunk lines of railway cross the state from east to west; the Great Northern in the north, with a mileage of 2,154 (in 1917); the Chicago, Milwaukee & Saint Paul in the center, and the Northern Pacific in the center and south; the latter has a mileage, owned and leased, of 2,234, the longest in the state. The Oregon Short Line enters the state from the south and extends to Butte, and the Chicago, Burlington & Quincy connects with the Northern Pacific at Livingston. Numerous branch lines connect with these trunk lines, and give the portions of the state through which they pass good railway facilities. There are areas yet without railway communication, and stages are the only means of conveyance.

Education. District schools must remain in session at least three months each year; the school age is from eight to fourteen years for all children, and to the age of sixteen for those unemployed. The University of Montana is at Missoula, the State Normal School is at Dillon, the state School of Mines is at Butte, and the College of Agriculture and Mechanic Arts is at Bozeman.

Institutions. The school for the deaf, blind and feeble-minded is at Boulder, the state orphans' home is at Twin Bridges, and the state soldiers' home is at Columbia Falls. There is a state hospital for the insane at Warm Springs, the penitentiary is at Deer Lodge, and the reformatory is at Miles City.

Cities. There were five cities in the state in 1918 each having more than 10,000 people. In order of size these were Butte, Missoula, Billings, Great Falls, Helena (the capital) and Anaconda.

Government. The state legislature consists of a senate of forty-one members, elected for four years, and a house of rep-



resentatives of ninety-five members, elected for two years. The legislature meets every two years, the session being limited to sixty days. The executive department consists of the governor, the lieutenant-governor, the secretary of state, the attorney-general, the treasurer, the auditor and the superintendent of public instruction, each elected for four years. The courts consist of a supreme court of three judges, elected for six years, and district courts each having one or more judges elected for four years. The local administration is by counties; no candidate for office may spend for election an amount exceeding fifteen per cent of one year's salary of the office to which he aspires. Such a law is in force in but few states of the Union.

History. The territory of Montana was first visited by the French in 1742, and later by Jesuit missionaries, fur traders and trappers. Most of it was included in the Louisiana Purchase of 1803, and it was explored by Lewis and Clark in 1805. The first permanent settlement was at Fort Benton in 1840. In 1861 gold fields were discovered, and the following year mining began in earnest. The territory was organized in 1864, being formed of a part of the old Territory of Idaho. In 1876 the Custer massacre occurred on the Little Bighorn River. The development of silver and copper mines and the construction of railroads brought prosperity to the region, and on November 8, 1889, Montana was admitted into the Union as the forty-first state.

Between the years 1907 and 1914 there was industrial discord in mining centers, and severe strikes occurred. Butte suffered most severely, nearly all labor being idle for considerable periods. The Flathead Indian Reservation was opened for settlement in 1910, and in the same year Congress established the Glacier National Park, a wonderworld of 1,400 square miles. See Glacier National Park.

Woman suffrage was adopted in 1914. Montana was the first state to send a woman (Miss Jeannette Rankin) to the Congress of the United States as Representative. She served one term (1917–1919), then was defeated for a seat in the Senate. By large popular vote the state voted for prohibition, to become effective January 1, 1919. The legislature has empowered cities to adopt the commission form of government.

Items of Interest on Montana

The main range of the Rockies is the Continental Divide, which separates the drainage of the Missouri River system from the Columbia River system.

The Yellowstone River is navigable for 300 miles.

Though small lakes and waterfalls are numerous in the mountains, there is only one large lake in the state, Flathead Lake, twenty-seven miles long and about twelve miles wide, an enlargement of the Flathead River.

Moose and elk, once plentiful, are now found only occasionally in the wilder regions; mountain sheep, bears, wolves, coyotes and lynxes are also becoming rare.

There are about 5,000,000 head of sheep in Montana, yielding 35,000,000 pounds of wool a year; Montana stands second only to Wyoming in number of sheep and value of wool produced.

The mining of gold and silver has fluctuated greatly; gold has been of little importance since 1870, but the production of silver, almost entirely a by-product of copper mining, varied from $2,600,000 in 1881 to $22,000,000 in 1892 and less than $10,000,000 a year since 1916.

Questions

What is the area of Montana? How does it rank in size among the states?

Where is the main chain of the Rocky Mountains? Where are the Bitter Root Mountains?

Name the principal rivers and describe the drainage of the state.

What are the Chinook winds?

What are the leading crops?

Name the leading fruits raised.

How does the state rank in quantity of wool produced?

In the production of what mineral does Montana stand second? What are some other mineral products?

What is the most important manufacturing industry?

What woman did the state elect to Congress?

Related Articles. Consult the following titles for additional information:

CITIES

Anaconda, Butte, Helena, Billings, Great Falls, Missoula

OTHER TITLES

Bitter Root, Glacier National Park, Chinook, Louisiana Purchase, Copper, Missouri River, Dry Farming, Yellowstone River

MONTANA, UNIVERSITY OF, a state university, opened at Missoula in 1895. It now has departments of science, English, fine arts, history, economics, forestry, classics, literature, mathematics, modern languages, music, philosophy, public speaking, physical culture, engineering, law, pharmacy, journalism, domestic science, commerce and accounting, a school of education, an extension department and a summer school. The university also maintains a summer biological station. The income is derived from a grant of land made by Congress in 1892, and from state appropriations. There are about seventy members on the faculty, and over 500 students. The library contains 35,500 volumes.

MONT BLANC, *moN blahN,* meaning *white mountain,* is a celebrated mountain, the highest in Europe, belonging to the Pennine chain of the Alps, situated on the frontiers of France and Italy, near Switzerland. It is a huge mountain mass about thirty miles long, ten miles wide with numerous summits, some rounded, some sharp. The main part of the mountain and the highest summit, 15,781 feet, are in France. The southeast slopes are steep; on the northwest the contours merge into lateral chains. The highest summit is always covered with a great ice cap, from which glaciers perpetually creep downward in all directions. Of these glaciers, the most famous is the Mer de Glace. The summit of Mont Blanc was first reached in 1876 by Jacques Balmat, a mountain guide. In 1918 the French municipality of Chamonix changed the name of one of the peaks of the mountains to Wilson Peak, in honor of the President of the United States.

MONTCALM DE SAINT-VERAN, *mohN kahlm' de saN va rahN',* LOUIS JOSEPH, Marquis de (1712–1759), a French general. He entered the army in 1726, distinguished himself in several campaigns in Europe and in 1756 was appointed to the chief command of the French troops in Canada. He captured Fort Ontario, took Fort William Henry, on Lake George, and occupied Ticonderoga, which he successfully defended against a much superior force of British. He then withdrew to Quebec, where he prepared to meet the British in a decisive conflict. In July, 1759, the attack began, and the British were at first repulsed; but Wolfe led his forces to the Heights of Abraham, a plateau above Quebec, and there the two armies met. The French were driven back, and in the final charge both Wolfe and Montcalm were mortally wounded. Montcalm's last words were, "Thank God, I shall not live to see the surrender of Quebec."

MONT CENIS TUNNEL. See CENIS, MONT.

MONTE CARLO. See MONACO.

MON'TE CRIS'TO, a small island in the Mediterranean Sea, located twenty-six miles south of Elba and belonging to Italy. It is the seat of a penal colony. Dumas made this island famous through his novel, *The Count of Monte Cristo.*

MONTENEGRO, *mon ta na'gro,* a small Balkan state lying between Serbia and the Adriatic Sea. In August, 1914, it declared war against Austria-Hungary and Germany, because of sympathy for Serbia, and was soon overwhelmed in the southern advance of the Austro-Hungarian forces. The little kingdom then lost its identity as an independent state until the end of the war. The aged King Nicholas and his wife fled to Italy, and the seat of government was removed to a town in France. In the fall of 1918 the capitulation of the central powers brought about the restoration of the Montenegrin kingdom, which expressed a desire to unite with Serbia and the other states forming the Jugo-Slavic nation. This was accomplished, and Montenegro ceased to exist as an independent nation. The Montenegrins are a branch of the Serbian division of the Slavic race, and speak a Serbian dialect. They are related by ties of blood and tongue with the groups forming Jugo-Slavia, and their union with the new state is a logical procedure (see JUGO-SLAVIA).

Before the Balkan Wars (1912–1913) Montenegro had an area of 3,506 square miles and a population of 285,000. By the treaty of November 12, 1913, the area was increased to 5,603 square miles and the population to 516,000. The new Montenegro, however, was not much larger than the state of Connecticut. Cettinje, the capital, is a town of about 5,500 inhabitants.

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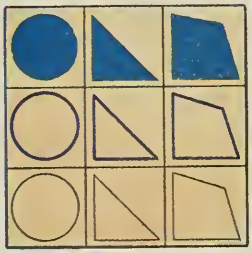

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THE MONTESSORI METHOD

1—Spools for use in teaching colors. 2—Script letters of sandpaper. 3—Board to educate the sense of touch. 4—Plane geometrical forms. 5—The "Tower." 6—Weights to teach size. 7—Apparatus for teaching knotting, buttoning and lacing. 8—The "Long Stair."

Life is difficult in this rugged little country, which is almost wholly mountain and forest land. Cereals, tobacco, vines and potatoes are grown, but under primitive conditions. Men and women toil together in the fields. Stock raising is the most important branch of agriculture, and cattle, sheep, goats, wool, hides and skins are exported. The rural homes are poor, with straw roofs without chimneys, and usually with one door and one window.

The Montenegrins are a powerfully built people, physically among the finest in the world. In war they have frequently distinguished themselves. Their latest adventure in this direction before the World War was their alliance with Serbia, Greece and Bulgaria against Turkey in the first Balkan War (1912), and with Rumania, Serbia and Greece against Bulgaria in the second phase of that conflict in the next year. They went joyfully into the conflict against Turkey, for the Turks had ruled Montenegro as a part of their empire from 1862 to 1878, and as cheerfully fought Bulgaria in the second Balkan War.

Related Articles. Consult the following titles for additional information:

Balkan Wars
Cettinje
Serbia
World War

MONTEREY, *mon ta ray',* MEX., capital of the state of Nuevo Leon, about 100 miles from the Texas frontier, on the Santa Catalina River. It is a well-built city, with some fine buildings and well-kept streets. It has a considerable transit trade and manufactures woolen goods and carriages. Mineral springs in the vicinity, an agreeable climate and beautiful scenery makes Monterey a popular winter resort for Americans when Mexico is in a state of peace. Population, 1910, 78,528.

MONTEREY, *mon te ra',* BATTLE OF, an important battle of the Mexican War, fought September 21, 1846, between an American force of 6,700 men, under General Taylor, assisted by General Worth, and a Mexican force of 10,000, under General Ampudia. The battle lasted two days, and the Mexicans asked for terms of surrender. The easy terms granted by General Taylor provoked much criticism, but were generally approved by military experts.

MON'TE RO'SA. Next to Mount Blanc this is the highest mountain in the Alps, situated on the Swiss-Italian frontier. The mountain is a giant mass crowned by eight peaks, all exceeding 13,000 feet, the tallest being 15,217 feet. The chief composition of the mountain is gneiss. Iron, copper and gold are found. The ascent of Monte Rosa, first accomplished in 1855, is very difficult. The whole mountain top is covered with glaciers, and the eastern slopes are precipitous.

MONTESSORI, *mon te sahr'i,* MARIA (1870-), an Italian educator whose methods of teaching young children have been discussed vigorously throughout the world and widely adopted. They have not been productive of the same results in America as in Europe. She received a thorough medical training, and was the first woman ever granted the degree of Doctor of Medicine by the University of Rome. After her graduation she became intensely interested in work among mentally defective children, and a course of lectures which she delivered on the subject led to the establishment in 1898 of the so-called *Scuola Ortofrenica,* or "mind-straightening school," of which she was for two years director. Her results with feeble-minded children were looked upon as little short of miraculous, and she herself began to feel that methods which were so successful with defective children might benefit normal children also. After studying experimental psychology for a time in the University of Rome, she took charge of the *casa dei bambini* (children's houses), or infant schools, in the model tenements which the Good Building Association had erected in the slums of Rome. Interest in the methods which she has employed there has been widespread, and her writings have been eagerly read. Best known of these is *The Montessori Method.* In 1914 Doctor Montessori lectured in the United States. For a discussion of the principles governing her work see MONTESSORI METHOD, below.

MADAME MONTESSORI

MONTESSORI METHOD. Madame Montessori begins instruction in her system of teaching with training the senses, especially the sense of touch. This is true also of Froebel's work; but the latter uses playful methods and games, while the Montessori method is individual training. It is based on contrasts, which are also used by Froebel. The child is given rough and smooth articles, alter-

nately to handle, until he recognizes them well. The name of the quality is taught, but as few words as possible are used by the teacher, lest the child be confused. Similar exercises with colors are given, and after a time the child has exercises in sorting and grading the objects or colors. An immense emphasis is put on the personal action, or "self-activity" of the child; and the teacher must never push him on nor give the new exercise or word until he seems eager for it. This, too, is the method Froebel advocates; but the large numbers of children gathered in our kindergartens under the American school system are not favorable to it. Madame Montessori's work was first successful among very poor children; the parents were so eager to have them begin school that they were often taught to read and write when three or four years old.

The child first gets to know squares, circles, etc., insets in hollow blocks, by touch; he then has large script letters, set in the same way, and fills in outlines with colored chalk. Italian being a phonetic language, the sound is acquired with the name. The children are allowed to choose the forms they wish to outline, so there is no regular order used for the letters; but as they go from one to another, and make the successive sounds aloud they soon discover they are the sounds made in pronouncing words, and begin to make new combinations. Their delight when they find out that they can rearrange these at will, is great. A child will exclaim, "I can write, see, bread, meat, etc.," sounding the successive elements of the Italian words for these, as he forms the letters. After this, reading is of course, only the discovery of the various ways in which sounds are combined in any words, and the children are eager to go on.

It is well to bear in mind that Madame Montessori's system involves constant supervision by the parent or teacher. It is true that liberty for the child is the essence of her plan, but it is not enough to give a child the set of apparatus and say to him, "Here's the Montessori method, take it." A Montessori directess must constantly watch, assist, inspire, guide, explain, correct. The best use of the Montessori system in the home will, perhaps, come from a thorough understanding of what it means. If the parents learn something of the value of child life, of its need for natural activity, of its characteristic methods of expression, of its limitless possibilities, the work of Madame Montessori will have its reward.

Exercises

In the application of this method there is a definite sequence in which the exercises should be used. This sequence is the result of experience in the Children's Houses.

First Grade. As soon as a child goes to a Montessori school he is taught to move the chairs or seats. This must be done without any noise. Then he may be given the exercises in lacing, buttoning and hooking, illustrated in the color plate, Figure 7. The child should see the parent or teacher do these things and should then be told to do the same thing. These are exercises in practical life. In the education of the senses the first apparatus consists of three sets of cylinders, one of which is illustrated by Figure 6 in the color plate. These cylinders should be used in the following order: first, a set in which the pieces are of the same height but of decreasing diameter; second, the set in which all dimensions decrease; third, those cylinders decreasing only in height. The cylinders should be put into their proper holes by the children. Here the child first begins to fix his attention, he makes his first comparison and his first selection. If he has placed a small cylinder in a large hole, he will soon find that he has a large cylinder which seems to fit nowhere. The box is thus a corrective and helps the child to form impressions of size.

Second Grade. Now the children should learn to rise and sit down in silence. They also learn to walk on a line without wavering from side to side. These are simple exercises, which any mother can show her child. The sense exercises in this grade deal with the "long stair" (figure 8 on color plate) and the tower (figure 5). The tower is built of cubes, the child soon learning that the largest cube must be at the bottom and the smallest at the top. The long stair is a set of rods of different lengths, each rod being divided into units one-tenth of a meter long. The children are early attracted by these sets, but they make many errors. Before the long stair is successfully completed they usually work with the "broad stair," a set of blocks of uniform length, but of varying height and width; when arranged they really look like stairs, the widest step at the top, the narrowest at the bottom.

By this time the child is able to fix his attention and maintain considerable interest. The education of the sense of touch is furthered by allowing the child to distinguish between rough and smooth. Alternate strips of smooth wood and sandpaper (as in figure 3) are used, the child being later blindfolded, so that only the sense of touch may be used. At this time also the first exercise in the use of color should be tried. This is called the "pairing of the colors," that is, the recognition of the identity of colors.

Third Grade. By the time the third stage in development is reached the children should be able to wash themselves, dress and undress themselves, dust the tables and learn to handle various objects with ease. Now is the time to introduce gradations in roughness, in color, and in weight. Work with the plane geometric insets (figure 4) should now begin. Here begins the education of the movement of the hand in following the contours of insets, an exercise which is a part of the preparation for writing. The use of the insets marks the transition from the concrete to the abstract. The solid insets are used first, the heavy outline forms next, and the thin lines last.

Fourth Grade. The children should now have advanced so far in the handling of objects that they can set and clear the table. They are also taught how to brush their teeth, clean their nails, and even to brush their hair. Meanwhile by the use of music and through walking on a straight line, they have learned to walk with freedom and perfect balance. They have also learned how to control their own movements, how to move objects without dropping them or breaking them. In the handling of geometrical insets they have advanced another step; instead of merely following the outlines with their fingers, they use pencils. The transition from geometrical figures to the letters of the alphabet is now easy. The child is given letters made of sandpaper (figure 2), which he is taught to recognize. The next step is the arrangement of these sandpaper letters in the form of words. The use of the long stair (figure 8) is continued and numbers are introduced up to 10, the child placing the proper number beside the proper number of blue and red sections on each rod.

Fifth Grade. In this advanced stage the exercises include drawing from nature (flowers, etc.), the use of water colors, the composition of words and phrases with the sandpaper alphabet, the writing and reading of words and phrases.

Summary. The parent and teacher will realize that all these exercises result in a gradual development of the senses, and a proper correlation of sense impressions. Size, weight, color, all mean something definite to these children. The progression of ideas follows the progression of exercises, as briefly outlined above. The exercises are divided into grades, not because the children are divided into grades, but because each child naturally advances in a more or less fixed order. One child may pass through the five stages in a year, another in two or three years.

List of Recommended Books. The literature on Madame Montessori and her work is constantly growing. The list below includes the best books on the subject; the more elementary and cheaper books being given first:

The Montessori System. Theodate Smith. Harper Bros.

Guide to the Montessori Method. Ellen Stevens. F. A. Stokes & Co.

Dr. Montessori's Own Handbook. Montessori. F. A. Stokes & Co.

The Montessori Method. Montessori. F. A. Stokes & Co.

The Montessori Method and the American School. Florence Ward. Macmillan Co.

MONTEVID'EO, Uruguay, the capital and leading seaport of the republic, situated on a peninsula on the north coast of the estuary of the Rio de la Plata, sixty-eight miles east of Buenos Aires. It is one of the best-built cities of South America and has an exceptionally fine climate. The principal buildings are a cathedral, a municipal building, a castle, a government building and a national museum. There is a university which has about 700 students. Within recent years large sums have been expended upon improvements of the harbor, which was originally inadequate for the city's commercial needs. These improvements included the construction of docks and breakwaters and the deepening of the harbor opening to permit entrance of the largest vessels. The chief exports are hides, wool, tallow, dried beef and other animal products. The chief imports are cotton, hardware and other manufactured articles. Montevideo sends out above half of the exports of Uruguay and receives all but a small fraction of the imports. Population, 1917, 376,163.

MONTEZU'MA, the Aztec emperor of Mexico when Cortez invaded the country in 1519. Influenced by an ancient prophecy, he at first welcomed the Spaniards; but when he discovered that they were not supernatural beings, he secretly took measures for their

destruction. Cortez, on learning of these, seized Montezuma and compelled him to recognize the supremacy of Spain. The Aztecs immediately rose in revolt and refused to be quieted by the appearance of Montezuma. While urging them to submission, he was struck on the temple with a stone and fell to the ground. Cut to the heart by this humiliation, he refused all nourishment, tore off his bandages and soon after expired. See AZTEC; CORTEZ, HERNANDO.

MONT'FORT, SIMON DE, Earl of Leicester (about 1208-1265), an English statesman, famous in the constitutional history of England. Although born in France, he identified himself with the English barons when they rose against Henry III and demanded the redress of grievances. Under the leadership of Montfort, the barons were able to wrest from the king a promise to abide by the measures known as the Provisions of Oxford. When the Pope absolved Henry from his agreement, Montfort objected and Louis IX of France was chosen as arbiter. The question was decided in favor of Henry, and in 1264 the nobles under Montfort took arms to compel the king to carry out his promises. The king was defeated at Lewes, was made prisoner and was compelled to make even more humiliating terms with the barons than had been made by the Provisions of Oxford. As virtual ruler of the country, Montfort summoned an assembly in 1265 which is memorable as the first Parliament at which representatives of the boroughs were permitted to hold seats.

MONTGOMERY, *mont gum'ur y*, ALA., the capital of the state, its third city in size, and the county seat of Montgomery County, 180 miles northeast of Mobile, at the head of navigation on the Alabama River, and on the Louisville & Nashville, the Mobile & Ohio, the Atlantic Coast Line, the Central of Georgia, the Seaboard Air Line and the Western of Alabama railroads. The city is situated on red clay bluffs and is surrounded by the famous black belt, which is productive of cotton, grain and many kinds of fruits and vegetables. Among the prominent structures are the state capitol, a fine Confederate monument, a city hall, a Federal building, a Carnegie Library and Masonic and Pythian temples. There is also a state normal school for colored people, the Woman's College of Alabama, an orphanage and Saint Margaret's Hospital.

The city is an important market for raw cotton and contains many cotton factories. Forests of yellow pine and deposits of coal, iron and clay are found in the vicinity, and some of the important establishments are foundries, railroad car and repair shops, brickyards, marble works and various factories. New Philadelphia was founded in 1817; East Alabama Town in 1818, and the two were united to form Montgomery in 1819. It was incorporated as a city in 1837, and nine years later it succeeded Tuscaloosa as the state capital. It was the seat of the Confederate government from February to May, 1861. Here the first Confederate Congress assembled. The commission form of government has been adopted. Population, 1910, 38,136; in 1917, 44,039 (Federal estimate).

MONTH, *munth*, a period of time derived from the motion of the moon, generally one of the twelve parts of the calendar year. *Month* originally meant the time of one revolution of the moon, but as that may be determined in reference to several celestial objects, there are several lunar periods known by distinctive names. Thus, the *anomalistic month* is a revolution of the moon from perigree to perigree, or the points of least distance from the earth; it has an average of 27 days, 13 hours, 18 minutes, 37.4 seconds. The *sidereal month* is the interval between two successive conjunctions of the moon with the same fixed star; average, 27 days, 7 hours, 43 minutes, 11.5 seconds. The *synodical,* or *proper lunar, month* is the time that elapses between new moon and new moon; average, 29 days, 12 hours, 44 minutes, 2.9 seconds. The *solar month* is the twelfth part of one solar year, or 30 days, 10 hours, 29 minutes, 5 seconds. The ordinary calendar months vary in length from twenty-eight to thirty-one days. February has twenty-eight days except in leap year, and September, April, June and November have thirty. All the others are months of thirty-one days.

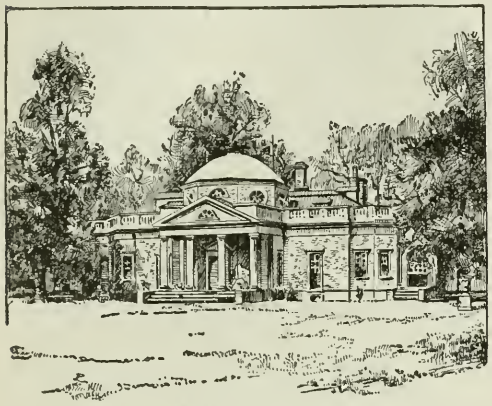
Related Articles. Each of the calendar months is treated in a separate article. For additional information consult the following titles:

Birthstones	Ides	Moon
Calendar	Kalends	Nones
Day	Leap Year	Year

MONTICELLO, *mon te sel'lo*, the name given by Thomas Jefferson to his home and estate in Albemarle County, Va., about three miles east of Charlottesville. The mansion was planned by Jefferson, who first occupied it in 1770, while it was still under construc-

tion. It was his home for fifty-six years, until his death.

MONTPE'LIER, Vt., the state capital and the county seat of Washington County, forty miles southeast of Burlington, on the Winooski River and on the Central Vermont and the Montpelier & Wells River railroads.



MONTICELLO

The city contains a handsome capitol, a granite structure built in the form of a cross and surmounted by a dome rising to a height of 124 feet. It also has the Heaton Hospital, the state library, Wood Art Gallery, Kellogg-Hubbard Library, Montpelier Seminary and a state arsenal. Admiral Dewey was born here. The principal industries are granite dressing and the manufacturing of saddlery, woolens, hardware and machinery. The place was first settled by people from Massachusetts in 1787, was made a town four years later and became the capital of the state in 1805. It was chartered as a city in 1894. Population, 1910, 7,856; in 1917, 7,950 (Federal estimate).

MONTREAL, *mon tre awl'*, Quebec, the largest city and commercial metropolis of the Dominion, and one of the oldest cities on the North American continent, situated on the island of Montreal, in the province of Quebec. This island is formed by the mouths of the Ottawa, where it empties into the Saint Lawrence River. The city is 164 miles southwest of Quebec, 420 miles by rail north of New York, and 2,760 miles west of Liverpool. Behind the city rises Mount Royal (Mont Réal), from which it derives its name. Situated at the junction of inland and ocean navigation, Montreal has a harbor with miles of wharfage, accessible to steamers of the deepest draught. There are numerous lines of steamships which have their Canadian headquarters at Montreal. It is also the chief terminus of the Grand Trunk Railway and the eastern terminus of the Canadian Pacific, and is entered by several American lines.

General Description. Montreal lies on the southeast shore of the island, which is thirty miles long and one-third as wide at the broadest part. Along the river front are great wharves, trackage, freight houses, grain elevators and other symbols of a vigorous commercial life, and back of this section lies the wholesale district. The retail and office district is located between the wholesale and the residential section, the streets of which climb the slopes of Mount Royal in a series of terraces. On the summit of the mountain is a beautiful public park of 460 acres. A series of long streets run in the general direction of the river front, and these are crossed at right angles by shorter thoroughfares which stretch between the river and the mountain. The main business streets are Craig, Notre Dame, Saint Paul, Saint James, Ontario, Wellington, Saint Catherine, McGill and Bleury; Saint Lawrence Street is the dividing line between East and West Montreal. Originally these divisions were respectively French and English Montreal.

Buildings. Gray limestone quarried in the vicinity, has been used quite generally in building construction, and the city possesses numerous handsome and dignified structures. One of the finest is the Bank of Montreal, built in the Corinthian style of architecture. It stands on the north side of the Place d'Armes, a small park in the heart of the business district. The south side of this square is occupied by the famous Cathedral of Notre Dame (see subhead *Churches*, below). The Royal Trust Building, a handsome structure of granite, is east of the bank, while the postoffice lies to the west. In the vicinity are a number of other substantial bank buildings, including the Bank of British North America. The courthouse and city hall, both noteworthy structures, occupy the north side of Jacques Cartier Square, on Notre Dame street. Opposite the city hall is a quaint old structure—the Château de Ramezay—formerly the residence of the French governor of Montreal, and now used as an historical museum. This is one of several picturesque buildings which have survived the old French period, and suggest to the vis-

itor the historic background of this modern city. Especially in the older part of Montreal, between Notre Dame street and the river, does one find these quaint relics of the past.

Churches. Montreal is one of the largest Roman Catholic cities in North America, and possesses many fine churches of that faith. Foremost among them is the Cathedral of Notre Dame, a massive example of composite Gothic architecture. It is one of the largest churches in the western hemisphere, having a seating capacity of 12,000. Another impressive cathedral is that of Saint James, which is a smaller model of Saint Peter's at Rome. A noteworthy feature is its lofty dome, above which shines forth at night a great cross lighted by electricity. The Jesuit Church, on Bleury Street, is also notable, possessing a series of beautiful fresco paintings. There are also several imposing Protestant churches, notably Christ Church Cathedral, Saint James Methodist and Saint George's Anglican.

Parks and Monuments. The small squares, or *places*, mentioned above, are a characteristic feature of Montreal. There are several of these miniature parks, many of them adorned with handsome statues or monuments. Dominion Square, between Windsor and Cathedral streets, is one of the most pretentious of these city parks. It is faced by Saint James Cathedral, the Y. W. C. A. building and the spacious Windsor Hotel, and contains a bronze statue of Sir John A. Macdonald and a monument to the Canadian heroes who fought in the Boer War. Mount Royal Park, on the mountain top, is beautified with flowers and trees, and is notable for the enchanting view it affords of the city and environs. Another attractive park is Saint Helen's Island, the largest of a group lying in the harbor.

Institutions. Public education in Montreal is under the direction of two separate boards, Roman Catholic and Protestant. Under both systems elementary, high school and college courses are available to students. At the head of the Protestant system is McGill University (which see), and at the head of the Catholic, Laval University (which see). Of the societies of learning, the most important include the Natural History Society, the Montreal Society for Historical Studies and various university organizations. McGill University has an exceptionally fine library, and the Jacques Cartier Normal School possesses a valuable collection of historical works. The books of the city public library are housed in a beautiful building in Lafontaine Park, in the eastern part of the city. The city possesses a large number of benevolent institutions and is especially notable for its hospitals.

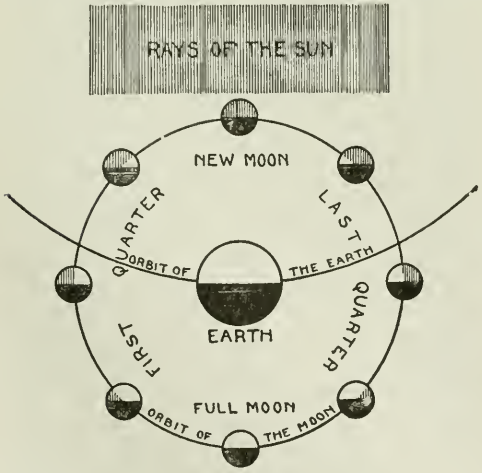
Commerce and Industry. About half the trade of Canada passes through the port of Montreal during the seven months when the harbor is open to navigation. The exports include lumber, grain, flour, dairy products and manufactures, and the imports, textile fabrics, iron and hardware, tea and sugar. The city is a prosperous manufacturing center, with an annual output approximating $200,000,000 in value. It has the largest flour mill in Canada, and produces large quantities of textiles, leather and leather goods, tobacco products, iron and steel goods and paper. In bank clearings, Montreal is surpassed only by five North American cities, the other four being in the United States.

History. Montreal was founded, under the name of Ville Marie de Montreal, in 1642, on the site of the Algonquin village, Hochelaga. It came into the hands of the English in 1760, when it was taken from the French by General Amherst. It was the seat of government of Lower Canada until 1849, in which year it was superseded by Quebec. Since the completion of the Victoria Bridge (1860), which permitted the Grand Trunk to enter the city, Montreal has developed steadily and enjoyed great prosperity. Population, 1916, 638,000.

MOODY, Dwight Lyman (1837-1899), an American evangelist, born at Northfield, Mass. At the age of nineteen he engaged in missionary work. During the Civil War and afterward he was a conspicuous missionary agent of the Y. M. C. A. in Chicago, where a large non-sectarian church was organized, with Moody, though not ordained, as its pastor. His success was phenomenal. Accompanied by Ira D. Sankey, the hymn singer, he made an evangelistic tour through England and later in the United States, visiting the largest cities, where the services caused a religious revival. In 1879 Moody opened a seminary for girls at Northfield, Mass., and in 1881, a seminary for boys. In 1886 he founded Moody Bible Institute, Chicago, a school of high rank for Bible students and missionaries.

MOON, a heavenly body that revolves about the earth in a nearly circular orbit and shines after dark with a silvery, mellow light. It is the only satellite that attends the earth, and to the inhabitants of that planet, it is, next to the sun, the most wonderful and interesting object in the heavens.

Measurements. The mean diameter of the moon is about 2,163 miles, or one-fourth that of the earth. Its surface is about 14,657,000 square miles, nearly four times the area of Europe, and about one-thirteenth the surface of the earth. The mean density of the moon is a little over one-half that of the earth, and a mass weighing one pound on the earth's surface would weigh less than three ounces on the moon's surface. No other heavenly body excepting meteors is so near to us, its average distance from us being about 239,000 miles. While the moon is making a revolution around the earth, it turns once on its axis and, accordingly, it always presents the same side to us. Exactly 27 days, 7 hours, 43 minutes and 7½ seconds, known as the sideral month, are required for this revolution. The



PHASES OF THE MOON

lunar month, or the time from one new moon to another, is a little more than 2 days longer.

Phases of the Moon. The changes in the appearance of the moon are known as phases. Our satellite is a dark globe, receiving all of its light from the sun, and this light reflected toward us makes the moon visible. When the moon is between us and the sun, its dark side is toward us, and it is invisible. This is the period of the new moon. When the moon has moved to a point at right angles with the sun, it is in the middle of its first quarter, and we see one-half of the side of it. When it is fully behind us, we see the full moon, or one-half of the moon's surface. When it is again moved to a right angle, we see again a quarter of the moon's surface. The *new moon* is the thin crescent seen in the west. If the sky is clear, we may then see the entire circle of the moon, the dark parts shining dimly by light reflected from the earth to the moon. A study of the accompanying diagram will make the causes of the different phases of the moon clear, if the reader will remember that the source of light is in the rays of the sun above the cut, and that the portions of the moon which are visible on the earth are white and the invisible parts are black.

Other Facts. An eclipse of the moon occurs when it passes into the earth's shadow; when it prevents the sun's being seen, there is an eclipse of the sun. With the naked eye we can see dark objects on the moon, often said to resemble the continents of the earth and also likened to the face of a man—"the man in the moon." Viewed through a telescope, the surface of the moon is seen to be dotted by mountains, many of which have been named after eminent scientific men. They are sometimes detached in precipitous peaks, but more frequently they form vast continuous ranges. The most prevalent form is that of the crater, sometimes eight to ten miles in diameter and showing evident traces of volcanic action. These craters look like circular forts, with walls sometimes two or three miles high. The interior of these rings is not usually flat and smooth, and oftentimes a mountainous cone rises from the center. Certain craterlike formations which have still greater diameter are generally spoken of as walled plains. Larger still are the gray plains which were at one time taken for seas, before the absence of water from the lunar surface was demonstrated. They may possibly be the floors of old seas. Some of the mountains have been estimated to be over 24,000 feet in height. Other peculiar ridges of comparatively small elevation extend to

great distances, connecting different ranges or craters. There are also valleys of various sizes, and "faults," or closed cracks, sometimes of considerable length. In reading descriptions of the appearance of the moon, it should be remembered that the highest telescopic power yet applied to that planet is only equivalent to bringing it within about 40,000 miles of the naked eye.

As the moon rotates so slowly on its axis, its days and nights are each about fourteen of our days long. During the lunar day the heat must be intense, and during its night, the cold is equally severe. No astronomer has ever been able to detect any water on the moon or any moisture or air surrounding it. With no water or air, human beings cannot exist on the moon; few changes of any sort can take place.

The influence of the moon on the earth and its affairs has always been thought to be great. At one time it was supposed to govern the weather; the time of planting and harvesting were regulated by its phases, and man superstitiously looked to the moon to regulate his affairs. While such things are believed no longer, it is known that the moon does exert remarkable physical influences on the earth, especially in regard to the formation of tides.

Related Articles. Consult the following titles for additional information:

Astronomy	Geology	Solar System
Earth	Harvest Moon	Sun
Eclipse	Month	Tides

MOONFLOWER, a genus of plants belonging to the *Convolvulus* family, which also includes the morning-glory, dodder and sweet potato. It is a climbing vine which produces broad, handsome, heart-shaped leaves and large, white, sweet-scented blossoms, shaped like morning-glories. The flowers open at night and close in the morning.

MOON'SHINERS, a term applied to secret distillers of whisky in remote mountainous regions of the south-central part of the United States, particularly in Kentucky and Tennessee. This unlawful business is conducted usually at night, to escape the attention of internal-revenue officers, hence the name applied to the operators. The people engaged in "moonshining" resent the imposition of a government tax upon the manufacture of liquor and the enforcement of prohibition laws. They are very resourceful in concealing evidences of their illicit calling, and they regard revenue officers as their enemies. The penalty upon conviction is imprisonment in a penitentiary.

MOONSTONE, a variety of feldspar, used to a considerable extent as a gem. It is either transparent or translucent, with a pearly luster and usually has a pale-blue gray or red tint. See FELDSPAR.

MOORE, JOHN, Sir (1761–1809), a celebrated British general, born at Glasgow. He had seen considerable service in the West Indies, Ireland, Holland and Egypt before 1808, when he was appointed commander in chief of the British army in Portugal, to operate against Napoleon. The failure of the Spanish army to coöperate heartily with him rendered many of his plans ineffective, but he advanced to Salamanca in spite of the gravest difficulties, only to learn of the fall of Madrid and the advance of a great army under Napoleon. He retreated to Coruña, a distance of over two hundred miles, but there found himself obliged to face Soult. Moore was killed in the battle.

MOORE, THOMAS (1779–1852), an Irish poet, born in Dublin. From Trinity College, Dublin, he went in 1799 to the Middle Temple, London, nominally to study law; but almost immediately he showed his preference for literature. His *Anacreon* was published not long after his arrival in London, and was soon followed by *Poetical Works of the Late Thomas Little,* a volume of rather sensual verse which increased his reputation. In 1803 he was appointed registrar of the admiralty court at Bermuda, but disliking the post, appointed a deputy and returned to England. In 1806 he published his *Odes* and *Epistles.* In the writing of verses for Sir John Stevenson's airs, published as *Irish Melodies,* Moore found the work for which his genius was peculiarly fitted. On them his poetic reputation will mainly rest. His most ambitious work, the Eastern romance of *Lalla Rookh,* was published in 1817 and brought its author $15,000. The *Life of Sheridan* was produced in 1825, and *The Epicurean,* a prose romance, in 1827. Next came the *Life of Lord Byron,* for which he received nearly $25,000, and the *Life of Lord Edward Fitzgerald.* His remaining works include *The Twopenny Post Bag,* lampoons on the prince-regent and his supporters; the humorous verses called *The Fudge Family in Paris; The Loves of the Angels,* and a *History of Ireland.*

MOORS. About the middle of the seventh century Arabian Mohammedans invaded Northern Africa, swept across Mauritania, or what now comprises the Barbary States, as far as the Strait of Gibraltar, took permanent possession of the country west of Numidia and gradually became assimilated with the original inhabitants, the Mauritanians. The descendants of these mixed races are known as Moors. In 711 the Moors crossed Gibraltar into Spain and, conquering the Visigoths, took possession of the peninsula. Not satisfied with this, they crossed the Pyrennes, intending to conquer Southern Europe, but in 732 they were met at Tours by Charles Martel, and there took place a conflict regarded as one of the decisive battles of the world, for the Moors were driven back into Spain south of the Ebro, and Europe was saved from Mohammedan rule.

There for centuries, art, science, literature and chivalry flourished among them. Their internal dissensions and divisions, however, weakened them in face of the new Christian kingdoms of Aragon and Castile, and before the close of the thirteenth century their possessions were limited to the kingdom of Granada (see ALHAMBRA). This too, was finally subdued by Ferdinand, in 1492; and while great numbers of the Moors emigrated to Africa, the remainder, under the name of Moriscos, assuming in great part a semblance of Christianity, submitted to the Spaniards. Philip II, however, excited a sanguinary insurrection among the Moors in 1568–1570, which was followed by the banishing of many thousands, and Philip III completed the work in 1610 by finally expelling the last of these, the most ingenious and industrious of his subjects. The expulsion of the Moors was one of the chief causes of the decadence of Spain; for both agriculture and industries fell into decay after their departure. The expelled Moors founded cities in Africa, and these developed into the Barbary states.

MOOSE, the largest member of the deer family, an animal of majestic proportions. A full-grown moose stands six or seven feet high at the shoulders, and sometimes weighs 1,200 pounds. The forelegs are longer than the hindlegs; this gives the animal an awkward appearance. Only the male has antlers, which are broad and flat, with a number of prongs. The male is called *bull moose.* The moose is clumsy, but it is fleet of foot and is a dangerous foe when at bay. The male will protect his family even to the point of losing his own life. In winter the animals herd together, several families being found

HEAD OF MALE MOOSE

in one group; in the summer they scatter, and individual pairs are found around lakes and streams. They are becoming scarcer every year, owing to the zeal of hunters, but are yet found in considerable numbers in the forests of Canada and Maine; there are a few in Northern Minnesota.

MOOSEHEAD LAKE, a lake in Maine, on the border of Somerset and Piscataquis counties. Its length is about thirty-five miles; its width, from one to ten miles. The Moose River and several other streams flow into the lake, while the Kennebec River and the Penobscot River flow out of it. The lake is navigable for steamboats. It is visited annually by many fishermen and tourists.

MOOSE JAW, SASK., at the junction of Moose Jaw River and Thunder Bay Creek, about forty miles nearly west of Regina and 400 miles west of Winnipeg. It is in the heart of the great wheat belt of Canada and is a large industrial center, the most important plants being flour mills, slaughter houses, bridge and iron works, and manufactories of automobiles, tractors, mattresses and brick and tile. The city is served by the Canadian Pacific, Canadian Northern and Grand Trunk Pacific Railways. The city owns an incinerating plant. Population, 1916, 16,889.

MORAINE, *mo rain'*, masses of rock and gravel carried and deposited by a glacier. The rock masses heaped up along the margins of the glacier are called *lateral* moraines; those formed at the confluence of two glaciers by two inner lateral moraines are called *medial* moraines. When the glacier in its downward movement reaches a region where the temperature is above freezing, the débris it has been carrying is deposited in mounds. Such deposits are called *terminal* moraines. The great terminal moraine of North America deposited in the glacial period extends from Long Island to the Dakotas and thence into Canada.

MORALITY PLAYS, a class of plays which began to be produced in Europe in the twelfth century and which link the medieval religious drama with the drama of modern times. Their immediate predecessors were the mysteries, dramatic representations of scriptural events only, and the miracle plays which were not confined to Biblical literature, but dealt with legends of the saints and the Church. The morality play marked a tendency to get still farther away from the sacred bounds, and while its theme continued to be ethical it was not essentially religious. The characters personified the vices and virtues. There were also allegorical figures, Riches, Poverty, Justice, Faith, Greed, and so on. The transition in the fourteenth century with these plays to the first modern plays began with the introduction of historical characters and types from real life. Within recent times public interest in the old morality plays was awakened by Ben Greet's production of the old English morality play *Everyman* and by two new plays, *Everywoman* and *Experience,* written on the same model.

MORALS COURT, a modern institution that reflects the new spirit of dealing with criminals and the wayward. In the morals court only persons accused of committing some form of vice are tried, and the attitude of officials in charge is one of sympathy rather than of hostility. The accused are regarded as persons who need help, and reform instead of punishment is the main purpose of the investigators. Social workers find the records of proceedings a valuable source of information. The city of Chicago established the first morals court in the world in 1913; in 1915 a similar court was organized in New York City.

MORATO'RIUM, a legal term, taken from the Latin, and meaning an extension of time for the payment of commercial or financial obligations. A moratorium usually takes the form of a decree and is issued by an executive, as the governor of a state, or by a legislative body. Its purpose is to provide relief for those, who because of some calamity, such as fire, flood, earthquake or war, are unable to meet obligations when they fall due.

A government sometimes declares a moratorium because of the interruption of some public service under their control. A moratorium can be extended by the same authority that declared it.

The duration of a moratorium and the region in which it is in force are stated in the declaration. Its effect is to stay legal action that otherwise might be brought for the collection of the obligations falling due. A moratorium does not release the debtor nor the indorsers of commercial paper from their obligations.

The interruptions in foreign exchange caused by the World War forced France and England to declare a moratorium several times during the conflict.

MORA'VIA, formerly a crownland of the Austrian Empire, lying west of Hungary, north of Lower Austria, east of Bohemia and south of Prussian Silesia and Austrian Silesia. In 1918, on the dissolution of the Austro-Hungarian monarchy, Moravia joined with Bohemia, Austrian Silesia and Slovakia in forming the Czecho-Slovak Republic. The area of Moravia is 8,580 square miles, and the population was estimated at 2,651,300 in 1912. The land consists of a plateau almost entirely bordered by mountains. The minerals are of considerable importance and include iron, coal, graphite and slate. The chief crops are rye, oats, barley, potatoes, flax and sugar beets. Fruit is very abundant, and large quantities of wine are annually produced. In normal years Moravia is a center of woolen manufacture. About seventy per cent of the inhabitants of Moravia are Slavs, and almost all the remainder are Germans. Roman Catholicism is the prevailing religion. The capital and chief city is Brünn. See Czecho-Slovak Republic.

MORAVIAN BRETHREN, also called United Brethren (*Unitas Fratrum*), a Protestant sect which sprang up in Bohemia and Moravia after the death of John Huss. At

first they spread and increased rapidly, but in time were nearly effaced by European wars and political upheavals. A revival came early in the eighteenth century and they built the town of Herrnhut, in Saxony, which later became a headquarters for the Church. The first Moravian immigrants to America sailed in 1735 and landed in Georgia, but removed in 1740 to Pennsylvania, where they founded a permanent colony. They built the town of Bethlehem, which became the Moravian center of North America and the seat of their American theological seminary.

The Church is not under a centralized government, as is the Roman Catholic, but is in four great independent divisions—the German, British, North American and South American. Each has an executive board and a general conference once every ten years. There are in the United States about 140 Moravian churches and about 21,000 communicants. The Moravians are active in missionary work, and are simple and earnest in their manner of living. Their fundamental doctrines do not differ appreciably from those of other Protestant churches.

MOR'DANTS, certain substances which dyers use for the purpose of fixing colors in fabrics. Among the mordants in common use are alum, several of the salts of iron, potassium, bichromate, tannic acid and certain "fatty acids" in the form of soap.

MORE, THOMAS, Sir (1478-1535), an English author and statesman, born in London. He was intended for the priesthood, but he turned to political life instead and entered Parliament in 1504. Through his opposition to the grants of certain moneys to Henry VII, he won the dislike of the king and soon left Parliament, but on Henry VIII's accession, various honors and offices were given him, and in 1517 he became a member of the king's council. This was quite contrary to his own wishes, as he did not enjoy life at the court. During the troublous times of the Reformation, More, while appreciating the need of Church reform, disapproved of Luther's extreme methods, and he supported Henry VIII in his defense of the Roman Catholic Church, and when Wolsey fell from power the king made More his successor. Henry found, however, when he wished to divorce Catherine and to break with the Church of Rome in consequence of its refusal to sanction the divorce, that More was by no means a tool in his hands. More resigned all his offices, and when, in 1534, he refused to take an oath subscribing to the measures which excluded Catherine's daughter from the throne and acknowledged Henry as head of the Church, he was imprisoned. The following year he was executed after a most unjust trial. The consternation which Europe felt at his death shows that he was ranked in his own day, as he is in ours, as one of the noblest characters of history. More is best remembered as the author of *Utopia*, a political romance, describing an ideal society on an imaginary island in the Atlantic.

MORELIA, MEX., *mo ra'le ah*, once called VALLADOLID, is the capital of the state of Michoacan, situated in a valley about 6,300 feet above sea level. It is about 125 miles west of the City of Mexico, has a mild and equable climate, is well built, has a cathedral, several fine churches and beautiful promenades. Cotton goods and tobacco are manufactured. Population, 1910, 40,042.

MOR'GAN, DANIEL (1736-1802), an American soldier, born in Hunterdon County, N. J. He removed to Virginia in 1753, accompanied Braddock's expedition two years later and distinguished himself on the frontier. On the outbreak of the Revolution he went at the head of a company of Virginia soldiers to Boston. He accompanied Arnold's expedition to Quebec and took command of the forces after Arnold was wounded. Fighting his way into the very heart of the city, he was captured, was later exchanged, became a colonel of a Virginia regiment and took a prominent part in the Saratoga campaign. He later joined Washington in New Jersey, resigned because of his disgust at the management of the war, but afterwards fought under Gates in the southern campaign. In command of the American forces at the Battle of the Cowpens, he won a memorable victory over Colonel Tarleton's cavalry. He was made a major-general in the army during the Whisky Insurrection and represented Virginia in Congress in 1796.

MORGAN, HENRY, Sir (1635-1688), a famous English buccaneer, born in Wales. When a child he was kidnapped and sold into slavery in Barbados, from which region he worked his way to Jamaica. There he participated in several buccaneering expeditions. In 1663, as master of a ship, he acquired fame by his daring attacks upon towns of the West Indies and Central America. His most famous exploit was the sack of

Maracaibo, where, after capturing the town, he led his men in pillage and the most terrible excessess.

MORGAN, JOHN PIERPONT (1837–1913), the most notable American financier of his generation, declared by some authorities the greatest that the country has produced. His genius for financial reorganization of crippled industry was almost unfailing. Morgan practically dictated the financial policies of many industries for years. He believed in "big business," in combinations of capital in a single industrial field, and under his counsel many so-called trusts were organized. He was disliked by the element that fears the power of money, and hated by radicals who preach that the possession of wealth is criminal. However, he was unmoved by public opinion. His personal life was above reproach; he was deeply religious, and he gave liberally to charity. He was America's greatest art collector, and was believed by the London *Times* to be the greatest that ever lived. Many of his valuable collections were given or loaned to the Metropolitan Museum of Art, in New York, of which great institution he was president at the time of his death.

J. PIERPONT MORGAN

Morgan was born in Hartford, Conn., and educated in Boston and at the University of Göttingen, Germany. In 1857 he secured employment in a New York banking house, and in 1860 became the American agent of George Peabody & Co., London brokers. Ten years later he became a partner of the Drexels, under the firm name of Drexel, Morgan & Co., which became the most important private banking house in America. In 1895 he was the leader of the syndicate which purchased $50,000,000 of the United States 4 per cent bonds; he was the leading spirit in the consolidation of railways, and he held a controlling interest in lines aggregating 50,000 miles in extent, besides owning ocean transportation lines and other large corporate interests. Perhaps his greatest achievement was the formation of the United States Steel Corporation.

One of the few failures recorded in his career was connected with the Northern Securities Company, a holding corporation for the Great Northern and the Northern Pacific railroads. In 1903 courts declared it to be a combination in restraint of trade. He died in Rome, Italy.

John Pierpont Morgan, (1867–), son of John Pierpont Morgan (see above), advanced to the post held by his father on the latter's death. He was born in New York and was graduated at Harvard University. The younger Morgan inherited nearly all of his father's great estate, including his priceless art collections. During the World War his business house negotiated many loans to the governments of the allies. He is a director and leader in many of America's great corporations.

MORGANATIC MARRIAGE. See MARRIAGE.

MORGANTOWN, W. VA., the county seat of Monongalia County, 103 miles south of Pittsburgh, Pa., on the Monongahela River and the Baltimore & Ohio, the Morgantown & Kingwood and the Monongahela railroads. The city has a large tin plate factory, a number of glass factories and other minor industries. Rich oil fields and extensive coal measures are near-by, and their development makes the city an important commercial center. The West Virginia University is located here, and there are two hospitals. Population, 1910, 9,150; in 1917, 14,444 (Federal estimate).

MORLEY, JOHN (1838–), Lord Morley of Blackburn, an English author and statesman, born at Blackburn, Lancashire, and educated at Lincoln College, Oxford. In 1889 he went to London and there for a time edited the *Literary Gazette*, then the *Fortnightly Review*, the *Pall-Mall Gazette* and *Macmillan's Magazine*. He was elected to Parliament in 1883 and some years later was made Secretary of State for Ireland. In 1905 he was appointed Secretary of State for India, and five years later became Lord President of the Council. He resigned the latter post in 1914 because he was opposed to Great Britain's participation in the World War. Morley's works include *Edmund Burke, Richard Cobden, Voltaire, Rousseau, Diderot and the Encyclopedists, Oliver Cromwell* and a *Life of Gladstone*, the last recognized as the authoritative biography of that statesman.

MOR'MONS, or **CHURCH OF JESUS CHRIST OF LATTER DAY SAINTS**, a religious organization founded by Joseph Smith, of Sharon, Vt., in 1827. Seven years previously, when he was only fifteen years old, the first two persons of the Trinity had, he claimed, visited him. The visit was repeated in 1823 and again in 1827, on which occasion there was delivered into his hands the golden plates of "The Book of Mormon." The plates were nearly eight inches long by seven inches wide, a little thinner than ordinary tin and bound together by three golden rings. The entire volume was about six inches thick, a part being sealed, and only that part which was unsealed was revealed to him, the other part being reserved for some future time. The letters, characters or whatever they might be called, were of very small size and beautifully engraved. They were in a language unknown to moderns, but called by Smith the "Reformed Egyptian." Accompanying the plates were the Urim and Thummim of Scripture, by means of which Smith claimed to have translated the records thus miraculously discovered.

Oliver Cowdery, a youthful associate of Smith's took down the words as Smith read them to him from the plates, and the first edition of the *Book of Mormon* was issued at Palmyra, N. Y., in 1830. Oliver Cowdery, David Whitmer and Martin Harris united in an affidavit, which prefaced the work, that they had been shown, by an angel who came down from heaven, the plates from which the book had been translated, and this testimony, was supplemented by that of eight other witnesses, including the father and two brothers of Joseph Smith, all of whom claimed to have seen the original plates. No one else was permitted to see them before they were returned to the angel from whom Smith received them. A farmer named Harris having supplied the necessary funds, the book was published, and the new sect of Mormons sprang into active existence and was the means of making multitudes of zealous converts.

The new sect met persecution from the start. Smith organized a church in Fayette, Seneca county, N. Y., April 6, 1830, and then, guided by a revelation, removed to Kirtland, Ohio, in 1831, where a bank was started, with Smith as president. In the same year a colony was founded in Missouri. In 1835 twelve apostles, including Young, were chosen, and soon after, a council of seventy. In 1838 the Kirtland bank failed, and Smith, accompanied by Rigdon, one of the leaders of the church, fled to a settlement of the sect that had been started at Independence, Mo. Here serious trouble broke out, and the denomination, to the number of 15,000 removed to the east bank of the Mississippi River, in Hancock county, Illinois, and established a new city, which they called Nauvoo. For the first five years the city prospered. Then the editor of the local paper published an article in which he threatened to denounce Smith and expose his immoral practices. The printing establishment was declared a nuisance by the Mormon authorities and was destroyed. This resulted in an outbreak that was quelled only by calling out the state troops. Joseph and Hyrum Smith were arrested and lodged in jail at Carthage, where they were shot by a mob, June 27, 1844. This is one of the historic incidents in the state.

Brigham Young succeeded Smith and under his leadership the Mormons emigrated to the valley of Salt Lake, Utah. Here they suffered many privations during a heroic struggle to form a new community. By irrigation they soon transformed the desert region into a fertile valley, where they have continued to increase in numbers and influence. Most of the difficulties with outside organizations, including the United States government, have arisen from the practice of polygamy. The followers of the original organization claim that the practice was introduced by Joseph Smith in accordance with a divine revelation. The members of the Reorganized Church of the Latter Day Saints, however, claim that the practice was introduced by Brigham Young after the Mormons reached Utah. The Lamoni edition of the *Book of Mormon* contains a strong denunciation of polygamy, and the reorganized branch of the Church has always opposed the practice.

Brigham Young was governor of Utah from 1851 to 1858. In 1882 Congress passed a law, since materially amended, requiring that polygamy be abolished, and in 1890 President Woodruff of the Mormon Church issued a decree forbidding polygamous marriages. The Mormon Church claims over 400,000 members in the United States. The Reorganized Church of the Latter Day Saints is an independent church. See LATTER DAY SAINTS.

MORN'ING-GLORY, the common name of a number of plants of the convolvulus family, all having handsome purple, white, pink or pale blue funnel-shaped flowers, which open for a short time in the early morning. The vine has dense foliage and grows rapidly, and for this reason it is much used as a screen for porches and as an ornamental cover for unsightly garden fences. The plant is sacred among the Japanese, who have developed wonderful varieties through careful cultivation.

MOROCCO, *mo rok'o*, a sultanate, almost entirely under the protection of France, and the largest of the Barbary states. It occupies the northwestern extremity of Africa, and is bounded on the west and north by the Atlantic Ocean and the Mediterranean Sea, and on the east by Algeria. Its southern limits, which are not definitely marked, touch the Sahara Desert. Morocco has an area of about 231,500 square miles, and a population estimated between 5,000,000 and 6,000,000. The land is crossed from southwest to northeast by parallel chains of the Atlas Mountains, from which run spurs to the desert and the seacoast.

Production and Industry. Morocco is a backward country, in which industry has made little progress. The French, however, are building roads and making other improvements, and it is declared that in time the country may be very productive. The articles produced in sufficient quantity for export include almonds, barley, olive oil, beans, wheat and maize. All the fruits of Southern Europe are cultivated to some extent, and cotton growing was introduced in 1911. As yet, the extent of agricultural production is far below the country's possibilities, though there was a decided stimulation of the industry during the World War. Morocco possesses valuable mineral deposits, including copper, iron, lead, antimony, sulphur, silver, gold and petroleum. These deposits are in large part awaiting development. The ancient manufacturing industries, including the making of choice Morocco leather, have declined almost to extinction.

The People. The most numerous element of the population are the Berbers, who cultivate the slopes of the mountains in a primitive way, and raise herds of goats, sheep and camels. On the plains live Arabs and Moors, while Jews are found in numbers in the towns. Most of the foreign trade is under Jewish control. The most important towns are Fez, Tangier and Morocco.

Government. Morocco has been a French protectorate since 1912. A sultan with despotic powers still reigns, but he is under the control of the French administration. At the head of that administration is the Resident-General, who is also Minister of Foreign Affairs. There are four capitals—Fez, Mequinez, Marakesh (Morocco) and Rabat. The seat of government in 1918 was Rabat. By a special treaty made in 1912 a concession was granted to Spain, whereby a Spanish zone was created along the Mediterranean coast. This zone is administered by an official called a *calipha*, chosen by the sultan from two candidates named by the Spanish government. The calipha is under the control of a Spanish high commissioner. An area of 140 square miles about Tangier is internationalized.

History. Morocco in ancient times formed part of Mauritania, and about A. D. 43 it was incorporated in the Roman Empire. In the latter part of the seventh century the Arabs spread over North Africa and took possession of the territory. When the Moors were driven out of Spain, after the fall of Granada in 1492, many of them settled in Morocco. In 1814 the slavery of Christians was abolished, and piracy was prohibited in 1817. The conquest of Algeria brought about complications with France, and the plundering of vessels by pirates has often caused trouble with European powers. In 1859 a war broke out with Spain, owing to attacks made by some of the wild tribes upon Spanish territory, and it resulted in a cession of land and the payment of an indemnity of $20,000,000 to Spain. By a treaty signed in March, 1912, Morocco became a French protectorate. During the World War thousands of Moroccans volunteered to fight for France, and gave an excellent account of themselves. Others were helpful as farm laborers and factory operatives. As a whole the protectorate gave convincing proof of cordial relations between the two countries.

Related Articles. Consult the following titles for additional information:

Arabs	Berbers	Morocco
Barbary	Fez	Tangier

MOROCCO, one of the capitals of the sultanate of Morocco, situated in the southwestern part of the country, ninety miles from the Atlantic, on an extensive and fertile plain about 1,500 feet above sea level. It is

about seven miles in circumference and is walled, though its walls and towers are in a dilapidated condition. The streets are unpaved, dirty, narrow and irregular, and the houses are small and mean. There are several open areas, used as market places, a covered bazaar and many mosques. Near the palace, which is in the southern part of the city, is the Jews' quarter, a walled enclosure about two miles in circumference. There are tanning and leather-dyeing establishments, but the manufacture of Morocco leather is not as important as it was formerly. During the Middle Ages the city was one of the chief centers of Mohammedan rule and was famous as a seat of learning, but it has none of its former splendor. Population, estimated, 50,000.

MOROCCO, a fine quality of leather, named for the Moors, who are said to have first developed the skill to make it. It is made from the skins of goats, therefore any leather made from calfskin or cowhide which is called morocco is not what it purports to be. The finest goat skins come from north and east of the eastern end of the Mediterranean Sea, particularly from the Levant. Specialists declare that some element in the soil or climate there breeds goats of finer quality than are found elsewhere in the world, but these animals everywhere yield their skins for the leather which is employed in the best bookbinding, in upholstering the better grades of furniture and in making fine shoes for ladies and children. See LEATHER.

MORPHEUS, *mor'fuse,* in classical mythology, the god of sleep, twin brother of Mors, death.

MORPHINE, *mor'fin,* or *mor'feen,* or **MORPHIA**, *mor'fi a,* the bitter narcotic principle of opium, first separated from it in 1816. Morphine forms, when crystallized from alcohol, brilliant colorless prisms. As it is very slightly soluble in water, it is never used alone medicinally, but it readily combines with acids, forming salts extensively used in medicine. In small doses it relieves pain; in large doses it causes death, with narcotic symptoms. It is very commonly administered medicinally by hypodermic injection. The habitual use of the drug is exceedingly injurious, and the "morphine fiend" becomes a perfect slave to his appetite. Those addicted to the use take large doses, many times larger than that which would kill any one who was not inured to the drug. They lose color and flesh, become weak and suffer terrible pains; their memories fail, they lose their moral sense, especially their regard for truth, and become helpless incurables.

MORPHOLOGY, *mor fol'o gi,* that branch of biology which deals with the form and structure of plants and animals. It embraces study of the life history of an organism and the growth and development of its parts, and searches for resemblances in the various forms. Plant morphology is sometimes called *structural botany.* Animal morphology lays the foundation for the study of physiology. It is through the study of morphology that material is obtained for a systematic classification of all plant and animal forms.

MOR'RILL, JUSTIN SMITH (1810–1898), an American political leader, born at Strafford, Vt. He was educated in the common schools and engaged in business, but soon entered politics and in 1854 was elected to the national House of Representatives. He was reëlected five times and in 1867 entered the United States Senate, where he remained until his death, an unprecedented record. He was always a leader and served on the most important committees. In 1857 he introduced a bill granting public lands for the founding of state colleges to teach agriculture, mechanic arts and allied subjects. The bill was vetoed by President Buchanan, but in 1861 was signed by President Lincoln. By virtue of this and a supplementary act passed in 1890 nearly seventy agricultural institutions have been established. (See AGRICULTURAL COLLEGE.) Senator Morrill is perhaps chiefly remembered, however, as the author of the Tariff Act of 1861, which was the beginning of the present system of high tariff.

MORRIS, GOUVERNEUR (1752–1816), an American statesman and diplomat, born at Morrisania, N. Y. He was educated at King's College (now Columbia) and was admitted to the bar in 1771. Four years later he entered the provincial congress of New York. From 1777 to 1780 he was a member of the Continental Congress, and in 1781 he was appointed assistant superintendent of finance under Robert Morris. As a delegate to the Constitutional Convention in 1787 he acted with the strong government party and was always a strong supporter of Washing-

ton. He represented the United States as minister to France and to England and from 1800 to 1803 was United States Senator for New York.

MORRIS, Gouverneur (1876–), an American writer of fiction, the great-grandson of Gouverneur Morris of Revolutionary fame (see above). He was born in New York City and is a graduate of Yale University. Morris is known chiefly as a writer of entertaining magazine stories, some of them novels of considerable length. They include *The Voice in the Rice, If You Touch Them They Vanish, The Penalty* and *The Incandescent Lily.*

MORRIS, Robert (1734–1806), an American statesman and financier, and a signer of the Declaration of Independence. Morris was born in England, and emigrated to America at the age of fourteen. He amassed a fortune in business, and entered public life in 1775 as a delegate to the Continental Congress. When Congress fled from Philadelphia to Baltimore in 1776 Morris executed all the continental business, and in 1781 he became superintendent of finance. To meet the financial exigencies of the government he organized the bank of North America, and his financial skill was of the utmost importance to the cause of the Revolution. In 1787 Morris was a member of the convention which framed the United States Constition and afterwards he was United States Senator from Pennsylvania.

MORRIS, William (1834–1896), an English poet, artist and social reformer, born at Walthamstow, near London, and educated at Exeter College, Oxford. In the early years of his career religion was the chief occupation of his keenly alert and vigorous mind, and he had plans for forming a brotherhood, but abandoned the idea for art. In 1859 he married Jane Burden, a noted beauty who had been his model. With Rossetti, Burne-Jones and others he established at London, in 1861, a firm for designing and manufacturing artistic household furnishings; at this time he invented the Morris chair. Later he became interested in textiles, dyes, book illumination and printing. In 1890 Morris founded the famous Kelmscott Press, where many beautiful books, including some of his own, were printed.

Morris did more than any other man of his day to promote the doctrine that ugliness is sin and that all the things necessary for use in a work-a-day world, including even kitchen utensils, should be of graceful design and pleasing to the eye. From 1885 onward Morris was an active Socialist, writing and lecturing on socialistic subjects. His life is a fine example of an unselfish idealist, who gave of his time, his wealth and his genius for the betterment of mankind. He left numerous volumes of romantic prose and verse, which give him rank as one of the best of all English story-tellers. His poetic inspiration and power of sustained effort are revealed in the *Defense of Guenevere,* the *Life and Death of Jason, The Earthly Paradise* and *Sigurd the Volsung and the Fall of the Niblungs.*

MORRIS PLAN BANKS, financial institutions which are organized to make small loans to men who under regular banking rules, imposed by law, cannot borrow money from state and national banks. A man may possess every moral quality to make him a good loan risk, but banks will not listen to his plea for money if he cannot deposit security for the repayment of a loan.

A Morris Plan Bank will lend money to any man of good character. He signs a note, and on it secures the endorsement of two friends in his station in life whose reputations are good. He agrees to pay interest at regular banking rates, and thus is saved from the greed of "loan sharks." If the loan is for $100, the debtor pays $2 per week, or more, as he may desire; if payments lapse the endorsers are notified. Losses are less than one-tenth of one per cent.

This banking plan was introduced into America by Arthur J. Morris, of Virginia, who founded a Morris Plan Bank in 1900. Increase in number at first was slow; there were but fifteen in 1914, but in 1918 the number had increased to 103. State and national banks endorse the Morris idea, and their officers very frequently are among the stockholders and directors of the Morris Plan institutions.

In Europe banks conducted on this plan were very popular for many years before the World War. See Banks and Banking.

MOR'RISTOWN, N. J., the county seat of Morris County, eighteen miles west of Newark, on the Lackawanna, the Morristown & Erie, the New Jersey and the Pennsylvania railroads. During the Revolution Washington had his headquarters here for a time in the old Ford mansion, which now belongs to

the Washington Society and contains numerous relics. Four miles from the city is the state hospital for the insane. The city has Memorial and All Souls' hospitals, a Y. M. C. A. building, a public library and lyceum, Randolph Military Academy and a Young Men's Catholic Association. There are hosiery mills and a wire factory. The place was settled in 1710 as West Hanover, and in 1740 received its present name. Population, 1910, 12,507; in 1917, 13,410 (Federal estimate).

MORSE, Samuel Finley Breese (1791–1872), the inventor of the electric telegraph. He was born at Charlestown, Mass., and was educated at Yale College, where he devoted his time to chemistry and natural philosophy. After his graduation from Yale, he went to England to study painting under West. On his return to the United States he continued painting, and in 1826 founded the National Academy of Design, of which he was first president.

SAMUEL F. B. MORSE

On a voyage from Europe he worked out a plan for using electro-magnetism in telegraphy. In 1835 he showed the success of his apparatus through a half-mile of wire which he had strung around his room. Two years later he gave a public exhibition of the telegraph, and this is the date generally given for his invention. On his first appeal to Congress for aid in developing the system, he was refused. The next four years he spent in attempting to influence Congress to grant him the necessary appropriation for an experimental telegraph line. He was finally successful and received $30,000 for the construction of the desired line from Washington to Baltimore. This was finished in 1844 and was completely successful. Alfred Vail, a partner of Morse, did much by his skill and knowledge in perfecting the instruments Morse had invented. In the opinion of some, Mr. Vail was the real inventor of the telegraph, but in a controversy between Morse and Vail concerning some patents, Morses's claims were sustained. The actual facts are that Vail did not change the plan which Morse perfected; he merely improved the mechanical construction of the instruments.

In addition to the invention of the telegraph, Morse laid the first submarine telegraph across the bay in New York. He also took the first daguerreotypes ever made in America. He received distinguished honors from all countries and was elected to the membership of numerous scientific and learned societies. In 1857 the representatives of ten countries voted him $80,000 as a reward for his labor. In 1871 a bronze statue was erected in his honor in Central Park, New York. See Telegraph.

MORTALITY, Law of, the statement of the average number of persons who die in any assigned period of life, out of a given number who enter upon the same period. Tables and statistics upon which the law is founded are called *tables of mortality.* Such a table (for the United States and Canada) follows, the number of individuals of each class considered being 1,000:

AGE	DEATH RATE	
	OF MALES	OF FEMALES
Under 1 year	138.6	112.1
1 to 4	13.3	12.2
5 to 14	2.9	2.6
15 to 24	4.5	4.0
25 to 34	6.7	6.0
35 to 44	10.4	8.3
45 to 64	23.5	19.5
65 to 74	61.6	55.1
75 and over	147.4	139.2

The average age of Americans and Canadians at death in 1890 was 31.1 years; in 1900, it was 35.2, and in 1916 it was 40.7. Through better ways of living and the advancement of medical science, people as a whole are living longer than in decades past.

MORTAR, *mor'tur,* a vessel in which substances are pounded to a powder by means of a pestle. Mortars are made of wood, stone, iron, glass or porcelain. Those made of wood and stone were the first mills used for grinding corn. In colonial times, the small wooden mortar was a common household utensil and was used for grinding coffee and the seeds that took the place of spices. Small glass and porcelain mortars are used in chemical laboratories and by druggists in compounding medicines.

MORTAR, a large cannon, shorter than a howitzer or other common field gun, which is built for shooting at a steep angle. Most mortars are fired at an elevation of sixty

to seventy degrees. The projectile therefore falls upon its target and not against its side. Aimed at a war vessel the deck of the vessel instead of its side is the target; the interior of a fort is intended to be reached, instead of its walls; the hollow of a trench, instead of its protective earth and sandbags.

The usual range of heavy mortars is 12,000 yards—about seven miles; projectiles for these may weigh as much as 1,000 pounds. Such guns have a caliber of twelve inches. The greatest mortars developed in the World War were of German manufacture; these had a caliber of sixteen and one-half inches. The power of their projectiles nothing could resist; the forts of Liege, Belgium, supposed to be strong enough to resist any guns in Europe, were easily destroyed. The shell employed in the German monsters weighed 1,760 pounds, including 400 pounds of high explosive. Their extreme range was 15,000 yards—over eight miles. Some howitzers may be used as mortars. See HOWITZER; CANNON.

MORTE D'ARTHUR, *môrt dahr tur'*, a name, which, in old French means *death of Arthur,* is applied to several versions of the legend of King Arthur and his knights. The most celebrated of these is Sir Thomas Malory's, first printed in 1485. It has been a treasure-house for subsequent English poets from Spenser to Tennyson, and is immortalized in the latter's *Idyls of the King.* Among modern editions of the Morte D'Arthur are Israel Gollancz' ("Temple Classics") and Edward Strachey's ("Everyman" edition).

MORTGAGE, *mor'gaje,* in law, the pledge, but not actual conveyance, of an estate, real or personal, by a debtor to his creditor, as security for the payment of a debt. The debtor is called the *mortgagor;* the creditor, the *mortgagee.* The conveyance is subject to a proviso by which it is to become void upon repayment to the mortgagee of the principal sum secured, with interest, on a certain fixed day. Upon the non-performance of this condition, the mortgagee gains absolute ownership at law, but the property remains redeemable in equity during a limited period. In order to obtain absolute possession after there has been default in payment, the mortgagee has to file a bill of foreclosure against the mortgagor, calling upon the latter to redeem his estate forthwith, by payment of the principal money, interest and costs; and if the mortgagor fail to do so within the time specified by the court, he is forever barred from doing so, and the mortgagee becomes owner in equity, as he before was in law. In the event of a sale, any surplus beyond the amount due the mortgagee must be paid to the mortgagor. If personal property, or *chattels,* are pledged as security, the mortgage is known as a *chattel mortgage;* if real estate is pledged, it is known as *real-estate mortgage.*

What a Mortgage Should Contain. A mortgage must contain a precise description of the property involved, besides the statement of the amount due, the interest, the date and place of final and interest payment, and the names of the mortgagor and mortgagee. Usually a mortgage contains a clause—and it always should, for the protection of the lender—that the whole debt shall be due if the mortgagor (the borrower) fails to pay the interest on the mortgage or the taxes or other assessments against the property. Such a clause protects the holder of the mortgage against the possibility of having the property sold for unpaid taxes. Mortgages formerly also contained a clause empowering the mortgagee to sell the property at once upon the mortgagor's failure to pay the mortgage; most of the states now have laws requiring foreclosure proceedings. Even in states where no such laws exist, the courts have allowed the mortgagor a reasonable time in which to redeem his property. The courts have always favored the rights of the mortgagor, especially the right of redemption.

Following is a common form of mortgage:

THIS INDENTURE WITNESSETH THAT THE MORTGAGORS, William Bruce Clark and Emily Smith Clark, his wife, of the city of Chicago in the County of Cook and State of Illinois, mortgage and warrant to Chester M. Jones, of the city of Chicago, County of Cook and State of Illinois, to secure the payment of a certain promissory note, executed by them, bearing even date herewith, payable to the order of Chester M. Jones, the following described real estate, to-wit: a certain lot of ground, together with the buildings thereon, and all rights and privileges thereto belonging, known as number 237 Walnut Street, the said lot being number 49 in McCormick's subdivision in Lake View, situated in the city of Chicago, in the County of Cook in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois.

DATED, this second day of July, A. D. 1914

Witnesses

James Franklin McMasters
Charles Morse

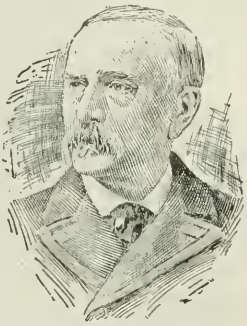
William Bruce Clark (Seal)
Emily Smith Clark (Seal)

Foreclosure. Foreclosure is the legal process by which a mortgagee acquires possession

of the property on which he holds a mortgage which is unpaid at maturity. Under the common law the mortgagor was given a reasonable time (depending upon circumstances) in which to *redeem* his property after the payment became due. The mortgagee institutes a bill of foreclosure praying that the amount of principal and interest due be computed and be paid on or before a certain date. If on the day fixed for payment the money is not forthcoming, the property is forfeited and the mortgagee is allowed to retain possession. This is called *strict* foreclosure, and is still the law in England and in some states of the United States. Most of the states, however, employ a method which differs from strict foreclosure in that the property is sold, not forfeited, to satisfy the debt. A foreclosure sale is ordered by a court of equity at the request of the mortgagee, the mortgagor being the defendant. The sale is made at public auction, after proper notice has been published, and is generally under the management of the sheriff or of a referee appointed by the court. The proceeds of the sale, over and above the principal of the mortgage, the interest and the costs of the proceedings, belong to the mortgagor.

If more than one mortgage has been given on the same property, the first mortgage must be paid in full. The holder of a second mortgage or third mortgage takes his chances on getting his money back from the proceeds of the sale over and above the amount due on the prior mortgage. Thus if a farm sells at a foreclosure sale for $8,000, subject to a first mortgage of $3,500 and a second mortgage of $1,500, both mortgages will be paid in full, and there will be a surplus for the mortgagor. If, however, the farm sold for only $4,700, only the first mortgage could be paid in full; the holder of the second mortgage would receive only $1,200, less the costs of the sale, and the mortgagor would receive nothing. The earliest mortgage, unless there is a definite agreement to the contrary, is the *first* mortgage, and has a prior claim.

MORTON, Julius Sterling (1832–1902), an American politician, born in Adams, Jefferson County, N. Y. He was taken in infancy to Michigan, studied at the state university and completed his education at Union College in 1854. In the following year he went to Nebraska, where he established the first newspaper in the state, the *Nebraska City News*. He was elected to the territorial legislature and was for a time acting governor. As the Democratic candidate, he was defeated in the election of 1866. In 1881 he was again an unsuccessful candidate for governor; in 1893 he became secretary of agriculture in President Cleveland's cabinet. He was a lover of nature, a great student of forestry and was responsible for the establishment of Arbor Day in Nebraska, a holiday devoted to the planting of trees, which has been adopted by many other states (See Arbor Day). He was an active member of the gold, or conservative, faction of the Democratic party, and up to the time of his death he edited a weekly paper called *The Conservative*.



J. STERLING MORTON

MORTON, Levi Parsons (1824–), an American financier, politician and Vice-President, was born at Shoreham, Vt. He graduated at Shoreham Academy and immediately entered upon a mercantile career, founding the banking houses of L. P. Morton & Co. and Morton, Bliss & Co., of New York, with branches and affiliated firms in London. In 1879 he was chosen to Congress from New York, two years later was United States minister to France and in 1889 was elected Vice-President of the United States on the Republican ticket with Benjamin Harrison. In 1895 he was elected governor of New York and served one term.

MORTON, William Thomas Green (1819–1868), a celebrated American dental surgeon. After studying at the Baltimore College of Dental Surgery he went to Boston, and continued his studies at Harvard. There he became acquainted with the anesthetic possibilities of sulphuric ether and began a series of experiments with animals. He obtained a patent for the use of ether in 1846, although another doctor also laid claim to the discovery. In 1852 he received the Montyon prize in medicine and surgery. Congress offered Morton $100,000 for his patent, but he refused to sell.

MOSAIC, *mo za'ik,* one of the fine arts, which was extensively employed in the Middle Ages and is to a certain extent practiced to-day. It is the most suitable decoration

that has ever been employed in connection with architecture, and the most costly. It is produced by piercing together, upon a bed of cement, bits of marble, stone, colored glass or other suitable material of different colors in such a way as to form an ornamental pattern or picture.

The art of mosaic decoration is of great antiquity. It was first employed in Egypt and Persia, and from there was carried to Greece and thence to Rome. At first it was used only for the pavements of temples, colonnades or such special public building, and the designs, worked out in marble or stone of two colors or black and white, were in the beginning simple geometric patterns in parallel straight lines. Gradually the designs became more and more complicated, figures were introduced and, later, elaborate compositions were evolved—historic and mythological scenes, landscapes, animal forms, portraits. The amount and magnificence of mosaic decoration employed at Rome and other wealthy Italian cities in the days of the Empire is almost unbelievable.

In recent times there has been a new interest in mosaic, particularly in the United States, owing to improvements in the manufacture of glass. The best American examples are in the Church of Saint John the Divine, New York City, and in the Wade Memorial Chapel, Cleveland, which compare not unfavorably with some of the mosaics of Saint Mark's, Venice, Saint Paul's, Rome, and other famous European examples.

MOSCOW, *mos'ko*, IDAHO, the county seat of Latah County, eighty miles nearly south of Spokane, Wash., on the Northern Pacific, and Oregon-Washington Railroad & Navigation Company lines. The University of Idaho and the State Agricultural College are located here. The principal industries of the region are mining, lumbering, farming, fruit growing and stock raising. There are tile and brick works, a flour mill, lumber yards and a number of grain elevators. There is a Carnegie Library and a Federal building. Population, 1910, 3,670.

MOSCOW, RUSSIA, the chief city and capital of the government of the same name, and capital of the Russian Empire from 1462 until 1703. After a lapse of 215 years Moscow again became the national capital, for after the rise to power of the Bolsheviki their leaders transferred the seat of government to that city on March 15, 1918, because of disorder in Petrograd and the nearness of that city to the theater of war. The description which follows applies to the Moscow of the czars. During the revolution there were riots and disorders, causing considerable property damage, besides great loss of life.

Moscow is located in a highly cultivated district on the Moskva, 400 miles southeast of Petrograd. It is the city where the former czars were crowned, and with it are connected many of the most sacred traditions of the Russian people. The Kremlin, which faces the center of the city, was for centuries the most sacred spot in Russia (see KREMLIN). To the east of the Kremlin is the portion of the city known as the Kitai Gorod (Chinatown), the commercial center. This is separated from the rest of the city by an ancient turreted wall. About the Kremlin and the Kitai Gorod extends the so-called White Town (Byely Gorod), and beyond the White City in a broad zone is the section known as the Earthen Town (Zemlyanoi). Outside of all of these quarters are the suburbs, which are larger than all of the rest of the city combined.

Among the chief buildings outside the Kremlin are the Cathedral of Saint Basil, the most striking building of Moscow, built in the sixteenth century; the modern Church of the Savior; the palace which Napoleon occupied while in Moscow, and the town hall. The principal educational establishment is the Imperial University, founded in 1755 by the Empress Catharine. It formerly had over 4,000 students, a rich museum and a library of 300,000 volumes. Moscow was the first manufacturing city in the empire, producing textile fabrics, hats, hardware, machinery, leather, chemical products and spirits.

The foundation of Moscow dates from the twelfth century, although the site was probably occupied long before. It became the capital of Muscovy and afterward of the whole Russian Empire, but was deprived of this honor in 1703, when Petrograd was founded. An important event in the history of the city was its occupation by Napoleon in 1812 and the burning of it for the purpose of dislodging the French from their winter quarters. In 1896, during a festival in honor of the coronation of Nicholas II, the crowd in Moscow was so great and excitement rose so high that over 2,000 people were crushed to death. Population of the city in 1910, not including the suburbs, 1,481,240;

according to reliable reports it was about 592,000 in 1919. See Bolsheviki; Russia.

MOSELLE, *mo zel',* a river which rises in France in the department of Vosges, flows northwest, then north, finally northeast, and after a winding course empties into the Rhine, at Coblenz. Its total length is about 315 miles, over 200 of which are navigable. The wines of the Moselle basin are famous for their delicate aroma. In the early fighting of the World War the German armies following the Moselle for miles in their invasion of France.

MOSES, *mo'zes,* leader, prophet and legislator of the Israelites, born in Egypt about 1600 B. C., during the time of the oppression of the Hebrews. His story is told in detail in these volumes in the article Bible, subhead *Bible Stories.*

MOSQUE, *mosk,* a Mohammedan house of prayer or worship. It conforms to no particular architectural styles, though it is commonly a square building with an arcade courtyard and surmounted by a dome or cluster of domes and flanked by slender, graceful towers called minarets, from which the muezzin summons the people to prayer. Inside there are no seats, but there are rugs for prayer, and numerous lamps. A fountain for ablutions is an indispensable feature of every mosque interior. The walls are often decorated with arabesques and inscribed with quotations from the Koran. The finest mosque in the world is that of Saint Sophia at Constantinople. Another celebrated one is at Cordova, Spain, built in the last quarter of the eighth century, when Mohammedans occupied that country. The main hall of this mosque is 534 by 387 feet, and the roof is upheld by a forest of columns, 856 in number.

MOSQUITO, *mos ke'to,* the common name of a group of insects first hated by mankind because of their annoying sting, and later because of the diseases they carry. Only the females torture humanity, but they are found in sufficient numbers to make the entire race unpopular. Mosquitoes are constant inhabitants of the warm regions, and during the summer they penetrate even to the arctic regions. In the United States there are about twenty-four species, all belonging to the same family.

The common mosquito may be taken as a type of the entire family. The female pierces the skin and sucks the blood of living animals. The proboscis or beak is needle-shaped, slightly enlarged at the end and covered with minute projections, that give it, when magnified, the appearance of a coarse, round file. It is particularly fitted for an instrument of torture and is the principal cause of the irritation that arises from the bites. The proboscis of the male is too weak to pierce the skins of animals, and it feeds on the juices of plants.

The eggs of the mosquito are laid in stagnant fresh water and appear in boat-shaped masses floating on the surface. Each mass is about a quarter of an inch in length and contains from 200 to 400 eggs, set on end in a single layer. In warm weather the eggs hatch in about sixteen hours, the larvae appearing as *wrigglers.* The larvae live in the water, are very active and feed upon minute aquatic organisms. They change to the pupa stage in about seven days under favorable conditions. The pupae float upon the surface and mature in two or three days, when the imago, or perfect insect, appears. The life-history of the mosquito during the summer is completed within a period varying from eleven to fourteen days, and the insects multiply very rapidly. During cool weather the period of transition is much longer, and many of the larvae remain torpid through the winter, to become perfect insects the next season.

EGG MASS AND SINGLE EGGS MUCH ENLARGED

PUPAE OF MOSQUITO

Transmission of Disease by Mosquitoes. The common mosquito in the United States, and in temperate latitudes generally, does not transmit disease, but in tropical climates there is a species whose bite is known to cause elephantiasis. Another species, the *Anopheles,* transmits malaria, and a third, the *Stegomyia,* propagates yellow fever.

All diseases communicated by mosquitoes are caused by germs (see Germ Theory of Disease). Elephantiasis is caused by a small, threadlike worm (*Filaria*), which lives in the lymphatic vessels of the skin. Its presence causes the skin to become thickened, rough, warty, livid in color and insensible to feeling. The worms multiply and pass from the lymphatics into the blood of the infected individual, where they are found

in abundance at night, when the patient is asleep. During the day, however, they do not exist in the blood. The young worms are sucked with the blood of the infected person into the stomach of the mosquito. They remain in the stomach about seventeen days, then penetrate the proboscis. When the infected mosquito bites its next victim the worms escape into the lymphatic vessels of the skin, and there they grow to maturity, multiply and produce elephantiasis.

Malaria Mosquito. The malaria mosquito can be easily distinguished from the common species by the spots on its wings. The parasite causing malaria is a minute protozoan, or animalcule, consisting of only one cell and known as *Hoemamoeba.* This parasite infests the red corpuscles of the blood, grows until it occupies the entire corpuscle, then divides into numerous spores, which escape into the liquid plasma of the blood and in turn infest other corpuscles. See MALARIA.

Yellow Fever Mosquito. The *Stegomyia,* or yellow fever mosquito, is found only in the warm regions. It resembles the common mosquito very closely, but it may be distinguished from it by the silver stripes on the thorax and the abdomen. While the nature of the yellow fever germ is not yet understood, experiments in Cuba in 1900, under the direction of Dr. Sternberg, surgeon-general of the United States army, seem to show conclusively that the disease is communicated by mosquitoes. The commission conducting the experiments constructed two rooms for the purpose. One was furnished with beds and bedding which had been used by yellow fever patients. The bedding was not disinfected or even washed. The room was not ventilated, nor open to the sunlight, but was screened.

Seven non-immune people occupied this room for several days, sleeping in the infected bedding and in some cases wearing the clothing of the yellow fever patients. None of them took the disease. The other room was arranged after the best hygienic plans and was occupied by seven other non-immune persons. Mosquitoes known to have bitten yellow fever patients were placed in this room, and six of the seven people came down with yellow fever. The conclusions of the commission are that yellow fever is not a contagious disease, like smallpox or scarlet fever, but that it is communicated by these mosquitoes and by them only.

How to Fight Mosquitoes. The results of these investigations point to the necessity of destroying mosquitoes, if the spread of the diseases described is to be prevented. Even the common mosquito should be warred against, for the sake of comfort. Destroying the breeding spots of the pests is the best preventive measure, and receptacles or places containing stagnant water should be eliminated in every community. Covering the surface of the water with a film of kerosene will destroy young mosquitoes. Of the animals that prey on mosquitoes the most useful is the dragon fly.

Related Articles: Consult the following titles for additional information:
Dragon Fly Malaria
Elephantiasis Yellow Fever

MOSQUITO TERRITORY, more popularly known as MOSQUITO COAST, is a narrow strip of territory in Central America, bordering the Caribbean Sea, which derives its name from the native Mosquito Indians. It is now a part of Nicaragua, but previous to 1906 was an object of contention.

From 1655 to 1850 it was a protectorate of Great Britain, but that country relinquished its claim because the United States objected to British influence so close to the proposed Nicaragua Canal. The Clayton-Bulwer treaty (1850) made the strip independent; in 1859 it was given to Honduras, but the Indians objected to this arrangement, and after years of diplomatic effort it became a part of Nicaragua, in 1894. Not until 1906, however, did all interested parties agree to leave it in permanent possession of that country. The only town of importance is Bluefields (population, 4,706), from which port there are large shipments of tropical fruits to New Orleans.

MOSSES, small, leafy-stemmed plants, growing usually in low, thick clusters, with a texture often of velvety softness. They form the botanical order of bryophytes. Mosses often form large and very pretty mats of living green in moist and shady woods. Some species grow on trees and stones, and some live on dry soil. They produce no flowers, but they bear spores in cuplike receptacles, that, when ripe, open and discharge their contents. When these spores fall upon the ground, they develop round, slender, thread-like bodies, upon which, in time, little buds appear, and from these buds grow the familiar moss plant, which again produces organs from which spores are formed.

Mosses are very hardy plants and have great power of multiplication, young shoots often springing from old ones which have apparently ceased to live. They can grow where nothing else but lichens can exist, and by their vigorous growth the mosses furnish soil for higher plants. Besides this, they help the higher plants by protecting their roots from cold and by filling up swampy places, which in time make good soil. The sphagnum mosses grow in bogs and wet places. While a portion of the stem dies each year, the tip continues to grow higher, and by this process dense beds many feet thick are formed. In time the stems in the lower levels become peat. Some mosses furnish medicines, and others are used as food, while a great many are suitable for bedding and for packing things easily broken. They are used more for such purposes in the Orient than in America or Western Europe.

MOSZKOWSKI, *mosh kof'ske*, MORITZ (1854–), a Polish pianist and composer. He was born at Breslau, and studied at Dresden and Berlin. When nineteen years old, he made his début in concert and after several successful tours settled at Berlin, though in his later years he was more closely identified with the musical life of Paris. Moszkowski wrote voluminously for the piano and among compositions in larger form, produced symphonies, sonatas and suites. Most popular of his works is *Spanish Dances*.

MOTH, the common name of a large group of insects resembling butterflies. A moth is distinguished from a butterfly in three important particulars. The antennae, or feelers, of moths are featherlike and usually taper to a point, while those of butterflies terminate in a knob; the wings of moths are horizontal when at rest, instead of being at an angle with the body; moths usually fly at night and butterfies by day. Butterflies are harmless, but some of the moths are injurious to crops, especially in the grub state, and one small species does incalculable damage to furs and woolen garments. There is one species, however, whose caterpillar spins the thread that makes silk, one of the most valuable fabrics used by mankind.

Related Articles: Consult the following titles for additional information:

Brown-tail Moth	Gypsy Moth
Butterfly	Insects
Caterpillar	Metamorphosis
Codling Moth	Silk
Death's-head Moth	Tussock Moth

MOTHER GOOSE, a beloved imaginary character, supposed to be the writer of those nursery rhymes that are the common possession of children of many lands. The grown-up person who is unable to repeat, at random, dozens of these jingles, is an exception. How and when they were first learned the average adult may not be able to recall, but in the early period of life they became a part of his nature, and he cannot forget them. There is a delightful mystery connected with the Mother Goose rhymes. They have been repeated in many different countries generation after generation, but nobody knows where they started. Like some of the fairy tales children love, they had their origin before printed picture-books were known.

It is almost certain that the name *Mother Goose* came from *Queen Goosefoot*, borne by a genial lady who is found in French legend. Charles Perrault, a French writer of the seventeenth century, issued a book of fairy tales in 1697, called *Mother Goose Stories*, and in 1760 a book of jingles called *Mother Goose Melodies* was published in London. This was the original book of Mother Goose rhymes printed in English, but since that time such books by the thousands have appeared. The pictures for them are often made by artists of high reputation, and no effort is spared to make them attractive.

Why is it, some people ask, that the Mother Goose rhymes hold their popularity? They are nonsensical, objectors argue; they make no pretense at teaching a moral lesson, and they have no educational value. Educators very generally agree that these rhymes are the natural beginning literature for children, and that they are of positive value in the development of the little ones. They afford an excellent channel for the exercise of the imagination and because they are humorous they add much to the little one's joy of life. Small children when normally trained are the happiest beings alive, and they respond instinctively to the gay spirit of the Mother Goose jingles. Moreover, these rhymes are a natural introduc-

tion to real poetry, for they have the swing and lilt that are characteristic of higher verse. A child who has learned the melodies in his nursery picture book will all the more readily feel the rhythm and music of the poetry he studies in school.

As to the moral influence of the Mother Goose melodies, this much can be said: They are always cheerful, even when they depict such disasters as Jill falling down hill after Jack, and if they have any effect on the child's character it is likely to be that of making him smile at his own misfortunes. Undoubtedly the child who would be harmed by learning the Mother Goose rhymes never will exist. (The reader will find some of the most popular of these rhymes in the article LANGUAGE AND GRAMMAR, under the section for the First Year.)

MOTHER-OF-PEARL, or **NACRE**, the hard, smooth, irridescent inner surface of several kinds of bivalve shells, chiefly those of the pearl oyster and river mollusk. This lining is destitute of coloring matter, but is composed of a series of minute and slightly overlapping layers, or ridges, which break up the light rays, thus producing beautiful rainbowlike hues. The large oysters of the tropical seas secrete a nacreous coat of sufficient thickness to render their shells valuable to manufacturers. Mother-of-pearl is extensively used in the arts, particularly in inlaid work, and in the manufacture of handles for knives, buttons and other small articles.

MOTHER'S DAY, a day set apart in the United States to honor mothers. The second Sunday in May has been thus selected, and the day is observed generally in churches by special sermons or other exercises. The wearing of a white carnation has been accepted as an appropriate expression of sentiment. Miss Anna Jarvis of Philadelphia was the first to suggest the idea of observing Mother's Day, on which everyone pays tribute to the best mother in the world—his own.

MOTHER SHIPTON, an Englishwoman who lived about 1640, whose sharp and prophetic tongue gave her the reputation of a sorceress. She prophesied many things, among them, "Carriages without horses shall go." Some people believe this to have shown occult knowledge of the coming of the automobile. *Mother Shipton's Prophesies* were published in 1681.

MOTHERS, NATIONAL CONGRESS OF. See CONGRESS OF MOTHERS, NATIONAL.

MOTHERS' PENSIONS, allowances paid to mothers to enable them to care for their children. Up to 1917 twenty-eight states had enacted the necessary laws to put such pensions in force. These laws vary considerably. In some states allowances are made to mothers with husband in prison or unable to work, while in others only widows may draw them. In certain states any needy mother is entitled to a pension, and in a few, allowances are granted to any parent, grandparent or guardian unable to care for a minor child. Pennsylvania grants pensions to widows or deserted wives with minor children. The sums paid vary according to the number of dependent children. In California, for example, the rate is $12.50 a month for the first child, with smaller amounts for additional children. The rate for the first child in Illinois, Ohio, South Dakota and Washington is $15 a month, and in Iowa, $2 a week. In many cases pensions are paid through the juvenile courts.

MOTION, LAWS OF. See DYNAMICS.

MOTLEY, JOHN LOTHROP (1814–1877), a distinguished American historian, born at Dorchester, Mass. After graduating from Harvard College he studied in Germany at the universities of Berlin and Göttingen and while there formed an intimate friendship with Bismarck. His earliest literary work includes numerous brilliant critical essays and two unsuccessful novels. From 1861 to 1867 Motley was ambassador to Vienna, and from 1869 to 1870 he was minister to London. Motley is chiefly noted for his works on the Netherlands, *The Rise of the Dutch Republic, The United Netherlands* and *The Life of John of Barneveldt.* The years which he spent in Holland in study for his work resulted in most accurate and trustworthy accounts, and his history is a standard for the period of which it treats.

MOTLEY

MOTOR BOAT, a small boat, larger than a rowboat, which is propelled by power furnished by a gas engine or, in some cases, by

electricity from a storage battery. Gasoline engines, usually less powerful than those employed in automobiles (the smallest are one-half horse power), are in almost universal use. It is not entirely proper to class as a motor boat a rowboat to whose stern can be attached at pleasure a one-cylinder motor. This is a small device which was first used in 1915.

A true motor boat is equipped with a permanently-placed engine, set as low as possible, with a driving shaft running from it to a screw propeller at the rear. The boat is constructed with a narrow bow, which maintains it well up in the water; the stern sinks quite low, so the propeller is at least a foot under water. The fuel tank is placed in the high bow, and the gasoline flows by gravity to the engine, thus making a pump unnecessary. The steering apparatus may be a small wheel, connected with the rudder by means of ropes, or it may be a hand-operated rod attached to the rudder. The speed of the average boat of this class is from five to fifteen miles per hour; larger boats with powerful engines may attain a speed of twenty-five to forty miles per hour. According to size a motor boat will accommodate from three to twenty or more passengers.

A racing type of motor boat is equipped with sets of wooden wings on the sides, slightly tilted upwards towards the bow, to lift the boat from the water when in motion. With such devices a speed of over fifty miles an hour has been attained.

MOTORCYCLE, a bicycle which is propelled by a small gasoline motor, equipped at the present day with two or four cylinders. As early as 1868 a steam bicycle was invented, and from that time there was constant effort to produce a practical machine which could be driven without effort on the part of the rider. The first motorcycles really worthy the name appeared in 1900, and since that date they have grown enormously in popularity.

The modern motorcycle is made heavier than a bicycle, that it may stand the strain of the engine and of the speed at which it travels. The average machine can easily be run at a speed exceeding fifty miles an hour; most riders on safe roads go at the rate of thirty-five to forty miles an hour. The two-cylinder machines require but a gallon of gasoline for approximately every fifty miles traveled.

The motor is much like that of the automobile, though it is small and built very compactly. It has the necessary carburetor, fuel and oil tanks, clutch, throttle, magneto, muffler, spark plugs, etc. The motor is always air-cooled, while this is true of only a very few types of automobiles. Motorcycles sell at prices ranging from $175 to $300.

Related Articles: Consult the following titles for additional information:
Bicycle Carburetor Gas Engine

MOTT, Lucretia Coffin (1793–1880), an American woman's rights advocate, born on Nantucket Island, educated in a Friends' School near Poughkeepsie, N. Y. and later chosen a minister in the Society of Friends. She and her husband were ardent supporters of emancipation and were members of the Anti-Slavery Society. Because Mrs. Mott was excluded with other women from the World's Anti-Slavery Convention in London, she and Elizabeth Cady Stanton began to discuss woman's rights and brought the subject before a convention at Seneca Falls, N. Y. Mrs. Mott was not only interested in abolition and woman's rights, but in temperance, the subject of permanent universal peace and many other questions concerning the uplift of mankind.

MOULDS. See Molds.

MOULTRIE, *mole'tri*, William (1731–1805), an American soldier, born in South Carolina. Though associated with loyalists, he early espoused the patriot cause in the Revolution, entered the South Carolina provincial congress, took command of a regiment of state militia and defended Charleston against an attack by Sir Henry Clinton, in March, 1776. For his service in repulsing a fierce attack by the British fleet under Parker, he was thanked by Congress, and the fort which he had built on Sullivan Island was named Fort Moultrie. He was also made brigadier-general, was given command of the army in the states of Georgia and South Carolina and was active in defending this territory. He was captured at Charleston in 1780, but was exchanged, and was made a major-general. He published, in 1802, *Memories of the Revolution*. He was chosen governor of South Carolina in 1785 and again in 1794.

MOUND BIRD, one of a group of fowls which have the common habit of building, for a nest, a large pile of vegetable matter, which, by the heat of its decay, hatches the

eggs that are distributed through it. The young are quite strong when hatched and make their way out of the pile of refuse and shift for themselves. The birds return to the same nesting place year after year, increasing the size of the mounds, and it is probable that several females use the same heap. The mounds vary in size and character with the species that builds them. The mound birds are principally natives of Australia, though some species are found in New Guinea and other islands. The Australian brush turkey is one of the largest and best known.

MOUND BUILDERS, the name given to the people who built the artificial hillocks or mounds which exist in the valleys of the Mississippi, the Ohio, the Missouri and their tributaries. The mounds are of earth or sand, round, oval, square and in some cases polygonal or triangular, varying greatly in height and size. Sometimes they are erected on the summit of a hill; sometimes they stretch irregularly across the plains.

The most important mound still in existence is that of Cahokia, in Illinois. This rises in the midst of about sixty others in four successive terraces, reaching an elevation of ninety-one feet and covering a surface of twelve acres. Some of the mounds appear to have been defensive works, others to have served for ceremonial purposes, and many were certainly burial places. The effigy mounds are the most curious. These are of diverse forms, grouped without any apparent order, representing men, quadrupeds, birds and reptiles. The most celebrated of these effigy mounds is the Serpent, on a hill overlooking Brush Creek, Adams County, Ohio. It now belongs to the Peabody Museum and is enclosed in a public park. The folds of the serpent give a length of 700 feet; in the mouth is an egg, represented by an elliptical mound, the large axis of which measures 160 feet.

Many of the mounds have been opened and have been found to contain pottery, weapons and other articles of primitive culture. The pottery was made of clay, dark gray in color, often with a shade of blue in it. Some of their vessels have a capacity of over ten gallons, others of several quarts. Some of the pottery is painted. Among the articles obtained from the mounds were necked vases; cooking vessels, sometimes provided with a cover and nearly always with handles; lamps, generally of black pottery; tureens or basins; cups, and pipes. At Mound City, Ill., four pipes were found, with human profiles of a singularly characteristic type. One pipe, representing a woman, will stand comparison with the Mexican sculptures, while one was found in Indiana representing on its opposite faces a death's head and the head of a goose.

The weapons discovered in the mounds consist mainly of arrowheads, made of quartzite, jasper, granite and many other kinds of stone, highly polished. Among the ornaments found are pearls, shells, perforated teeth of animals, bones of small birds, claws of wild beasts, rings and earrings of copper, the last sometimes covered with a film of silver.

Some writers claim that the present-day Indians are the descendants of the Mound Builders, which is probably not true; others hold that the race which raised the great mounds has disappeared, and that no additional information will ever be gained regarding these strange people.

MOUNTAIN, a mass of earth and rock rising in rugged majesty, higher than a hill, above the suface of the globe. An elevation of land ceases to be a hill at 2,000 feet elevation. Mountains are usually found in groups, systems, ranges or chains, though isolated mountains, due to volcanic action, are also found. The elevation of great mountain masses is due to movements of the earth's crust, but mountains of considerable mass have also been carved out by erosion. The highest mountain in the world is Mount Everest, one of the Himalayan range, which is 29,002 feet above the level of the sea.

There are three important methods of measuring mountains, namely, by the barometer, by observation of the boiling point of water, and by calculation from data procured by accurate surveying instruments, the necessary formulae being supplied by trigonometry. This last is by far the most accurate method. See PLAIN; PLATEAU.

The Highest Mountains. The world's nine highest peaks are in Asia; the next highest are in South America. Mount McKinley, in Alaska, is the highest in United States' territory, and Mount Whitney (18,501 feet), in California, is the most elevated in the United States proper. Following is a list of peaks with elevations exceeding 20,000 feet:

ASIA			
Mt. Everest	29,002	Mercedario	22,315
Godwin-Austen	28,280	Huascaran	22,188
Kunchinginga	28,156	Anconhuma	21,490
Gusherbrum	26,378	Illampu	21,192
Dhawalagiri	26,826	Huandoy	20,847
Kutha Kangir	24,740	Illimani	21,030
Nanda Devi	25,600	Pamiri	20,735
Mustaghata	24,400	Chimborazo	20,498
Chumalari	23,946	Tupungato	20,286
SOUTH AMERICA		Haina	20,171
Aconcagua	23,080	San Jose	20,020
		NORTH AMERICA	
		McKinley	20,300

MOUNTAIN ASH, a small tree of the rose family, distributed throughout Europe and North America. It is found mostly in high latitudes and the higher altitudes of more temperate regions. Of dwarfish growth, it is rarely more than thirty feet in height, and often occurs as a shrub. The graceful foliage, in some species compact, clusters of white flowers and red berries make it one of the most valued of ornamental trees. The wood of some species is very hard and is useful for making tool handles and other small implements, while the berries furnish food for birds.

MOUNTAIN LAUREL. See KALMIA.

MOUNT CARMEL, *kahr'mel*, PA., a borough in Northumberland County, seventy miles north of Harrisburg, on the Northern Central, the Lehigh Valley and the Philadelphia & Reading railroads. It is in a mountainous region near anthracite coal mines, and it contains manufactures of lumber, mining implements and supplies, clothing, flour, silk, shirts, cigars and other articles. Population, 1910, 17,532; in 1917, 20,709 (Federal estimate).

MOUNT DESERT ISLAND, now Lafayette National Park. See PARKS, NATIONAL, for description.

MOUNT STEPHEN, George Stephen, First Baron (1829–), a Canadian financier, born at Dufftown, Scotland. At an early age went to London, but emigrated to Canada in 1850 and entered his uncle's establishment in Montreal, later forming a partnership with him. In 1860 he purchased his uncle's interest in the business and entered largely into the manufacture of woolen goods. He was elected a director of the Bank of Montreal, and in 1876 was chosen president of that institution. From its organization until 1888 he was president of the Canadian Pacific Railway, and the successful completion of that gigantic enterprise is due largely to his energy, foresight and faith in the future of Canada. As a reward for his services in connection with the building of this railway, the queen created him a baronet of the United Kingdom in 1886, and in 1891 raised him to the peerage as Baron Mount Stephen.

LORD MOUNT STEPHEN

MOUNT VERNON, *vur'non*, the home and estate of George Washington, in Fairfax County, Va., on the right bank of the Potomac, fifteen miles south of Washington, D. C. The mansion was built in 1743 by Washington's brother Lawrence, and it was named after Admiral Vernon of the British navy. Washington's tomb is on this estate, a few hundred yards from the house, near a picturesque ravine. Washington bequeathed the estate to Bushrod Washington, who in turn left it to his nephew, from whom it was purchased in 1858 by the Ladies' Mount Vernon Association, and it is carefully maintained for its historic interest.

MOUNT VERNON, ILL., the county seat of Jefferson County, seventy-six miles southeast of Saint Louis, Mo., on the Chicago & Eastern Illinois, the Southern, the Wabash, Chester & Western and the Louisville & Nashville railroads. The city is in a fertile agricultural region, near extensive deposits of bituminous coal. It has a valuable trade in grain and live stock and contains manufactures of flour, lumber, cars, hosiery, catsup, and machine shop, creamery and other products. The supreme court building is an attractive structure, and there is a Carnegie Library. The place was laid out in 1819 and was incorporated in 1872. Population, 1910, 8,007; in 1917, 10,043 (Federal estimate).

MOUNT VERNON, N. Y., in Westchester County, on the Bronx River and an arm of Pelham Bay and on the New York Central, the New York, Westchester & Boston and the New York, New Haven & Hartford railroads. Adjoining New York City on the north, thirteen miles from the Grand Central Station, it is a beautiful residence suburb. There is a Carnegie library, a good city building, a Federal building, a hospital and many churches and schools. There are manufactures of machinery and clothing. The place was settled in 1852 and became a city in 1892. Population, 1910, 30,919; in 1917, 37,991.

MOUNT VERNON, Ohio, the county seat of Knox County twenty-five miles north of Newark, on the Baltimore & Ohio and the Pennsylvania railroads. The city is in an agricultural region, near natural gas wells, and it contains large locomotive and Corliss engine works flour and lumber mills bridge works and furniture and other factories. The city has a tuberculosis hospital, a library and a court house. Population, 1910, 9,087; in 1917, 10,877 (Federal estimate).

MOURNING, a term applied to some visible sign of grief for the dead. A generation ago it was the almost universal custom in Western nations to wear black garments for months after the passing away of a loved one. While this practice is still followed by some, the tendency is to modify it or do away with it altogether. The custom of wearing white to funerals is preferred by many; others wear no mourning at all. Physicians advise against the use of black because of its gloomy associations. In ancient times various other ways of showing grief were common. The Jews of Old Testament times rent their clothes and put on sackcloth and ashes; the Greeks shaved their heads and the Romans went about in disordered garments and with neglected beards and hair.

MOURNING DOVE. See Pigeon, subhead *Mourning Dove.*

MOUSE, a member of a group of small gnawing animals differing from the rat only in size. The house mouse, a pest only too familiar to the housewife, is found in various parts of the world. Wherever found it has the same description—large eyes and ears, long tail and characteristic gray color. The domestic cat is the most deadly enemy of the mouse. The *harvest mouse*, the smallest of quadrupeds, constructs a little globular nest of grass, entwined round and supported by the stalks of the corn or wheat. The common *field mouse* is a dusky brown, with a darker strip along the middle of the back, while the tail is of a white color beneath. The *short-tailed field mouse*, or *meadow mouse*, is not a true mouse, but is one of the voles. The dormouse (which see) is also of a different family. The jumping mice of America are more closely related to the jerboas than to the true mice. See Jerboa.

MOUTH, The, an opening through which food is taken into the alimentary canal, of which it is the first enlargement. It contains the teeth and tongue and is bounded above, at the front, by the hard palate, or "roof of the mouth," which separates it from the nose, and at the back, by the soft palate. The mouth is connected with the pharynx by the *isthmus of the fauces*, which has two muscular pillars on each side, between which are situated the *tonsils*. See Palate.

MOVING PICTURES, pictures reproduced in succession on a smooth, white, upright surface, so rapidly as to create the appearance of motion in animate and movable objects. They provide the world's newest amusement; they possess educational value of the highest type; they make a world-wide appeal, because the motion picture speaks a universal language.

Through the unwinding of the photographic film and its instantaneous flash upon the screen California makes known its beauties to Constantinople; Japan's blossom-laden cherry trees and lovely tea-gardens become familiar to villagers in every hemisphere; the voice of Christ is vibrant in the land of Confucius; mothers of a score of races learn how to promote the health of their babies; the fur-clad Eskimo is made aware of lands so warm that no clothing is needed by their people; the equatorial habitant may see frigid scenes whose discomforts he cannot sense; the Siberian peasant learns of harvesters, tractors and oil stoves; the rusty tongues of Babel and Rameses carry a message, reborn, to the twentieth century. There might be almost unlimited description of the universality of moving pictures; their creators often expend a fortune upon a single picture that it may be given a true geographical, racial and historic setting.

Even more important than creations built upon study and research are pictures of great events of permanent interest to the world. Instances which are impressive as showing the limitless value of this form of recorded history are moving scenes of battle, which all nations will reverently preserve for the knowledge of future generations; pictures of the surrender of the German grand fleet

to the allied navies, in December, 1918; of the meetings of the new Berlin government when Germany was torn by revolution; of the sessions of the peace conference of 1919.

No moving-picture program is complete unless there is added to the inevitable humorous film (which was once almost the sole ambition of the producer) others of more absorbing interest or of educational value. Extremely popular are dramatizations of great books, such pretentious works as *Les Miserables* and *The Garden of Allah* among them; and the artistic trappings and stage opportunities have attracted truly great actors from the "legitimate" drama to the films.

Development of the Industry. In the moving picture business the United States leads the world. Within a few years the industry has climbed to fourth place in amount of capital invested. In 1918 authorities declared that $250,000,000 was that year invested in the production of pictures. Six hundred million feet of film were produced in that year,—one-half more than in the preceding year. There are over 14,000 moving-pictures theaters in the United States, and they are attended daily by 15,000,000 people. Admissions were originally five cents. Later a few houses charged ten cents, and as interest grew and pictures became more worthy prices advanced in many cities to a regular fee of twenty cents and often more. Special productions have been billed at one dollar or more per seat.

Popular actors have been able within a few years to demand and to receive salaries greatly out of proportion to services they render mankind. It is true that Charles Chaplin, the comedian, received in one year a salary of $520,000—$10,000 every week. Other "stars" who could name their own salaries were Mary Pickford, Marguerite Clark, Will S. Hart, Nazimova and Douglas Fairbanks. These succeeded others equally popular for a few years, and may expect to be retired as new favorites appear.

How Pictures are Made. Moving picture cameras, of whatever design, use films of uniform width—one and three-eighths inches, including perforations on the sides for gripping. One linear foot of film will accommodate sixteen pictures. Cameras are of varying sizes; the average is about twenty-four inches high, fourteen inches in depth and five or six inches wide. It is provided with mechanism for taking a series of snapshots, the film unrolling for exposure from a reel on which there are several hundred feet. The film unrolls by imperceptible jerks; as each new section is halted for exposure it comes to an instant of complete rest, then moves on.

The film is taken to a dark room, there it is wound on frames, developed, rinsed, "fixed" and then given a final cleansing bath. Thus the *negative* is made. The negative is then cut and rearranged so the various scenes will appear in the order desired, after which the *positive* films are made, on other machines operated by electricity. Only positives are distributed to moving-picture theaters, and it is evident that many hundred positives are required to meet the demand for important pictures.

The films are marketed through exchanges established in all large cities. They are not sold; a film is leased for a day, two days, a week, or for a longer period, as desired. Sometimes a theater must pay as high as $100 per day for a film; the rate charged is determined in part by the expense of production (sometimes more than $200,000), and to a large degree by the seating capacity of the theater and the price charged for admission.

Showing the Pictures. Each theater is equipped with a projecting machine, which may be described as a stereopticon with an intricate mechanism for moving the film in front of the lantern for exposure. The film is moved one foot per second, and in that fleeting bit of time sixteen pictures are exposed, each picture halting for an instant while being exposed. In the instant while one picture is moving away after exposure and the next is approaching, the light is cut off by a shutter, which must open again while the next exposure is being made.

The First Moving Pictures. The first successful attempt to take photographs of a moving object was at a race track. A series of cameras was placed along the track and a string was stretched across it and fastened to the shutter of the camera. As the horse ran, he broke each string in succession, and twenty or thirty pictures of him were taken within the period of about two seconds. In 1893 Edison perfected a camera in which a long strip of sensitized film moved rapidly while light was alternately admitted and shut off from the lens. This was a wonderful in-

vention, but years were required to remove disagreeable features which detracted from the successful exhibition of a picture.

MOZAMBIQUE *mo zam beek'*, **CHANNEL**, the body of water which separates the island of Madagascar from the east coast of Africa. It is about 1,000 miles long and ranges in width from 250 to 600 miles, being narrowest in the middle. At the north entrance to the channel lie the Comoro Islands. A warm current flows through this channel which, on striking the shallows of the African coast to the south, produces one of the roughest seas in the world. The chief ports on the Channel are Beira, just north of which is the mouth of the Zambezi River, and Mozambique.

MO'ZART (German pronunciation, *mo' tsahrt*), JOHANN CHRYSOSTOMUS WOLFGANG AMADEUS (1756–1791), a German composer, one of the supreme masters of all time, and one of the most precocious genuises who ever lived. At Salzburg, his native city, his father began to teach him music when he was little more than a baby, and when the boy was five years old he composed minuets. At six he was taken with his little sister on a concert tour of Europe and everywhere created a furore. At the age of seven Mozart published several sonatas, and at eight could play the difficult works of Bach and Handel. After 1769 he spent much time in Italy, and the influence of the Southern sojourns is largely responsible for the balance of melodiousness and sunshine with German seriousness and vigor which are characteristic of his compositions. Mozart contracted a happy marriage with a member of the illustrious Weber family, and this, together with the joy afforded by creative work, were the sole earthly recompense for a short life of hard work and poverty, embittered by the enmity of jealous rivals.

MOZART

Mozart's productivity was almost incredible. He produced forty symphonies, twenty-five piano concertos, six violin concertos, and forty arias with orchestral part. His chamber music includes twenty-six string quartets, seven string quintets and forty-two sonatas for piano and violin. Those of his works most frequently performed are the operas *The Marriage of Figaro, Don Giovanni* and *The Magic Flute;* among sacred pieces, the immortal *Requiem,* the *Twelfth Mass* and the famous *Ave Verum,* and numerous sonatas, symphonies and pieces of chamber music.

MUCILAGE, *mu'si laje,* a jellylike preparation, made from vegetable gums and from starch. Many of the gums used for making mucilage exude from trees; some of them are found in the form of clear roundish tears, and some are obtained by extracting the mucilaginous substance from shrubs, quince, marshmallow and several others.

MU'CUS, a clear, sticky fluid, secreted by mucous membranes, forming a layer of greater or less thickness on their surface. It covers the lining membranes of all the cavities which open externally, such as those of the mouth, nose, lungs and intestinal canal, and it is renewed with more or less rapidity. Besides keeping these membranes in a moist and flexible condition, it also protects them against the action of the air, of the food and of the different glandular fluids that might otherwise inflame them.

MUD HEN. See COOT.

MUD TURTLE. See TURTLE.

MUEZZIN, *mu ez'in*, a Mohammedan official who is entrusted with the task of calling the time for prayers. He stands on a balcony surrounding the tower, or minaret, of the mosque, or at the side of the building. Five times a day is the call made, beginning, "Allah is great." The periods of prayer, observed by every devout Mohammedan, are dawn, noon, 4:00 P. M., sunset and nightfall. See MOHAMMEDANISM.

MUG'WUMP, a term in common use in a past generation, given to a citizen nominally affiliated with a certain political party, but who often voted for other candidates. It was applied to the Republicans who voted the Liberal Republican ticket in 1872, but it became especially common in 1884, as applied to those who called themselves "Independent Republicans" and refused to vote for James G. Blaine. To-day independence in voting characterizes both local and national politics. Party affiliations mean less than ever before.

MUIR, JOHN (1838–1914), an American geologist, naturalist and explorer. He was born at Dunbar, Scotland, and emigrated with his family to America at the age of

eleven. After four years of study at the University of Wisconsin, he began to explore the less known parts of North America, notably the western coast of Alaska, where he discovered the famous glacier that bears his name, and other parts of the Arctic regions. Subsequently he visited Australia and New Zealand, India, Manchuria, Siberia and Russia, South America and Africa. Descriptions of his travels were published as *The Mountains of California, My First Summer in the Sierra, The Yosemite,* and *Picturesque California.* John Muir strongly advocated preserving the forests and establishing natural parks, and he may be regarded as the originator of the conservation movement. Among the last of his published writings are *Our National Parks, Story of My Boyhood and Youth* and *Steep Trails* (1918).

JOHN MUIR

MUIR GLACIER, one of the largest and best-known glaciers of Alaska, named for its discoverer, John Muir (see MUIR, JOHN). It is situated at the head of Glacier Bay, and has a frontage of nearly three miles and an altitude varying from 150 to 210 feet. Its highest point probably extends 1,000 feet above the bed of the ocean. The glacier extends up the mountains for more than fifteen miles and covers an area of 350 square miles, but the actual area drained by it is estimated to exceed 800 square miles. The front presents a vertical or overhanging cliff, resembling in structure rugged, waterworn rock. From this cliff icebergs are constantly breaking and falling into the sea. See GLACIER.

MUKDEN, *mook'den,* or **MOUKDEN,** a town of China, capital of Manchuria and of the province of Shengking, about 400 miles northeast of Peking. It is surrounded by a wall, and has a second wall which includes the government offices, the palace and other important buildings. The tombs of the early rulers of the Manchu dynasty of China are located at Mukden. The city is connected with Port Arthur by the Manchuria Railway. During 1904 and 1905 several great battles were fought near Mukden (see RUSSO-JAPANESE WAR). Population, about 158,000.

MULAT'TO, a person one of whose parents is of the white, the other of the negro, race. Loosely speaking, a mulatto is any person having a mixture of white and negro blood; however, the child of a white person and a mulatto is properly called a *quadroon,* and the offspring of a quadroon and white person, whose blood is seven-eighths white and one-eighth negro, an *octoroon.*

MUL'BERRY, a genus of trees and shrubs distinguished by large leaves and fruit which in form and structure resembles the blackberry. These trees originated in Persia. Of the several species, the *common black mulberry* is the best known and has been cultivated for centuries because of its fruit, which is used as dessert and also preserved in the form of a syrup or light jelly. The *white mulberry* is the most interesting, because it furnishes food for silkworms. This

MULBERRY

tree has been introduced to some extent into the United States, in the hope that the raising of silkworms might become profitable. As yet, not much progress has been made.

The *red mulberry* bears a fruit of a rich, deep-red color. The *paper mulberry,* now much cultivated, belonged originally to Japan, where its bark is used in the manufacture of paper. The *Russian mulberry* is a small, hardy shrub that grows very rapidly and has been introduced into the Western United States as a hedge plant. See SILK.

MULE, a beast of burden, the offspring of a male ass and a mare. The animal has long ears, bushy tail, short mane and pointed hoofs. It has unusual powers of endurance, is rarely attacked by disease and is long lived. Mules are extensively bred in the Southern states, in Mexico, Spain and parts of India. In 1916 there were in the United States about 4,500,000 of these animals. Thousands of them were purchased by the allies for use in the World War, at prices ranging from $150 to $300.

MULLEIN, *mul'lin*, a large coarse weed, which produces both leaves and flowers on a single upright stalk. The leaves are large, and are covered with a whitish fuzz. The stalk terminates in a spike of yellow flowers. Of 100 known species, three are widely distributed in the United States—white, moth and common mullein. The average height of the plants is three feet. Formerly used for certain medicinal purposes, the plant is now regarded as not only without practical utility, but as a nuisance.

MULLENS, or **MULLINS**, Priscilla, the heroine of Longfellow's poem *The Courtship of Miles Standish*. With her parents and brother she was one of the colonists who came in the *Mayflower*. Her parents and brother died during the first winter at Plymouth, and soon afterward she married John Alden. Eleven children were born to them, and among their descendants was the poet Longfellow. See Alden, John.

MUL'LER, Friedrich Max (1823-1900), a celebrated German philologist, son of the poet Wilhelm Müller and commonly known as Max Müller. He attended the University of Leipzig, and there studied Sanskrit. One of his earliest scholarly undertakings was a translation of the *Hitopadesa*, a collection of Sanskrit fables. In 1846 he went to England and established himself at Oxford, where he became professor of modern languages, a position which he held until his death. He was a foreign member of the French Institute and received the degree LL.D. from Cambridge and Edinburgh. His numerous writings included an edition of the *Rig-Veda*, a *History of Ancient Sanskrit Literature, Science of Language, Chips from a German Workshop, On the Origin and Growth of Religion, Selected Essays, The Science of Religion* and *Natural Religion;* and he was the editor of the series of *Sacred Books of the East*, published by Oxford University. Although professor Müller advanced few original ideas, by reason of his enthusiasm, poetic imagination and readable style, he did more than any other scholar to awaken interest in the science of languages.

MULLET, one of a family of fishes extensively used for food. The mullets are nearly cylindrical in shape, have large scales and two fins on the back, far apart. They inhabit all warm waters and abound plentifully in the Mediterranean and in the Gulf of Mexico. At certain seasons they swim in shoals near the surface and are caught in nets. The *striped mullet*, considered the best, is the largest, weighing from ten to twelve pounds. It is successfully raised in ponds. Botarcha, made from mullet roe, is a favorite condiment in Southern Europe.

MU'LOCK, Dinah Maria. See Craik, Dinah Maria Mulock.

MULTIGRAPH. See Copying Devices.

MUM'MY, a dead body embalmed and dried after the manner of those taken from Egyptian tombs. An immense number of mummies have been found in Egypt, including not only those of human bodies, but of various animals, as bulls, apes, ibises, crocodiles and fish. They are yellow in color and light in weight. The processes for the preservation of the body were various. The bodies of the poorer classes were merely dried by salt of natron, a mixture of salt, saltpeter and sodium sulphate, wrapped up in coarse cloths and deposited in the catacombs. The bodies of the rich underwent the most complicated operations and were laboriously adorned with all kinds of ornaments. Embalmers of different ranks and duties extracted the brain through the nostrils and removed the entrails through an incision in the side; the body was then washed and salted, and after a certain period, the process of embalming, properly speaking, began.

This consisted, in general, in steeping the body for seventy days in a strong solution of natron. It was then washed and wrapped in linen bandages; each finger and toe was separately enveloped or sometimes sheathed in a gold case, and the nails were often gilded. The bandages were then folded round each of the limbs and, finally, round the whole body, to the number of fifteen to twenty thicknesses. The head was the object of particular attention; it was sometimes enveloped in several folds of fine muslin, the first glued to the skin, the others to the first,

and the whole was then coated with a fine plaster. Mummies have been found in Peru and in Mexico, but they are much less carefully preserved. Natural mummies are frequently found preserved by the dryness of the air. See EMBALMING.

MUMPS, a contagious disease of the salivary glands, which is accompanied by swelling along the neck, extending from beneath the ear to the chin. It may appear on one side of the face only, on both sides of face or first upon one side and then on the other. The premonitory symptoms are a soreness and stiffness of the jaw, with pain in the ear, which is soon followed by the swelling. Usually no treatment is necessary, except to keep the bowels regular and to protect the face from exposure to the cold. For several days after the swelling has subsided, a cold is liable to produce serious complications. Mumps occurs at any period of life between infancy and old age. It is a common childhood ailment.

MUNCIE, *mun'si*, IND., the county seat of Delaware County, fifty miles northeast of Indianapolis, on the White River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Lake Erie & Western, the Pennsylvania, the Chesapeake & Ohio and the Central Indiana railroads, all of which are connected by a belt line encircling the city. There are five electric railroads. The surrounding region contains deposits of natural gas and coal. The city has iron and steel works, automobile industries, glass factories, flour mills, canneries and manufactures of wagons, engines and clothing. The city leads the world in the manufacture of glass fruit jars. It contains a normal school, a courthouse, a city hospital, a public library and a Federal building. Population, 1910, 24,005; in 1917, 25,653 (Federal estimate).

MUNDELEIN, *mun'de lin*, MOST RT. REV. GEORGE W. (1869–), a Roman Catholic prelate, whose appointment as archbishop of Chicago, made him the youngest American Catholic holding such rank, and placed him in charge of the most populous diocese of the Roman Catholic Church. He was born in Brooklyn, N. Y., and educated at Manhattan College, N. Y. and at the College of the Propaganda, Rome. He was ordained priest in 1895, appointed monsignor ten years later, and in 1906 was honored with membership in the Ancient Academy of the Arcade. Three years later came his appointment as auxiliary bishop of Brooklyn, and in November, 1915, his promotion to the archbishopric of Chicago.

MUNGOOSE. See MONGOOSE.

MUNICH, *mu'nik*, GERMANY, the capital of Bavaria and one of the chief German centers of art and learning. It is situated on an extensive plateau, about 1,700 feet above sea level, chiefly on the southern bank of the Isar. The old town has a quaint and irregular aspect, but the new town, which has sprung up chiefly to the north and west, has a regular and imposing appearance, and altogether Munich is one of the finest cities in Germany. The center of the life of the city is the Max-Joseph-Platz. Here is located the royal palace, which forms a very extensive series of buildings, chiefly in the Italian style, and contains many magnificant apartments and artistic treasures. Connected with it are the court church and the court and national theater, one of the largest in Germany.

Munich is famous for its art galleries, especially the Old Pinakothek, or Museum of Painting, and the New Pinakothek, the Glyptothek, or Museum of Sculptures; the Kunstgewerbehaus, or Industrial Art Building, and the Schack Gallery. The great Bavarian National Museum is world-renowned. The royal library has over 1,300,000 volumes and is one of the richest libraries in the world. The university is normally attended by over 4,000 students and has a library of over 400,000 volumes. The city also possesses an academy of science, an academy of arts and many fine churches, including the cathedral, which dates from the fifteenth century. There are many beautiful monuments in Munich. The so-called English Garden is a fine park of over 500 acres, watered by two arms of the Isar. In 1917 there was opened in Munich the largest hospital for women in Germany. Brewing is the chief industry, and immense quantities of beer are exported. There are manufactures of leather, gloves, jewelry, glass, carriages and musical instruments; and the mathematical, optical and surgical instruments made in Munich are famous throughout the world. In the spring of 1919 the city was the scene of serious disorders due to attempts to set up a soviet government. Population, 1910, 596,467; in 1918, 608,124.

MUNICIPAL, GOVERNMENT, *mu nis'e pal*, the government of a city, town, village or other minor civil division of a state.

It is most often applied in common speech to the administration of the affairs of a city. The municipality is chartered as a separate governing body by the state and represents the state at the same time that it conducts the special activities of the city itself. For instance, in the matter of charity, the exercise of the police power, sanitation and the administration of justice, it is the agent of the state as well as of the city or village.

Government by Mayor and Council. Municipal government as organized generally throughout the world is administered in the majority of cases by a mayor and a common council, through executive boards, partly responsible to the mayor, partly to the council and partly exercising independent functions.

The mayor is elected by the people in the United States and Canada, but often by the council in some European countries. He is the head of the executive department of government and has the appointment of a large number of officials. The council may consist of one or of two houses. In the latter case the lower house is usually chosen directly by the people by districts; or wards; the upper house may be chosen by larger districts or for the city at large, or it may be especially appointed by the whole council from its own number. The councilmen, called aldermen, represent the wards, and there are two from each ward. In the hands of the council are most of the legislative functions, though the mayor usually has a veto power over its measures.

The above applies to a city government. A village is not divided into wards, but all the voters choose a village president and six trustees for two-year terms.

Commission Form of Government. A radical departure from the system above described, where authority is in the hands of many officials is a comparatively new scheme of control, under which the affairs of a municipality are entrusted to no more than five men. This enlightened form of administration is described elsewhere.

City Manager. The newest plan for centralizing responsibility in city affairs is found in the appointment of city managers. See list below.

Related Articles. Consult the following titles for additional information:

Alderman
City
City Manager
Commission Form of Government
Mayor
Municipal Ownership

MUNICIPAL OWNERSHIP, in general, ownership of anything by a municipality. The term is specifically applied to the ownership of public utilities, such as waterworks, lighting plants and street railways. There is a division of opinion as to the expediency of a city government managing other than the most necessary functions of government, such as the protection of property and the public health. In the United States, in 1800, there were fifteen private waterworks plants and one public; at the end of the century there were more than 1,700 public plants and fewer than 1,500 private. In 1917, of 180 cities of 25,000 or more people, 137 owned their water system; 805 cities owned their electric light plants, while over 3,200 were privately owned. In regard to other utilities there is more disagreement, only about three per cent of the cities in the United States owning their gas works; four per cent, their sewage disposal plants; not more than a half dozen cities, their street railway system. The other utilities, such as telephones, ferries, subways and public markets, are owned by cities in a few scattered instances.

In Great Britain and Ireland the proportion is even greater in favor of public ownership, and in Canada three-fourths of the cities own their own water plants. Canada is far more advanced in municipal ownership of public utilities than is the United States. See MUNICIPAL GOVERNMENT.

MUNKACSY, *mun kah'che,* MIHALY (1844–1900), a Hungarian painter whose real name was MICHAEL LIEB. He was born at Munkacs. After hard work and privations he was enabled to study at Gyula, Vienna, Munich and Düsseldorf, and in 1872 he settled in Paris. Among his best-known pictures were *Last Day of a Condemned Man; Milton Dictating Paradise Lost; Christ before Pilate,* his most famous picture; *The Crucifixion,* and *The Last Moments of Mozart.* Several examples of Munkacsy's art are in public and private galleries in America.

MUNROE, KIRK (1856–), an American writer of books for boys, was born near Prairie du Chien, Wisconsin. He studied civil engineering at Harvard, and afterwards while working on the routes of the Northern and the Southern Pacific railways gained information and experience of western life which fostered a love of adventure and later led him to give his attention to

literature. For a time he did newspaper work in New York City and was the first editor of *Harper's Young People.* Since his marriage, to a daughter of Amelia Barr, the novelist, he has made his home in Florida. His books are wholesome in tone, but not always historically accurate. They include *The Flamingo Feather, At War with Pontiac, Dory Mates, The Belt of Seven Totems* and *The Outcast Warrior.*

MUN'SEE, the most warlike group of the Delaware Indians, and the natural leaders of the tribe in all their councils. They were prominent in the early history of New York and New Jersey, but are now widely scattered throughout the United States and Canada. The Munsee are also called Wolf tribe, because the wolf was their symbol.

MUNSEY, FRANK ANDREW (1854–), an American magazine and newspaper owner, who has contributed much to the discussion of public questions. He is a "self made" man. His first employment was in a country store, then he became a telegrapher in Augusta, Maine, the home of numerous cheap magazines. He founded there the *Golden Argosy,* which, moved to New York, is now the *Argosy Magazine.* He has established *Munsey's Magazine, the Railroad Man's Magazine* and the *All-Story Weekly,* and has purchased the famous New York *Sun* and the Baltimore *News,* both daily newspapers. Munsey has written several books, but none of special merit. He was decorated by the French government in 1919.

MURAT, *mu rah',* JOACHIM (1767–1815), a French marshal and king of Naples from 1808 to 1815, was born the son of an innkeeper near Cahors. He early chose a military career and rose rapidly. Under Napoleon in Italy and Egypt he rose to the rank of general. Napoleon gave him his sister Caroline in marriage. On the establishment of the Empire honors were showered upon him. Marshal of the Empire, Prince of the Imperial House and Grand Admiral were among the titles he received. He rendered distinguished services in the battle of Austerlitz, Jena, Eylau and Friedland, in 1808 commanded the French army which occupied Madrid, and in the same year was proclaimed king of Naples under the title Joachim I. He shared the reverses of the Russian campaign in 1812, and in 1813 again fought for Napoleon, whose cause he deserted, however, after the Battle of Leipzig. He took up arms again in 1815 for Napoleon, but was defeated and forced to leave Italy. After the overthrow of Napoleon he escaped to Corsica, and later set sail for Naples in a foolhardy attempt to recover it. He landed at Pinzo, but was immediately captured, tried by a court martial and shot.

MURATORE, *mu'ra tohr,* LUCIEN (1878–), a French tenor, one of the foremost of present-day opera singers. After completing a course in the musical conservatory of Marseilles, his native city, he went to Paris and soon appeared with Calvé in *La Carmélite.* From that time onward his career was a brilliant success. In America he has appeared for several seasons as a member of the Chicago Grand Opera Company. His rôles include Faust, Romeo, Walther, Don José. His wife, Lina Cavalieri, is a well-known dramatic soprano.

MURCIA, *moor'the ah,* SPAIN, in the southern part of the country, capital of the medieval kingdom and modern province of the same name. It is situated on the River Segura, thirty miles north-northwest of Cartagena, and about twenty-five miles west of the Mediterranean Sea. Among the public buildings, the most important is the cathedral, with a façade which is a combination of Gothic and Romanesque architecture and which dates from the latter half of the fourteenth century. The episcopal palace is one of the finest in Spain. There are manufactures of woolens, silk stuffs, hats and gloves, powder, soap and musical instruments. Population, 1910, 125,057; 1917, estimated, 133,012.

MUR'DER, the act of killing a human being with premeditated malice. To establish the charge of murder it must be shown that the person committing the act was of sound mind and descretion at the time. The old common law rule, which classed together all murders, however their circumstances differed, and punished all the same, has been changed by statutory enactments, murders being divided into three classes, or degrees, according to the degree of moral culpability.

Murders of the first degree are those resulting from specific intent or from the commission of felony. The penalty is usually death or life imprisonment. Murder is distinguished from *manslaughter* by the absence in the latter of malice or evil intent. Manslaughter may result from accident, or may be due to neglect or to misdemeanors, in

which case the crime is *involuntary* manslaughter; if it arises from sudden intent, due to sufficient provocation, it is classed as *voluntary* manslaughter. Punishment for either varies from five years' to twenty-five years' imprisonment.

Related Articles. Consult the following titles for additional information:
Crime Felony Homicide

MUR'FREE, MARY NOAILLES (1850–), better known by her pen name, CHARLES EGBERT CRADDOCK, was a gifted writer whose stories of Southern mountain life are a genuine contribution to American literature. A native of Tennessee, she spent much time among the curious primitive folk of the Cumberland mountains and she wrote of them with keen sympathy and understanding. Her keen perception and familiarity with her subject are evidenced in such stories as *The Prophet of the Great Smoky Mountains, The Phantoms of the Foot-Bridge, A Spectre of Power* and in the collection, *In the Tennessee Mountains.* Among her latest books are *The Frontiersman, A Mountain Romance of Tennessee* and *The Story of Duciehurst.*

MUR'FREESBORO, BATTLE OF, or STONE RIVER, BATTLE OF, a battle fought near Murfreesboro, Tenn., Dec. 31, 1862, and Jan. 2, 1863, between a Federal force of about 41,000, under General Rosecrans, and a Confederate force of about 35,000, under General Bragg. Rosecrans was the aggressor, advancing from Nashville against Bragg's position at Murfreesboro. The opposing generals both planned to open battle on the morning of the thirty-first, and each intended to begin a vigorous assault upon the enemy's right wing. The Confederates were at first successful, the Federal offensive being converted into desperate defensive. After an all-days fight the Federals retained their position, though with fearful loss of men and guns. On the morning of January 2 the Confederates again opened a vigorous attack upon the Federal position, but did not gain any important advantage and at night withdrew. The net result of the battle was a strategic advantage for the Federals, though it was probably a drawn contest from a tactical point of view.

MURIATIC ACID. See PRUSSIC ACID.

MURILLO, *moo reel'yo*, BARTOLOMÉ ESTÉBAN (1617–1682), one of the greatest of Spanish painters, was born at Seville. Penniless, he walked from Seville to Madrid in 1642, and was fortunate enough to establish a friendship with Velasquez, who gave him shelter and procured for him permission to copy the masterpieces of the Royal Gallery. After six years he returned to Seville, where he married a wealthy lady; in that city he remained the rest of his life. He founded the Academy of Seville and became the head of the Seville School of painters. Unspoiled by wealth and fame, his style continually improved, his technic becoming more finished and his conception more idealistic.

Early in his career Murillo had painted with much skill and charm many pictures of humble life—ragged street urchins, vendors and the like; in his later years he did his best work on religious subjects. The *Immaculate Conception* was a favorite subject with him, and he painted it no fewer than fifteen times. Examples of Murillo's work are to be seen in all the large museums of Europe. A few of his pictures have been brought to America. While not so great a master as Velasquez, Murillo was nevertheless an unusual genius, and his canvases, such as *Moses Striking the Rock, The Miracle of the Loaves and Fishes, Vision of Saint Anthony* and the several representations of the Holy Family have been an inspiration to millions.

MURRAY, LINDLEY (1745–1826), an American grammarian, born at Swatara, Pa., of Quaker parents. At the age of twenty-one he was admitted to the bar and acquired an extensive practice in New York City. During the Revolutionary War he engaged in mercantile pursuits with such success that he amassed a fortune. On account of failing health, he then went to England and purchased an estate near Holgate, where he passed the remainder of his life engaged in literary pursuits. He is most widely known as the author of *Grammar of the English Language,* which was long used as a text-book in the schools of England and the United States. He was also the author of a spelling book, English exercises and several other text-books.

MURRAY RIVER, the largest river in Australia. It rises in the Australian Alps, in Victoria, flows for a long distance westward, forming the boundary between Victoria and New South Wales, then passes into South Australia, where it takes a southern direction and flows into the sea, after passing through a large shallow area of water

known as Lake Alexandrina. There is a sand bar at the mouth which impedes navigation, but small steamers ascend the river for hundreds of miles. Its total length is about 1,500 miles, and its chief tributaries are the Murrumbidgee and the Darling.

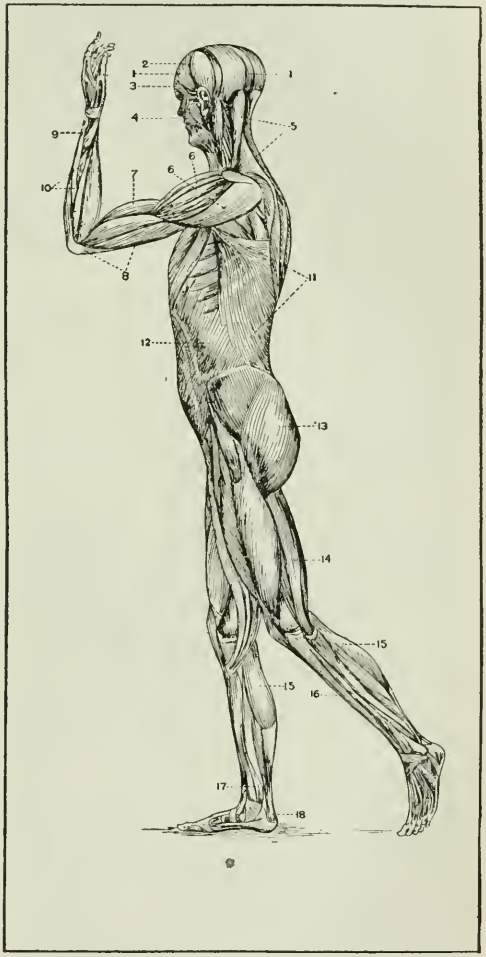
MURRUMBIDGEE, *mur rum bij'ee,* a large river in New South Wales, Australia. It rises in the Australian Alps, flows in a westerly direction and into the Murray. Its total length is about 1,350 miles, and it is navigable in the wet season, for small steamers, about 500 miles, but at other times, because of it shallowness, is of little commercial importance. Its chief tributary is the Lachlan.

MUSCAT', MUSKAT, or **MASKAT,** the chief city of the sultanate of Oman, a seaport on the Indian Ocean, near the east angle of Arabia. The town stands in a hollow, under cliffs 400 or 500 feet high. The streets are extremely narrow, and the town is one of the hottest places in the world. It has an excellent port, and is an important center of trade, exporting coffee, pearls, mother-of-pearl, dye stuffs and drugs, and importing rice and sugar. Population, with Matrah, adjoining, about 24,000.

MUSCATINE, *mus ka teen',* IOWA, the county seat of Muscatine County, on the Mississippi River, twenty-five miles below Davenport, on the Chicago, Milwaukee & Saint Paul, the Chicago, Rock Island & Pacific and the Muscatine North & South railroads. The city is located on high bluffs, and has a bridge crossing the river. It is an important industrial center, containing flour mills, pickle works, canning factories, foundries, machine shops, lumber mills, engine works, button factories and potteries. There is a considerable trade in lumber, fruit and agricultural and dairy produce. The city has several charitable institutions, two hospitals and the Musser Library. It was settled in 1833, and was incorporated six years later. Population, 1910, 16,178; in 1917, 17,713 (Federal estimate).

MUSCLE, *mus'l, or* **MUS'CULAR TISSUE,** the flesh, or lean meat, of the body, making up about one-half its weight and forming the organs of movement.

Classes of Muscles. Muscular tissue exists under forms, the *striped,* or *striated,* and the *unstriated.* The latter is made up of elongated, spindle-shaped cells, about $\frac{1}{600}$ of an inch in length, each of which has, near its center, a nucleus. The muscles composed of these fibers are called *involuntary,* because they are not under the control of the will. They receive their nerves from the sympathetic, or ganglionic, system (see NERVOUS SYSTEM). This tissue forms the muscular coats of the digestive canal, of the trachea and bronchi, of the blood vessels and lymphatics,



THE MUSCLES

1. Muscle of the scalp. 2. Temporal muscle. 3. The muscle that closes the eye. 4. Masseter muscle. 5. Trapezius. 6. Deltoid. 7. Biceps, the flexor muscle of the arm. 8. Triceps, the extensor muscle of the arm. 9. Extensor muscles of the thumb. 10. Extensor muscles of the wrist. 11. Broad muscle of the back. 12. Oblique muscle of the abdomen. 13. Glutaeus. 14. The flexor of the leg. 15. Gastrocnemius. 16. The extensor of the toes. 17. The flexor of the toes. 18. Tendon of Achilles.

of the ducts of glands and of parts of the eye. It is found in the true skin, where its

contraction under the influence of fear or cold causes the roughness known as *goose flesh.*

Striated muscular tissue exists in bundles of fibers about an inch in length, which are enclosed in an elastic sheath of thin membrane, called the *sarcolemma;* and these bundles, supported and protected by connective tissue, penetrated by nerves from the cerebro-spinal system, freely supplied with blood vessels and bound in a sheath, make up the *voluntary* muscles, those under the control of the will. A few muscles of this class cannot be controlled, as those of the heart, the internal ear and the pharynx. The name *skeletal muscles* is applied to this class, because so many are attached to bones, among the exceptions being those which surround orifices, as the eye or the mouth.

A third kind of muscular tissue is found in the heart. It has striped fibers similar to the voluntary muscles, but neither so long nor so wide; they contain a nucleus and are united by short branches. In its action the heart is like the involuntary muscles.

Characteristics. The peculiar characteristics of muscles are *contractility,* by which the fibers contract under such stimuli as are furnished by the nerves, by mechanical and chemical agents, by heat and by electricity; *elasticity,* by which the fibers return to their former position after the weight or power which stretched them has been removed, *tonicity,* or the slightly stretched condition in which ordinary muscles exist, even when entirely relaxed. This is shown in the gaping of a wound and in the lapping over of the ends of a broken bone.

MUSCLE READING. See MIND READING.

MUSCLE SENSE, or **MUSCULAR SENSE,** the sense which forms the basis of our perception of the direction and operation of movements of the body and also the amount of muscular force necessary to accomplish a given act. The muscle sense lies in certain sensory nerves that are distributed in the muscular tissue and have their centers in the brain. The function of these nerves is to discharge nerve impulses to the motor nerves of the muscle. This sense is capable of being highly educated, and upon its proper training largely depends one's skill in any manual occupation. See MANUAL TRAINING; REFLEX ACTION; SENSES, SPECIAL.

MUSES, *mu'zez,* in Greek mythology, the goddess of all the arts and sciences. Originally the muses were the nymphs of springs, especially the Pierian springs on the northern slope of Mount Olympus. In Homer they appear as the goddesses of song who sing at the banquets of the gods on Olympus. At first there seem to have been three muses, later nine. They sang to amuse the gods and in honor of great heroes among men. From the earliest times they were associated with the worship of Apollo, under whose direction they were supposed to sing. The early Greeks sometimes regarded the muses as the daughters of Uranus and Gaea, but later writers always speak of them as the children of Zeus and Mnemosyne (memory). Each presided over a branch of art or science—Caliope over epic poetry; Euterpe over lyric poetry; Melpomene, tragedy; Erato, erotic poetry; Thalia, comedy; Polyhymnia, or Polymnia, sacred hymns and pantomime; Terpsichore, choral song and dance; Urania, astronomy, Clio, history.

MUSE'UM, *mu ze'um,* an institution for the exhibition of objects that have an immediate relation to literature, art, science and history. The term means *the home of the muses* and was originally applied to temples sacred to the muses; its present application is of comparatively recent date. Well-conducted museums are valuable educational institutions, and naturally they are promoted in all the leading countries of the world.

The first attempt to establish a museum on a large scale in the United States was in connection with the Smithsonian Institution (see SMITHSONIAN INSTITUTION). The success of this led to the establishment of the National Museum (see NATIONAL MUSEUM OF THE UNITED STATES). There are also museums of art and natural history in nearly all large cities. Among the most noted of these are the museum in Philadelphia, established immediately after the Centennial Exposition; the Carnegie Institute at Pittsburgh, the Museum of Natural History and the Art Museum in Boston, the Metropolitan Museum in New York and the Field Columbian Museum in Chicago.

In Canada there is a museum in connection with the department of education in Toronto, and in the same city is the Royal Ontario Museum, under the patronage of the University of Toronto. There are several museums and historical exhibits in Ottawa. Among those in Europe of special note are

the museum of the Vatican at Rome, that of the Louvre in Paris and the British Museum, the greatest in the world. See BRITISH MUSEUM; LOUVRE.

MUSH'ROOMS, the common name for numerous species of fungi, many of which are edible. Mushrooms are found in all parts of the world, and most species are of a very

TWO VARIETIES OF MUSHROOMS

rapid growth. Certain classes are commonly known as toadstools and puffballs. While many varieties are edible, some are deadly poisonous.

Description. The parts of a typical mushroom are the cap, the gills, the ring and the stem. The cap is the expanded top, frequently umbrella-shaped. The gills are the thin plates on the under side of the cap, usually extending from the stem to its circumference; they bear the spores by which the mushroom is propagated. The ring is a growth around the stem, just below the gills, and is formed by part of the covering of the cap, left when the mushroom expands into its perfect form. The stem may be wanting altogether, as in the case of puffballs, or it may be short and thick or long and slender. The cap also takes a great variety of forms, some of them fantastic in the extreme. In young plants of some species, the cap, before breaking away from the ring, resembles a button, hence growing mushrooms are often said to be in the "button stage." Mushrooms take a great variety of colors, ranging from pure white to the most brilliant or rainbow tints, and in some species several colors blend, making beautiful specimens when growing, but they soon wither when picked. Certain species are unpleasant or even disgusting in appearance, and all are clammy and cold to the touch. Some species growing on the trunks of trees become hardened with age, and one of these forms, the well-known *touchwood*, or *punk*, has the property of shedding light in the dark.

Mushrooms As Food. Edible mushrooms are cultivated for market in the United States and in many of the European countries. They thrive best in a moist atmosphere, from which bright sunlight is excluded. Gardeners usually grow them in beds of soil mixed with decaying horse manure. The beds are long and narrow and are usually covered, to protect them from the sun. The industry is very profitable, when successful. As an article of food, mushrooms contain but little nutrition and are regarded as a delicacy rather than a staple. Of the species commonly found in North America, the *golden peziza, clavaria formosa* and *polyporus* are edible; the *russulus* acts as an emetic, and the *fly* mushroom is poisonous.

Since it is difficult for those not thoroughly familiar with the species to distinguish between poisonous and edible mushrooms, these plants should never be eaten unless selected by some one whose knowledge can be relied upon. Any mushrooms whose stalks have a swollen base, surrounded by a saclike or scaly envelope, should be avoided, especially if the gills are white, as should those with a milk-white juice.

MUSIC, *mu'zik*. Longfellow in one of his poems said of music that it was "writ in the language spoken by angels." To the lover of music such a description seems more adequate than the one usually given—a succession of sounds which please the ear. Yet a series of notes is exactly what music is, and its tones reach our ear in the same way as do discordant sounds.

All sounds are the result of very rapid regular vibrations of some elastic medium, usually the air, set in motion by a sounding body, transmitted through the intervening space in the form of waves and striking the mechanism of the ear. If the vibrations are fewer than sixteen or more than 8,192 in a second the sound ceases to be a musical sound; it is mere noise. By variously combining musical sounds men create the melodies that are the "universal language of mankind"—cradle songs and patriotic an-

thems, oratorios and symphonies, songs of home, of love, of war and of peace, in endless variety.

Importance of Music. Someone has said that "music is our fourth great material want—first food, then raiment, then shelter, then music." It may seem at first reading that this statement is an exaggeration. Surely a man can live without music, we think; and too surely the most of us do—without real music. But whether we recognize it or not the want is there; there is that in every one of us which calls for something that only music can supply. So large a part of our lives is of necessity spent in a rush and grind which almost inevitably dulls our finer sensibilities and blinds us to the better things of life that we owe it to ourselves to take time for those things which make for relaxation and for uplift. And among these uplifting agencies music certainly ranks with the first. It makes no attempt to instruct us, to tell us a story, to put facts before us. It simply appeals to the love for the beautiful and excites emotions of pleasure, and for these reasons it is considered the purest of the arts. For many people to whom religion makes no appeal, music is almost the only bond of connection with the world beyond the purely physical; and for all of us it may, as Carlyle says, "lead us to the edge of the infinite, and let us for moments gaze into that."

Nature and Terminology of Music. Musical tones vary in three respects—*pitch, intensity, or* loudness, and *timbre,* or quality. The pitch of a tone, or its relative position in a scale of high and low tones, is determined by the number of vibrations of the medium in a given time, a small number of vibrations producing a deep, or *low,* tone, a higher number producing an acute, *high,* or shrill tone. The intensity, or loudness, of a tone is determined by the size of the vibrations, loud tones being produced by wide vibrations in the medium, the soft tones by small vibrations. The quality of a tone depends upon the character of the substance which causes the vibration. For instance, the musical tone caused by the vibrations of a copper string differs in quality from one caused by the vibrations of the vocal cords of the throat. The element of a musical tone which is most commonly under the control of a performer is its pitch. Therefore, this subject will be considered in most detail.

Scales. Consider a tone produced by a certain number of vibrations. The tone produced by double this number of vibrations will be in unison with it, though higher in pitch. Between these two notes are several other notes at different intervals of pitch, forming together a series more agreeable than any other. This series is known as the *diatonic scale.* There are eight of these tones, including the first and last. The interval between the first and last tones is therefore called an *octave,* and the intervals between the first and the second, the first and the third, the first and the fourth, etc., respectively, are known as a second, a third, a fourth, etc.

Each of the tones of the diatonic scale is given a name, to denote its absolute pitch, that is, its number of vibrations. These are the letters of the alphabet, beginning with A. The scale may be extended up or down, so long as the sounds continue to be musical, that is, so long as the additional tones are in the same relation, as to number of vibrations, as those of the original scale. The tone upon which the scale begins is said to be the *keynote,* or *tonic,* of the scale, and the letter which represents this tone is the name of the key upon which the scale is written. The fundamental key is the key of C. The following table shows the scale of C through one octave, with the number of vibrations which produce each of these tones, relative to the number which produces C, which is taken as 24 (middle C is in reality 256); also the names by which the tones of any scale, regardless of key, are called, in order:

C	D	E	F	G	A	B	C
24	27	30	32	36	40	45	48
do	re	mi	fa	sol	la	ti	do

It is evident that if a scale is begun with the tone of E, the order of the intervals of the scale will not be in the order of the diatonic scale as given above. On most stringed instruments it is possible to produce the correct order by shortening and lengthening the vibrating string, as required. But on keyed instruments, such as the piano, this is impossible, and to obviate the difficulty a few intermediate tones are represented on the keyboard by black keys, known as the *sharp* and *flat* keys. These are placed at such intervals that a scale may be begun on any tone, and, by the proper insertion of the tones represented by the black keys approximately the proper intervals in order may be produced. However, to do this ab-

solutely, a vast number of keys would have to be inserted, so that in the pianoforte no key is usually absolutely correct. This accounts for the fact that violin music, in which the intervals of a scale can be more closely regulated, is more agreeable to the thorough musician than piano music.

Besides the forms of the diatonic scale, which has an interval of two tones between the keynote and the third and is called the *major* scale, there are so-called *minor* scales, of which the most important kind, known as the *harmonic minor,* has an interval of a tone and a semitone between its tonic and its third and has the seventh note *sharped,* or raised a part of a tone, in the ascending scale. Another form of minor avoids the harsh interval between the sixth and the seventh tones by sharping the sixth tone. This is known as a *melodic minor.* In both forms the sharps are removed in descending, and the scale is identical with the major, beginning at the sixth tone. The minor which begins upon the sixth tone of a certain major scale is said to be a *relative minor* of that major scale. Thus, the scale of E minor is relative to the major scale of G and the relative minor of the major scale of C is A minor.

Notation. Every sound employed in the art of music may be represented by a character, called a *note,* written on a *staff,* that is, five equi-distant horizontal lines. A note represents a higher or a lower sound, according as it is placed higher or lower on this staff. When a note is higher or lower in pitch than any which can be placed upon the staff, short lines, called *ledger lines,* are added above or below the staff, to indicate the relation of the note to those written on the staff. Since the addition of numerous ledger lines is liable to confuse the eye, composers have made use of several staffs, of which the most common are the *bass* and the *treble,* the former containing the lower notes. Each line and space of the staff corresponds to a note in the diatonic scale. Each line and space is therefore given a name corresponding to the name of the note for which it stands. The lines and spaces of the treble staff, beginning with the lower line and named in order, are E, F, G, A, B, C, D, E, F.

Sharps and Flats. In the writing of music upon the staff, in order to represent scales having any other keynote than C, it is necessary to have symbols to represent the semitones as mentioned above, called *sharps* and *flats.* The sharp (♯), placed before a note, raises the pitch by a semitone; a flat (♭) lowers it by a semitone. A sharp or flat placed at the beginning of a staff affects every note upon the line on which it is situated. A *natural* (♮) is placed before a note to restore it to its normal or natural pitch, but it acts only through the measure in which it is situated.

Time. In the writing of music, each note upon the staff represents not only the pitch of the tone which it represents, but also the duration of the sound; this is always dependent upon the so-called *time* in which the composition is written. Every piece of music is divided into portions which are to be performed in equal spaces of time. These are called *measures* and are separated from each other, in writing, by vertical lines, called *bars.* The fixed standard of time length of the notes is a whole note (𝅝). This is divided into half notes, quarter notes, eighth notes, sixteenth notes, etc. Of these a certain number, or their equivalents, are to be used in each measure. At the beginning of every composition is the so-called *time signature.* This does not tell the absolute time to be consumed in the performance of a measure, but indicates, rather, the number of beats or units of rhythm which are to be marked off during its performance, these beats coming at equal intervals of time. The most common signatures are the following: $\frac{4}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{6}{8}$, $\frac{8}{8}$, $\frac{2}{2}$ In each of these, the upper number represents the number of beats to the measure, the lower represents the time value of each beat, that is, the kind of notes which form the units of time in each measure, or the time length of each unit note relative to the standard whole note.

The rate of speed is regulated by the performer or composer. Custom has decreed that compositions written with half or whole notes as unit notes be performed in slow, stately time, representative of dignity or reverence, and those written with smaller fractional notes as units be given in faster time, indicative of gaiety or emotion. Besides the notes on the lines and spaces of the staff, other signs are used to indicate the duration of the sounds. A dot placed after a note lengthens it by one half; a curve placed over two notes on the same degree of the staff indicates that they are to be played as

one and prolonged to the duration indicated by the two notes together. This is called a *tie.* When an interval of time is to occur between the sounding of two notes, a *rest* is introduced, notes of every time value having corresponding symbols for rests.

Symbols. Besides the pitch and duration of tones, the quality and intensity may be indicated in a musical composition by certain symbols, usually Italian words, of which the most common are, perhaps, *forte* (loud), *fortissimo* (very loud), *piano* (soft) and *pianissimo* (very soft). A large number of other phrases, indicating the emotion which the music is intended to arouse and the consequent quality of the tones which should represent the music, are used in every composition.

History. The history of music is naturally divided into two great periods, ancient and modern, distinguished by two facts; the ancients knew nothing of harmony, that is, of the results produced by sounding several notes together; they also knew nothing of a key. The oldest records of music are those of ancient Egypt, dating to about 4000 B. C., but the representations that have been found of the crude cymbals, drums, flutes and harps show conclusively that little progress had been made up to that time. Among the Hebrews and Assyrians the important phase of music was its religious significance, for it never attained among them the dignity of an art.

In India there are indications that the art of music had made some progress even in early times, but it was left for the Greeks to give the first great impetus to the study. Their music was inseparably linked with poetry. It consisted of a "sort of rhythmic diction," accompanied by coarse instruments, whose chief purpose was to accentuate the rhythm. That part of such a performance which we would call *music,* they distinguished by the name *harmony.* The Greeks also made the first systematic attempt to produce a system of permanent notation. The principal instrument among the Greeks was the lyre, later called the cythara. The Romans added little to the knowledge of musical art or science, but to them is due the construction of the first organ and the bagpipe.

The next epoch in the history of music begins with the rise of Christianity, the first great name being that of Gregory the Great, to whom is due the Gregorian chant, still used in the Roman Catholic Church. After the time of Charlemagne, when the Saracens gained a foothold in southern France, their simple, emotional spirit became a lasting influence upon Western music. Somewhat later, in the North, the development of minstrelsy among the Celts and Saxons became an important force, keeping alive the love of music and carrying from place to place the best that was known. Writers of music became more numerous at this time; the monk Hucbald suggested counterpoint, and the use of the staff in notation. Adam de la Halle composed a work similar to light opera and developed the idea of harmony, while Guido d'Arezzo practically produced modern notation.

In the sixteenth century another revival took place, and among the names of musical importance of that time are Martin Luther, to whom the Christian Church is indebted for many beautiful chorals, and Palestrina, probably the greatest musical genius in Italian history. Shortly after, the first real opera was produced by Peri, who was followed by Monteverde, who gave to music the touch of imagination and ardor which it needed to bring it to popular esteem. Meantime, the construction of musical instruments was progressing, the violin, organ and clavichord were being perfected, and musicians were appearing to play upon them. From this time, then, all the elements requisite for growth were present—a knowledge of harmony, a musical notation, a diversity of instruments, and enthusiasm.

At this point its history separates into national channels, corresponding to the national spirit which was beginning to pervade literature and politics. The German school was characterized by its scientific accuracy, large themes and powerful use of instruments; the Italians sought for beauty, purity and striking melody; the French musicians sought to express strong, truthful emotion; the Russian school is notable for its picturesque, melodious and striking themes; the Scandinavians aimed to produce music of a stirring patriotic character, with emphasis upon rhythm rather than upon melody; the same may be said of the Bohemian school. In England the best work has been done in the fields of light opera and choral music. Of American composers, MacDowell attained international fame, but his works cannot be called typically American. There is, in fact, no

American school of music that represents the American nation of to-day. Of late years French influence has been dominant, and there is notable a tendency towards impressionism, as in painting.

Related Articles. Consult the following titles for additional information:

THEORY OF MUSIC

Chord	Harmonics	Sound
Chromatic	Harmony	Tone
Counterpoint	Scale	Treble

CLASSES OF COMPOSITION

Cantata	Hymns and	Opera
Gavotte	Hymn Tunes	Opera Bouffe
Hymns,	Minuet	Oratorio
National		Waltz

MUSICAL INSTRUMENTS

Accordion	Fife	Oboe
Bagpipe	Flageolet	Organ
Banjo	Flute	Piano
Bassoon	Guitar	Pianoplayer
Bugle	Harmonica	Siren
Castanets	Harp	Tambourine
Clarinet	Horn	Trombone
Concertina	Hurdy-gurdy	Trumpet
Cornet	Jew's-harp	Viol
Cymbals	Lute	Violin
Drum	Lyre	Violoncello
Dulcimer	Mandolin	Zither

AMERICAN COMPOSERS

Buck, Dudley	Foster, Stephen C.
Chadwick, George W.	Herbert, Victor
Damrosch, Leopold	MacDowell, Edward A.
Damrosch, Walter J.	Nevin, Ethelbert
De Koven, Reginald	Root, George F.
Eddy, Clarence	Sousa, John Philip
Foote, Arthur	Thomas, Theodore

AUSTRIAN COMPOSERS

Dvorak, Antonin	Liszt Franz
Haydn, Joseph	Smetana, Friedrich

ENGLISH COMPOSERS

Balfe, Michael W.	Elgar, Edward W.
Coleridge-Taylor, Samuel	Sullivan, Arthur S.

FRENCH COMPOSERS

Auber, Daniel F.	Franck, Cesar A.
Berlioz, Hector	Gounod, Charles F.
Bizet, Alexandre C.	Massenet, Jules E.
Chaminade, Cecile L.	Offenbach, Jacques
Chopin, Frederick F.	Saint-Saens, Charles

GERMAN COMPOSERS

Bach, Johann S.	Humperdinck, Engelbert
Beethoven, Ludwig	Mendelssohn-Bartholdy, Felix
Brahms, Johannes	Mozart, Johann W.
Bülow, Hans Guido von	Schubert, Franz
Flotow, Friedrich von	Schumann, Robert
Gluck, Christoph	Strauss, Johann
Handel, George F.	Strauss, Richard
Henschel, George	Wagner, Wilhelm R.
	Weber Karl von

ITALIAN COMPOSERS

Bellini, Vincenzo	Palestrina, Giovanni da
Donizetti, Gaetano	Rossini, Gioachino
Mascagni, Pietro	Verdi, Giuseppe

OTHER NATIONS

Grieg, Edvard H.	Rubinstein, Anton G.
Faderewski, Ignace Jan	Tschaikowsky, Peter

SINGERS

Calve, Emma	Galli-Curci
Caruso, Enrico	Garden, Mary
Cavalieri, Lina	Gluck, Alma
De Reszke, Edouard and Jean	Homer, Louise
	Kellogg, Clara L.
Destinn, Emmy	Lauder, Harry
Eames, Emma	Lind, Jenny
Farrar, Geraldine	McCormack, John
Gadski, Johanna	Melba, Nellie
Muratore, Lucien	Schumann-Heink, Ernestine
Nilsson, Christine	Tetrazzini, Luisa
Nordica, Madame	
Patti, Adelina	

VIOLINISTS AND PIANISTS

Bloomfield-Zeisler, Fanny	Paderewski, Ignace Jan
Elman, Mischa	Paganini, Niccolo
Kubelik, Jan	Powell, Maud

MUSK, a soft, reddish-brown powdery substance of powerful odor, found in a gland of the musk deer (which see). When the animal is killed the sac containing this secretion is cut off and dried before it is shipped to manufacturers. It is used to a certain extent in medicine as a stimulant and as an antispasmodic; but its chief commercial value is as a base for perfumery.

MUSKAT. See MUSCAT.

MUSKE'GON, MICH., the county seat of Muskegon County, forty miles northwest of Grand Rapids, on Muskegon Lake, connected with Lake Michigan by a channel 200 feet wide, and on the Grand Trunk, the Pere Marquette and the Grand Rapids & Indiana railroads. It has boat service to Milwaukee and Chicago. The city conducts a large trade in fruit, and garden products, raised for city markets, and contains flour, paper, furniture, pianos, automobile engines, knit goods, refrigerators, electric cranes and billiard tables. There is a manual training school, a public library, a gymnasium, two hospitals and a public square containing a soldiers' monument, all of which were gifts of Charles H. Hackley. There is also a Federal building. Muskegon was settled in 1834, and was chartered as a city in 1869. Population, 1910, 24,062; in 1917, 27,434 (Federal estimate).

MUSKELLUNGE, *mus keh lunj* (first or third syllable accented), also called MASKINONGE, from an Algonquin word meaning *great pickerel,* an excellent food fish and the finest and gamest member of the pike family. It may attain a length of five to eight feet, and weigh nearly a hundred pounds, though few are caught which are more than forty inches long. When caught, this fish is difficult to land, for it is very strong, extremely swift in its movements, and it fights ferociously. It is dark-gray in color, with darker spots over the top and sides of the body. It is found in the Great Lakes of North America and in the small lakes of Northern United States and Southern Canada. See *Pike.*

MUSKHOGEAN, INDIANS *mus ko'ge an,* a great family of Indian tribes which formerly lived along the Atlantic coast, south

of Tennessee, and the remnants of which now live in Oklahoma. The Muskhogean was an extensive family that varied greatly in different sections of the country. No other Indians have proved so intelligent or made such progress in agriculture as have the members of this great family. The tall and active Creek and the shorter, thickset Choctaw are the two chief types. Their system of government was elaborate and interesting, each tribe living in a village by itself. The western tribes flattened the skulls of their children, and in all tribes they were deformed in some way.

Related Articles. Consult the following titles for additional information:

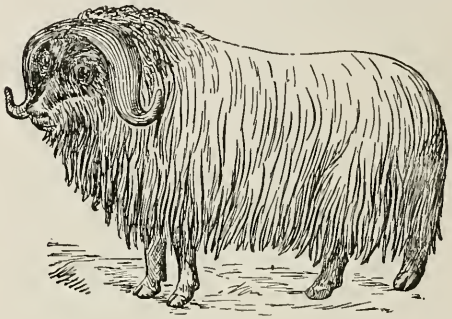
Chickasaw	Creeks
Choctaw	Seminole

MUSK'MELON, a popular species of melon, so called because it has a delightful flavor suggestive of musk. The term *mush-melon,* sometimes used for the fruit, is simply a misnomer. Of the several varieties, two are in great demand—*cantaloupes* and *nutmeg melons.* The former have a hard, scaly rind, sometimes containing deep furrows. They ripen later than the nutmeg melons. The latter have softer rinds, more or less netted. The distinction between these forms is not known to most people, and the name *cantaloupe* is applied for the most part to both kinds. Muskmelons, like other members of the gourd family, grow on vines. They require a warm soil of moderate fertility. As a table fruit they are about as nutritious as peaches, pears or oranges.

MUSKOGEE, *mus ko'ge,* OKLA., the county seat of Muskogee County, situated 150 miles northeast of Oklahoma City, on the Missouri, Kansas & Texas, the Missouri, Olkahoma & Gulf, the Midland Valley and the Saint Louis & San Francisco railroads. Two of them maintain repair shops here. Muskogee occupies a commanding position with respect to the oil and gas fields of the eastern part of the state. The surrounding country is fertile. The city has several office buildings eight and ten stories in height, a fine Federal building, a court house, a Carnegie Library and three hospitals. There are 130 acres in parks. Population, 1910, 25,278; in 1917, 47,173 (Federal estimate).

MUSKO'KA, a lake region of Central Ontario, Canada, on the eastern shore of Georgian Bay. It covers an area of about 4,000 square miles and includes a county of the same name. It is dotted with lakes and contains extensive forests. Three of the largest lakes, Muskoka, twenty miles long, Rousseau, twelve miles long, and Joseph, are connected, and have steamer service in summer. The lakes teem with fish and the forests abound in game, and the region attracts many fishermen, tourists and hunters. The scenery in many places is very beautiful, Bridal Veil Falls of the Shadow River, and High Falls and South Falls of the Muskoka, contributing to the picturesque charm.

MUSK OX, an animal related to both the ox and sheep, so named because of its musky

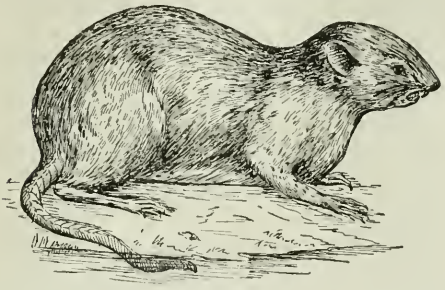


MUSK OX

odor. Its body is covered with a coat of tufted hair, brownish in color and of great length. The hair about the neck and shoulders is so thick as to give the animal a humped appearance; on the rest of the body it is very long, smooth and flowing. The musk ox is active and agile and climbs mountainous places with ease. The horns broad at the base, and covering the forehead and crown, curve downward between the eye and the ear and then upward and slightly backward. The ears are short; the head is large and broad, the muzzle blunt. Each herd numbers from twenty to thirty members. The food consists of grass, lichens and herbs. The musk ox inhabits the Arctic regions of America, though formerly it was often found in northern parts of the United States, as well as in northern Europe and Asia. The flesh is edible, though it smells strongly of musk.

MUSKRAT, also called *musquash,* a rodent related to the field mouse, found only in North America. It is about the size of a small rabbit and has a tail about ten inches long. It lives usually in streams and moist places, where it burrows in the bank or builds houses of sticks and rushes. It is of considerable commercial importance, on account of its fur, which in commerce is

known as river sable. The muskrat has a strong, musky odor, hence its name. Similar small animals in other countries, notably the



MUSKRAT

ratlike *shrew* of India, because of their odor, are called muskrats.

MUSLIN, *muz'lin*, a fine cotton fabric, woven plain, similar to calico, but less compact. It was first made in Mosui, Mesopotamia, whence its name; afterwards it was produced in India, and it was first imported into England about 1670. The common muslins to-day are manufactured in France, England and America.

MUS'SEL, a term popularly given to two groups of double-shelled mollusks, one marine, the other fresh-water. The common mussel is found in the temperate salt waters of Europe and America. Although sometimes used as food, the mussel is chiefly valuable as a pearl producer. The animal has an interesting life history. The eggs, after they are laid, are carried in the mother's gills until the young, which are very minute, are hatched. The tiny animals then attach themselves to the skin of a passing fish and, like the cocoon, encase themselves in a covering in which they grow and develop. When the little mussel is completely developed, it breaks through the covering or capsule and settles to the bottom, where it attaches itself firmly and remains the rest of its life. See MOLLUSCA.

MUSSET, *mü sa'*, ALFRED DE (1810–1857), a celebrated French poet, novelist and dramatist, born at Paris. He received a classical education and published his first verses at the age of twenty. These and poems which almost immediately followed established his fame. Dramatic works were produced soon afterwards, and these showed Musset to be the most original dramatist of the French romantic school. He wrote several novels, and although these, with his plays, are works of distinction, it is on his volumes of poems that his fame chiefly rests. He is one of the most distinctive and, in a sense, original of French poets.

MUS'TARD, the common name of two species of plants belonging to a large botanical family of the same name. One of these, *white mustard*, is a dark green plant with straight, branching stems, the lowest covered with bristling hairs. In summer it produces small, brilliant-yellow flowers, and in the autumn very small pods, each containing one row of seeds. These seeds are of great commercial value as medicine and as flavoring for food. *Black mustard* is a weed which in parts of the United States grows to a height of six feet. Used as a hedge it is impenetrable.

MUSTARD FAMILY, or **CRUCIFERAE**, an extensive order of plants, embracing about 1,800 species. The plants are easily distinguished. The stems and leaves all have a pungent taste, and the flowers, four-petaled, in shape resemble a maltese cross (hence the botanical name of this family *cruciferae*, which in Latin means *cross-bearing*). The seeds of some species are ground into powder and are used medicinally and in cookery, while almost the entire plant of others (cabbage, cress, turnips, radish, horseradish) are used for the table.

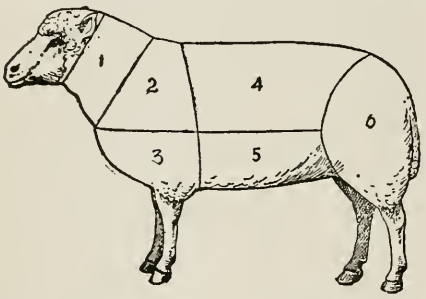
MU'TINY, the act of refusing to obey military or naval orders by those in such service, or of rising against that authority and acting in defiance of rules and orders. To be mutinous, unlawful conduct must tend to subvert the constituted authority, even temporarily. The punishment for mutinous acts in all armies and navies is very severe; the death penalty is almost always imposed in time of war, and in not many cases is a milder fate meted out in peace times.

MUTINY ACT, an act passed by the British Parliament each year, granting to the Crown the power to regulate the army and navy. According to the Bill of Rights, the maintenance of a standing army in time of peace is illegal; hence Parliament is compelled to pass a law each year, fixing the strength of the army for the following year and determining the cost of its maintenance. But English courts have decided that in spite of Parliament's establishment and maintenance of an army, the king has no power to punish a mutinous soldier in time of peace. Parliament was again compelled to pass a law, annually granting to the Crown this

right. In 1879 this, the so-called Mutiny Act, and the other law referred to, known as the Articles of War, were consolidated, and since that time they have been passed each year as one bill, known as the Army Act.

MUTSUHITO, *müt sü he'to,* (1852–1912), emperor of Japan. He ascended the throne in 1867 and inaugurated a liberal reform policy, including the adoption of a constitution. During his long reign European influence and ideals became firmly established in Japan, and the emperor was credited with much of the country's progress towards modern standards. The chief events of his reign were the war with China and the war with Russia.

MUT'TON, the flesh of sheep, a standard meat for the table, having about seven-eighths the nutritive value of beef. After



MEAT CUTS FROM A SHEEP
1, neck; 2, chuck; 3, shoulder; 4, loin; 5, flank; 6, leg.

mutton is dressed it is cooled and allowed to "ripen" before it is put on the market. The carcass is sold to the retail dealer whole, and he usually cuts it according to the diagram here shown. European markets are supplied with mutton by Australia, New Zealand and Argentina. The meat for export is first frozen and then shipped in refrigerator boats. See MEAT PACKING; SHEEP.

MYCENAE, *my sē'ne,* one of the most ancient of the dead cities of Greece which flourished probably 1,400 years B. C., long before the Trojan War. It was situated in the Peloponnesus on an elevation overlooking the Argive Plain, about six miles northeast of Argos. The city was destroyed by the Argives in 468 B. C. Excavations begun at Mycenae in the last quarter of the nineteenth century disclosed relics of a wonderful pre-Hellenic civilization. Cut gems, painted pottery, stone carving and numerous other art objects were found.

MYO'PIA, a deformity of the eye, caused by the lengthening of the diameter of the eyeball from front to back. This is usually produced by too great a curvature of the cornea, or crystalline lens. Rays of light entering an eye thus deformed are brought to a focus in front of the retina, causing indistinctness of vision. Persons afflicted with myopia are said to be *near-sighted* or *short-sighted.* The defect is remedied by spectacles with concave lenses. See EYE; SPECTACLES.

MYRIAP'ODA, a group of animals resembling worms, in having long, slender bodies, which, however, are divided into many rings, rarely less than twenty-four, nearly equal in size and each bearing legs. The legs of some species are very numerous and resemble bristles, but in the higher forms they are jointed, like those of insects (see CENTIPEDE). Formerly these animals were classed with the insects, which they resemble very closely in their larval state, but they now are considered a distinct group of the jointed animals (see ARTHROPODA).

The animal has a distinct head, bearing a pair of antennae, or feelers. Myriapods are usually found in dark, moist places, under logs and in cellars. Some are not visible without a microscope, while others are several inches long. Some species secrete sharp, burning fluids that protect them from their enemies; others are armed with poison fangs.

MYRRH, *mur,* a gum resin which exudes from a small balsam tree growing in Arabia and Eastern Africa. The gum exudes from the bark in oily yellowish tears which harden and turn dark. It was used by the ancients as a fumigant. To-day it is used in medicine as a tonic, a stimulant, a mouth wash and a gargle. The best myrrh is exported from Turkey.

MYRTLE, *mur't'l,* a genus of plants, embracing a number of aromatic and evergreen trees and shrubs. The flowers are either rose-colored or white. Cloves, allspice and Brazil nuts are produced by trees belonging to this family. The *common myrtle* is a native of countries bordering on the Mediterranean Sea and the temperate parts of Asia. The leaves, which contain a volatile oil, have been much used in the East as a stimulant, while the berries, also aromatic, have been used medicinally in Greece and India. In Italy a wine is made from myrtle, and in other parts of Southern Europe the bark of the

tree is used for tanning. Myrtle has been celebrated from remote antiquity on account of its fragrance and the beauty of its evergreen foliage, and by different nations it was consecrated to various religious purposes. The brows of victors in intellectual contests were adorned with myrtle wreaths, and at Athens myrtle was an emblem of civic authority. The running plant known as myrtle in the United States is of a different family and should be called *periwinkle.*

MYSORE, *mi sohr',* INDIA, the capital of the native state of the same name, 245 miles southwest of Madras and ten miles southwest of Seringapatam. The town is well built, with regular streets and a number of interesting buildings, among which are the maharaja's palace and the residency. Carpet weaving is the leading industry. Population, 1911, 71,306.

MYS'TERIES, among the ancient Greeks, and afterwards, also, among the Romans, secret religious assemblies which no uninitiated person was permitted to approach. They originated at a very early period and seem to have had a double object—first, that of handing down the traditions relating to the divinities in whose honor they were celebrated; and secondly, that of teaching and practicing religious rites. The most important Greek mysteries were: 1, The *Eleusinian.* 2, The *Samothracian,* celebrated in honor of the Cabiri. 3, The *Dionysia,* which were celebrated in honor of Bacchus or Dionysus. These were of so immoral a character that they were in time forbidden as injurious to the public peace and morals. 4, The *Orphic,* founded by those who called themselves followers of Orpheus.

MYSTERY, a kind of rude drama, which was a favorite spectacle in the Middle Ages and was presented at solemn festivals. The subjects were of a religious character, and the monks were at first the performers and authors, the performance being in church. Such plays were called *mysteries* because they taught the mysterious doctrines of Christianity. They represented scenes from Scripture history, being thus distinct from the *miracle* plays, which dealt with lives of saints, though the distinction is not always observed. In later times these plays were usually exhibited in a connected series by the guilds of a town, and it sometimes took several days to perform a series. The *Passion of Christ,* the *Slaughter of the Innocents, The Creation of the World* and the *Fall of Man* were among the subjects represented, the first perhaps more frequently than any other. Corpus Christi day was the chief occasion on which they were performed. Mysteries continued to be given from the twelfth to the sixteenth century. Such plays are still given at various places in Roman Catholic countries. The passion play performed at the village of Oberammergau, in Bavaria, every ten years, is a play of this kind. The mysteries were superseded by the moralities.

Related Articles. Consult the following titles for additional information:
Drama Morality
Miracle Play Passion Play

MYSTICISM, *mis'ti siz'm,* a religious attitude of mind in harmony with the doctrine of revealed as contrasted with that of reasoned religion. It is diametrically opposed to rationalism, which holds that man should be guided by his highest faculty, reason. The mystic believes that since we cannot with certainty attain to absolute truth by way of the senses or the reason, our only source of light is inspiration and faith, that through these alone we come into direct relationship with God. Mysticism was conspicuous in the philosophy of ancient Egypt, in China and in India, and it has manifested itself in men's minds throughout the intervening centuries.

MYTHOLOGY, *mith ol'o jy,* the collective name given to the body of fables, legends or myths which grow up in almost all primitive nations regarding the creation of the world, the origin of man, the powers of nature and the adventures of the gods and heroes. It is natural that in the savage mind there should arise such questions as: What is the world? What is man? Who made them? Whence came all the natural objects about us? What causes the changes from light to darkness, from heat to cold, from life to death? The attempts to answer satisfactorily these questions gave rise to a certain body of stories, which are known as *explanatory myths.* Other groups of stories which do not explain, which have no obvious aim beyond that of

mere entertainment, which consist in tales of the adventures of gods and heroes, are called *aesthetic myths.*

We think sometimes of mythology as the religion of the ancients, but it was much more than that. It was their religion, their science, much of their literature. And yet it was none of these things, in just the sense in which we understand the words. All mythologies of which we have any record tell of the supernatural beings who had made and who controlled the universe, and in this sense they were religions; but few of them made any attempt to make people better morally, and in that they differed from religion, as we understand it. The primitive religions, in fact, concerned themselves little enough with morals. They demanded worship of the gods, forms, ceremonies, observances; they forbade, as the worst of sins, anything which might be translated as slights to the deities, or as ceremonial carelessness.

Origin. Much time has been spent, especially of recent years, in the study of mythologies with a view to discovering their meaning, the way in which they arose and their interrelation. Most attention has been given to the myths of the Greeks and Romans, the Egyptians, the Norsemen and the Hindus. For the great similarity which is found in many of the myths of these different peoples, various explanations have been advanced. One is that all of these peoples had a common ancestry, and that their myths and legends date back to the ages before the separation took place. Another, and on the whole more satisfactory, explanation is that with the same primitive surroundings the same questions are likely to arise and similar explanations are likely to be made.

Another question regarding the myths, that as to the method of their origin, has also been answered in various ways. One is that the gods and demigods treated of were originally merely men who were remembered after death for their famous achievements and who came in time to be regarded as more than human. A second theory is that wise men invented those myths in which the gods appear as good and just and beneficent, for the purpose of establishing law among communities through a wholesome reverence for higher powers. This view necessitates the conclusion that the myths in which the gods are represented as capricious, unjust and immoral were later inventions of poets or storytellers. Still another view is that all myths were originally the explanation of physical phenomena, but that many of them have lost their original significance. (For a general account of this subject of the growth and explanation of myths, see Gayley's *Classic Myths in English Literature.*)

Grecian and Roman Mythology. These may well be treated together, since the accounts of the creation are practically identical with the two peoples, and since the Grecian gods, with their attributes and legends, were to a large extent adopted by the Romans. All of the striking characteristics of mythology are to be found in Greek and Roman mythology, the best known and in many ways the most interesting of any of these ancient collections of tales and legends. We find stories which concern themselves entirely with the actions and characters of the gods; we find other stories which give explanations, often beautiful and poetic, but far from scientific of nature; and we find still other tales which seem to have no other purpose except to give pleasure—no value except a literary one. It will be interesting to read stories of these various kinds and to become acquainted in some measure with the imaginings of that wonderful people, the Greeks; for the most that is beautiful and attractive in what we call Grecian and Roman mythology comes from the Greeks.

We must remember, when we read stories of the gods, that to the ancients these supernatural beings were not of necessity better, purer, more self-controlled than men. They were only stronger, more clever, more resourceful. When they were angry, they were more angry than men; when they loved, they loved more fiercely; when they were jealous they were more bitter, more relentless, than men. In fact, the beings whom the ancients worshiped as gods were simply beings who did what the people who created them would have done had they been powerful enough. The explanation given in classic mythology of the beginning of all things is that in the beginning there was a vast abyss, known as Chaos. There arose first Earth (Gaea) and love, and from these came heaven and the mountains, the seas, the fields, the animals and vegetation. Of Chaos were born Erebus and Nox (night), and from these in turn sprang light and day. The Titans, children of Uranus (heaven) and Gaea, were twelve in number, and by one of these Titans, Sat-

MYTHOLOGY

Ancient Beliefs Concerning the Beginning of Things

PANDORA

MARS
God of War

JUNO. (From statue in Vatican)
Queen of Heaven
and Goddess of Marriage

APOLLO
God of the Sun

TWO-FACED JANUS
He opened and closed the year,
looking forward and backward.
January is named after him.

CHARON
The boatman to Pluto's shore

CERES
Goddess of Sowing and Reaping

VENUS
Goddess of Beauty

ATLAS
Supporting the World
on his shoulders.

THE FATES. (From painting by Michael Angelo)
They spun the thread of human destiny and
cut it when they pleased.

H.M. Haines

urn, Uranus was at length dethroned. Saturn, with Rhea, his sister and wife, reigned for a time supreme, until he in turn was dethroned by Jupiter, his youngest son. Jupiter divided the universe by lot, he himself receiving the earth and the heavens, Neptune the sea, and Pluto, Hades, the lower world. Jupiter was supreme, however, over his two brothers and over all the other great gods, of many of whom he was the father. Juno, his sister and wife, was the queen of heaven. The great gods who dwelt on Olympus were Jupiter, Juno, Minerva, Mars, Vulcan, Apollo, Diana, Venus, Mercury and Vesta.

One of the best-known stories of Jupiter, the king of gods and men, is that of Europa. Minerva, too, enters into this story.

Story of Europa

Europa, the daughter of Agenor, king of Phoenicia, was so beautiful and charming that everybody who looked at her loved her. But she was young and all unconscious of her charm, and cared little for anything except playing with her young companions in the fields; and there they would stay all day gathering the narcissus, the crocus, the violet, the crimson rose, and twining them into wreaths for their hair and their robes.

One day as they wandered, now here, now there, about the fields near the seashore, calling to each other and holding up any unusually brilliant blossoms which they might find, their attention was attracted to a beautiful snow-white bull that had entered the field and was coming toward them. Ordinarily they would have been frightened at the sight of such an animal; but this bull looked so intelligent, so gentle, so almost human, that they could not feel afraid of him. He advanced until he was in their midst, and they began to throw about his neck and horns the flower wreaths which they had been weaving. At length, Europa said:

"I know what we shall do; we shall mount on the back of the bull and he shall carry us far over the fields and meadows. I know he will not hurt us. See! he seems to understand just what I am saying and to be telling us that he is willing to have us ride on his back."

For the bull had lain down on the grass at the feet of Europa and her companions. Europa first seated herself on his back, and a beautiful picture she made with her purple robe and her flower-wreathed hair.

"Come," she said, "he can carry several of us at once."

But as she said these words the bull, as if declaring that he had no desire to do such a thing, got swiftly to his feet and started across the fields to the sea. Faster and faster he went, and Europa stretched out her hands toward her companions and called to them. Run as they might, however, they could not overtake her, and when the bull gained the shore of the sea, they were startled and horrified to see him plunge at once into the water. With one hand Europa grasped a horn of the bull; the other she stretched toward her companions. As she found out, however, that no harm came to her, that she was as safe on the bull's back as she could have been in her father's largest sailing vessel, her fear gave place to curiosity and wonder.

"What does this mean?" she asked of the bull, feeling sure that as he had understood when she spoke to her companions, he would surely understand her now, "and where are you carrying me? How does it happen that a bull is able to move in this way as safely over the water as on the land?"

And what was her astonishment to have the bull reply to her in a deep voice.

"I am no bull, though to the most careful eyes I look so. I am the god Jupiter, and seeing you in the field, I loved you, and assumed this disguise that I might carry you off and make you my wife."

With these words he comforted the girl, and we may be sure that her pride was great in having so gained the attention and the love of the greatest of all the gods.

At home, however, Europa's parents knew nothing of this side of the story. Europa's frightened companions had rushed to the palace, calling aloud how the bull, the beautiful, white bull, had run off with their dear comrade.

"Into the sea he plunged," they cried, "and as far as eyes could reach, we could see him swimming safely, while Europa's purple mantle spread out behind her like a sail."

The king was in despair, for he loved his only daughter, and felt that his palace, and indeed, his whole kingdom, would be but a sorry place without her. So he called to him his son Cadmus, and said:

"You are strong and wise for so young a man. I cannot leave my kingdom and my people, but you may set forth now, at once, and search for your sister; and do not, whatever happens, venture to come back without her."

Cadmus was willing enough to search for his sister, for he had loved her and was much distressed at her loss. He set out, therefore, and journeyed, day after day, inquiring of all he met as to whether they had seen a white bull carrying on his back a beautiful girl. All over his own land and far into foreign lands he went; but never a word could be hear of his lost sister. Knowing well his father, and what his wrath would be if his command were disobeyed, Cadmus did not dare to return to Phoenicia; but where else could he find a home?

At length he decided to consult a famous oracle of Apollo in the Castalian cave. Down into the darkness of the cave he went to where the priestess of the god sat, waiting to hear the questions of those who came seeking information. Cadmus put his question:

"Where shall I find a home, now that I no longer dare to go back to Phoenicia?"

Strange sounds came up from the ground which Cadmus himself was unable to interpret. The priestess, however, translated them for him.

"Follow the cow," she said, "follow the cow."

In vain Cadmus begged for a full explanation; the priestess would say nothing more, and he returned to his companions from the darkness of the cave not much wiser than when he had entered. What cow was he to follow? As he stood in deep thought he lifted his eyes and saw a cow walking in a leisurely manner down a path but a little distance from him.

"This as well as any other," he said, beckoning to his companions, and they set off to follow her.

She went on for some distance, Cadmus keeping close behind her, and at length she stopped, looked about, and quietly lay down. This then, if Cadmus had understood the oracle aright, was to be his future home. He stooped down and kissed the ground and made his followers do the same; and he then sent them out to see whether there was in the neighborhood any pure, clear water. They carried with them jugs which they were to bring back full if possible. They passed across the fields into a little grove which looked wild and untouched as though no man had ever set foot in it. Presently they heard a sound of gushing water and looked about them hopefully. Yes, there out of the darkness of a cave there flowed a clear little stream. They bent and drank, and then lowered their jugs into the water. The jugs began to fill with a gurgling sound which was pleasant enough to their ears; but soon they heard another sound which caused them to look up in terror.

Dragging his glittering length across the leaves and the stones, there came from the depth of the cave a monstrous serpent, the guardian of the spring. In vain the men scrambled to their feet and attempted to flee. Terror held them rooted to the ground, and the venomous dragon was upon them; and not one of them escaped the monster's fangs or tightening coils.

Cadmus waited long for his companions and then, when they did not come, he set out in search of them. In the little grove which he had seen them enter he too heard the sound of running water, but when he came to the side of the spring, he found his dead companions with the shimmering serpent coiled up beside them.

After a severe struggle, in which he more than once despaired of his life, Cadmus slew the dragon, and as he stood looking down upon the monster, he heard a voice say, close beside him:

"Bury the dragon's teeth and see what will happen."

He looked about hastily, but could see no one. It was indeed the goddess Minerva, who, invisible to him, had watched the conflict and was now giving him advice. This he was very quick to follow.

Cadmus plucked out all of the teeth of the dragon, and a great number there were, for the huge mouth had had three gleaming rows. These he took back to the field and planted in the soft, moist earth. He had not long to wait before something bright began to appear above the surface of the ground. First the tips of spears, then the glimmering points of helmets, then the heads and shoulders, and, finally, the whole bodies of stalwart men pushed up through the ground before him until the field was full of armed men in ranks. Was this a new enemy which he had to fight? If so, he might as well begin the conflict first as last, and he rushed toward the nearest man. Before he reached him however, this man cried out:

"What part have you in our civil war?" and turning to the soldier nearest to him, who was so exactly like him that Cadmus could never have told the difference, he struck him a sharp blow with his spear. Instead of striking back, this soldier thrust his spear at the man on the other side of him, and soon the whole field was in an uproar. But in an incredibly short space of time the dragon-tooth warriors had almost all perished; indeed only five remained. These ceased their strife and came and knelt down before Cadmus saying:

"Let us help you to build your city. We choose you here as our king."

And thus there was begun in this place, where no city had before existed, a city which grew and become powerful and attracted to it people, from all nearby lands. But Cadmus, the king, never heard again of his sister Europa, whose loss had been the beginning of all his adventures.

As proof that the gods and even the goddesses could be very cruel when mortals did not act to suit them, we may take the story of Arachne.

The Story of Arachne

Arachne had many things of which she might have been very proud; she was young, beautiful, and had many friends. But she cared less for any of these things than she did for the fact that she was a very skilful weaver. People came from all the country near her home to see the beautiful patterns which she wove on her loom; and as they watched the web grow under her fingers, they would exclaim:

"Surely Minerva herself must have taught you; in no other way could you have learned to do such wonderful work."

Most girls would have been proud to have been taken for a pupil of the wisest and most skilful of the goddesses, but Arachne was so proud that she could not bear to have people think that even Minerva ever could have taught her anything. Finally her boasts came to the ears of Minerva herself. Now Minerva was not naturally cruel or revengeful, but there was a wickedness in any mortal's setting herself up to surpass a deity which even Minerva could not pardon. Determined, however, to give the boastful girl a chance, Min-

erva took the form of an old woman and went to Arachne's home.

"Foolish girl," she said, "how do you dare to set yourself up as an equal in skill to the goddess of the arts? Do you not know that she could punish you severely for such boasting?

"Let her!" said Arachne. "I am her equal, and I am willing that she should know what I have said. Let her come and match her skill with mine. And if I am beaten I will pay the penalty."

"Foolish girl!" cried the goddess, dropping her disguise and appearing in her own radiant form; "the trial shall take place here and now."

All those who stood by were terrified; some of them fell at the feet of Minerva; others besought Arachne to yield before it was too late. But the proud girl remained defiant, unafraid.

So the goddess began, while the bystanders stood breathless with fear and admiration. Minerva at her loom worked rapidly, the shuttle seeming to fly as she passed it back and forth through the threads; and a marvelously beautiful pattern soon began to show itself in the web. But Arachne's web seemed, to those who watched, little, if any, less perfect than that of the goddess herself. Only what was this which the reckless girl was daring to do? Not content with defying one of the gods, she chose for her subject in the web she was making the faults and failings of the dwellers on Olympus, showing them so clearly that nobody could mistake.

Her own web finished, Minerva turned and looked at Arachne's. It was wonderful—the goddess could not but admit it to herself. But the presumption! the wickedness of it! thus to hold up the faults of the gods before these staring people.

With her shuttle she tore the beautiful web of Arachne from top to bottom, and then turned to the girl herself.

"Your sin merits death," exclaimed the angry goddess, "but death shall not be your portion. Since, however, you have been so fond of weaving, your punishment shall be, that forever and forever you and your descendants shall make your threads and weave your webs. And wherever men see you they shall tear your webs as I have torn this, and shall drive you from them as I drive you from me now."

And touching the girl upon the forehead, she transformed her into a spider.

This story has a hint in it of the nature myth. We can perhaps imagine that watching the spiders spin their endless threads may have suggested to some imaginative Greek the possibility of the spider's being but a mortal transformed to this low form as a punishment. In other stories which we may study, however, the nature element is far stronger.

Phaethon

When the boys with whom Phaethon played about the fields and river banks boasted of their fathers, Phaethon was silent. His mother, he knew, was more beautiful than the mothers of his friends; his grandfather was a wealthy, honored man; but his father—he knew nothing whatever about a father. This was bad enough, but when his playmates began to see that such was the fact, they made him suffer constantly.

"No one can play in this game unless he can tell who his father is," one would cry mischievously.

"Let's spend our time telling about the greatest deeds our fathers ever did," another would suggest.

An Phaethon, ashamed and angry, would rush home to his mother and pour out his wrath and shame.

"Some day, Phaethon," she would assure him, "you shall know about your father, and then none of the other boys will dare to taunt you."

"But I want to know now!" Phaethon would insist, stamping his foot.

"You are too young yet, my son," Clymene would reply, looking sadly at her son.

At length one day when Phaethon had grown to be a tall, handsome lad, he came into the house in a fiercer state of anger than usual.

"I will endure this no longer!" he cried. "Either I shall be able to tell those insulting boys tomorrow who my father is, or I shall never look them in the face again."

Clymene smiled. "Come here, Phaethon." she said, "and let me whisper something in your ear."

What he heard made the boy look first astonished, then delighted; and he rushed out-of-doors and back to the place where he had left his comrades, radiant with joy.

"Now let's tell tales of the deeds of our fathers!" he cried.

And the other boys looked at him in surprise.

"But you have no father," one of them declared.

"O haven't I!" replied Phaethon, no longer angered by the taunt which had so many times stung him. "You see him every day when he drives his chariot across the highest part of the heavens. He is Apollo, the sun god."

A burst of laughter greeted this proud statement.

"Oho!" cried the boy. "Why could you not have made up that story some years ago and saved yourself a great deal of embarrassment?"

"Do you actually expect us to believe that?" asked another, with a sneer.

Disappointed, angry, Phaethon turned again toward home. Having a father was as bad as not having one, if you could not convince other people of his existence.

But his mother was ready to help him out of this difficulty. Looking at him proudly, she said:

"No father would be ashamed to acknowledge you as his son. Tomorrow morning you may go to Apollo, and ask him whether what I have told you is not the truth."

The impatient boy could scarcely wait for the morning to come, and long before daybreak, while the stars and moon were still to be seen in the sky, he started off toward the East, traveling as rapidly as he could. At last he came to the gorgeous palace of the Sun and was admitted within the doors to the very throne-room of his father. There, on the diamond-stubbed throne, sat the radiant god, wearing a purple robe and bearing on his head the crown of beams.

"Who are you," he asked, "who have come here to my palace? It is almost time for me to set out on my day's journey and I have not long to talk with you."

Impulsively Phaethon poured out the story of his wrongs, and ended with a plea that his father would give him some sign by which he might convince his skeptical comrades. Apollo laid aside the beams from about his head, which were so dazzling that the youth could not approach closely, and called the boy to him.

"To be sure you are my son," he declared, "a son whom any father might be proud to own. I am willing to give you any proof of the fact, and I swear by the River Styx—and that is an oath which even the strongest of the gods would not dare to break—that I will grant you any wish which you may ask of me."

This was precisely what Phaethon had hoped for, but had hardly dared to expect, and it did not take him long to give his answer.

"There is one thing," he declared, "which will really be a proof. Let me drive for one day your great chariot across the sky; then no one who sees me can doubt that I am your son."

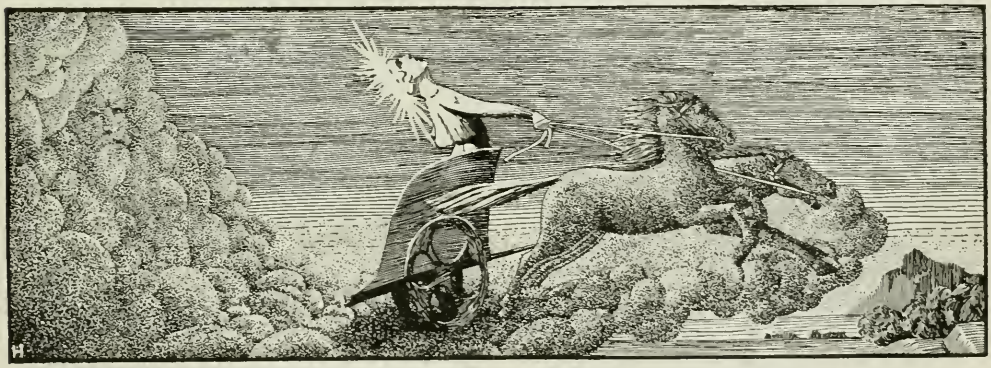
road slopes downward so rapidly that it is almost impossible to hold in the horses. If it is hard for me, think what it would be for you."

But Phaethon refused to think. He had set his heart on this one thing and this one thing he would have. He knew his father could not break the oath which he had sworn by the River Styx, so he persisted in his demand. At last, attended by the Seasons, the Days, the Months, the Years, and the Hours, Apollo led the way to where the sun chariot stood waiting. It was the most gorgeous chariot that Phaethon had ever looked upon—of gold and silver and precious gems; and his heart beat proudly that he was actually to have the guiding of the magnificent car for a whole day. The horses were led forth and fastened to the chariot, and Aurora, the goddess of dawn, threw open the doors of the East, through which the sun in its splendor was presently to rise. After a final plea, which Phaethon stubbornly resisted, Apollo anointed the boy's head with ointment so that he might not be scorched by the brightness of the beams, and then set the crown of rays on the young head.

"Remember, my son," he said, "do not drive too high or too low; a middle course is best. Above all, do not attempt to use the whip, for the horses are spirited; and hold tight to the reins."

Only half heeding his father's instructions, Phaethon sprang into the chariot, grasped the reins, and shaking them over his steeds, started out through the open door.

It did not take the horses long to feel that it was an unpracticed hand that grasped the reins, and, taking the bits in their teeth, they



THE HORSES DASHED OUT OF THE TRAVELED ROAD

Now Apollo was very sorry for the rash promise which he had made.

"Choose something else, my son," he begged; "what you have asked for is not safe. You can have no idea of the dangers of the path across the heavens. The road at the beginning of the journey slopes upward so steeply that even my horses can hardly climb it; the middle of the road is so high above the earth that even I, myself, become dizzy when I look down; and the last part of the

dashed out of the traveled road and wildly up the heavens. The courage with which Phaethon had started out did not last long. Below him—a dizzying, sickening distance below—was the earth and the sea. What if he should drop from this awful height! And there, when he looked about him in the heavens, were even worse sights; the Big Bear and the Little Bear, the Scorpion and the Lion, the huge Crab—all of these seemed to be reaching out toward him as he dashed among

them. Up, up, up, went the horses, and then as suddenly downward, almost taking the breath from Phaethon's body with their rapid plunge. They came so close to the earth that mountains which for thousands of years had been snow-crowned lost their snow-caps and stood bare and brown; rivers were dried up; a great part of Africa was burned to a desert; and many of the people were scorched almost black.

Phaethon had long before this dropped the reins, and he stood shaking with terror. Cries came up to him from the earth, cries of pain and terror and fright from the people of the countries over which he was passing. But he was too much afraid for his own safety to worry about others.

The cries did, however, reach the ears of Jupiter, the king of the earth and heavens, where he sat on his throne on Olympus, and he, horrified, looked out upon the course of the wild boy. The other gods and goddesses gathered about him and besought him to save the earth.

"There will be no beauty, no freshness left," they cried. "There will be no cool springs and lakes for the nymphs to live in; no great trees and forests where dryads may shelter themselves."

"I call you all to witness! There is no other way to save the earth but this!" cried Jupiter, and he raised his arm and hurled a bolt of lightning at the luckless Phaethon.

Struck from the chariot, the boy fell headlong into a great river, while the horses trotted quietly across the remaining part of their course and disappeared into the doors of the West.

It may seem to us as at first we read this story through that it is simply a fairy tale, like those we have been used to hearing all our lives; but to the people who created the tale in the far-off country and the far-off time it was much more than a fairy tale. They could not understand the periods of drought which occurred sometimes and dried up vegetation and rivers, and made fresh lakes shallow and stagnant. Why should Apollo, the god of the Sun, allow his chariot to cause such destruction? There was only one way to account for it—somebody else must be driving the chariot. And thus gradually grew up the story of the rash son of Apollo, who compelled his father to let him take his place and caused such great destruction thereby. The lightning-bolt which Jupiter hurled at the boy signified to them the thunder-storm which so often follows a dry period.

We are not to think that any one man or any hundred men ever said: "Let's invent an explanation of drought," and then made up this story. The tale grew up gradually, a little here, a little there, until it came to have the form in which we have just read it.

There is another nature story which is to the full as famous as that of Phaethon. It will be interesting to see, as you read it, whether you can get, in any degree, the meaning of the story. However, you need not be discouraged if you do not, for the tale is in itself interesting enough, even if we did not know that it had a meaning.

Story of Proserpina

Ceres, the goddess of agricultural, was one of the busiest of the deities. In the springtime, she had to go about from field to field all over the earth, attending to the sowing of the seeds; in the summer, she watched the growth of the grains and fruits; and in the autumn, she went about from place to place blessing the harvests. Her car bore her swiftly, and she so loved the helpful work she did that she never grew tired. Still, she was always glad to come back to her home and to her beautiful daughter Proserpina, whom she loved very dearly.

Like her mother, Proserpina had her duties to perform, though they were not as difficult as those of her mother. She had charge of all the flowers, and in the springtime, when she walked across the meadows, violets and daisies and buttercups sprang up in her footsteps. Naturally, she loved the flowers, and spent much of her time in the fields with her companions tending them and gathering them for wreaths.

One day, as the girls played in the meadows, they heard a strange rumbling sound and looked up hastily. A huge, dark chariot with dark horses and a handsome but gloomy-looking driver was coming toward them. The girls screamed in terror and started to scatter. But the driver stopped his chariot, leaped to the ground, and seizing Proserpina, bore her away with him in his chariot. The frightened girl called to her companions and to her mother, but the black horses carried them on too swiftly for any help to follow her. Meanwhile the stern-looking man explained to Proserpina that he was Pluto, king of all the regions below the earth; that he loved her and wanted her for his wife.

Proserpina answered:

"I must tell my mother; she will be wild with grief when she finds that I am gone and knows not where to look for me."

But Pluto shook his head.

"She would never let you go with me," he declared.

While they were talking thus, they had come to the margin of the River Cyane, which opposed their passage. Angrily, Pluto struck the ground with the great trident which he carried, and the earth opened and made him a passage back to his underground kingdom.

The darkness in which they found themselves after the earth had closed behind them was delightful to Pluto, whose eyes were tired with the glare of the sun; but to Proserpina it was nothing less than horrible. All her life she had been used to living out of doors from daylight to dark; and now this was far, far worse than the blackest night she had ever seen.

"You will like it when you become accustomed to it," said Pluto, noticing that the girl trembled as she sat beside him.

Gradually the way grew lighter, though the light was white and ghostly—not like the beautiful golden sunlight of the upper world.

When they came at length to the huge palace of Pluto, he expected Proserpina to exclaim with delight over its gorgeousness; for Pluto owned all the gold and silver and gems that lay hidden in the earth and had made good use of them in decking his palace. But Proserpina was not used to gorgeousness. She and her mother had lived simply always, and the rich gems which she saw about her were less to her than a handful of fragrant flowers would have been. And all the jewel-studded lights, which to her seemed to serve only to make the gloom more noticeable, she would have exchanged for one look at the stars.

It was the same way with the food. All her life she had eaten but the plainest dishes—simple grains, fruits, bread and milk. And the rich food which Pluto ordered to be placed before her seemed so strange that she would not even taste it. This went on for several days, Pluto, in great distress, urging her to eat, and she as steadily refusing.

Meanwhile her mother had been almost distracted with fear and grief. The girls with whom Proserpina had been playing could tell her nothing except that a man in a black chariot had carried off her daughter. Who the man was, she could have no idea. She sought day and night through one country after another for her daughter. The sun, when he came through the doors of the East in the morning, saw her wandering on, stopping everyone to inquire for her lost girl; and the evening star found her still at her task. One day, as she sat for a few minutes resting on a stone, an old man with a little girl passed her. The goddess bore about her no signs of her divinity; she looked like a poor worn-out, old woman, and they took pity on her and begged her to go home with them. At last she consented to do so, and as they walked the old man told her that his little son was very sick of a fever.

When they reached the house they found that the child had grown rapidly worse, that he was, in fact, almost dead. You may imagine the delight it caused when Ceres, taking the child in her arms, kissed him and thus restored him instantly to health. Then she asked that she might be allowed to take charge of the boy. Of course the family was only too glad to have so excellent a nurse; but the mother, over-anxious for the son in whose sudden recovery she could scarcely yet believe, determined to hide and watch what happened; and it was, indeed, a startling sight which she saw.

Ceres bathed the boy, murmured some magic-sounding words over him, and then, stepping to the hearth, raked a hollow in the glowing coals and laid the boy within it. The watching mother sprang forward with a cry and snatched her child from what she believed would have been its death. But what was her amazement, when she turned around, to see before her not the feeble old woman whom her husband had brought home, but the radiant goddess Ceres, with her hair of gold and a wreath of wheat and scarlet poppies. Ceres spoke sadly but not angrily:

"I would have given to your son," she said, "immortality. Now you, by your failure to trust me, have taken from him that gift."

And with these words, the goddess vanished.

Her search still continued, and finally, when it seemed that everything was in vain, Ceres became angry with the earth which had failed to aid her in her search and laid her curse upon it. Drought and famine, she declared, should extend over the whole earth; nothing green should grow; there should be no seed-time, no harvest, until her daughter should come back to her. In vain the people implored her, in vain tales of their suffering came to her ears; she, usually so gracious and kindly, was cruel enough now.

At length she found a clew. The River Arethusa, which comes up from the underworld, had seen in the kingdom of the underworld a queen who looked, she said, most like Proserpina. She was pale and sad, and the white poppies which she wore in her hair were very different from the bright flowers she had been so fond of wearing. But still, beyond a doubt, thought the river Arethusa, it was Proserpina. Ceres knew not whether to be glad or sorry. Her daughter was found, but found where? She went to the meeting-place of the gods on Olympus, which she had not visited since the loss of her daughter, and implored Jupiter to use some means to have her daughter brought to her. All the gods felt sorry for Ceres, and they felt sorry, moreover, for the people on the earth, whom Ceres' grief was causing to suffer. At length Jupiter summoned Mercury, the messenger of the gods, and sent him to the regions of the underworld.

"I will do my best," said the king of gods and men, "but the Fates are even stronger than I, and they have declared that if your daughter has eaten anything while she has been in Pluto's realm she may not again come back to the light of day."

When Mercury reached the kingdom of Pluto and stood before the king and the sad-eyed queen, he himself felt sorry for her and hoped that he should be able to take her back with him. When it became known, however, that Proserpina had eaten a few of the seeds of a pomegranate, Mercury shook his head in despair.

"It cannot be," he said, and he went sadly back to the assembly of the gods, leaving Proserpina more hopeless than before.

At length, however, the Fates agreed to make a decree less severe, and declared that though Proserpina must spend six months of every year with Pluto in the dark underground kingdom, the remaining six months she might spend with her mother on the earth.

You may imagine the delight of Ceres when it came time for her daughter to return to her

for the first time. She stood anxiously at the door of her cottage, waiting, watching while the former companions of Proserpina stood about where they might welcome her. Suddenly there seemed to be a new freshness in the air; the grass in the meadows, long dry, grew green before their eyes, and purple violets and yellow buttercups started up all about them.

"She is come!" they cried, and sure enough, she was advancing toward them across the meadows, her hands outstretched, her garments blowing in the breeze, no longer the sad, white-faced queen of the underworld, but the old glad Proserpina who had left them long before.

This is a weather myth. Why, the old Greeks asked themselves, should the goddess Ceres, so kindly, so bountiful through a part of the year, withdraw all of her blessings through the winter months?

It must be, they declared, that she was grieved or angry about something; and gradually this tale grew up of the loss of her daughter and her long search. The descent of Proserpina each year to the underground regions meant the coming of winter, when no flowers bloomed and no seeds sprouted. The return to the upper world, on the other hand, marked the coming of spring.

There are some of these old myths which may possibly have meant to the Greeks more than they mean to us. The following story is to us but a story; we can see in it no figurative meaning. It is, however, possible that such a meaning may originally have existed. But the tale is interesting enough simply as a story:

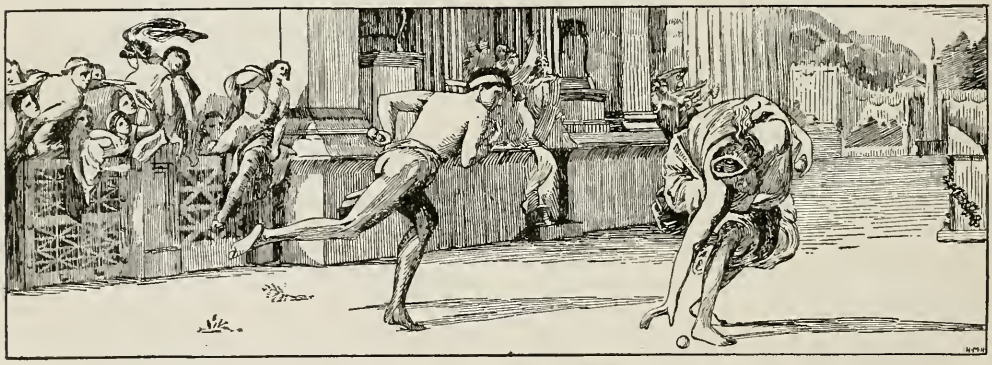
The Story of Atalanta

The king of Boeotia had one daughter, Atalanta. While she was more beautiful than any other girl in her father's kingdom, she remained a maiden at home in her father's house, long after all her companions were married. And this was not because she lacked suitors. Young men, handsome, strong, rich, fearless, came constantly to her father's palace, seeking her in marriage, and it was not because the king refused his consent that they went away unhappy.

Atalanta herself was the cause of their unhappiness, for she had made a vow that she would not marry, but would devote her life to the chase, like the goddess Diana, whom she so much admired. It was hard, however, to be constantly refusing without having any good reason that was apparent, so she made up her mind to give a different answer to her suitors —an answer which would leave them no argument. Accordingly, when the next youth presented himself, she replied:

"I shall marry the man who can defeat me in a race; but everyone who tries and fails shall be put to death."

This may sound as if Atalanta was a very cruel princess, but her idea was simply to keep people from bothering her with the question of marriage. However, her resolution did not have the effect she expected, for there were still found young men who were anxious enough to have the princess for a wife to submit to the trial which she proposed.



ATALANTA'S RACE

Now, Atalanta could run as swiftly as the deer she hunted in the forests, and however much a youth might pride himself on his speed, he was certain to find it was no match for hers. A number of suitors had met their deaths by reason of their love for her, and the people of her father's kingdom were beginning to murmur among themselves at her cruelty. One day there acted as judge in one of the races a youth, Hippomenes, by name, who had never before seen Atalanta. As he took his place in the judge's seat, he said to himself, looking around at the crowd which had gathered to witness the race.

"How can any man be so foolish as to risk his life for the sake of this one girl when their are so many beautiful girls to choose from?"

But when he saw Atalanta step forward, ready for the race, he changed his mind; for never, he felt sure, had he looked upon any-

thing so beautiful, and he found himself hoping that the youths who ran with her would be defeated.

And as she ran she looked even more beautiful. Her bright hair blew backward in the breeze, a lovely color flushed her face and her gracefulness in running was wonderful to look upon. Of course she won, as she always did, and the youths who had made trial of their skill with hers were mercilessly put to death. Even this, however, did not frighten Hippomenes.

"What glory," he said to her, "can there be in defeating weaklings like those who just ran with you? Tomorrow, if you will, I shall try my speed and endurance against yours."

As Atalanta looked at him, she felt that she would scarcely wish to defeat this young man, so handsome did he look, so brave, so worthy to be her partner. Still she only nodded her head and made up her mind that she would give him as hard a trial as she had given the others.

Now, Hippomenes knew, having seen her run, that he could never hope to conquer her in a fair race, but he thought:

"There are ways in which it can be managed. Every girl is curious, every girl likes beautiful things."

Accordingly, the next day when he took his place beside Atalanta in the starting line, he had in the front of his robe three beautiful golden apples. As the signal for starting was given, the two sped forward, side by side. For a moment it seemed as if he would actually outrun her, but with a fleet step she passed him. Instantly he seized one of his golden apples and tossed it a little ahead of her. She caught her breath, almost stopped, but her desire to win was strong; however, the beautiful golden sphere looked so tempting that she hastily stooped to grasp it. Running with all his might, Hippomenes threw a second apple, and again Atalanta slacked her speed and seized it, yet kept fairly ahead of her fellow contestant. Almost despairing, Hippomenes tossed slightly to one side of the course the third apple, the largest, ruddiest, most beautiful one of all.

This was too much for the princess. She stopped suddenly, her draperies whirling about her, stooped, and seized the apple. The delay was but for a second, although longer than on the two previous occasions, but that was all Hippomenes needed. He passed her and with a final rush, reached forward, and touched the maple goal. He had won! and the cheers of the people told that they were glad that at last their beautiful, haughty princess had been conquered.

And as Atalanta came toward Hippomenes and held out the hand in which lay the beautiful golden apples, all could see that she looked far more happy in her defeat than she had ever looked before in all her victories.

Some of the myths told by the ancient Greeks were on the border-land between mythology and history. It is probable, for instance, that the tale of the Argonautic Expedition (see *Jason* and *Argonauts*) had its rise in a voyage of discovery, although, of course, all historical reference to such a voyage is now lost. The story of the siege of Troy, likewise, the most famous of all the tales that have come down to us, was, probably, an outcome to some war which Greek chieftains waged with some people in Asia Minor. The innumerable legends which grew up around this conflict were used by Homer and Vergil as subjects for their great poems, and it is these poems, the *Iliad*, the *Odyssey*, and the *Aeneid*, which have made the story of the siege of Troy and all the wonderful happenings which were caused by it, so well known to us. Attempts at historical accuracy are mingled in all three of these poems with accounts of the part taken by the gods in human affairs.

The Trojan War

The original cause of the fierce conflict was simple enough. The sea nymph Thetis, at the time of her marriage with Peleus, invited to the wedding of the immortals, except one—Eris, the goddess of discord. If Thetis had thought, however, to avoid trouble by slighting Eris, she soon found her mistake; for the goddess, enraged at the slight, threw among the guests a golden apple on which were inscribed the words, "For the fairest." Juno, queen of the gods, Venus, goddess of love and beauty, and Minerva, goddess of wisdom and the arts, each claimed the apple, and they appealed to Jupiter. He, however, was unwilling to bring upon himself the wrath of two of the goddesses by deciding for the third. And he therefore sent all three to another judge.

The judge chosen in the delicate matter was Paris, son of Priam, king of Troy. At the birth of the prince it had been foretold that he would bring much trouble to his country, and in an attempt to avoid the outcome of the prophecy Priam had Paris exposed to die on the mountain side while he was but a child. A shepherd, however, who found the beautiful boy, brought him up as his son, and at the time that Paris was called upon to make his momentous decision he was acting as shepherd on Mount Ida.

The three goddesses appeared before him and stated their case, and not content to allow him to judge as his eyes directed, each of them offered him a bribe. Juno declared that if he decided for her, he should have power and riches; Minerva promised him fame in war; Venus, the most beautiful woman on earth as his wife. Paris was not influenced by this offer of Venus, for he had a wife, a beautiful nymph, Oenone. However, looking upon the marvelously beautiful face of Venus, he felt that he could not award the prize to anyone else. By this decision, he won for himself the hatred of Juno and Minerva.

Inspired by Venus, although he did not realize that fact, Paris shortly after journeyed to Greece, where he was entertained by Menelaus, king of Sparta. The wife of Menelaus, Helen, was the most beautiful of all women, and it was she whom Venus had promised to Paris.

Urged by Paris, and driven to a decision by Venus, Helen consented to leave her husband and journey with Paris to Troy. Menelaus when he discovered the treachery of his guest and his wife, called upon all the chieftains of Greece to give him aid in punishing the one and bringing back the other. Most of them responded willingly enough to his call—Agamemmon, king of Mycenae and brother of Menelaus, Ajax, Diomede, and Nestor, the oldest and wisest of all the Grecian chiefs. Ulysses and Achilles did not wish to go, and various means had to be adopted to gain their aid; for all felt that without these two the expedition was certain to be a failure. Ulysses, the craftiest of men, would be able to give them counsel in many difficult places, and Achilles was looked upon by all as the greatest of all Greek heroes. He was the son of Peleus and Thetis, and might well be brave in the presence of enemies; for his mother had bestowed upon him a wonderful gift. She had dipped him, while he was young, in the River Styx, and had thus made his body

THE ABDUCTION OF HELEN

invulnerable to any weapons; only one place, a spot on the heel by which she had held him, could be injured by mortal weapon.

It took several years for the Greeks to prepare for the expedition—to get ready the supplies, the arms, the provisions which would be required by so large an army. But finally everything was ready, and the chieftains with their thousands of followers assembled at Aulis in Boeotia, ready to embark. But here a vexatious delay awaited them. While hunting, Agamemnon, the commander-in-chief, killed a stag which was sacred to Diana, and the goddess of the chase would by no means allow him to go unpunished. She brought a pestilence upon the army and produced a calm which made it impossible for the vessels to leave port; and the soothsayers, after trying all their arts, declared that the wrath of the goddess could be placated only if Agamemnon would allow his daughter, Iphigenia, to be offered up as a sacrifice.

Agamemnon refused, absolutely, at first, but as there was no other way to appease the angry goddess, he finally sent for his daughter, giving as his reason that he wished to marry her to the hero Achilles before the expedition should set out. The princess was laid on the altar and the knife was almost at her throat, when the goddess, seeing her beauty and innocence, relented, and bore her away in a cloud to be prietess in a temple to Diana.

Favorable winds were now granted, and the fleet set sail for Troy.

Meanwhile, the Trojans had been preparing for the coming of the enemy. Priam, king of Troy, was an old man, and unable to lead his forces in battle, but his sons were strong, active men, and particularly was Hector a leader of whom any army might have been proud. Aeneas, a relative of Hector, was one of the strong defenders of Troy.

When the news spread through the city that the Greek fleet was approaching, the Trojan forces gathered on the shore, but the Greeks drove them back and easily effected a landing.

For nine years the struggle went on. First the Greeks would gain the advantage, then the Trojans; and by the close of the ninth year the affair seemed apparently at a standstill. The Trojans had withdrawn their forces within the walls of the city, and the Greeks were besieging them. At the beginning of the tenth year an event occured which promised badly for the attacking forces. Achilles, the great pride of the Greeks, became angry with the leader, Agememnon, on account of a real or fancied insult, and he left the struggle absolutely, taking refuge in his tent and withdrawing all of his forces. This was indeed a blow, and the Trojans might have profited largely by it had it not been just at this point the gods and goddesses began to take a part in the struggle. Juno and Minerva, because their claims to beauty had been ignored by the Trojan Paris, took part against Troy, while Venus and Mars favored the Trojans. Jupiter remained, for the most part, neutral, though often one goddess or another was able to influence him.

Partly because of the withdrawal of Achilles, partly because Thetis, the mother of Achilles, angered at the slight to her son, had petitioned Jupiter to grant a Trojan victory,

the forces of Troy defeated the Greeks utterly, in a battle, and drove them to their ships. A council of war was called, and Nestor, to whom all looked for wise counsel, declared that he could see no way out of the difficulty unless Achilles could be persuaded to return.

Agamemnon at last consented to humble himself before the hero and to petition his aid, and rich gifts were sent by the messengers who were dispatched to Achilles. The latter, however, was firm; he had been slighted and the Greeks might get along without his aid. He even announced that he was going to return to Greece at once.

The Greeks had built a rampart around their ships and the Trojans were besieging them there. Encouraged by the news that Achilles had refused to take part against them, the Trojans broke through the Greek ramparts and would have set fire to the ships had not Neptune offered aid to the Greeks.

There remained one last way of making a plea to Achilles. Patroclus, his relative and his dearest friend, was persuaded to go to him and to report the sorry state in which the Greeks found themselves. Even this, however, did not move Achilles, but he did finally consent to allow Patroclus to don his armor and to place himself at the head of the Myrmidons, Achilles' own special troops.

When he returned to the field, Patroclus found a fierce battle going on. He dashed into the midst of it at the head of his men, and the Trojans, terrified at the supposed sight of the one whom they so dreaded, fled in dismay, even Hector being obliged to flee.

The Trojans, however, rallied and returned to the conflict, and suddenly Hector and Patroclus found themselves face to face. The Greek writers who tell us the story cannot, apparently, bear the thought of Patroclus being really vanquished in fair fight by Hector, so they tell us that Apollo took sides against the Greek warrior, and deprived him of his helmet and his lance. At any rate, Hector obtained the advantage and Patroclus fell, mortally wounded by the Trojan's spear.

Achilles, when he heard of the death of the man whom, more than any other, he loved, was wild with remorse and anger. He was about to rush unarmed into the fight against Hector, who had arrayed himself in the armor of Achilles which he had stripped from Patroclus. But Thetis, his mother, persuaded him to wait until she could get from Vulcan another and finer suit of armor for him.

Impatient at the delay, but recognizing the wisdom of his mother's request, Achilles spent the night in grief for his friend and in ragings against the slayer. In the morning the armor was ready, and a most wonderful suit it was, with its elaborate trimmings of gold. First Achilles proceeded to the council, where he became reconciled with Agamemnon, and then, urging all the Greeks to follow his example, he rushed forth to battle. The Trojans could not stand against the Greek forces, inspired as they were with new courage by the presence of Achilles, and they rushed back into the city.

Hector, however, remained without the walls, determined not to flee; but when he saw Achilles approaching in his flashing armor, with his spear poised, he became terrified and turned to flee. Around and around the walls of the city they fled, Achilles gaining not at all upon Hector; and it is uncertain how the race might have terminated had not Minerva interfered in it.

She assumed the form of Hector's bravest brother, and appearing at Hector's side, urged him to turn and defy Achilles, promising aid. Hector, much delighted, for it was far from being his desire ever to run from an enemy, stood to give battle and instantly hurled his spear with all his strength. Turning to ask his brother for another spear, Hector found that he was alone, and understood that he had been deceived by some deity. Now Achilles advanced upon him and launched his spear with such true aim that Hector fell to the field, mortally wounded. His last words were an appeal to Achilles to allow his body to be carried back to Troy and given proper burial rites, but Achilles answered him brutally. Tying the body of Hector by strong cords to his chariot he drove back and forth before the gates of the city in full view of the Trojan forces and of the grief-stricken parents of Hector. No pleas seemed to move him; he would have vengeance on the dead body of his enemy.

That night, however, the old king Priam went to Achilles in his tent and finally prevailed upon him to give up the body of Hector and let it be borne back to Troy. A twelve-day truce was pledged, that the Trojans might have time for the funeral ceremonies which they felt were the due of their dead leader.

Achilles himself did not live long after the death of Hector. One day, during the funeral ceremonies of Hector, the Greek hero saw a young woman who seemed to him the most beautiful and charming person he had ever seen. Eagerly he inquired who she was, and what was his dismay to learn that she was a princess of Troy, daughter of Priam and sister of Hector. However, he was not to be turned from his purpose; he had determined when first he set eyes on the maiden to make her his wife, and he immediately sent messengers to Priam declaring his desire. For some reason, Priam decided to look favorably upon his suit—perhaps because Achilles had yielded to his plea for Hector's body, perhaps because he thought that the Greek hero might influence his people in favor of the Trojans.

At any rate, a conference was arranged, and the parties met in the temple of Apollo. Paris had not been invited to be present, but he appeared during the course of the negotiations, and his coming meant no good for Achilles. Paris knew that this man was invulnerable in all but one spot, and it was at this spot in the heel of Achilles that he aimed his poisoned arrow. The arrow flew true to its mark, and Achilles fell, mortally wounded. Paris, however, did not enjoy his triumph long, for a Grecian chief in his turn shot Paris with a poisoned arrow. Thus died the man

who had caused all the trouble, who had brought distress to two entire peoples and death to hundreds of brave men.

And now a prophecy came to the ears of the Greeks. There was in the city of Troy a statue of Minerva, supposed to have fallen from heaven. It was called the Palladium, and was looked upon as the guardian of the city. Until the Greeks should gain possession of this Palladium, the prophecy ran, they could not hope to capture Troy. At the risk of their lives, for the statue was well guarded, Ulysses and Diomede entered the city in disguise, stole the statue, and bore it off to the Grecian camp.

But even this did not seem to bring decisive victory to the Greeks. Their confidence in their own power was lessening, and they began to argue that if they could not subdue the Trojans with the aid of Achilles, they could never make head against them now. Here the crafty Ulysses came to their aid.

THE GREEKS LEFT BEHIND THEM A HUGE WOODEN HORSE

"If we cannot take the city by force," he declared, "we can do it by stratagem." And he laid a plan which all the Greek leaders declared to be certain of success.

First they allowed it to be noised abroad, so that it came to the ears of the Trojans, that they had given up the siege and were returning to Greece. And they did indeed, withdraw their ships and hide them behind a near-by island. They left something behind them, however—something which filled the Trojans, when they poured forth out of the city gates and across the plain, with curiosity and amazement. This was a huge wooden horse, the purpose of which they could not guess. Had they known that it was hollow and full of armed Greeks, they would have left it on the sands, or have burnt it, but as it was they gathered about it and wearied themselves with conjectures as to its use.

"Let us take it into the city," cried some, "and present it as a gift to Minerva."

"Let us not touch it," exclaimed others. "Who knows what harm it may do us?"

Most determined of all in his command that the horse be let alone was Laocoön, priest of Neptune.

"What would you do?" he cried. "Have you not learned that the Greeks are never to be trusted? For my part, I fear them even when they offer gifts." And with these words he struck the side of the horse with his lance.

Had the people been wise, they might have guessed the truth from the hollow sound and the clanking as of armor which followed the blow, but it so happened they could not quite persuade themselves to give up this curious object.

Meanwhile, another part of the scheme of Ulysses was put into action. A Greek was here dragged forward by eager Trojans, who declared that they had captured him and demanded that he tell his story. With apparent reluctance and terror, he replied to their questions. Yes, he was a Greek. His name was Cinon, and he had been cruelly treated by Ulysses, who had persuaded the Greeks to abandon him when they set sail from Troy.

"But do you know the purpose of the wooden horse?" cried his captors.

"O yes," replied the wily Sinon. "It was built to propitiate the goddess Minerva, who was angry at the theft of the Palladium."

"And why is it so huge?" asked the Trojans.

Again Sinon pretended to be reluctant to tell, but at length he said:

"They have deserved no good at my hands, and I will tell you the truth about the wooden horse. Calchas the prophet assured them that if the Trojans succeeded in getting the horse within their city they would assuredly triumph over the Greeks, and they built the horse large so that you could not get it through the gates."

While the people looked at each other, not quite convinced as to Sinon's good faith, a remarkable portent occurred. Out of the sea there glided two monstrous serpents, so terrible to look upon that all the crowd scattered in fright. The serpents, however, paid no attention to the crowd; they made their way at once to where Laocoön and his two sons stood. All struggles on the part of the three were unavailing; they were crushed to death in the coils of the monsters, and the people saw in this portent a sure sign of the displeasure of the gods at Laocoön's treatment of the wooden horse.

Without delay they dragged the huge horse into the city, forming a joyous procession about it and singing and dancing in triumph. But their triumph was short-lived. In the night the traitor Sinon let out the men who were shut in the horse's body, and they in turn opened the city gates to the Greek forces, which had returned under cover of darkness. Immediately the whole city was full of the enemy. Fires were started in every quarter; men, women and children were put to death; and the few who escaped the sword took refuge in flight.

Troy had fallen, not through force but through treachery; and the long struggle was at an end.

This story of the siege of Troy is of necessity brief, but the full account is interesting enough to repay detailed study. Homer, in the *Iliad,* gives the story, in most fascinating form, of the last year of the war, from the time when Achilles becomes angry to the death of Hector. The story of the wooden horse, of the final fall of the city, of the wanderings of Ulysses and the Trojan Aeneas, are told in the *Odyssey* and the *Aeneid.* There are good translations, both in prose and in poetry, of these three wonderful old poems, and girls as well as boys will find much in them that is absorbing and delightful.

Scandinavian or Northern Mythology. This is the name given to the body of myths which in its earliest forms was common to all the Teutonic nations, to the Germans and Scandinavians, as well as to the ancestors of the English. The legends tell that in the beginning there was no world, but only a vast abyss, to the north of which was mist and to the south of which was light. Twelve rivers had their sources in the mist world, and these flowed into the great abyss, where they were frozen. The warmth from the light world melted this ice, and from the mist which arose came Ymir, regarded as the father of the giants, and the cow Adhumbla. The giant was nourished by the cow's milk, and the cow by the salt which she licked from the ice. One day, while she was thus feeding, human hair appeared above the ice; the next day a head came into view, and shortly after the god Bori appeared. From Bori all the gods were descended. Odin and his two brothers, the grandsons of Bori, killed the giant Ymir and of him they formed the earth, making the solid ground from his flesh, the ocean from his blood, the rocks from his bones, the forests from his hair, the clouds from his brains and the canopy of heaven from his great skull.

The great gods, known as the *Aesir,* were twelve in number, and the goddesses were twenty-four in number. These immortals lived in a realm known as Asgard, regarded as some place above the earth. The most of the gods were beneficent in their dealings with man, and in northern mythology there are fewer stories showing the gods as cruel and licentious than there are in the classical myths. Lok, or Loki, the god of evil, was at first considered not so much the personification of evil as of mere mischievousness. As time went on, however, the conception of him changed, and he came to correspond closely with the Satan of the Christian religion.

Men, according to the northern mythology, were created from trees. In the beginning they lived in perfect innocence and goodness, but with the advent of Lok on earth and with the entrance of the giants into various relations with men, the age of innocence came

Wonder Questions in Mythology

How has mythology enriched our vocabulary?

The origin of some of our most familiar words may be traced to names that figure in classic mythology. An interesting illustration is the word tantalize, which comes from Tantalus. Tantalus was a king of Phrygia who was banished to the lower regions because he had served the gods with the flesh of his own son. In the realms of Pluto he had to stand in a pool with his chin on a level with the water. Tortured by thirst, he again and again bowed his head to drink, but as often as he did so the water swept away from his reach. Trees laden with luscious fruits swayed their branches over him, but ever eluded his grasp. Thus tantalized, he spent his days in misery. Another interesting word story centers about the name Chimera. The Chimera was a fire-breathing monster having the head of a lion, the body of a goat and the tail of a dragon. To-day, any wild, fantastic scheme is said to be chimerical. The familiar word cereal is derived from Ceres, the name of the Roman goddess of agriculture. These are representative of a number of words that are associated with mythology.

What myth can be said to symbolize the Shakespearian phrase, "vaulting ambition which o'erleaps itself"?

The story of Icarus and Daedalus is suggested by this expressive phrase. Daedalus made wings for himself and his son Icarus, and fastened them on with wax. As they flew into the air, Daedalus warned his boy not to fly too near the sun, but Icarus, scorning this warning and desiring to go higher than his father, flew so near the sun that the heat melted the wax. Then the wings fell off and the lad dropped into the sea and was drowned.

What well-known Norse myth symbolizes the conflict between good and evil?

This myth is the story of Balder, the pure and radiant god of light. To protect him from harm, his mother Frigga sent her servants to all parts of the world, bidding them to exact a vow from all things, animate and inanimate, that they would not injure Balder. Every object in creation made the vow except a weak sprig of mistletoe, which grew upon the oak stem at the gate of Valhalla. One day while the gods were at play, they began throwing missiles at Balder, for they knew none of their weapons could harm him. Frigga, who was spinning in her home, heard their merry cries, and asked an old woman who was passing by what the noise was. Loki, in disguise, told the goddess that the gods were throwing stones, spears, darts and other objects at Balder, who stood smiling and unharmed through it all. Then the mother related the story of the vows, and added that only a weak little plant, too small to be feared, had failed to make the required promise not to injure Balder. When the evil Loki heard this he hastened to the gate of Valhalla, fashioned a spear from the mistletoe, and sought out Hodur, the blind brother of Balder. Putting the shaft in Hodur's hand, he bade him throw it in the direction of Balder. The shaft struck home and the beautiful god fell to the ground slain. In this story Balder and Hodur are symbols of the opposing forces of good and evil, and Loki impersonates the tempter.

Is there any resemblance between classic myths and Old Testament stories?

There are several Old Testament stories that are strangely like Greek and Roman myths, though scholars do not know just what is the relationship between them. The story of Noah, for instance, is similar to that of Deucalion, for when Jupiter had the race of men swept away by a flood, Deucalion and his wife Pyrrha found refuge on Mount Parnassus and were saved. Samson's feats of strength remind us of the deeds of Hercules, and the dragon that guarded the apples in the Garden of the Hesperides may have been the serpent that tempted Eve. From these and similar coincidences some authorities reason that all nations at some time came under the same religious influences. This subject, though interesting, is still a matter of speculation.

What familiar figures of speech have their origin in mythology?

There is space here for only a few such sayings and phrases, but they are typical of many others. A man in a dilemma is said to be "between Scylla and Charybdis," referring to two mythical monsters that destroyed unlucky mariners. A politican who endeavors to remedy bad conditions is sometimes described as one who "cleanses the Augean stables." This refers to the stables of King Augeas, which were cleaned in one day by Hercules, after having been neglected for thirty years. To be "hit by Cupid's dart" is to fall in love; "to be a devotee of the Muses' is to pursue art, music and literature; "to be Argus-eyed" is to be exceedingly alert; "to be overtaken by one's Nemesis" is to suffer just vengeance. These examples could be multiplied indefinitely.

Why should we study mythology?

The old myths are the expression of the religion, the literature and the science of the ancients, and through the study of mythology we learn much about their ideas, manners and customs and mental attitude. Besides throwing interesting light on a bygone age, mythology has an interest all of its own. Many of the stories are nothing less than fascinating fairy tales which appeal to adults and children alike. We find, too, that literature abounds in allusions to the ancient myths, and a knowledge of mythology helps one to enjoy and understand the books one reads.

What are the special characteristics of Norse mythology?

The grand and tragical elements of life receive emphasis in the mythology of the people of the North. Over and over again their myths suggest the unending struggle between the beneficent and the forbidding forces of nature, for this struggle is a perpetual reality in a climate where the brief summer season is ever contrasted with the darkness and cold of a long winter. In the lands of rugged landscapes and fields of ice and snow, where the flashing aurora borealis and the iceberg are familiar sights, a mythology of tragedy and struggle is quite to be expected. Therefore Norse mythology has few of the sweet and idyllic stories that grace the mythology of Southern lands. It is an interesting fact that in Northern mythology the gods are mortal.

How did the Greek conception of the beginning of things differ from that of the Scandinavians?

Both races imagined that the earth was formed out of chaos, but the Greek idea of chaos was that of a vapory, formless mass; in Norse mythology chaos is a mixture of fire and ice, and from these opposing elements the first gods came into being. The idea of fire and ice was doubtless suggested by the extraordinary contrast of elements in Iceland, which has been called the "land of ice and fire." There may be seen ice caps and volcanoes, glaciers and boiling geysers.

Of what is the story of Apollo and Daphne a symbol?

This is one of the myths by which the ancients gave poetic interpretation to a common natural occurrence. Apollo, wandering one day in the forest, saw and loved the nymph Daphne. She was frightened by his advances and fled when he tried to approach her. The god pursued her to the edge of the River Peneus, where, trembling and exhausted, she called on her father, the river god, for help. When Apollo came up with outstretched arms he embraced a tree, for the father had saved his daughter by changing her into a laurel. Thereafter the laurel was sacred to Apollo. The story symbolizes the effect of the sun on the dew. The sun, enchanted by the beauty of the dew, seeks to come close to it; the dew, in fear, flies from the sun, and when the rays fall upon it, vanishes.

How did the Greeks explain the phenomenon of an echo?

They had a story of a lovely but frivolous wood nymph named Echo, who fell deeply in love with Narcissus, whom she met in the forest. She tried in vain to win his love, and finally, in despair, wandered off into the mountains. There she pined away until only her voice remained. The gods thought that her grief showed lack of self-respect, and they condemned her to wander among the mountain solitudes, always repeating the last sounds that reached her ear.

What is the mythical explanation for the presence of sin and unhappiness in the world?

The story of Pandora is the myth that explains the world's sorrows. Because men had used the divine fire stolen from heaven by Prometheus, they had to be punished for their presumption. In a council of the gods it was decided that women should be sent among men as a punishment, and they ordered Vulcan to create one. He made a lovely creature, to whom Apollo gave musical gifts, Mercury gave persuasive powers, and Venus the gift of charm. So she was called Pandora, meaning all-gifted. The maiden was taken to earth by Mercury and left with Epimetheus, brother of Prometheus. For a time all went well, but Pandora was not wholly happy because of a curious box that Mercury had left, one which he had sternly forbidden her to open. After struggling long with the temptation to open it, her curiosity overcame her one day, and she unlocked the cover and threw it back. To her dismay there flew out of the box all the ills that have ever since plagued mankind—disease, envy, fear, disappointment and so on. Too late Pandora slammed the cover down, but after a time she heard a weak little voice saying, "Let me out." When this had kept up for some time the curious maiden opened the cover and peered in the box to see what was left there. Then out flew a beautiful winged creature that sang as it soared away, "I am Hope." Thus, although the age of innocence was past, and sin and sorrow had come to mankind, still there was Hope in the world, and this meant that suffering would not be too great for men to bear.

Outline on Mythology

I. General Meaning
II. Divisions
  1. Myths of explanation of questions asked by primitive man in regard to creation.
    a. What am I?
    b. Whence did I come?
    c. What is the world?
    d. Whence came all nature?
    e. Causes of light, darkness, life and death, etc.
  2. Myths of entertainment
    a. Tales of adventure of gods and heroes
III. Origin and Theories
  1. Gods were mere men remembered after death by their great deeds
  2. Wise men invented them for the purpose of establishing law, through the gods appealing to mankind
  3. Inventions of poets, story-tellers, etc.
  4. Myths explained all physical phenomena
IV. Grecian and Roman
  1. Creation of all things explained by myths
  2. Planets as rulers of universe
  3. Universe divided and rulers take different abodes
  4. Abode of lesser deities
  5. Typical Myths
V. Scandinavian and Northern
  1. Explanation of creation
  2. Giant Ymir first created
  3. Bori, father of all gods, appears
  4. Earth then formed from Ymir by Bori's grandsons
  5. Twelve gods and twenty-four goddesses
  6. Gods beneficent and kind
VI. Egyptian
  1. Many religious myths
  2. The stronger eventually led
  3. Distinctive belief, soul of man was immortal
VII. Comparison of Different Myths
  1. Points of resemblance
  2. Points of difference

to an end, and gods and men were involved in a struggle for existence with the powers of evil. One distinctive point of the northern mythology was the belief that a time known as Ragnarök (the Twilight of the Gods) would come, when the rule of Odin and his fellow gods would come to an end, when the powers of evil would triumph, when Asgard with its palaces would be destroyed. They believed, however, that out of the destruction of the old order of things would arise a new heaven and a new earth and that peace and happiness would once more reign. In the article STORY TELLING there is told in detail one of the important Norse myths.

Egyptian Mythology. This differed from that of the Greeks and Romans and the northern people in that it consisted, originally, not in a general or national religion, but in a number of religions which grew up in separate towns and villages. Naturally, as some of the cities increased in importance and gained control of others, the stronger ones were able to force their religions upon the weaker, so that as time went on the gods became fewer and attained importance among a larger number or worshipers. There was never, however, in Egypt a complete fusion of the different religions. One of the distinctive beliefs of the Egyptians was that the soul of man was immortal. All the Egyptian religions united in this belief, although there was a great difference of opinion as to where and in what state the soul lived after death.

Related Articles. Consult the following titles for additional information:

GREEK AND ROMAN MYTHOLOGY

Achilles
Actaeon
Admetus
Adonis
Aegis
Aeneid
Aeolus
Aesculapius
Agamemnon
Ajax
Alcestis
Amazons
Ambrosia
Amphion
Andromeda
Antaeus
Antigone
Aphrodite
Apollo
Apple of Discord
Arachne
Argonauts
Argus
Ariadne
Atalanta
Atlas
Augeas
Augurs
Aurora
Bacchus
Baucis
Bellerophon
Bellona
Cadmus
Caduceus
Calliope
Calypso
Cassandro
Castor and Pollux
Centaur
Cerberus
Ceres
Charon
Chimaera
Chiron
Circe
Clio
Clytemnestra
Cupid
Cybele
Cyclops
Daedalus
Deucalion
Diana
Dido
Diomedes
Echo
Elysium
Endymion
Erebus
Europa
Euterpe
Fates
Fauns
Flora
Fortuna
Furies
Galatea
Ganymede
Golden Fleece
Gorgons
Graces
Hades
Harpies
Hebe
Hecate
Hector
Hecuba
Helen
Hercules
Hero
Hesperides
Hydra
Hygeia
Hymen
Io
Iphigenia
Iris

Ixion
Janus
Jason
Juno
Jupiter
Laocoön
Lethe
Mars
Medea
Medusa
Melpomene
Menelaus
Mentor
Mercury
Midas
Minerva
Minos
Minotaur
Morpheus
Muses
Naiads
Narcissus
Nectar
Nemesis
Neptune
Nereids
Nestor
Niobe
Nymphs
Oedipus
Oracles
Orestes
Orion
Orpheus
Palladium
Pan
Pandora
Paris
Pegasus
Pelops
Penelope
Perseus
Phaedra
Phaethon
Philomela
Pluto
Plutus
Polyphemus
Priam
Prometheus
Proserpina
Protesilaus
Proteus
Psyche
Pygmalion
Python
Rhadamanthus
Rhea
Romulus
Sarpedon
Saturn
Satyrs
Scylla
Selene
Semele
Sibyl
Sirens
Sisyphus
Styx
Tantalus
Tartarus
Thalia
Themis
Theseus
Thetis
Titans
Troy
Ulysses
Uranus
Venus
Vertumnus
Vesta
Vulcan

SCANDINAVIAN MYTHOLOGY

Asgard
Balder
Frey
Freya
Frigga
Heimdall
Hel
Idun
Lok
Niflheim
Norns
Odin
Sigurd
Thor
Valhalla
Valkyries
Yggdrasil

EGYPTIAN MYTHOLOGY

Ammon
Anubis
Apis
Iris
Osiris
Serapis

N, the fourteenth letter of the English alphabet, in its form derived, with practically no change, from the Phoenician alphabet. Its value, also, has been the same from the earliest time. In English and most other languages, *n* has a pure nasal sound, and it is much the commonest of the nasals. In a few words, after *m* and *l*, it is silent, as in *hymn, kiln;* and in many words it has, in unaccented syllables, the force of a vowel, as in *open, chosen.*

The commonest use of *n* as an abbreviation is for *north.*

NA'DIR. Imagine an imaginary straight line passing from the zenith through the center of the earth and beyond. Any astronomical point upon this line on the side of the earth opposite the zenith is the nadir. The zenith and the nadir are the poles of the horizon.

NAGASAKI, *nah ga sah'ke,* JAPAN, one of the principal Japanese seaports, and capital of the prefecture of the same name, on the northwest coast of the island of Kiushiu. It is beautifully situated on a peninsula and enclosed by hills, upon the sides of which a portion of the town is built. The harbor, which is three miles in length, is excellent, and the trade is very large. Nagasaki was one of the five Japanese ports opened in 1858 to the British and Americans, and eleven years later it was opened to foreign nations generally. The chief exports are copper, silk, camphor, tobacco, porcelain, lacquered wares and sugar. Population, 1916, 136,800.

NAGO'YA, JAPAN, a prosperous industrial city, capital of the province of Owari, on the island of Hondo, 170 miles west-southwest of Tokyo, and on the Bay of Owari. The city is well built, and contains many temples and monasteries, and a castle. Nagoya is one of the greatest centers of the pottery trade in Japan, and the industry gives employment to most of the inhabitants. The city also contains cotton, silk and embroidery establishments. Population, 1916, 389,272.

NAIADS, *na'yadz,* in Greek mythology, nymphs of fountains and brooks, of similar character to the dryads and resembling the nixies of northern mythology.

NAILS, of animals, are a form of the outer layer of the skin. In man the nails do not enclose the ends of the fingers and toes, but in the horse and other animals the nails assume the form of protective coverings and are then known as "hoofs." Nails may be produced to form "claws," as in birds and flesh-eating animals, while in the sloths they are large enough to aid in climbing trees. The human nail consists of a root, which is hidden below the skin, and an exposed part, which is attached to the skin. Both are produced from the true skin. They grow in length about one-thirtieth of an inch in a week on the fingers and more slowly on the toes. If a nail be removed by accident, it will grow again, provided the cells which secreted it have not been injured. The light spot at the base of the nail is called the *lunula.*

NAILS, small, slender pieces of metal, generally with round or flattened heads, used for driving into timber or other material for the purpose of holding separate pieces together. There are numerous kinds and sizes, and these are all made by machinery. There are many patterns of nail-making machines, and the process of manufacture has been so cheapened that the price of nails is much less than formerly. *Cut nails* are made by rolling the iron into flat bars, which are a little wider than the nail is long, and of the same thickness. These bars, called *nail plates,* are fed into a machine, which cuts the nail, then seizes it in a viselike ar-

rangement and strikes it a sharp blow with a die, which forms the head. By an ingenious device, the plate is usually fed into the machine so as to have the wide part of the nail cut from the two edges alternately; in this way waste of iron is prevented.

Wire nails are now in use for most purposes. They are made from steel wire which is prepared especially for the purpose. The wire is wound on a reel; one end of it is fed into a nail machine, which cuts the nail, points it and makes the head automatically. A single machine will make from 150 to 500 nails a minute, depending on the size, the large nails requiring more time than the small ones. Half a million tons of wire are made into nails in the United States each year.

The size of the nails is denoted by the term *penny;* as, six-penny and eight-penny. The word *penny* in this sense means *pound,* and the term indicates the number of pounds that a thousand nails of that size will weigh; as, one thousand six-penny nails will weigh six pounds. Very large nails are called *spikes,* and very small ones, *brads* or *tacks,* according to the shape.

NAMES, Personal. It is probable that in early times each name had some personal significance. Most old Testament names are original; that is, they were given in the first instance to the individuals bearing them. They either originated in some circumstance of birth or expressed some religious sentiment, thus: Jacob (supplanter), Isaiah (salvation of Jehovah), Hannah (favor), Deborah (bee). When some important change occurred in a man's life, his name was often changed to fit his new circumstances or disposition. Thus Abram became Abraham, and Jacob became Israel.

The Hebrews, Egyptians, Assyrians, Babylonians, Persians and Greeks had no surnames; and in the earliest period of their history the same may be said of the Romans. In course of time, however, every Roman citizen had three names, the *praenomen,* or personal name, the *nomen,* or name of the gens or clan, and the *cognomen,* or family name, as Publius Cornelius Scipio. Conquerors were occasionally complimented by the addition of a fourth name, or *agnomen,* commemorative of their conquests, as Publius Cornelius Scipio *Africanus.* Greek names often referred to some personal characteristic, to some special favoritism on the part of the gods or to some future momentous event; while Roman names referred often to the personal appearance and were frequently supplemented by the occupation, place of birth or a nickname. Times of public excitement have had considerable influence in modifying the fashion in names.

It is impossible to state with any degree of certainty when the modern system of personal nomenclature became general. Surnames were introduced by the Norman adventurers, but were for centuries confined to the upper classes. They became general in Scotland about the twelfth century. In some of the wilder districts of Wales they can hardly be said to have been adopted even yet. The principal sources of surnames have been words denoting personal characteristics (Black, Long, Short), rank, profession or occupation (Bishop, Knight, Miller), localities or natural objects (Hill, Dale, Stone), and patronymics (Johnson, Wilson, Andrews). The Scotch *Mac,* the Irish *O',* the Norman *Fitz,* the German *-sohn,* the Scandinavian *-sen* and the Russian *-vitch* have the same signification as the English *-son.* The Hebrews had no surnames proper, but to distinguish two men of the same name they used the form Solomon ben David. (Solomon, son of David). The Welsh use the word *ap* in the same way—Evan ap Richard (John, son of Richard).

In most nations the wife changes her surname on marriage to that of her husband; in Spain, however, she retains it, and a son may adopt either the paternal or maternal name. In many states of the Union, a man can change his name only by securing a special act of the legislature of his state.

NAMUR, *na moor',* Belgium, a picturesque city of many historic associations, capital of the province of the same name. It is situated at the junction of the Sambre and the Meuse, thirty-five miles southeast of Brussels. Though protected by a circle of nine forts, Namur was captured by the Germans early in the World War, after a fierce bombardment of two days. Before the war it was a thriving industrial center, carrying on the manufacture of cutlery, machinery, glass, leather and other commodities. It is in a coal and iron region, and in normal years has a prosperous trade. The city's chief buildings include a stately cathedral and a museum of antiquities. Population, 1912, 32,453.

NANAIMO, *nah ny'mo*, B. C. a town on the east side of Vancouver Island, thirty-three miles from Vancouver, with which it maintains steamboat connection. Lumbering and coal mining are the principal industries of the neighborhood, and the packing of salted herring is an important industry in the town. The Hudson's Bay Company laid the foundation of the town in 1833 by the erection of a blockhouse. Population, 1911, 8,306.

NANA SAHIB, *nah'na sah'hib*, about (1820-?), the leader of the Sepoys in the Indian mutiny. He was adopted by the ruler of the Mahratta State of Bithur, but on the death of the latter the British government refused to recognize Nana's claim to the succession. In May, 1857, there arose a mutiny of the Sepoys in Cawnpore, and Nana, after offering to help the English, treacherously placed himself at the head of the mutineers. The Europeans in Cawnpore capitulated on a promise that they should be sent down the Ganges in safety, but the men were all shot down, and the women and children were massacred, on the approach of a British force. Nana was defeated by Sir H. Havelock, and was driven across the frontier into Nepal. There all knowledge of him ceases, but the general opinion is that he escaped into central Asia.

NANCY, *nahN se'*, FRANCE, capital of the department of Meurthe-et-Moselle, is situated 220 miles east of Paris and ninety-four miles west of Strassburg, on the left bank of the River Meurthe. Though Nancy was repeatedly bombarded during the World War, it was fifteen miles from the farthest German advance and was never captured. However, it suffered considerable material damage. The ancient citadel, the ducal palace and the Hotel de Ville are among the most noteworthy structures. One of the leading universities of France, comprising schools of medicine, law, science, philosophy and pharmacy, is located at Nancy. The chief manufactures of the town consist of broadcloth and other woolen stuffs, cotton goods, hosiery, lace, boots and shoes, embroidery and musical instruments. The trade in peace times is extensive. Population, 1914, about 120,000.

NANKING', CHINA, the largest city and capital of the province of Kiangsu, situated on the Yang-tse-kiang, 194 miles northwest of Shanghai. Here, in 1842, was signed the first treaty with Great Britain. From 1368 to 1403 it was the capital of the Chinese Empire, and in former days was noted for its art and learning and its historic monuments. In the Tai-ping rebellion of 1853 Nanking was captured by the rebels, and its beautiful porcelain tower, many public structures and much of its famous wall were destroyed. The rebels made the city their capital and held it until 1854. Since then it has been of secondary importance, the chief activities centering in the arsenal and military college. In the vicinity are the tombs of the Ming dynasty. Population, 267,000.

NANSEN, *nahn'sen*, FRIDTJOF (1861-), a Norwegian Arctic explorer. He was educated in the University at Christiania, specializing in zoölogy. Before he was of age he made a notable voyage from Spitzbergen to Greenland to investigate animal life, and in 1888 he made a memorable expedition across Greenland on the ice cap.

The achievement on which his fame as an explorer must rest was an expedition on which he started in June, 1893, from Christiania to the Arctic regions, with twelve companions, in the *Fram*, a vessel constructed to resist the pressure of ice floes. In September of the same year, he thrust his vessel into an ice pack, in which the party drifted, thus imprisoned, for eighteen months, until March, 1895. Nansen now, with one companion, left the ship and made his way by sledges toward the Pole. After experiencing fearful hardship, he reached latitude 86° 4'. He was then obliged to turn back to an island of the Franz Josef Land archipelago, where he passed the winter. A start for Spitzbergen was made May 19, 1896, and when off Cape Flora he and his companion encountered Captain Jackson, of the British exploring expedition, who took them aboard. During his three years' exile from civilization Nansen passed over hundreds of miles of hitherto unexplored coast, discovered a number of new islands and traversed 50,000 square miles of unknown waters. The highest point reached by him in the Arctic regions was 195 miles nearer the North Pole than any man had ever been before and 261 miles, by

NANSEN

his calculation, from the Pole itself. Nansen wrote a popular account of his voyage called *Farthest North.*

The most important result of Dr. Nansen's explorations was his substantiation of the earlier assumption that there is no Arctic continent, but only an immense ocean of profound depths. See NORTH POLAR EXPLORATION.

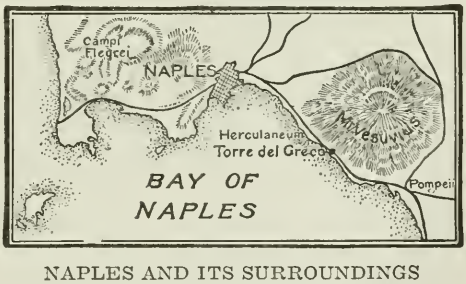
NANTES, *nahNt,* FRANCE, capital of the department of Loire-Inférieure, on the River Loire, 250 miles southwest of Paris. The situation, on an important navigable river, within forty miles of the ocean, is highly advantageous for commerce. Among the chief buildings are the Cathedral of Saint Pierre, the castle of the old Dukes of Brittany, where the edict of Nantes was signed; the Church of Saint Nicholas, a picture gallery containing examples of modern French painting, and the Exchange, one of the most imposing buildings in France. The chief industries are shipbuilding, the manufacture of ships' boilers and machinery, linens, cottons, sail cloth, leather and soap, the production of tobacco goods and the preparation of sardines. Before the conquest of Gaul by the Romans, Nantes was a place of note. For a long time it formed one of the most valuable possessions of the Dukes of Brittany, but in 1499, when Anne of Brittany married Charles VIII, it passed with the rest of her possessions to the crown of France. The most famous event in its history was the issuing of the famed Edict of Nantes (see below). In 1793 it was the scene of some of the most atrocious massacres of the French Revolution. Within recent years large sums have been expended on harbor improvements. Population, 1911, 170,535.

NANTES, EDICT OF, a decree issued by Henry IV of France, April 13, 1598, ending the religious wars of the country. It put the Huguenots on an equality with the Catholics in political rights and conceded them greater freedom of worship than they had formerly enjoyed. They were allowed to establish new churches in all parts of the country, except in Paris and its environs and in places of royal residence, and to maintain four theological colleges. However, they were forced to celebrate the Catholic festivals and pay tithes to the Catholic priesthood. In 1685, by a decree of Louis XIV, the edict was revoked. As a consequence of this act, about 500,000 Huguenots went to other countries.

NAN'TICOKE, PA., in Luzerne County, eight miles southwest of Wilkesbarre, on the Susquehanna River and on the Pennsylvania, the Lackawanna and the Central of New Jersey railroads. The mining of anthracite coal is the principal industry, and there is also considerable manufacturing of implements, hosiery, flour and cigars and the canning of fruits. The place was settled about 1850, and was incorporated in 1874. Population, 1910, 18,877; in 1917, 23,811 (Federal estimate).

NANTUCK'ET, an island off Massachusetts, eighteen miles south of Cape Cod. It is fifteen miles long and from three to four miles wide, and is a popular summer resort because of its delightful climate and scenery. The town of Nantucket is situated on the south side of the island, and has a deep and secure harbor. It is the county seat of Nantucket County, which includes the island and a number of near-by islets.

NAPLES, *na'pl'z,* ITALY, the largest city in the kingdom, and the capital of the province of Naples, situated on the northern shore of the beautiful Bay of Naples, at the foot of Mount Vesuvius, about 120 miles southeast of Rome. It is built partly along the shore, partly on the slope of the hills, and is one of the most picturesque cities in the



NAPLES AND ITS SURROUNDINGS

world. In the modern part there are wide, regular, well-kept streets, and the older portion has been greatly improved by the government in recent years. Among the chief buildings are the cathedral, begun in the thirteenth century; the opera house San Carlos, one of the largest in Europe; the royal palace, with its noteworthy paintings; the old palace, and the National Museum, which contains a remarkable collection of antiquities from Pompeii and Herculaneum. The city has a university which dates from the thirteenth century and is attended by over 6,000 students in normal years. There are

also schools of medicine, engineering, music and military affairs, besides numerous hospitals and charitable institutions. The city is well supplied with street railways, which connect it with various towns.

The manufactures of Naples include macaroni and vermicelli, silks, cottons and woolens, glass, china, musical instruments, artificial flowers, perfumery, soap, machinery and ships. The harbor accommodations are excellent, and the trade is second to none among Italian cities. Naples is one of the most densely populated cities in Europe. In the environs are situated the tomb of Vergil, the ancient Roman cities of Herculaneum and Pompeii and the remains of Roman temples, villages, palaces and tombs.

The place was founded by a Greek colony from the town of Cumae many centuries B. C. It passed to the Romans in the third century B. C. and under them flourished for several centuries. After the fall of the Western Roman Empire, the Ostrogoths held the city for a time, and from them it passed to the Byzantines in the sixth century. In 1130 the Norman Robert Guiscard united the south of Italy and the adjacent island of Sicily into one state, and in that period the history of Naples became a part of the history of the Kingdom of the Two Sicilies, of which Naples was recognized as the metropolis (see SICILIES, KINGDOM OF THE TWO). Population, 1915, including suburbs, estimated, 697,917.

NAPLES, BAY OF, an inlet of the Mediterranean Sea on the southwestern coast of Italy, extending from Cape Miseno, its northwestern boundary, to Cape Campanella, its southern limit, a distance of twenty miles. Between it and the open sea are two lovely little islands, Ischia and Capri, about ten miles from shore. The bay, with Naples and other towns and settlements along its shores, and behind them, in sinister grandeur, Vesuvius, rising like a gray wave in the landscape, is famous for its scenic beauty. The bay furnishes good anchorage and is for the most part sheltered from winds.

NAPLES, UNIVERSITY OF, one of the oldest educational institutions in Europe, founded in 1224. It has been several times fully reorganized, the last time in 1860, and since then has gradually become a powerful influence in Southern Europe. Before the War of the Nations the attendance was over 3,600.

On St. Helena, looking toward France

NAPO'LEONI (1769–1821), emperor of the French, conqueror of Europe, and an outstanding figure in world history. He was born at Ajaccio, Corsica, the son of Charles Bonaparte, an advocate, and of Letizia Ramolino. In his tenth year he was sent to the military school of Brienne, and after a short time spent at the military school of Paris he received his commission as lieutenant of artillery.

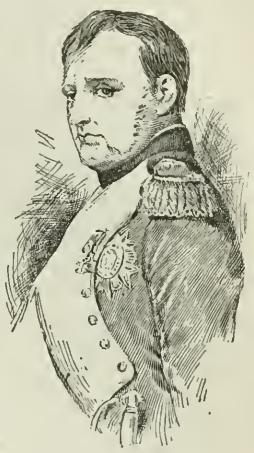
Early Career. In 1792 Napoleon became captain of artillery, and in 1793 was sent to assist in the reduction of Toulon, then in the hands of the British. The place was captured almost entirely through his strategic genius; and in the following February he was made a brigadier-general of artillery. In 1795, when the mob of Paris rose against the Convention, Napoleon was made commander of the 5,000 troops provided for its defense. He had only a night to make arrangements, and next morning he cleared the streets with grape, disbanded the National Guard, disarmed the populace and ended the outbreak. Early in 1796 Bonaparte married Josephine de Beauharnais, the charming widow of a French army officer. Subsequently he departed to assume the command of the army of Italy against the forces of Austria and Sardinia. By a series of victories, culminating in that of Lodi, he forced Naples, Modena and Parma to conclude a peace; the Pope was compelled to sign an armistice, and the whole of Northern Italy was in the hands of the French. Army after army sent by Austria was defeated, and Napoleon carried the war into the enemy's country and by the Peace of Campo Formio, 1797, compelled Austria to cede the Netherlands and Lombardy in return for the Province of Venetia. The Pope had previously been forced to cede part of his dominions.

Invasion of Egypt and Syria. In December, 1797, Napoleon returned to Paris, where his favor with the people was great. The Directors, fearing him on account of his newly acquired influence, were anxious to get him out of France, and a plan soon presented itself. Realizing that, after Austria, England

was the most dangerous enemy which France had, the Directors determined to strike a blow at her by invading Egypt, as a preliminary step to the conquest of British India. Napoleon was put in command of the expedition, and in July, 1798, he landed at Alexandria. This city fell after a short resistance, and Cairo was taken within the same month, after the sanguinary Battle of the Pyramids. In August the word reached the army in Egypt that Nelson had annihilated the French fleet in the Bay of Aboukir. All means of return to Europe for the French were thus cut off; but Napoleon, having suppressed with rigor a riot in Cairo, advanced to attack the Turkish forces assembling in Syria. He took El Arish and Gaza and stormed Jaffa; but after sixty days' siege he was compelled to abandon the attempt to capture Acre, which was defended by a Turkish garrison, assisted by Sir Sidney Smith and a small body of English sailors and marines. Bonaparte returned to Egypt in June, 1799, and in July attacked and almost annihilated a Turkish force which had landed at Aboukir.

Supreme in France. On August 22 he abandoned the command of the army to Kléber and sailed for France, having learned that the Directory was in danger through a Royalist rising and that the people were longing for a return of some sort of order. He secured the coöperation of his brother Lucien, Talleyrand, Siéyès and others, and by a sudden stroke he abolished the Directory on the 18th and 19th Brumaire (November 9 and 10). A new constitution was then drawn up, chiefly by Siéyès, under which Napoleon was made first consul, with Cambacérès and Lebrun as second and third consuls. From this time Napoleon was virtually ruler of France.

His government was marked by sagacity, activity and vigor in the administration of civil affairs, by the proclamation of complete freedom of religious worship, by the reconstruction of the school system and by the compilations of the famous body of laws known as the Code Napoleon. But war was his element, and in 1800 he resolved to strike a blow at Austria. Having executed a daring march into Italy across the Great Saint Bernard, he defeated the Austrians at Marengo, and after the decisive Battle of Hohenlinden forced Austria to conclude peace by the Treaty of Lunéville. Treaties were subsequently concluded with Spain, Naples, the Pope, Bavaria, Portugal, Russia and Turkey, and finally, the Treaty of Amiens was signed by England. In 1802 Napoleon was proclaimed by a decree of the senate consul for life, and in 1804 he had himself crowned as emperor, nearly 3,000,000 votes of the people being given in favor of this measure.



NAPOLEON

Reorganization of Europe. In 1803 war had again broken out with Great Britain, and Napoleon collected an army and flotilla which were to invade England. In 1805 Britain, Russia, Austria and Sweden united against Napoleon, who marched at once across Bavaria at the head of the army collected for the invasion of England and compelled the Austrian General Mack to capitulate at Ulm. This surrender occurred on the day before Nelson by his great victory at Trafalgar established the British supremacy on the sea. In November, Napoleon entered Vienna, and in the following month he completely routed the allied Russian and Austrian armies at Austerlitz. This was one of his greatest victories, and the Austrian emperor immediately sued for peace, giving up to France all his Italian and Adriatic territories.

Napoleon now turned to the organization of the territory which had come into his power. Early in 1806, a French army occupied the continental part of the Neapolitan states, and Joseph Bonaparte was declared king, on the deposition of their former sovereign. Another brother of the emperor, Louis, became king of Holland, and various districts in Germany and Italy were erected by the conqueror into dukedoms and bestowed upon his most successful generals. This brought him into collision with Prussia, and war was declared. Late in 1806 Napoleon defeated the enemy at Jena, while one of his generals on the same day gained the victory of Auerstädt. These were two of his most important victories.

On October 25 Napoleon entered Berlin and issued the celebrated Berlin Decree, thus instituting the important Continental System, a commercial war against England. He then marched northward against the Russians, who were advancing to assist the Prussians. At Pultusk and at Eylau he met with severe checks; but in the summer of 1807 the Battle of Friedland was fought, which was so disastrous to the Russians that Alexander was compelled to sue for an armistice. The result was the Peace of Tilsit, by which the king of Prussia received back half of his dominions and Russia undertook to close its ports against British vessels. The duchy of Warsaw was erected into a kingdom and given to the king of Saxony; the kingdom of Westphalia was formed and bestowed upon Jerome, Napoleon's youngest brother; Russia obtained a part of Prussian Poland, and by secret articles was allowed to take Finland from Sweden.

As Portugal had refused to respect the Berlin Decree, Napoleon now sent Junot to occupy Lisbon; and because the administrative affairs of Spain had fallen into confusion, he sent into that kingdom an army under Murat, which took possession of the capital. By the Treaty of Bayonne Charles IV was obliged to resign the Spanish crown, which was given to Joseph Bonaparte, Murat receiving the vacant sovereignty of Naples. The great body of the Spanish people rose against this summary disposal of the national crown, and Britain aided them in their resistance. Thus was begun the Peninsular War, which lasted seven years. In the meantime Austria again declared war and got together an army in splendid condition, under the Archduke Charles. Napoleon hurried into Bavaria, encountered the archduke at Eckmühl, completely defeated him and entered Vienna.

He was himself defeated at Aspern and Esslingen; but at Wagram (1809) the Austrians were completely crushed, and Napoleon was thus enabled to dictate his own terms of peace. On his return to Paris, Napoleon divorced Josephine, who had borne him no children, and soon afterward married the Archduchess Maria Louisa, of Austria, thus entering into closer relations with that country.

Decline and Downfall. The years 1810 and 1811 were the period of Napoleon's greatest power. But now the tide began to turn. Russia found it impossible to carry out the continental blockade and give due effect to the Berlin Decree; accordingly in May, 1812, Napoleon declared war against that country and soon invaded it with an army of nearly 600,000 men. The Russians retired step by step, wasting the country, carrying off all supplies and avoiding as far as possible general engagements. The French pushed rapidly forward, defeated the Russians at Borodino and elsewhere and entered Moscow only to find the city on fire. It was impossible to pursue the Russians farther, and nothing remained but retreat. The winter was uncommonly severe, and swarms of mounted Cossacks, incessantly harassed the French, now sadly demoralized by cold, famine, disease and fatigue. Of the invaders, only about 25,000 left Russia. Napoleon immediately ordered a fresh conscription, but the spirit of Europe was now fairly roused. A coalition, consisting of Prussia, Russia, Great Britain, Sweden and Spain, was formed, which early in 1813 sent its forces toward the Elbe.

Napoleon defeated the allies at Lützen, at Bautzen and at Dresden; but the last was a dearly-bought victory for the French, who were now so outnumbered that their chief was compelled to fall back on Leipzig. There he was completely hemmed in, and in the great "Battle of the Nations," which was fought October 16, 18 and 19, he was completely defeated. He succeeded in raising a new army, and from January to March, 1814, he confronted the combined host of the allies. But numbers were against him; and Wellington rapidly advanced upon Paris from the south. The last of March the allies captured the fortifications of Paris and entered the city, and early in the following month Napoleon abdicated at Fontainebleau. He was allowed the soverignty of the island of Elba, with the title of emperor and a revenue of 6,000,000 francs.

The Hundred Days. After a residence of ten months he made his escape from the island and landed at Fréjus, March 1, 1815. Ney and a large part of the army joined him, and he made a triumphal march upon Paris, driving Louis XVIII from the throne. The allied armies once more marched toward the French frontier, and Napoleon advanced into Belgium to meet them. June 16 he defeated Blücher at Ligny, while Ney held the British in check at Quatre-Bras. Wellington fell back upon Waterloo, where he was attacked

by Napoleon on the 18th, the result being the total defeat of the French. The allies marched without opposition upon Paris. Napoleon abdicated in favor of his son and tried to escape from France, but failing, he surrendered to the captain of a British man-of-war. With the approval of the allies he was conveyed to the island of Saint Helena, where he was confined for the rest of his life. He died in 1821, of cancer, and was buried in the island, but in 1840 his remains were transferred to the Hôtel des Invalides at Paris.

Related Articles. See map of three conquests, in the article Europe. Consult the following titles for additional information:

Austerlitz	Leipzig, Battles of
Blucher, Gebhard	Louisiana Purchase
Bonaparte	Lutzen, Battles of
Continental System	Marengo, Battle of
Corsica	Maria Louisa
Directory	Nelson, Horatio
Elba	Saint Helena
French Revolution	Trafalgar
Jena, Battle of	Waterloo, Battle of
Josephine, Marie	Wellington, Duke of

NAPOLEON II. See REICHSTADT, NAPOLEON FRANÇOIS JOSEPH BONAPARTE, Duke of.

NAPOLEON III, CHARLES LOUIS NAPOLEON BONAPARTE (1808–1873), emperor of the French. He was the youngest son of Louis Bonaparte, brother of Napoleon I and king of Holland, and of Hortense Beauharnais. On the death of his cousin, the Duke of Reichstadt, he became the recognized head of the Bonaparte family, and thenceforth his one ambition was to occupy his uncle's imperial throne. In 1836 an attempt was made to secure the garrison of Strassburg, but the affair turned out a ludicrous failure. In 1840 he made a foolish and theatrical descent on Boulogne, was captured, tried and sentenced to perpetual confinement in the fortress of Ham, but after six years of imprisonment he escaped to England. On the outbreak of the Revolution of 1848, he hastened to Paris, and, securing a seat in the National Assembly, began at once his candidacy for the presidency. On the day of the election, it was found that he had received a majority of four million. In December, 1851, the president declared Paris in a state of siege, issued a decree dissolving the Assembly and another ordering the reëstablishment of universal suffrage and the election of a president for ten years. When the vote came to be taken, an enormous majority was in favor of his retaining office for ten years, with all the powers he demanded.

As soon as he found himself fully confirmed in this ambition, he began to prepare for the restoration of the Empire. In January, 1852, the National Guard was revived, a new constitution was adopted and new orders of nobility were issued; and at last, on December 1, Louis Napoleon Bonaparte was proclaimed emperor, under the title of Napoleon III. In March, 1854, Napoleon III, in conjunction with England, declared war in the interest of Turkey against Russia; and in 1859, when war was declared between Austria and Sardinia, Napoleon took up arms in favor of his Italian ally, Victor Emmanuel.

In 1861 France dispatched an expedition to Mexico for the purpose of exacting redress of injuries. An imperial form of government was instituted, Maximilian, archduke of Austria, being placed at its head, with the title of emperor. Napoleon then withdrew his army, and the unfortunate Maximilian, left without protection, was captured and shot. On the conclusion of the Austro-Prussian War of 1866, Napoleon, jealous of the growing power of Prussia, demanded a reconstruction of frontier, which was peremptorily refused. The ill-feeling between the two nations was increased by various causes, and in 1870, war was declared by France. Prussia was well prepared for the struggle, which had long been foreseen in that country, but Napoleon seems to have been greatly deceived as to the state of France. The disastrous close of the war, therefore, was a great surprise to him (see FRANCO-GERMAN WAR). After the surrender at Sedan he was kept a prisoner for a time at the Castle of Wilhelmshöhe, and then he joined his wife and son in England, where he remained till his death. His only child, the prince imperial, who joined the British army in South Africa as a volunteer, was killed by Zulus.

NAPHTHA, *naf'tha,* or *nap'tha,* one of the numerous products of petroleum. The naphtha oils are among the lightest and therefore among the first to pass off in fractional distillation. Crude oil contains from eight to twenty per cent of naphtha. Naphtha is also obtained in the distillation of wood and coal tar. It is used in the manufacture of paints and varnishes and as a solvent; but it is chiefly employed as a burning-fluid for illumination and as fuel for motors. See PETROLEUM.

NARBADA, *nur bud'a.* See NERBUDDA.

NARCISSUS, *nar sis'sus,* according to Greek mythology, the son of the river god Cephissus. He possessed rare beauty, but was excessively vain. Echo, a nymph who loved him, pined away to a mere voice, because her love for him found no return, and Nemesis, determined to punish him for his coldness of heart, caused him to drink at a certain fountain, wherein he saw his own image, with which he fell violently in love. With this passion he, too, pined away, until the gods transformed him into the flower which still bears his name.

NARCISSUS, a genus of bulbous plants, mostly natives of Europe. The plants, because of the beauty of their crisp, lilylike foliage and the fragrance and delicacy of their blossoms—yellow or white—are widely cultivated. The white narcissus is successfully cultivated without soil, in a bowl of water, the bulbs supported by pebbles, and is among the most satisfactory of winter house plants. The yellow daffodils and jonquils, allied species, make their appearance in the open with the earliest spring flowers. Some of the more hardy members of this family grow wild in English meadows and hedgerows.

NARCISSUS

NARCOT'IC, a substance which, in small doses, diminishes the action of the nerves and brings on sleep. Most narcotics are stimulating when given in moderate doses; in larger doses they produce sleep, and in poisonous doses they bring on stupor, convulsions and even death. Opium, hemlock, henbane, belladonna, aconite, camphor, digitalis, tobacco, alcohol and leopard's bane are well-known narcotics, and of late years there has been introduced a new series, derived from coal tar. These include phenacetine, acetanilid and sulphonal. While narcotics are at times absolutely necessary to relieve pain or induce sleep, their action is so uncertain and so dependent on the physical condition of the person to whom they are administered that they should seldom if ever be used without expert advice.

Related Articles. Consult the following titles for additional information:

Belladonna	Cocaine	Opium
Chloral	Morphine	Tobacco

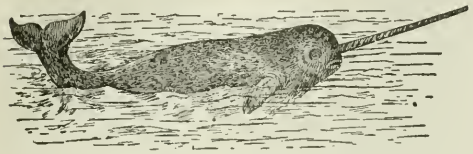
NARRAGAN'SETT, in colonial times, a leading Indian tribe occupying Long Island and the present state of Rhode Island. They cherished the friendship of Roger Williams, but joined in King Philip's War, losing nearly 1,000 men in the famous Swamp Fight. After the death of their leader, Canonicus, they were quickly subdued, and now survive only in mixed bloods.

NARRAGANSETT BAY, an inlet of the Atlantic Ocean, which extends into Rhode Island for nearly thirty miles, almost to Providence. Newport is situated near the southern end of the bay, which at its mouth is less than five miles wide. Its greatest width is eight miles.

NARVAEZ, *nahr vah'eth,* PANFILO DE (1470?-1528), a Spanish adventurer and explorer, who, in 1528, left Cuba with an expedition for the purpose of exploring the southeastern part of what is now the United States. He was betrayed and misled by Indian guides and was finally forced to put to sea. After cruising along the Gulf coast for several months, his party reached the mouth of the Mississippi. Two of the boats were swept to destruction by the rush of the river current and Narvaez's was lost in a storm.

NARWHAL, *nahr'wahl,* a marine mammal, about fifty feet long, found in cold waters of the northern hemisphere. Its body, tapering like the whales, ends in a fishlike tail, and on each side of it, near the head, is a limb resembling a fin. It has no teeth,

but between the eyes is a straight, hollow, spiral tusk, which tapers to a point and measures about seven feet in length. This tusk is of hard, white material, somewhat like



NARWHAL

ivory, for which it is often substituted in commerce. The animal feeds chiefly on mollusks. The Greenlanders obtain an oil from the blubber, which they use much as they use whale oil, and make the skins into various articles. The narwhal is sometimes called *sea unicorn, unicorn fish* and *unicorn whale.*

NASEBY, *naz'by,* BATTLE OF, a famous battle, fought on June 14, 1645, in the parish of Naseby, in Northampton, England. The struggle was between Charles I and the Parliamentary army under Fairfax and Cromwell, and it ended in the complete defeat of the royalists.

NASH'UA, N. H., the second city in size in the state and the county seat of Hillsboro County, forty miles northwest of Boston, on the Nashua River near the Merrimac, and on several divisions of the Boston & Maine railroad. In size it is the second city in the state. A canal from the Nashua to the Merrimac furnishes good water power, and there are large cotton mills, and manufactures of machinery, paper, boilers, furniture, shoes, saddlery and hardware. The city has a public library, a sanitarium, a Federal building, a court house and a United States fish hatchery. The place was settled in 1655. It was incorporated as the Township of Dunstable in 1673, was given its present name in 1746 and chartered as a city in 1853. Population, 1910, 26,005; in 1917, 27,541 (Federal estimate).

NASHVILLE, BATTLE OF, an important battle of the Civil War, fought at Nashville, Tenn., December 15 and 16, 1864, between a Federal force under General Thomas, and the Confederate Army of the Tennessee under General Hood. The latter had evacuated Atlanta early in September and had struck northward, hoping to draw Sherman from his proposed march to the sea. Sherman dispatched Thomas to defend Tennessee and provided him with ample forces, including cavalry under General Wilson, numbering all told about 55,000. At Franklin, on November 30, General Hood attacked General Schofield, who was slowly retreating toward Nashville, and was repulsed. The Confederates reached the vicinity of Nashville December 2, but Thomas did not offer battle for two weeks, though urged and ordered to do so and even threatened with dismissal. At last, on December 15, he proceeded against the Confederate position, and after a battle lasting for two full days, the Confederates were almost surrounded and compelled to withdraw. Harassed by Federal cavalry, they began a retreat which soon became a rout. So complete was the disaster, that the Confederate force was never reorganized, and General Hood asked to be relieved of his command.

NASHVILLE, TENN., the second city in size in the state, the state capital and the county seat of Davidson County, is 209 miles northwest of Memphis, on both sides of the Cumberland River, which is spanned by fine bridges. It is on the Nashville, Chattanooga & Saint Louis, the Tennessee Central and several lines of the Louisville & Nashville Railroad. It is the center of an extensive system of turnpikes and good roads traversing the whole of the Middle Tennessee basin. There are two interurban lines, also several public parks, of which the Centennial, containing the Parthenon, is the most important. Mount Olivet Cemetery is a beautiful burying-ground, and there is a large national cemetery north of the city, in which are 16,643 soldiers' graves. The state capitol, on Cedar Hill, is the most prominent structure in the city. Near it are the tomb of James K. Polk and an equestrian statue of Andrew Jackson. Jackson's famous home, the "Hermitage," is ten miles from the city.

The charitable institutions include the state hospital for the insane and the Saint Thomas, the Galloway Memorial, and the City hospitals. Nashville is a very important educational center, containing Vanderbilt University, the Peabody College for Teachers, Knapp School of Farm Life, Fisk University (for negroes), Buford College, Ward-Belmont College (for women), Meharry Medical College (colored), Boscobel College and several preparatory and business schools. The state institutions for the blind and the state industrial school are also lo-

cated here or close to the city. The city has a Carnegie Library, a state library and the Watkins Institute.

The city is an important trade center and ships large amounts of agricultural implements, grain, livestock, seeds, boots and shoes, lumber products, hardware, dry goods, hats and other goods. As a manufacturing center it ranks next to Memphis, and has about 600 manufacturing establishments. There are flour mills, stove foundries, wooden ware factories, fertilizer works and harness, clothing, tobacco, boots and shoes, etc. The place was settled in 1780 and named in honor of Abner Nash, then governor of North Carolina. It was incorporated as a city in 1806. Population, 1910, 110,364; in 1917, 118,136 (Federal estimate).

NA'SMYTH, JAMES (1808–1890), a Scotch engineer, born and educated at Edinburgh. He became a manufacturer of machine tools, and developed a large industry. The steam hammer, which has rendered possible the immense forgings now employed, was invented by him in 1839. The steam pile driver and the safety foundry ladle are among his other inventions. He also achieved distinction as an astronomer. See STEAM HAMMER.

NAST, THOMAS (1840–1902), an American caricaturist, illustrator and painter, born in Bavaria. At the age of six he emigrated with his parents to America, and when only twenty he contributed cartoons on the Civil War to American and English periodicals. Returning to America from a trip to Italy he became connected with *Harper's Weekly*, for which his best work was done. In his particular line, pictorial satire, Nast stands in the foremost rank. His severe and pointed caricatures did much toward breaking up the notorious Tweed "ring" of New York. Nast also produced some creditable oil paintings. He originated the "Tammany tiger," the "Republican elephant" and the "Democratic donkey," which have been retained as popular designations to the present day.

NASTURTIUM, *nas tur'shun*, a genus of plants native to South America and Mexico, and widely cultivated everywhere for ornamental purposes. Both the climbing and bushy varieties, the latter much used for garden borders, are rapid growers and prolific bloomers. The glossy leaves and stems, which are crisp and juicy, and have a pungent flavor, are much used in salads. The flowers are gorgeously colored, red, yellow and pink predominating in the North American cultivated varieties.

NATAL, *na tahl'*, formerly a separate British colony in South Africa, but now a part of the Union of South Africa. It has an area of 35,290 square miles—nearly as large as that of Ohio—and a subtropical climate well suited to white people; it had a population in 1911 of 1,194,043, of whom nearly 100,000 were Europeans.

Natal was annexed to Cape Colony in 1844, was given a separate government under British officers the next year, and in 1856 became a self-governing colony. In 1910 it was merged into the Union of South Africa as one of its provinces. The seat of provincial government is Natal, whose population is about 20,000.

Other features of Natal are described in the article Union of South Africa.

NATCH'EZ, MISS., the county seat of Adams County, 100 miles southwest of Jackson, on the Mississippi River and on the Mississippi Central, the Saint Louis, Iron Mountain & Southern, the Natchez & Southern and the Yazoo & Mississippi Valley railroads. The city is situated on a bluff, which rises 200 feet above the river. It has many fine residences, good city and county buildings, Fisk Library, Carpenter Library, Memorial Park, Stanton College, Natchez Institute, Jefferson Military College, an Elks' Building and Institute Hall. A large national cemetery, containing over 3,000 graves (over half the tombs of unknown dead), adjoins the city. The industrial establishments include cotton mills, compresses and oil mills, planing mills, an ice plant and other factories.

NASTURTIUM

A fort was built on the site of Natchez by the French in 1716, but it was destroyed by the Indians in 1729. The city practically dates from 1763, when the English took possession of the old fort, according to the terms of the Treaty of Paris. The Spaniards captured the place in 1779,

but gave way to the United States in 1798. Natchez was made a city in 1803, and was the capital of Mississippi from 1798 to 1820. Population, 1910, 11,791; in 1917, practically unchanged.

NATICK, Mass., in Middlesex County, seventeen miles southwest of Boston, on the Charles River and on the Boston & Albany railroad. It was settled by John Eliot in 1651 and was used by the founder until his death, chiefly as a home for converted Indians. It was incorporated as a town in 1781. The principal manufactures are clothing, boots, shoes, tools and sporting goods. The town contains the Bacon Public Library, Morse Institute (a library), the Walnut Hill High School, a public park, a soldiers' monument and one to John Eliot. Population, 1910, 9,866; in 1917, 10,140 (Federal estimate).

NATIONAL ACADEMY OF DESIGN, an institution established in New York City in 1825 by a group of artists. Three years later it was incorporated, and Professor Morse, the inventor of the telegraph, was its first president (see Morse, Samuel F. B.). The membership, which does not exceed 100, is made up entirely of artists, though others may obtain honorary memberships or fellowships which entitle them to certain privileges. The Academy holds an annual exhibition, at which prizes are awarded. It also maintains a school of design, with classes in various branches of the plastic arts.

NATIONAL ACADEMY OF SCIENCES, an organization incorporated by Congress in 1863 to investigate, experiment and report on subjects of scientific note when required so to do by any department of the United States government. The society, made up of distinguished scientists, has about 140 members and numerous foreign associates. The members are divided into six groups, styled committees, each group having charge of a special line of research. The academy holds two meetings a year and awards medals for meritorious service to science.

NATIONAL CIVIC FEDERATION, an organization formed in New York in 1900–1901 for the purpose of investigating, discussing and solving, so far as possible, great social and industrial problems. The list of its departments suggests the scope of the federation's activities:

1. Industrial conciliation department, dealing with industrial controversy.
2. Industrial economics department.
3. Welfare department, interested in the working condition of employees.
4. Women's department, investigating the welfare of women wage earners.
5. Department of compensation for Industrial Accidents and their prevention.
6. Social insurance department.
7. Department on regulation of combinations and trusts.
8. Department on regulation of interstate and municipal utilities.

NATIONAL DEBT, the aggregate of money owed by a government to individuals, corporations or other governments, for amounts borrowed for any purpose of government, either in war or peace. At various periods economists have been alarmed at the growth of the debts of nations, but it was proved many times that the rapid growth in national wealth has justified increasing indebtedness. However, most debts of this nature have been due to the heavy demands of war.

Not until the World War (1914) did national indebtedness reach proportions at all alarming. That unprecedented conflict inflicted a burden of debt upon all belligerents, and threatened, in some instances, the entire economic life of nations. Money spent in war is destroyed; there is no salvage. Money borrowed to promote peace-time projects is an investment which tends to increase national wealth and opportunity. The World War cost the nations engaged the monstrous sum of $150,000,000,000, a sum six times as great as the debts of all of the principal nations of the world in 1913.

In the following table is a list of leading countries and their debts; there has been an attempt made to show the vast increase within a period of less than five years; the figures in the last column are as nearly correct as it is possible to give them, but in several instances they are no more than careful estimates:

Country	1913	Later	
France	$6,285,000,000	$22,227,050,000	(1917)
Great Britain	3,485,818,000	28,612,640,000	(1918)
Austria-Hungary	1,054,346,000	18,248,277,000	(1918)
Russia	4,553,488,000	22,774,330,000	(1915)
Italy	2,706,509,000	6,675,902,000	(1917)
Germany	1,177,418,000	24,090,444,000	(1918)
United States	2,906,750,000	24,000,000,000	(1919)
Canada	508,339,000	1,996,393,000	(1916)

NATIONAL EDUCATION ASSOCIATION. See Education Association, National.

NATIONAL GUARD, or **MILITIA**, a body of citizens of a state trained at state

expense in the manual of arms and, to some degree, in the arts of war. In simplest phrase, they are citizen soldiers. In time of peace the members of the Guard have no duties beyond regular drills; in times of riot or insurrection, the governor of the state may call as many companies or regiments of the Guard as he may deem necessary to maintain order in the disturbed area.

Except when the nation is imperilled the National Guard is purely a state institution. The Constitution of the United States (Art. I, Sec. 8) authorizes Congress—

to provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions.

After the organization of the regular army that body was charged with the responsibilities named above. In time of national danger, such as the World War developed in the United States in 1917, the Federal government is justified in calling the Guard to national service. This step was taken in that year; the National Guard of all the states was ordered into sixteen great cantonments to drill for participation in the war in Europe. The identity of the Guard was lost in the army divisions then created.

Organizations. As reorganized in 1916 by act of Congress the National Guard was to consist of at least 800 enlisted men for each Senator and Representative in Congress, and a number to be designated by the President for each territory. The Guard of a state was forbidden to disband without the consent of the President, nor could a state allow the number of men to be reduced below the prescribed number. The period of enlistment was placed at six years—three in the active organization and three in the reserve.

Peace-time pay of members was placed as follows: Captains and higher grades, $500 per year; first-lieutenants, $240; second-lieutenants, $200. Privates were allowed one-fourth of the initial pay of the regular army privates of the same grade. Drills were set for forty-eight times each year.

The Militia. The word *militia,* in its true sense, refers to all able-bodied men between the ages of eighteen and forty-five. They are bound by obligation to respond to call for military duty in time of need. The militia, therefore, is unorganized; the National Guard is an organized portion of a state's militia strength. See ARMY; WORLD WAR.

NATIONAL MUSEUM OF THE UNITED STATES, a branch of the Smithsonian Institution, founded according to Congressional act in 1846. It contains the government collections in the arts, in geology, zoölogy, botany, ethnology and archaeology. The building which houses these wonderful collections is a handsome stone structure near the Smithsonian building, on the west side of the Mall, Washington. In the center of the building is the rotunda and dome, where, above the fountain's basin, is the plaster cast of Crawford's *Statue of Liberty,* that surmounts the dome of the Capitol. Among the historic relics of particular interest are articles that belonged to Washington, Jefferson, Jackson, Franklin and Grant. An almost endless number of articles illustrate the life of peoples from the aborigines of America to the most enlightened of modern societies. Besides these, there is a rich collection of natural-history specimens including rare stuffed animals. Although the halls of the National Museum are already crowded, they contain only a part of the great collections belonging to the government.

NATIONAL ROAD. See CUMBERLAND ROAD.

NATIONS, LAWS OF. See INTERNATIONAL LAW.

NATIONS, LEAGUE OF, a worldwide union of states, originating in an international covenant signed in 1919 by the representatives of all the principal nations of the earth which at the time were considered as possessing responsible governments. It was intended to form an international coalition which should so command the destinies of the world as to make war thereafter practically impossible and by moral force and economic pressure secure justice for all peoples.

The suggestion respecting a league of nations was brought forward in 1918 by President Woodrow Wilson as one of the fourteen bases on which he believed the awful war in which over twenty nations were then engaged could be honorably ended and future peace assured. The plan was loudly acclaimed in some sections and in others ridiculed as Utopian.

The peace conference, which held meetings in Paris for the first four months of 1919, before moving to Versailles, prepared the compact and published the first draft of the proposed league in March. Its weaknesses were pointed out and features objectionable to some of the countries were vigorously dis-

cussed. The document was then remade in part, and given to the world in completed form in April.

The covenant is not strong, as viewed by France, for there is no power to ascertain military facts and no provision for the exchange of military information. France with 40,000,000 people felt that at some future time Germany with nearly twice that number, might again menace its frontiers. There is no provision for strong military and naval display against unruly members by a supernational body—otherwise, no international police force to compel obedience to the mandates of the league. Radical provisions naturally failed to get conservative support; conservative policies did not please the more radical element. The best opinion seemed to incline to the belief that a good beginning had been made, however, and that the league would grow in strength, under capable guidance. The amending article and the clause concerning the admission of new members would seem to make certain the steady, if gradual, fulfilment of the promise of a world organization of all nations that are fit to govern themselves and to respect the rights of other nations. The use that is ultimately to be made of this instrument depends entirely upon the nations of the world. If they want to destroy the league they can do so easily; if, on the other hand, they want it to live and grow they have only to accord it their earnest good will.

The Articles. The constitution of the league, article by article, is as follows:

Preamble

THE COVENANT OF THE LEAGUE OF NATIONS:

In order to promote international co-operation and to achieve international peace and security, by the acceptance of obligations not to resort to war, by the prescription of open, just, and honorable relations between nations, by the firm establishment of the understandings of international law as to actual rule of conduct among governments, and by the maintenance of justice and a scrupulous respect for all treaty obligations in the dealings of organized peoples with one another, the high contracting parties agree to this covenant of the league of nations.

Article One.

The original members of the league of nations shall be those of the signatories which are named in the annex to this covenant and also such of those other states named in the annex as shall accede without reservation to this covenant. Such accessions shall be effected by a declaration deposited with the secretariat within two months of the coming into force of the covenant. Notice thereof shall be sent to all other members of the league.

Any fully self-governing state, dominion, or colony not named in the annex, may become a member of the league if its admission is agreed by two-thirds of the assembly, provided that it shall give effective guarantees of its sincere intention to observe its international obligations and shall accept such regulations as may be prescribed by the league in regard to its military and naval force and armaments.

Any member of the league may, after two years' notice of its intention so to do, withdraw from the league, provided that all its international obligations and all its obligations under this covenant shall have been fulfilled at the time of its withdrawal.

Article Two.

The action of the league under this covenant shall be effected through the instrumentality of an assembly and of a council, with permanent secretariat.

Article Three.

The assembly shall consist of representatives of the members of the league.

The assembly shall meet at stated intervals and from time to time as occasion may require, at the seat of the league, or at such other place as may be decided upon.

The assembly may deal at its meetings with any matter within the sphere of action of the league or affecting the peace of the world.

At meetings of the assembly, each member of the league shall have one vote, and may have not more than three representatives.

Article Four.

The council shall consist of representatives of the United States of America, of the British empire, of France, of Italy, and of Japan, together with representatives of four other members of the league. These four members of the league shall be selected by the assembly from time to time in its discretion. Until the appointment of the representatives of the four members of the league first selected by the assembly, representatives of ———shall be members of the council.

With the approval of the majority of the assembly the council may name additional members of the league whose representatives shall always be members of the council; the council with like approval may increase the number of members of the league to be selected by the assembly for representation on the council.

The council shall meet from time to time as occasion may require and at least once a year, at the seat of the league, or at such other place as may be decided upon.

The council may deal at its meetings with any matter within the sphere of action of the league or affecting the peace of the world.

Any member of the league not represented on the council shall be invited to send a representative to sit as a member at any meet-

ing of the council during the consideration of matters specially affecting the interests of that member of the league.

At meetings of the council each member of the league represented on the council shall have one vote, and may not have more than one representative.

Article Five.

Except where otherwise expressly provided in this covenant, decisions at any meeting of the assembly or of the council shall require the agreement of all the members of the league represented at the meeting.

All matters of procedure at meetings of the assembly or of the council, the appointment of committees to investigate particular matters, shall be regulated by the assembly or by the council, and may be decided by a majority of the members of the league represented at the meeting.

The first meeting of the assembly and the first meeting of the council shall be summoned by the president of the United States of America.

Article Six.

The permanent secretariat shall be established at the seat of the league. The secretariat shall comprise a secretariat general and such secretaries and staff as may be required.

The first secretary general shall be the person named in the annex; thereafter the secretary general shall be appointed by the council, with the approval of the majority of the assembly.

The secretaries and the staff of the secretariat shall be appointed by the secretary general, with the approval of the council.

The secretary general shall act in that capacity at all meetings of the assembly and of the council.

The expenses of the secretariat shall be borne by the members of the league, in accordance with the apportionment of the expenses of the international bureau of the Universal Postal Union.

Article Seven.

The seat of the league is established at Geneva.

The council may at any time decide that the seat of the league shall be established elsewhere.

All positions under or in connection with the league, including the secretariat, shall be open equally to men and women.

Representatives of the members of the league and officials of the league, when engaged on the business of the league, shall enjoy diplomatic privileges and immunities.

The buildings and other property occupied by the league or its officials, or by representatives attending its meetings, shall be inviolable.

Article Eight.

The members of the league recognize that the maintenance of a peace requires the reduction of national armaments to the lowest point consistent with national safety and the enforcement by common action of international obligations.

The council, taking account of the geographical situation and circumstances of each estate, shall formulate plans for such reduction for the consideration and action of the several governments.

Such plans shall be subject to reconsideration and revision at least every ten years.

After these plans shall have been adopted by the several governments limits of armaments therein fixed shall not be exceeded without the concurrence of the council.

The members of the league agree that the manufacture by private enterprise of munitions and implements of war is open to grave objections. The council shall advise how the evil effects attendant upon such manufacture can be prevented, due regard being had to the necessities of those members of the league which are not able to manufacture the munitions and implements of war necessary for their safety.

The members of the league undertake to interchange full and frank information as to the scale of their armaments, their military and naval programs, and the condition of such of their industries as are adaptable to warlike purposes.

Article Nine.

A permanent commission shall be constituted to advise the council on the execution of the provisions of article one and on military and naval questions generally.

Article Ten.

The members of the league undertake to respect and preserve, as against external aggression, the territorial integrity and existing political independence of all members of the league. In case of any such aggression or in case of any threat or danger of such aggression, the council shall advise upon the means by which this obligation shall be fulfilled.

Article Eleven.

Any war or threat of war, whether immediately affecting any of the members of the league or not, is hereby declared a matter of concern to the whole league, and the league shall take any action that may be deemed wise and effectual to safeguard the peace of nations. In case any such emergency should arise, the secretary general shall, on the request of any member of the league, forthwith summon a meeting of the council.

It is also declared to be the fundamental right of each member of the league to bring to the attention of the assembly or of the council any circumstance whatever affecting international relations which threatens to disturb either the peace or the good understanding between nations upon which peace depends.

Article Twelve.

The members of the league agree that if there should arise between them any dispute likely to lead to a rupture, they will submit the matter either to arbitration or to inquiry by the council, and they agree in no case to resort to war until three months after the award by the arbitrators or the report by the council.

In any case under this article, the award of the arbitrators shall be made within a reasonable time, and the report of the council shall be made within six months after the submission of the dispute.

Article Thirteen.

The members of the league agree that, whenever any dispute shall arise between them which they recognize to be suitable for submission to arbitration and which cannot be satisfactorily settled by diplomacy, they will submit the whole subject matter to arbitration. Disputes as to the interpretation of a treaty, as to any question of international law, as to the existence of any fact which, if established, would constitute a breach of any international obligation, or as to the extent and nature of the reparation to be made for any such breach, are declared to be among those which are generally suitable for submission to arbitration. For the consideration of any such dispute the court of arbitration to which the case is referred shall be the court agreed on by the parties to the dispute or stipulated in any convention existing between them.

The members of the league agree that they will carry out in full good faith any award that may be rendered, and that they will not resort to war against a member of the league which complies therewith. In the event of any failure to carry out such an award the council shall propose what steps should be taken to give effect thereto.

Article Fourteen.

The council shall formulate and submit to the members of the league for adoption plans for the establishment of a permanent court of international justice. The court shall be competent to hear and determine any dispute of an international character which the parties thereto submit to it. The court may also give an advisory opinion upon any dispute or question referred to it by the council or by the assembly.

Article Fifteen.

If there should arise between members of the league any dispute likely to lead to a rupture which is not submitted to arbitration as above the members of the league agree that they will submit the matter to the council.

Any party to the dispute may effect such submission by giving notice of the existence of the dispute to the secretary general, who will make all necessary arrangements for a full investigation and consideration thereof. For this purpose the parties to the dispute will communicate to the secretary general, as promptly as possible, statements of their case, all the relevant facts and papers; the council may forthwith direct the publication thereof.

The council shall endeavor to effect a settlement of any dispute, and if such efforts are successful a statement shall be made public giving such facts and explanations regarding the dispute, terms of settlement thereof, as the council may deem appropriate.

If the dispute is not thus settled, the council, either unanimously or by a majority vote, shall make and publish a report containing a statement of the facts of the dispute and the recommendations which are deemed just and proper in regard thereto.

Any member of the league represented on the council may make public a statement of the facts of the dispute and of its conclusions regarding the same.

If a report by the council is unanimously agreed to by the members thereof other than the representatives of one or more of the parties to the dispute, the members of the league agree that they will not go to war with any party to the dispute which complies with recommendations of the report.

If the council fails to reach a report which is unanimously agreed to by the members thereof, other than the representatives of one or more of the parties to the dispute, the members of the league reserve to themselves the right to take such action as they shall consider necessary for the maintenance of right and justice.

If the dispute between the parties is claimed by one of them, and is found by the council, to arise out of a matter which by international law is solely within the domestic jurisdiction of that party, the council shall so report, and shall make no recommendation as to its settlement.

The council may in any case under this article refer the dispute to the assembly. The dispute shall be so referred at the request of either party to the dispute, provided that such request be made within fourteen days after the submission of the dispute to the council.

In any case referred to the assembly all the provisions of this article and of article 12, relating to the action and powers of the council, shall apply to the action and powers of the assembly, provided that a report made by the assembly, if concurred in by the representatives of those members of the league represented on the council and of a majority of the other members of the league, exclusive in each case of the representatives of the parties to the dispute, shall have the same force as a report by the council concurred in by all the members thereof other than the representatives of one or more of the parties to the dispute.

Article Sixteen.

Should any member of the league resort to war in disregard of its covenants under articles twelve, thirteen, or fifteen, it shall, ipso facto, be deemed to have committed an act of war against all other members of the league, which hereby undertake immediately to subject it to the severance of all trade or financial relations, the prohibition of all intercourse between their nationals and the nationals of the covenant breaking state and the prevention of all financial, commercial, or personal intercourse between the nationals of the covenant breaking state and the nationals of any other state, whether a member of the league or not.

It shall be the duty of the council in such case to recommend to the several governments concerned what effective military or

naval forces the members of the league shall severally contribute to the armaments of forces to be used to protect the covenants of the league.

The members of the league agree, further, that they will mutually support one another in the financial and economic measures which are taken under this article, in order to minimize the loss and inconvenience resulting from the above measures, and that they will mutually support one another in resisting any special measures aimed at one of their number by the covenant-breaking state, and that they will take the necessary steps to afford passage through their territory to the forces of any of the members of the league which are co-operating to protect the covenants of the league.

Any member of the league which has violated any convenant of the league may be declared to be no longer a member of the league by a vote of the council concurred in by the representatives of all the other members of the league represented thereon.

Article Seventeen.

In the event of a dispute between a member of the league and a state which is not a member of the league, or between states not members of the league, the state or states not members of the league shall be invited to accept the obligations of membership in the league for the purposes of such dispute, upon such conditions as the council may deem just. If such invitation is accepted, the provisions of articles twelve to sixteen inclusive shall be applied with such modifications as may be deemed necessary by the council.

Upon such invitation being given, the council shall immediately institute an inquiry into the circumstances of the dispute and recommend such action as may seem best and most effectual in the circumstances.

If a state so invited shall refuse to accept the obligations of membership in the league for the purposes of such dispute, and shall resort to war against a member of the league, the provisions of article sixteen shall be applicable as against the state taking such action.

If both parties to the dispute, when so invited, refuse to accept the obligations of membership in the league for the purposes of such dispute, the council may take such measures and make such recommendations as will prevent hostilities and will result in the settlement of the dispute.

Article Eighteen.

Every convention or international engagement entered into henceforward by any member of the league, shall be forthwith registered with the secretariat and shall, as soon as possible be published by it. No such treaty or international engagement shall be binding until so registered.

Article Nineteen.

The assembly may from time to time advise the reconsideration by members of the league of treaties which have become inapplicable, and the consideration of international conditions whose continuance might endanger the peace of the world.

Article Twenty.

The members of the league severally agree that this covenant is accepted as abrogating all obligations or understandings inter se which are inconsistent with the terms thereof, and solemnly undertake that they will not hereafter enter into any engagements inconsistent with the terms thereof.

In case members of the league shall, before becoming a member of the league, have untaken any obligations inconsistent with the terms of this covenant, it shall be the duty of such member to take immediate steps to procure its release from such obligations.

Article Twenty-One.

Nothing in this convenant shall be 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.

Article Twenty-Two.

To those colonies and territories which, as a consequence of the late war, have ceased to be under the sovereignty of the states which formerly governed them and which are inhabited by peoples not yet able to stand by themselves under the strenuous conditions of the modern world, there should be applied the principle that the well being and development of such peoples form a sacred trust of civilization and that securities for the performance of this trust should be embodied in this covenant.

The best method of giving practicable effect to this principle is that the tutelage of such peoples be intrusted to advanced nations who, by reason of their resources, their experience or their geographical position, can best undertake this responsibility and who are willing to accept it, and that this tutelage should be exercised by them as mandatories on behalf of the league.

The character of the mandate must differ according to the state of the development of the people, the geographical situation of the territory, its economic condition, and other similar circumstances.

Certain communities formerly belonging to the Turkish empire have reached a stage of development where their existence, as independent nations, can be provisionally recognized subject to the rendering of administrative advice and assistance by a mandatory until such time as they are able to stand alone. The wishes of these communities must be a principal consideration in the selection of the mandatory peoples, especially those of central Africa, who are at such a stage that the mandatory must be responsible for the administration of the territory under conditions which will guarantee freedom of conscience or religion subject only to the maintenance of public order and morals, the prohibition of abuses, such as the slave trade, the arms traffic, and the liquor traffic and the prevention of the establishment of fortifications or

military and naval bases and of military training of the nations for other than police purposes and the defense of territory, and will also secure equal opportunities for the trade and commerce of other members of the league.

There are territories, such as Southwest Africa and certain of the South Pacific islands, which, owing to the sparseness of their population or their small size or their remoteness from the centers of civilization or their geographical contiguity to the territory of the mandatory and other circumstances can be best administered under the laws of the mandatory as integral portions of its territory subject to the safeguards above mentioned in the interests of the indigenous population. In every case of mandate, the mandatory shall render to the council an annual report in reference to the territory committee to its charge.

The degree of authority, control, or administration to be exercised by the mandatory shall, if not previously agreed upon by the members of the league, be explicitly defined in each case by the council.

A permanent commission shall be constituted to receive and examine the annual reports of the mandatories and to advise the council on all matters relating to observance of the mandates.

Article Twenty-Three.

Subject to and in accordance with the provisions of international conventions existing or hereafter to be agreed upon, members of the league [a] will endeavor to secure and maintain fair and humane conditions of labor for men, women, and children, both in their own countries and in all countries to which their commercial and industrial relations extend, and for that purpose will establish and maintain the necessary international organizations.

[b] Undertake to secure just treatment of the native inhabitants of territories under their control.

[c] Will intrust the league with the general supervision over the execution of agreements with regard to the traffic in women and children and the traffic in opium and other dangerous drugs.

[d] Will intrust the league with the general supervision of the trade in arms and ammunition with the countries in which the control of this traffic is necessary in the common interest.

[e] Will make provision to secure and maintain freedom of communication and of transit and equitable treatment for the commerce of all members of the league. In this connection the special necessities of the regions devastated during the war of 1914-1918 shall be in mind.

[f] Will endeavor to take steps in matters of international concern for the prevention and control of disease.

Article Twenty-Four.

There shall be placed under the direction of the league all international bureaus already established by general treaties if the parties to such treaties consent. All such international bureaus and all commissions for the regulation of matters of international interest hereafter constituted shall be placed under the direction of the league.

In all matters of international interest which are regulated by general conventions, but which are not placed under the control of international bureaus or commissions, the secretariat of the league shall, subject to the consent of the council, and if desired by the parties, collect and distribute all relevant information and shall render any other assistance which may be necessary or desirable.

The council may include as part of the expenses of the secretariat the expenses of any bureau or commission which is placed under the direction of the league.

Article Twenty-Five.

The members of the league agree to encourage and promote the establishment and co-operation of duly authorized voluntary national Red Cross organizations having as purposes improvement of health, the prevention of disease, and mitigation of suffering throughout the world.

Article Twenty-Six.

Amendments to this covenant will take effect when ratified by the members of the league whose representatives compose the council and by a majority of the members of the league whose representatives compose the assembly.

Such amendment shall (the word not apparently omitted in cable transmission) bind any member of the league which signifies its dissent therefrom, but in that case it shall cease to be a member of the league.

Those Which Sign.

One—Original members of the league of nations. Signatories of the treaty of peace.

United States of America, Belgium, Bolivia, Brazil, British Empire, Canada, Australia, South Africa, New South Wales, India, China, Cuba, Czecho-Slovakia, Ecuador, France, Greece, Guatemala, Haiti, Hedjaz, Honduras, Italy, Japan, Liberia, Nicaragua, Panama, Peru, Poland, Portugal, Roumania, Serbia, Siam, Uruguay.

States invited to accede to the covenant:

Argentine Republic, Chile, Colombia, Denmark, Netherlands, Norway, Paraguay, Persia, Salvador, Spain, Sweden, Switzerland, Venezuela.

Two—First secretary general of the league of nations, Sir Eric Drummond, of Great Britain.

The secretary general was allowed a salary of $25,000 per year, with a like amount for the expenses of his office for the first year. While the capital of the league will be at Geneva, not all the meetings will be held there. The first general meeting was scheduled for Washington, D. C., in October, 1919.

See WORLD WAR: VERSAILLES, TREATY OF.

NAT TURNER INSURRECTION. See TURNER, NAT.

NATURAL, in music, a sign (♮), which, if placed before a note counteracts the effect of a sharp (♯) or a flat (♭) and restores the affected note to its normal tone. See MUSIC.

NATURAL BRIDGE, a bridge formed by the wearing away of soft rock underneath harder rock, thus leaving an arch. A famous natural curiosity of this sort is the Natural Bridge across Cedar Creek, Va., about

NATURAL BRIDGE, VIRGINIA

125 miles west of Richmond. The sides are nearly perpendicular; the arch is 215 feet high and from fifty to one hundred feet wide, with a span, in its broadest part, of ninety feet. Three natural bridges have been discovered recently in Utah, each being larger than the one in Virginia. The Augusta Bridge in Utah is the largest in the world.

NATURAL HISTORY, in its widest sense, that department of knowledge which comprises the sciences of zoölogy and botany, chemistry, physics, geology, palaeontology and mineralogy. The term is most frequently used to denote collectively the sciences of botany and zoölogy, and it is sometimes restricted to the latter.

NATURALISM, *nat'ure al iz'm*, a philosophical term which indicates various debatable principles of the universe on the theory that nature furnishes a satisfactory explanation of all questions concerning them. The underlying type of most philosophies is *theism*, or belief in one superhuman power or spiritual controller of the universe. Naturalism opposes this view and declares other explanations must be sought.

NATURALIZATION, the process whereby a person renounces allegiance to the land of his birth and becomes a citizen of another country. Formerly many countries refused to recognize any act of naturalization as exempting the party naturalized from former allegiance. Thus the maxim of English common law, "Once an Englishman, always an Englishman," forbade a subject from adopting a new political status and rendered him liable to the penalties of treason, if found in arms against his native country. The existence of this principle gave rise to many disputes, more particularly between Great Britain and the United States, and it was not till the passage of the Naturalization Act of 1870, that its contention was formally abandoned by Britain.

When a person from another country becomes by naturalization a citizen of the United States he is invested with every political right of natural-born Americans except one—he cannot aspire to the Presidency of the United States.

Naturalization in the United States. In the following paragraphs are summarized the naturalization laws of the United States:

An alien may be admitted to citizenship in the following manner, and not otherwise:

1. He shall declare on oath before the clerk of the proper court at least two years before his admission and after he has reached the age of eighteen years, that it is bona fide his intention to become a citizen of the United States and to renounce allegiance to any foreign state or sovereignty.

2. Not less than two years nor more than seven after he has made such declaration he shall file a petition, signed by himself and verified, in which he shall state his name, place of residence, occupation, date and place of birth, place from which he emigrated, name of the vessel on which he arrived, the time when and the place and name of the court where he declared his intention of becoming a citizen; if he is married, he shall state the name of his wife, the country of her nativity and her place of residence at the time the petition is filed, and if he has children the name, date and place of birth and place of residence of each child living. The petition shall also set forth that he is not a disbeliever in or opposed to organized government or a member of any body of persons opposed to

organized government, and that he is not a polygamist or a believer in polygamy; that he intends to become a citizen of and to live permanently in the United States. The petition shall be verified by the affidavits of at least two credible witnesses who are citizens. At the time of the filing of the petition there shall be also filed a certificate from the department of commerce and labor stating the date, place and manner of his arrival in the United States and the declaration of intention of such petitioner, which certificate and declaration shall be attached to and be apart of his petition.

3. He shall, before he is admitted to citizenship, declare on oath in open court that he will support the Constitution of the United States, and that he absolutely renounces all allegiance to any foreign prince, potentate, state or sovereignty.

4. It shall be made apparent to the satisfaction of the court admitting any alien to citizenship that immediately preceding the date of his application he has resided continuously within the United States five years at least, and within the state or territory where such court is at the time held one year at least, and that during that time he has behaved as a man of good moral character, attached to the principles of the constitution. In addition to the oath of the applicant, the testimony of at least two witnesses, citizens of the United States, as to the facts of residence, moral character and attachment to the principles of the constitution shall be required.

5. He must renounce any hereditary title or order of nobility which he may possess.

6. When any alien who has declared his intention dies before he is actually naturalized the widow and minor children may, by complying with the other provisions of the act, be naturalized without making any declaration of intention.

Immediately after the filing of the petition, the clerk of the court shall give notice thereof by posting in a public place the name, nativity and residence of the alien, the date and place of his arrival in the United States and the date for the final hearing of his petition and the names of the witnesses whom the applicant expects to summon in his behalf. Petitions for naturalization may be filed at any time, but final action thereon shall be had only on stated days and in no case until at least ninety days have elapsed after the filing of the petition. No person shall be naturalized within thirty days preceding a general election.

No person who disbelieves in or who is opposed to organized government or who is a member of or affiliated with any organization entertaining and teaching such disbelief in or opposition to organized government shall be naturalized.

No alien shall hereafter be naturalized or admitted as a citizen of the United States who cannot speak the English language. This requirement does not apply to those physically unable to comply with it, or to those making homestead entries upon the public lands of the United States.

Naturalization in Canada. When a person seeks to become a citizen of Canada the act involves naturalization as a subject of the British Empire. Before seeking the privilege the candidate must have resided within the British Empire five years and in Canada one year. An alien woman who marries a British subject acquires British citizenship.

NATURAL SELEC'TION, a phrase frequently employed to indicate that process in nature by which those plants and animals best fitted for life under the conditions in which they are found, survive and spread, while others die out and disappear. Allowing for slight variations, each pair of plants or animals tends to produce more than two like themselves, and hence in time they would fill any locality with individuals requiring the same food and environment. In time, according to the theory, the locality becomes very much crowded and the weaker individuals are driven out in the so-called "struggle for existence," thus illustrating again the "survival of the fittest."

Of course, natural selection does not act suddenly, but operates noticeably only in a series of many generations. Moreover, it would not be possible were the individuals of each generation exactly like their predecessors. But children are never exactly like their parents; there are always variations which are intensified more or less by the surroundings. If natural selection acts at all, it is operative throughout the whole universe, from the lowest forms of animal life to man himself. Darwin first advanced this theory, which is not accepted by all scientists in every particular. See HEREDITY; EVOLUTION.

NATURAL THEOL'OGY, a systematic arrangement of all the knowledge man possesses of the attributes and the being of the Creator. This knowledge is derived from consideration of nature and through philosophical study of all surrounding phenomena, and is the application of the principles of science to the assumption on which religion is based. Natural theology attempts to prove the existence of God through the contemplation of nature. Socrates, Aristotle and Plato taught the existence and the unity of God by means of the study of nature and human life. More modern philosophers assume that all existing phenomena reveal the character of the Being which organized the worlds.

NATURE STUDY. Of all the books that children may read and study there is none as fascinating or so comprehensive as the Book of Mother Nature. It presents to those whose eyes are open and whose senses are alert materials on all the natural sciences —botany, zoölogy, physiography, geology. It spreads before the observer flowers of every hue, and birds and insects in countless variety; it permits investigation of such marvels as the germination of plant life and the transformation of the crawling caterpillar into a gorgeous butterfly.

From that book the child learns at first hand—

> "How the tortoise bears his shell,
> How the woodchuck digs his cell,
> And the ground-mole sinks his well;
> How the robin feeds her young,
> How the oriole's nest is hung,
> Where the whitest lilies blow,
> Where the freshest berries grow."

The inclusion of nature study among the regular school subjects is a comparatively modern step, but one which now has the endorsement of practically all educators. Its purposes may be summarized as follows:

(1) To train the child's powers of observation.

(2) To give him insight into the form, structure, characteristics and uses of all objects of nature, especially those belonging to the vegetable and animal kingdoms, with which he comes in daily contact.

(3) Through this acquaintance to lead the child to form a right attitude towards all objects which affect his life, to use all things economically, to prevent waste and destruction and to be kind to insects and animals.

(4) To lead the child to see the relations of various subjects to one another, as the relation of plant life to animal life and the dependence of occupations upon the geographical conditions of the locality in which he lives.

(5) To give the child the power to discover things for himself.

(6) To show the connection between the work of the school and the work of the home.

Suggestions for the Teacher. With the exception of those children living in the congested portions of large cities, all children have some knowledge of the plant and animal life of their locality and of the different forms of water, as vapor, ice and snow; but their observation has not been systematic, and much of their knowledge is unclassified. The first work of the teacher is to train her pupils to habits of systematic observation. This may be accomplished by observing the following plan of procedure:

(1) With young children, especially those in the first and second grades, study objects as wholes. If the object is a pansy, use the entire plant.

(2) Question skilfully, so as to direct the pupil's attention to the facts in the order in which they should be learned, so as to enable him to see the relation of these facts to one another.

(3) Lead the pupil to discover for himself the facts which he should learn. He should not be told what he can learn from his own observation.

(4) Let each lesson depend as much as possible upon what has been learned in previous lessons.

(5) Secure from the pupils definite statements, in good English, of the facts they have learned.

(6) Lead the pupils to discover the uses of the objects studied.

(7) Keep the work within the capacity of the class. In the first three grades minute analysis of objects should not be attempted. Children in these grades easily grasp the relations of the large parts of an object, as the root, the stem, the leaves and the blossom of a plant, but they are not prepared for the study of the parts of these different organs. Besides, there is much more profitable work that they can do in these grades. The children of the third grade will enjoy studying attachments of seeds, by which they are scattered, and in spring, the germination of beans, peas, corn, squashes, pumpkins or other large seeds.

The plan outlined above for primary grades constitutes the foundation of work in more advanced grades. The teacher should adhere to the principles here set forth and elaborate upon the plan as the needs of the class require.

Material. In the selection of material the teacher should be guided by the locality, the season and the conditions of her class. She should select the material with a view to reaching a definite end through the nature study work. In the autumn the preparation of plants and animals for winter is a theme which affords many interesting lessons, such as the withering and falling of the leaves, the ripening of fruit, the scattering of seeds, the migration of birds, the storing up of food by some animals and the burrowing by

others. During winter the study of frost, ice and snow and the weather will furnish many lessons of interest to the younger pupils, while the older ones may be interested in studying the bark, wood and plan of branching of the different trees common to the locality. In the spring, the awakening of life in the plant and animal kingdoms is of interest to all. In rural schools the study of the life history of insects injurious to vegetation and of means for preventing their ravages is an interesting and profitable line of work. The ingenious teacher will find means to use profitably the abundance of material at her disposal.

How to Use These Volumes. The makers of this set of books recognized the importance some phase of this subject assumes in most courses of reading and in every carefully outlined plan for general study. The investigation of every phase of nature is quite naturally never attempted by any one person, yet some of its departments are constantly drawn upon by young people in many ways to furnish contributions to their classified knowledge. Literally hundreds of articles appear in alphabetical order in these volumes which in authoritative manner explain the facts of plant and animal life.

Birds. Children are interested in birds, and while they cannot classify the species and families, you, teacher or parent, will find such classification helpful in your work with the little people and useful in your own advanced study. Without mentioning one of more than 200 birds discussed in these volumes, we give below their divisions, and one group can easily be studied without reference to any other:

BIRDS

Birds of Prey	Scratchers
Creepers	Sea Birds
Fishers	Swimmers
Perchers	Waders
Pigeons	Weak-footed
Runners	

Plants. The wonders of nature are nowhere more strongly emphasized than in the study of plant life. The subject is exceedingly broad; children are most interested in flowers, because attracted by beautiful forms and coloring; later they see other marvels in growing leaves and stalks, and the great diversity of plant life makes an appeal it is difficult to resist.

This work contains articles on more than 600 specimens of plant life, and each is described in its proper alphabetical order in the volumes. The student, teacher or parent can quickly arrange a study plan based on any phase of plant life by examining the following table of sub-headings under which the hundreds of articles are appropriately grouped:

PLANTS

Animal-eating	Herbs
Aquatic	Medicinal
Creepers	Mosses and Lichens
Desert Plants	Nuts
Diseases of	Parasitic
Dye Plants	Fruits
Ferns	Fungus
Fiber Plants	Garden Vegetables
Flowers	Grains
Forage	Grasses and Sedges
Parts of Plants	Spice-yielding
Plant Products	Trees
Seaweeds	Tropical
Shrubs	Weeds
Small Fruits	Unclassified

Insects. It is a mistake to class all insects as injurious. Many are pests, it is acknowledged, but this is untrue of some. We often wonder what reason there can be for the existence of numerous species of insects; possibly we have not classed them as injurious, but at least we have maintained a strong prejudice against them. This has been frequently brought to our attention when an investigator, studying insect life, has proved that some particular object of our disapproval is of great benefit to man, in one way or another. For instance, we know that the ladybird, which is not a bird but an insect, protects vegetables from plant lice. So far as we yet know, the world would be better off without our great variety of insect life, but we may learn in time that our present views must be greatly modified.

Insects are very carefully described in these volumes in regular alphabetical arrangement. The following list of sub-headings will assist the investigator in preparing material for nature study along this particular line:

INSECTS

Ants	Bugs
Bees	Butterflies and Moths
Beetles	Flies

Extending our investigations farther, we find that it will profit us, in seeking a well-rounded view of nature study, to refer to the general articles on Zoölogy, Botany, Insects, Birds, etc., not forgetting to study the colored illustrations showing orders of birds and animals.

Wonder Questions in Nature Study

Why do the leaves drop off the trees in the fall?

During the spring and summer months the leaves are working hard manufacturing food for the trees, absorbing carbon dioxide, giving off oxygen, and sending into the air surplus water which has circulated through the plant tissues. As winter approaches the food materials found in the leaves are absorbed by the branches and roots of the trees, to be stored away during the cold months. The leaf then withers, for its work is done, and across its base is formed a layer of hard cells. This marks the place where its breaks off. The fall of the leaf in northern regions is a wise provision of Nature, for during the cold months the root of a tree cannot absorb much soil water from the frozen earth, and if the broad-leaved trees kept their foliage the leaves would give off so much water the trees would dry up and die. Again, in the countries where there is a heavy snowfall, the branches, if covered with leaves, would be so laden with snow that they would suffer injury. Evergreen trees, which keep their leaves the year around, have long narrow leaves which cannot hold the snow.

What are the oldest living things in the world?

We have heard of certain animals living to be several hundred years old, but some of the "Big Trees" of California are older than any creatures alive today. The largest of these forest monarchs are probably 7,000 years old, and they are still flourishing, while the trees of average size have been growing for more than 2,000 years.

Why are some teas black and others green?

Black teas and green teas do not come from different varieties of the tea plant. The difference in color is the result of two methods of preparation. Black tea leaves undergo a sort of fermenting process. That is they are spread out until certain chemical changes take place that cause the black color. In preparation of green teas the leaves are placed in a firing machine soon after they are picked, which prevents fermentation by closing the pores. Oolong is a partially fermented tea which is black in color but has the flavor of green tea.

What are the silk and tassels on corn?

Each corn plant bears two kinds of flowers: those that produce stamens and those that produce pistils. The tassels are the staminate and the silk the pistillate flowers. Tassels grow on the stalk and silk on the ear. There is always one silk for each kernel of corn, and there are about 800 kernels to an ear.

What causes a kernel of pop corn to "pop"?

The kernels on an ear of pop corn have a very hard, strong outer coat. When a kernel is shaken in a popper over a hot fire the heat transforms the moisture inside the kernel into steam. When this steam generates sufficient force it bursts open the kernel, which literally turns inside out with a popping sound.

How does a cricket sing?

The familiar sounds made by this insect are not produced by its mouth, as many people suppose, but by its wings. On the lower part of each forewing there are a number of little ridges which form a sort of rasp, or file, and on the inner margin of the wing there is a hardened portion which may be called the scraper. When the cricket wishes to "sing" he lifts up his forewings and moves them in such a way that the file on one wing rubs against the scraper on the other. This makes the wing membranes vibrate and produces the sound. Only the males are equipped with this musical apparatus.

Of what is the spider's web made?

The gauzy web of the spider is made of a sticky fluid that hardens into silk when exposed to the air. At the end of the spider's body there are three pairs of spinnerets, consisting of a number of small tubes that connect with glands in the abdomen. These glands secrete the sticky fluid. When the web is to be spun the spider lifts its spinnerets in the air, and by gently pressing them against some object makes the fluid run out in the form of fine threads, which harden in the air. Usually the spider spins a strand across the space where its web is to be hung, and then fastens other threads to the first one near the middle. These threads form the radiating spokes of the fairylike wheel which is to be a prison-house for many an unwary insect.

Where does the snail get its shell?

The snail makes its shell itself, for the hard covering is formed of a limy substance secreted by the skin of the little animal. Snails build their shell coverings in the same way that oysters and other mollusks do.

How do oysters eat?

To look at an oyster one would not sup-

pose that it had a mouth. It has, however, and this consists of a funnel-shaped opening at the narrowest part of the body. About the opening are a number of tiny projections which strain out from the sea water all sorts of plant and animal organisms, too small to be visible to the naked eye. A short gullet joins the mouth to a stomach. Digestion is also aided by a liver and a coiled intestine.

What tiny animals help to build islands?

These builders are minute, jellylike animals called polyps, which have the power to secrete a limy substance and build it around them like a shell. Anchored in the bed of the sea, millions of polyps working through countless years have built up colonies of shell formations which have finally projected above the sea level. This shell is known as coral, and is one of the most beautiful things in the ocean. It takes on lovely, flowerlike forms, and has many different colors. Polished, reddish-pink coral is used extensively to make necklaces, as everyone knows. The coral structures sometimes form broad barks, or reefs, along the shores of continents, and sometimes they form rings in the water. The latter are called atolls. The Maldive Islands, in the Indian Ocean, are atolls. There is a chain of coral reefs along the coast of Australia which is over 1,200 miles in length.

Where do pearls come from?

Pearls are made by pearl oysters, especially by a species found in tropical seas. On the inside of the oyster shell may be seen a hard, shiny substance of various colors. This is called mother-of-pearl, and is the inner layer of the limy substance which the oyster secretes to form its shell. Sometimes an object gets into the shell and irritates the oyster's soft body. The animal then secretes mother-of-pearl about the troublesome body and this forms a pearl.

How do fishes breathe?

Fishes breathe by means of gills, placed in the sides of the head. There are four pairs of gills, and they are made up of numerous tiny projections of skin, supported by bony arches. A current of water is kept constantly flowing over the gills as the fish alternately opens and shuts its mouth, and as the water circulates through them the gills extract oxygen from it. A fish brought to land has no means of getting oxygen, for the gills cannot extract it from the air. Therefore it dies of suffocation.

Where do the spots on bird's-eye maple come from?

Though birds-eye maple when polished is a beautiful and expensive wood, the small round spots that are so prized are the result of injury to the bark. Usually when the bark is injured the trunk begins to sprout and soon sends out a number of weak little twigs. Each of these twigs becomes the center of a series of wood rings that give the wood its attractive markings.

What flower is used by tailors to raise nap on cloth?

Strange to say, no device has ever been invented which serves the tailor's purpose quite so well as the flower heads of the teasel. The flower heads are stiff enough to raise the nap, but if they meet an obstruction they will break off instead of tearing the material, as a metal device might do. The flower heads are cut in two and fastened to a cylinder which revolves against the cloth, the largest flowers being used for blankets, and the smallest ones for broadcloth.

Where does cork come from?

Cork is the outer layer of bark found on a small evergreen tree that grows in Spain and Portugal. It is composed of thickened walls of cells which have lost their living contents. Cork is cut from the tree in oblong strips, and if care is taken not to bruise the tree new layers form as long as the plant is in good condition. Raw cork is covered with a rough, woody layer, and before the substance is fit to be made into bottle stoppers, fish-net floats, etc., it has to be scraped and boiled.

Where do we get rubber?

Rubber is also the product of a tree, though it does not grow in the form in which we use it. The rubber tree is a warm-weather plant, and is found abundantly in the tropics. This tree yields a whitish juice, from which the rubber is extracted by evaporation of the liquid. The gatherer sticks a paddle into a pail of the juice and then holds the paddle over a smoldering fire. When the water evaporates a thin coating of rubber is left on the paddle, and after this process has been repeated several times enough rubber accumulates to be cut off and rolled into a ball. The crude rubber is then sent to factories, where it is put through various processes and made ready for the market.

Why does a dog turn around before lying down?

This habit is supposed to be an inherited one. In the days when all dogs were wild they used to trample down the grass to make a good place to rest in, and though our domestic dogs do not need to do this, they go through the same performance through instinct.

How does a chameleon change the color of its skin?

The outer skin of this interesting lizard is colorless; in the deeper layers of skin there are cells containing pigment, or coloring matter. When the creature is frightened and wishes to become inconspicuous it can change to the color of its surroundings by shifting the pigment grains toward or away from the outer skin. Usually it has a grass-green color, but it can assume various shades ranging from emerald to dark bronze.

What is the rattlesnake's rattler made of?

The rattle is a series of thin, horny rings, loosely attached to and overlapping one another. When the snake shakes them they produce the rattling sound. The rings are outgrowths of the skin at the end of the body. Each time the skin is shed a new ring forms, and so the oldest rings are the smallest, for they grow on the body of the young snake. Successive rings become gradually larger until the creature is full grown. Since the skin is shed several times a year, the age of a snake cannot be told by the number of rings.

What animal carries with it an electric battery?

There are several species of fish which have special organs capable of giving an electric shock. In South American waters there is found a long, snakelike eel which has an electric apparatus on the underside of the tail. With this organ the eel can stun an animal as large as a horse.

Why do dogs bark?

The barking of dogs is believed to be their attempt to talk to their human masters. It is a sort of imitation of human speech. This theory is held because wild animals that are most closely related to dogs do not bark. They yelp and howl, but they do not make the barking sounds of the domesticated dogs.

Do talking parrots have human intelligence?

No, these birds are clever at imitating the speech of human beings, but they are mere imitators. Probably the greater part of what they say has no meaning to them, though they may learn after a time that such expressions as, "Polly wants a cracker" will bring desired results. Parrots have only bird minds, no matter how cleverly they chatter.

How do deep-water fishes see?

Down deep in the ocean, where no sunlight ever penetrates, it is as dark as night, and some of the fish in those depths are blind, because their eyes have degenerated or disappeared. Others, however, carry little lanterns with them, in the form of phosphorescent lights. The light-giving organs are on the sides of the body, either in the head or near the tail. Though these natural lanterns aid the fish in making their way about, they also reveal the whereabouts of their possessors to enemy fish. Hence they are not entirely an advantage.

How do seeds travel about?

The wind is the most important distributor of seeds. It is interesting to know that some seeds, such as those of the elm and maple trees, have little membranous flaps that serve as wings and permit the winds to blow the seeds long distances. Orchids and some other plants have seeds as fine as dust, which float readily in the air. Sometimes whole plants are blown about after the seeds are ripe, as is true of the tumbleweed. Another interesting growth is the pod of the poppy or morning glory, which is open at the top. When the stalk bends back and forth the seeds are flung out of the pod in all directions. Animals also help in seed dispersal, for the seeds stick in their fur and hair and are thus carried about. Birds are especially valuable as carriers of fruit seeds. These are some of the agents provided by nature that plant life may be kept distributed.

What plants steal their nourishment from other plants?

Plants which exist in this manner are called parasites. Good examples of these robbers are the mistletoe and the dodder. The mistletoe is an attractive evergreen shrub that twines about the trunks of such trees as the apple, hawthorn and sycamore. The dodder is less popular than the mistletoe, which does not really injure the host it lives upon. The dodder produces great tangled masses of threadlike stems, and is very destructive when it gets a good hold in a clover or alfalfa field. The destruction of this parasite is one of the many problems of the agriculturist.

Do plants ever store up food?

Yes, food is stored by all plants except those that live only one season. Trees go on living year after year, and in some cases century after century. If they did not store plant food in their roots during the winter, they could not put forth leaves and buds in the spring. Some of the food-storing plants are our most useful vegetables. The turnip and carrot, for example, store food the first year in their roots, and the second year, if allowed to mature, they use the stored food to build a tall stem that will bear flowers and seeds. Man

finds the roots of these plants a very good food, and he cultivates them for the purpose of eating them. Another food-storer, the onion, puts its foodstuffs in a bulb.

How does soil water get into the roots of plants?

As they reach down into the soil roots divide and subdivide into tiny branches called root hairs, the walls of which are extremely thin. It is a law of nature that two liquids of unequal density separated by a thin membrane will mingle with each other. In the soil we have the water, and in the root hairs the denser sap of the plant. By a process called osmosis the soil water flows through the thin walls of the root hairs and mingles with the sap, for the flow is always toward the denser liquid. To provide sufficient moisture for plants a large extent of root hairs is necessary. Experiments show that 480 root hairs may be counted on each hundredth of an inch of root at the end of a corn plant.

What are the "eyes" of a potato?

These spots are stem buds. The edible part of a potato is not a thickened root, but an underground stem, or tuber. When a piece of potato containing "eyes" is planted it will develop into a new plant.

How does the caterpillar change into a butterfly?

It seems strange that the crawling hairy worm we call a caterpillar could ever become the beautiful winged butterfly, but it is not so strange when we learn that when the caterpillar goes into its cocoon for the resting period it already has the beginnings of wings and butterfly legs. Just behind the head there are three pairs of tiny projections that become the feet and long legs of the butterfly, and if one of these is injured the developed insect will have an imperfect leg. The caterpillar also has a pair of folded buds that are to be the wings of the coming insect. During the caterpillar existence the creature eats and eats and eats, storing in its body food for the nourishment of the developing butterfly. After a time the caterpillar ceases to eat and envelopes itself in a hard, shiny case. In this it remains inactive for several weeks, but all the time its rudimentary wings and legs are developing, and it is being transformed into a flying creature. Finally the case splits open, and the perfect insect emerges. The butterfly looks small and forlorn when it first comes out, as its wings are closely folded against its body. In the air and sunshine, however, it soon becomes a lovely creature.

What causes milk to turn sour?

The souring of milk is a chemical change resulting from the action of minute organisms called ferments, or bacteria. These are everywhere present in the air, and they are especially active in warm, moist places. That is why the milk turns sour if it is left standing on a warm day. If put in an ice box, where the temperature is low, it will remain sweet a much longer time. Sometimes you hear it said that thunder sours milk, but this is not true. People got this idea because it was noticed that milk often became sour on a day when there was a thunder shower. On such a day the air is usually warm and moist, and so this is a favorable time for the action of bacteria. The thunder itself has no effect on the milk.

What makes the bubbles in bread dough?

Yeast is a ferment, and when mixed with flour and water it changes the starch in the flour to sugar and then decomposes the sugar into carbon dioxide and alcohol. The bubbles in the dough form because the carbon dioxide, which is gas, rises up through the mixture. When the bread is baked the alcohol evaporates and the yeast germs are killed. Hence we cannot taste them.

How do insects breathe?

Insects do not have lungs, like mankind, nor gills, like fishes. Yet they have a very wonderful breathing apparatus. Along the sides of the body are openings called spiracles, through which air enters. These openings connect with a system of elastic tubes, which divide and subdivide throughout the insect's body, much like the veins in higher animals. These air tubes go to every part of the body, and they have such delicate walls that oxygen can pass out of them into the blood and purify it, as occurs in our own lungs. The air is circulated and renewed in the tubes by the regular swelling and contraction of the insect's body.

What insect is the most valuable to man?

Some may think that the bee, which makes honey and wax, should hold the place of honor, but there is another insect, the moth of the silkworm, which produces the fibers that form some of our loveliest and most costly fabrics. Probably an impartial jury would give the award to this industrious creature. Silk fiber is taken from the cocoon which the larva of the silk moth spins. These cocoons are plunged into scalding water; then floating threads of silk are caught by trained workers, and the fibers are wound on reels. Each cocoon consists of one long, very delicate thread, and a good many have to be twisted together to make thread strong enough to be woven into cloth.

In many of the articles will be found special type lessons. The general form of each may be used in connection with other lessons relating to different members of the same species; thus the value of the studies is particularly emphasized.

Books. There are scores of books on nature study, treating of both material and methods. Some of the best of these are Flagg's *A Year Among the Trees;* Newell's *Outlines of Botany*—Part I, *From Seed to Leaf;* Part II, *Flower and Fruit;* Dana's *How to Know the Wild Flowers;* Arnold's *Waymarks for Teachers;* Hale's *Little Flower People;* McMurry's *Special Method in Natural Science;* Ballard's *Among the Moths and Butterflies;* Burrough's *Birds, Bees and Bright Eyes;* Morley's *Insect Life;* Dugmore's *Bird Homes;* Flagg's *A Year with Birds;* Lange's *How to Know One Hundred Wild Birds of Illinois* (the same author also has similar books for Indiana, Missouri, Minnesota and Wisconsin); Olive Thorne Miller's *The First Book of Birds* and *The Second Book of Birds.*

Related Articles. Consult the following titles for additional information:

Agriculture	Geology
Animal	Germination
Aquarium	Grasses
Astronomy	Herbarium
Beetle	Insects (with list)
Bird (with list)	Kindergarten
Boys' and Girls' Clubs	Language and Grammar
Botany	Seeds
Fish (with list)	Story Telling
Flowers (with list)	Tree (with list)
Gardening	Weeds
Geography	Zoölogy

NATURE WORSHIP. The religions of primitive peoples contain many elements of nature worship. The mysteries of nature, which early man could not comprehend, excited his awe and led not only to worship of the great elemental forces, such as fire, but of innumerable objects that inspired his admiration or wonder. Animal worship is very common in most primitive religions. In ancient Egypt several animals were held sacred, among them being the cat, the bull and the ibis. Snakes have been venerated at one time or another in nearly every land. They have been objects of special reverence in China. Of inanimate objects which have inspired man's awe and adoration are stones, worshiped by the early Lapps, Finns and by some African negroes, and certain trees, venerated in India. Australia, Peru and elsewhere. The celestial bodies were deified even by highly-civilized ancient communities. The Persians, Egyptians and Babylonians worshiped the sun and moon. Sun worship has been prominent among the Hindus for ages, and was a conspicuous feature of the religion of the American Indian.

NAUSEA, *naw'she a,* or *naw'sha,* the sensation of sickness, or inclination to vomit, similar to that produced by the motion of a ship at sea. Though the feeling is referred to the stomach, it frequently originates in disorder of other parts of the body, such as the brain or kidneys, or may result from shock or sudden blows. Anyone who suffers from chronic attacks of nausea should consult a physician.

NAUTILUS, *naw'til us,* a genus of animals, related to the cuttlefish. The pearly nautilus, an inhabitant of tropic seas, constructs a spiral shell resembling somewhat a snail's shell but differing from the latter in that the coil in its winding course is crossed by partitions, which divide it into innumerable compartments. As the animal increases in size, the spiral increases in width and as the nautilus outgrows its narrow quarters it seals them up behind it. The chambers are connected by a tube, through which they may be filled with air or water, and thus the nautilus is able to rise or sink. The animal which has been said to sail its shell upon the surface of the water, is the *paper nautilus,* or argonaut.

NAVAHO, or **NAVAJO,** *nah'va ho,* a tribe of Athapascan Indians who have been allotted a large reservation in Southwestern Utah, Northeastern Arizona and Northwestern New Mexico. About half of the Navahos live in this reserve, and the others are employed in white settlements in the vicinity or keep herds and flocks on the plains outside. These Indians are known especially for their skill in making blankets and rugs, which are woven from the wool of sheep. They number between 22,000 and 25,000.

NA'VAL ACAD'EMY, United States, a national school established at Annapolis, Md., in 1845, by act of Congress, for the purpose of giving instruction to young men who would become officers of the United States navy. Credit for the origin of the school is due to the historian, George Bancroft, who, when Secretary of the Navy, urged its establishment. In the course of the development of the institution it has become the largest and best-equipped naval school in the world. The students, formerly called cadets,

are now known as midshipmen. The course of study covers six years—four years at the Academy and two years at sea. Final examinations follow the sea service. Graduates first fill lower vacancies in the naval service, and occasionally in the Marine Corps. Promotions are not rapid, but are certain, in time, to all who show ability.

How Entrance Is Secured. In the following paragraphs the laws relating to admission to the Academy are summarized:

Appointments. Three midshipmen are allowed for each senator, representative and delegate in congress, two for the District of Columbia, ten each year from the United States at large and fifteen from enlisted men of the navy. The appointments from the District of Columbia, ten each year at large and fifteen from enlisted men of the navy are made by the President. One midshipman is allowed from Porto Rico, who must be a native of that island. Candidates must be actual residents of the districts from which they are nominated.

Examinations. Two examinations for the admission of midshipmen are held each year. The first is held on the third Tuesday in April under the supervision of the Civil Service Commission at certain specified points in each state and territory. All those qualifying mentally, who are entitled to appointment in order of nomination, will be notified by the superintendent of the Naval Academy when to report at the Academy for physical examination, and if physically qualified will be appointed. The second and last examination is held on the third Tuesday in June at Annapolis, Md. Alternates are given the privilege of reporting for mental examination at the same time as the principals. Examination papers are prepared at the Academy and the examinations of candidates are finally passed upon by the academic board. Certificates from colleges and high schools will not be accepted in lieu of the entrance examinations.

Mental Requirements. Candidates will be examined in punctuation, spelling, arithmetic, geography, English grammer, United States history world's history, algebra through quadratic equations and plane geometry.

Physical Requirements. All candidates must, at the time of their examination for admission, be between the ages of sixteen and twenty years. A candidate is eligible for appointment the day he becomes sixteen and is ineligible on the day he becomes twenty years of age. Candidates are required to be of good moral character, physically sound, well formed and of robust constitution. The height of candidates for admission must not be less than five feet two inches between the ages of sixteen and eighteen years, and not less than five feet four inches between the ages of eighteen and twenty years. The minimum weight at sixteen years is 105 pounds, with an increase of five pounds of each additional year or fraction of a year over one-half. Candidates must be unmarried.

Pay. The pay of a midshipman is $600 a year, beginning at the date of his admission. Midshipmen must supply themselves with clothing, books, etc., the total expense of which amounts to $280.64. Traveling expenses to the Academy are paid by the government.

Enlistment. Each midshipman on admission is required to sign articles by which he binds himself to serve in the United States navy eight years (including his time of probation at the Naval Academy).

NAVAL MILITIA, citizens who are organized in a body which supplements the Naval Reserve (which see). Its members receive no pay, and are not obliged to serve on ships, although this experience is provided for all who wish it. The government loans small naval vessels periodically to the states soliciting them, for the purpose of drills. In times of stress the naval militia may be called into service. There is a naval militia in each of the following jurisdictions, all under the direction of an Assistant Secretary of the Navy:

California	Maine	North Carolina
Connecticut	Maryland	Ohio
District of Columbia	Massachusetts	Oregon
	Michigan	Pennsylvania
Florida	Minnesota	Rhode Island
Illinois	Missouri	South Carolina
Indiana	New Jersey	Washington
Louisiana	New York	Wisconsin

NAVAL OBSERVATORY, *ob zurv'a to ry,* an astronomical observatory established at Washington, D. C., operated under the supervision of the bureau of equipment in the Navy Department. The buildings are on Georgetown Heights and comprise an office building and observatories for the various astronomical instruments used. Chief among these is the 26-inch equatorial telescope, which was placed in position in 1874 and was at that time the largest instrument of its kind in the world. There are also transit instruments, astronomical clocks, photoheliographs and various other pieces of intricate apparatus. The library contains 28,000 volumes and a large number of pamphlets. The work of the observatory consists largely in the following up discoveries that have been made in other observatories and making them practical. It also prepares the *Nautical Almanac* and issues numerous reports and articles pertaining to astronomical subjects. The United States Naval Observatory is one of the finest institutions of its kind in the world.

NAVAL RESERVE, in the United States, put upon a permanent basis by act of Congress in 1915, is a body of men who have served in the navy for at least four years or who enlisted in the navy before becoming of age, and were honorably discharged. Members must hold themselves ready for a call to naval service in time of necessity. When so called they have the same status as the regularly-enlisted men of the navy.

The naval reserve members are in two classes. The first includes those who enlist within four months of discharge; all others are in class two. The pay of class one members is $30 per year, if their regular service in the navy was less than eight years; $60, if service was from eight to twelve years; $100, if over twelve years. Members of the second class receive $12 per year. When called to service a clothing allowance is made, and regular naval pay is given. Enlistment in the naval reserve is for four years.

NAVAL TRAINING STATION, Great Lakes, the largest station of its kind in the United States, located on the shore of Lake Michigan, thirty-three miles north of Chicago. It was established by act of Congress in 1904; the site, a tract 167 acres in extent, was donated by the Commercial Club of Chicago. In 1911 the station, which then consisted of twenty-three buildings, was officially opened by President Taft. Up to January 1, 1917, the normal complement was 1,500 men; the course of training was such as is usually given apprentice seamen, and covered a period of from four to six months.

The entrance of America into the World War caused an extraordinary expansion of the station. By the summer of 1918 it had spread over 1,200 acres and comprised 775 buildings, nine of them immense drill halls, each capable of accommodating a regiment of 1,726 men. The total number of men in training at one time was nearly 50,000, and during the entire war period 121,000 were received. Of these, 86,779 were transferred to sea, while the special schools, fifteen in number, graduated 17,356. A Great Lakes Band organized by John Philip Sousa had a complement of 1,500 musicians. The Great Lakes Station was retained after the close of the war, and on a peace footing will continue to surpass all other naval stations in the United States.

NAVARRE, *na vahr'*, an independent kingdom of Old Spain, lying on both sides of the Western Pyrenees Mountains. The territory included within its boundaries constitutes at present the Spanish province of Navarre, sometimes called Upper Navarre, and a portion of the French department of Basses-Pyrenees, or Lower Navarre. Modern Navarre has an area of 4,055 square miles and a population of 318,310. The capital is Pamplona. Ferdinand the Catholic annexed Upper Navarre to Castile in 1512, while the northern portion passed with Henry IV to the crown of France.

NAVARRO, *na vah'ro*, Madame. See Anderson, Marie Antoinette.

NAVE, the middle or main division of a church interior, that part extending from the chancel to the entrance opposite. In Gothic architecture the nave is flanked by columns, and over it extend lofty arches, much higher than the ceiling over the side aisles. In churches that have an aisle crossing in front of the chancel, the nave is that part which extends from this aisle to the church rear.

NAVIGA'TION, the science of sailing vessels from one place to another; more especially the art of directing and measuring the course of ships and of determining their position by observation and computation. The direct management of the sails, the rudder, the engines and the working of the ship generally, though essential to navigation, is usually classed as seamanship. In order that a ship may be navigated successfully, it must not only be a perfect machine, but it must be supplied with accurate charts and plans of ports and harbors, with compasses, chronometer, sextant, log and the various mathematical instruments by which observations can be taken and computations made. It is by the compass that the direction which the ship sails or should sail is determined. Though the compass points in a northern direction, it does not always point to the true north, and its variation must be taken into account.

The rate of speed at which a vessel is sailing is found by the log, which is heaved usually at the end of every hour. The position of the ship may be obtained by noting the rate and direction of sailing and the distance which has been covered. But the more accurate way is by taking observation of the heavenly bodies with the sextant and comparing these with printed data, relying

upon the correct Greenwich time, which is given by the chronometer. The science of trigonometry is involved in navigation, but the operations can be much shortened by tables and instruments.

Related Articles. Consult the following titles for additional information:

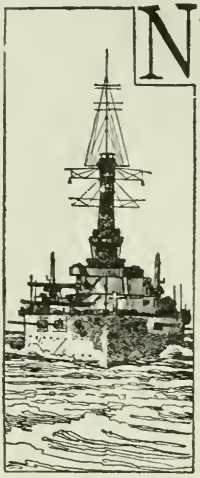
Chronometer	Declination
Compass	Log
Dead Reckoning	Sextant

NAVIGATION ACTS, a name given to acts passed by the British Parliament in 1645 and in years following in order to protect British commerce, to injure the shipping interests of the Dutch and to exploit the British colonies.

The First Navigation Act, passed in 1645, confirmed and enlarged in 1651 and again strengthened in 1660, enacted that all products of growth, production or manufacture from any country in the world should be imported into England only in ships built in England or in its colonies and manned by Englishmen. Another was passed in 1663; it levied prohibitive duties upon goods imported into the colonies from any but British ports and required that certain important products of the American colonies should be sent directly to England. A little later, duties were imposed upon goods shipped between colonies, if the same goods could be secured in England. Before the end of the century, acts directed at the suppression of colonial manufactures were passed, and in 1719 Parliament condemned all colonial manufactures as "tending to independence." Before 1761 at least twenty-nine separate acts in restraint of colonial trade and manufactures had been passed, including one prohibiting the importation of molasses and sugar, from which the Americans manufactured rum for export.

The full effect of this policy of suppression was never felt in America, owing to the practice of smuggling, which was considered by the colonists as legitimate, and which assumed immense proportions. Furthermore, many of the provisions of the acts were favorable to American industry, especially to shipbuilding, while certain privileges were extended to colonial producers which were denied to all others. However, the principle of restriction of trade and manufactures was vigorously denounced by the Americans, and the persistence of the British in this policy was one of the important causes of the Revolution.

Great Britain long ago abandoned such a policy towards its colonies; just before the World War (1914–1919) Germany, which insisted upon "freedom of the seas," was selling its goods in British ports all over the world cheaper than English merchants could sell them.



NAVY, an arm of government, an instrument of law and order, properly a policeman of the seas. The term is applied to all the ships of war of a nation, including their crews, guns and fittings. The world's conception of the uses of a navy has radically changed with the development of society. Once it was an institution devoted wholly to enforcing peace, but now it would be difficult to convince the average man that it is not wholly an implement of war. There are two reasons for the latter view. Men as a rule do not read history correctly, and they are apt to draw conclusions from offending examples and apply those conclusions to all.

There is a belief that the possession of a large and powerful navy is a temptation to use it aggressively, for conquest. This proved to be true of Germany when it planned the World War. On the other hand, the navy of Great Britain was much stronger in 1914 than any other two navies in the world (and it yet possesses that distinction), but since the English have learned from their failures the art of good government the British fleet has not been an instrument which right-thinking peoples have had cause to fear. The British have been masters of the seas for a hundred years, everybody admits; but there is no record in all that time of abuse of the power thus held. England has believed in and has practiced free trade; but ships of all countries have swarmed in harbors owned by Great Britain, and there has been no limit upon peaceful development of commerce by competing nations. Even Germany, which plaintively cried for "a place in the sun" for years before the World War, was all the time underselling British merchants in British lands all over the world.

The Legitimate Demand for Navies. Commercial nations in early days suffered from depredations of piratical crews which sailed the seas to rob merchantmen, wherever found. It became necessary to send vessels armed with guns to protest merchant vessels from such robbers. Here navies had their beginning; they were built to preserve the peace and to make the seas safe for legitimate commerce. As shipping increased in volume the number of protecting vessels increased. In time national ambitions led to strengthening these protecting vessels, and ships with many guns appeared. With this development of strong sea forces navies became important elements in war, and no war was projected without due consideration of the assistance which could be rendered by them.

When the *Monitor and Merrimac* battle in 1862 developed the iron-clad vessel, the serious business of building modern competitive navies was begun, though the pirates of old had disappeared from the seas, and commerce-laden vessels found the ocean lanes everywhere safe. The theory persisted that were war vessels to disappear the highwaymen of the seas might reappear, and there is truth in the assertion, even to-day, but precaution in that respect has not been the moving impulse in naval development. It has been due to national distrust, in the main, although self-protection has also been a motive. Since naval vessels have become so important a part of modern warfare, the great nations have considered it necessary to build navies large enough to maintain their interests on the seas against all the powers of a possible adversary.

How Power Was Divided. The greatest maritime nation is Great Britain; theoretically, therefore, that empire should have the world's largest navy, and such it actually has. Britain's responsibilities in keeping watch over its own extend to the remotest corners of the seven seas. Abandonment of a navy which keeps a clear road between London and the antipodes would be fatal to the life of the empire. Germany created its great navy after William II became emperor. Bismarck did not believe his country needed colonies, and therefore saw slight need of heavy sea fighters. William II began to acquire colonies, and he knew that he came into the colonial field so late that he might have to fight for strong colonial outposts. After over twenty years of rapid construction the German Empire boasted the second navy in the world, in point of strength. France, desiring nothing but to live in peace with its neighbors, possessed a navy in 1914 inferior to that of Germany, but powerful enough for its needs. The United States, the richest nation, but without a merchant marine, was fourth in naval strength.

Naval Strength in 1914. Up to the day on which the World War began the sea strength of all nations was known; thereafter naval programs could only be conjectured. On August 2, 1914, the relative strength of navies was as follows, in ships of 1,500 tons or more, either in commission or nearing completion, and in torpedo boats and submarines of more than fifty tons:

COUNTRY	SHIPS	TONNAGE
Great Britain	545	2,714,106
Germany	304	1,306,577
France	368	899,915
United States	187	894,889
Japan	145	699,916
Russia	241	678,818
Italy	183	497,815
Austria-Hungary	124	347,508

In 1919 it was known that Great Britain had added over 300 vessels of all sizes to its navy during the four years of war, and that in 1916 the United States had increased its number of vessels to 356, by commandeering large private yachts and by building new vessels.

Great Britain had maintained its supremacy; the United States had advanced to second place, and Germany had surrendered its great navy without a determining test of valor. From second place German sea power fell in a day to a place low on the list, for over seventy war vessels were delivered to the allies, including all its largest and most modern craft.

Kinds of War Vessels. Following is a brief statement of the principal classes of warships, the names given being those popularly applied to each class:

Superdreadnaught, the largest warship built, slightly heavier and more powerful than the dreadnaught. It is likely to have 14-inch guns.

Dreadnaught (meaning a fearless person) was the most powerful battleship until the advent of the superdreadnaught. Vessels of these two classes are over 500 feet long and have a displacement of at least 26,000 to 30,000 tons. Their guns are of the heaviest caliber (not less than 14 inches) and the longest range—over twenty miles.

First-Class Battleships, a division which of course includes the two superclasses. These vessels have a displacement above 15,000 tons, with armor as heavy as the dreadnaughts and guns whose range varies from twelve to twenty miles. These vessels are slow in movement, for their best speed is from eighteen to twenty-two miles per hour, but they are powerful in action. The caliber of the guns is 8 and 10 inches.

Armored Cruisers, speedier than battleships, in many instances as large, and frequently as heavily armed. The displacement is from 9,000 to 14,000 tons; their speed, not far from twenty-five miles per hour. Their armor is heavy. The caliber of the guns is usually 10, 8 and 6 inches, but larger guns are in prospect.

Protected Cruisers, vessels with light armor plate, in length from 300 to 400 feet, and with a displacement of 3,200 to 8,000 or 9,000 tons. Their speed is nearly that of the armored cruisers. Calibers of guns is 8, 6 and 5 inches.

Other Vessels. Boats of lesser value are unprotected cruisers, scout cruisers, torpedo boat destroyers (with speeds as great as thirty-five miles per hour), torpedo boats, submarines and gunboats.

In the United States. The greatest vessels of the United States navy are the superdreadnaughts *Pennsylvania, Arizona* and *Mississippi,* 31,500 and 32,000 tons, completed in 1916, 1917 and 1918. The *Tennessee, Idaho, New Mexico* and *California* will be sister ships of the above. An ambitious building program was inaugurated after the war began in Europe which would have assured for the country second place in naval strength even had Germany kept its fleet intact. That building plan contemplated a navy with five battleships of 32,000 tons, with twelve 14-inch guns each, and a speed of twenty-five miles an hour; four battleships of 32,600 tons, with eight 16-inch guns, and the same speed; four battleships of 42,600 tons (larger than England's mightiest), with twelve 16-inch guns, and a speed of twenty-six miles per hour; five battle cruisers of 34,800 tons, with ten 14-inch guns and a speed of forty miles an hour; six fast scout cruisers (forty miles an hour), 300 destroyers, 100 submarines, 345 submarine chasers, fifty-nine sweepers, and one ammunition ship.

The President of the United States is the commander in chief of the navy; he acts through the Secretary of the Navy.

The American navy has always upheld the highest traditions of the seas. President McKinley once said, "We need a *larger* navy; we could not well have a *better* one." Since 1917 the larger navy seems assured. At Great Lakes, Ill., thirty-five miles north of Chicago, the largest naval training station in the world has been established, capable of housing 40,000 future seamen at one time. It is not a school for the training of officers; that remains the task of the Naval Academy at Annapolis. The entire cost of the construction programs which will keep the United States navy second only to that of Great Britain will be at least $1,250,000,000.

Related Articles. Consult the following titles for additional information:

Admiral	Privateer
Blockade	Rank in Army and Navy
Gunboat	Submarine
Marine Corps	Submarine Mine
Naval Academy	Torpedo
Naval Militia	Torpedo Boat
Naval Reserve	Warship
Navy, Department of the	World War

NAVY, Department of the, one of the executive departments of all maritime nations. In the United States the office is in direct charge of the Secretary of the Navy a member of the Cabinet of the President and responsible to that official, who is commander in chief of the navy. The Secretary performs such duties as the President assigns to him, and has general supervision of construction, manning, armament, equipment and employment of vessels. The salary of the Secretary is $12,000 per year. See Cabinet.

NAZARENE, a resident of Nazareth, a town in Galilee where Joseph and Mary lived and where Jesus was brought up.. In the new testament any adherent of the religion founded by Jesus of Nazareth was called a Nazarene. The name is also applied to a sect which arose at the end of the fifth century and existed chiefly in Egypt.

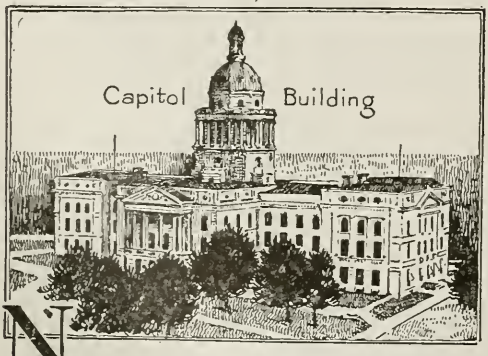
NAZ'ARETH, a small town in Palestine about seventeen miles southeast of Acre, famous as the residence of Jesus during the greater part of his life on earth. It is beautifully situated among hills dotted with fig trees, olive trees and cypresses. The houses, flat-roofed, are built mostly of limestone. The convent of the Annunciation, built by the Franciscans in 1620, is said to mark the site of Mary's dwelling, but the only incontestably unchanged and identifiable Biblical site is the Virgin's Spring. The population, made up of Moslems, Orthodox Greeks, United Greeks, Catholics, Maronites and Protestants, numbers about 11,000.

NAZIMOVA, *na ze'mo vah,* Alla (1879–), a Russian actress who has taken a distinguished place on the modern stage in the

portrayal of emotional rôles. She was born at Yalta, in the Crimea. Her first professional appearance occurred in London, in 1905, where she won praise for her excellent work in a Russian play, *The Chosen People.* A year later, having acquired a knowledge of English, she successfully acted the part of Nora in Ibsen's *A Doll's House,* before a New York audience. She appeared also in *Hedda Gabler, Little Eyolf* and *The Master Builder,* and in these established herself with the American public as one of the great emotional actresses of the day. Of more recent date are her appearances in *War Brides,* a one-act tragedy based on the World War, and *'Ception Shoals,* a morbid but intensely dramatic play which was picturized as *Out of the Fog.* Nazimova gained an enthusiastic and even larger audience by entering the moving-picture field, in which she speedily won new laurels through her superb acting. Her husband, Charles Bryant, has appeared with her in pictures.

NAZIMOVA

NE'BO, Mount, a mountain of Palestine, situated east of the Dead Sea near its northern end. It was from the summit of this mountain that Moses viewed the Promised Land of Canaan. (*Deut.* XXXII, 49; XXXIV, 1). The mountain has been identified with the present Neba, and it probably took its name from a sanctuary of the god Nebo, a deity of the Babylonians and Assyrians. The altitude is 2,643 feet.



NEBRAS'KA, geographically one of the central states of the American Union. It is popularly called the Tree-Planters' State, because J. Sterling Morton, a Nebraskan and former United States Secretary of Agriculture, inaugurated Arbor Day to supply trees to the state's barren prairies; its observance was soon adopted by the nation.

Kansas, south of Nebraska, is in the exact geographical center of the United States; South Dakota and the Missouri River are on the north; the same river extends entirely along the eastern boundary, separating the state from Iowa and Missouri; Colorado and Wyoming are on the west. The area of Nebraska is 77,520 square miles making it fifteenth among the states in size. The state flower is the goldenrod.

Population. It was twenty-ninth in population in 1910, having then 1,192,214 people. In 1918 the Federal government estimated the population to be 1,296,877. There were in 1910 seven cities each with a population exceeding 8,000. The third in size, South Omaha, was annexed to Omaha in 1915. Lincoln (46,957 in 1917), second in size, is the state capital; Omaha (177,777 in 1917), is the largest city. No other city in 1917 had 15,000 people. Those next in size, in order, are Grand Island, Hastings, Beatrice and Fremont. Nebraska's most famous citizens have been J. Sterling Morton and William Jennings Bryan.

Surface and Drainage. Nebraska forms a section of the eastern slope of the great plains, and rises, at an average of about ten feet to the mile, from an elevation of 850 feet, at the southeastern corner, to more than 5,000 feet, on the western boundary, where the foothills of the Rocky Mountains begin. The highest point in the state is Hogback Mountain, 5,084 feet, in Banner County, which adjoins Colorado; the average elevation is about 2,500 feet. The surface is rolling prairie, through which rivers have worn wide channels. Along the Missouri and the North Platte are numerous high bluffs, and in the northwestern corner is found a section of the Bad Lands, which occupy a larger area in South Dakota. These lands consist of bluffs that have been fantastically worn by wind and water into many curious and interesting shapes. They constitute one of the richest fossil regions of the world.

The state is drained directly or indirectly into the Missouri. A height of land, extending irregularly from the eastern to the western boundary through the northern tier of counties, separates the streams that flow into

the Missouri to the north from those that flow into the Platte. The Niobrara, flowing eastward along the northern part of the state, with its short, spring-fed tributaries, forms one of the most picturesque regions of the continent; there are in its basin near Valentine fifteen beautiful waterfalls, the highest of which are the Arikaree and the Pary, each with a precipice of ninety feet.

The Platte, formed by the North Platte, which enters the state near the middle point of the western boundary, and the South Platte, which enters it from Colorado, flows across the southern and central parts to the Missouri. Its principal tributary from the north is the Loup, which receives the South Fork Loup, the Middle Loup and the North Fork Loup and drains a large portion of the central and southern part. The Elkhorn enters the Platte from the north, a few miles before it reaches the Missouri. The Republican River flows through the southern tier of counties, from west to east, about three-fourths of the distance across the state, and then enters Kansas; the southeastern counties are drained by the two Nemahas and their tributaries, flowing into the Missouri. A number of lakes are found in Holt, Brown and Cherry counties.

Climate. The climate is warm-temperate, and is characterized by sudden changes common to inland regions. On the whole it is agreeable, exhilarating and healthful. The atmosphere is dry, and gentle winds prevail. The mean temperature is about 21° for January, and 74° for July, but the thermometer sometimes falls in winter as low as 25° below zero and rises as high as 100° during the hottest months. The nights, however, are cool, and because of the dryness of the atmosphere the extremes of heat and cold are not felt as they are in a humid climate.

The rainfall averages about twenty-four inches, being over thirty inches in the eastern part and from fifteen to twenty inches in the western counties. In respect to rainfall, the state is divided into three regions: the eastern, which receives an abundance of rain; the central, receiving usually enough for agriculture, and the western, which is semiarid and requires irrigation.

Mineral Resources. The minerals are few, but the output is worth about $1,500,000 per year. Building stone is found in most parts of the state, there being about 200 limestone quarries in operation; a high-grade cement rock is generally distributed. The brick and tile industry is important, for there are many valuable clay deposits. In the south central counties there are also deposits of ocher, and most of America's pumice stone is found in the state. Nebraska now produces about one-third of the potash of America, and this comes from the waters of lakes in the sandhills portion of the state.

Agriculture. With the exception of limited areas in the northwestern and western portions, the entire state is covered with good soil, consisting of loam mixed with sand, underlaid by a porous layer of sand or gravel. Corn is the leading crop, and occupies nearly one-half of the acreage under cultivation; the value of the crop in recent years has been close to $100,000,000. This is followed, in order of their importance, by wheat, oats and alfalfa. Among the states Nebraska is fourth in wheat, fifth in corn and forage crops and seventh in oats. Sugar beets are raised in large quantities, and Nebraska is one of the important states in the production of beet sugar. Stock raising is practiced throughout the state, though it receives relatively greater attention in the western part, where the natural grasses mature and support live stock through the winter with little or no additional feed. Large numbers of horses and mules are raised for market, and cattle, hogs and sheep are fattened for slaughter. Dairy husbandry also is an important branch of agriculture.

Manufactures. Nebraska is not a manufacturing state, though certain industries have received considerable attention. Chief among these is slaughtering and meat packing, the center of which is at Omaha, which is the third city in importance in this industry in the Union. The second manufacturing industry of importance is the making of flour and other grist mill products. Large quantities of starch are made, and there are numerous factories for canning fruits and vegetables and for the manufacture of beet sugar. The making of butter and cheese also receives considerable attention.

Transportation and Commerce. The state is well provided with railroad transportation facilities. Three important railroads—the Chicago & North Western, the Chicago, Burlington & Quincy and the Union Pacific—cross the state from east to west.

Items of Interest on Nebraska

The valleys of the great streams are huge shallow troughs: the valley of the North Platte in the foothills, once the flood-plain of a large river, is in places 700 feet below the table-land and ten to fifteen miles wide; the present flood-plain is one to four miles wide.

The Missouri is noteworthy for the high bluffs, cut by ravines, which border it almost continuously on one side.

Many springs of considerable size are found in the foothills; artesian wells and a practically inexhaustible supply of ground water are found in nearly all parts of the state.

The Bad Lands are famous fossil fields.

Nebraska has fully 3,300 species of trees, shrubs and grasses, "representing every branch and nearly every class of the vegetable kingdom."

Arbor Day, now observed in nearly all states, was first celebrated in Nebraska in 1874.

There are about 15,000 species of insects and over 400 species of birds in the state.

Nebraska is one of the foremost winter wheat states, being second only to Kansas.

The state ranks very high in dairy products, eggs and poultry.

Nearly two-fifths of the total net income from farm products comes from live stock and forage.

Apples, peaches and other fruits are raised with great success: there are about 8,000,000 fruit trees in the state.

Irrigation projects of great extent and importance are being carried out in the western part; the irrigation canals aggregate about 3,000 miles.

Meat-packing employs nearly one-fourth of the wage earners and yields one-half of the total value of products.

The first creamery in Nebraska was established in 1881; a creamery at Lincoln is said to be the largest in the world.

Of manufactures not dependent on agriculture, the most promising is that of brick and tile products, but printing and publishing is the largest.

The mineral resources of the state are limited; three-fifths is clay products, one-fifth of stone, and the remainder of sand and gravel.

Coal is found only in thin seams which are not easily accessible, and can never be of more than local importance.

Nebraska has a lower proportion of illiteracy than any other state except Iowa.

Questions on Nebraska

What are the main physical divisions of Nebraska?

What is the characteristic form of the valleys of the great rivers?

Name five of the important rivers.

What day, now observed in nearly all states, was first observed in Nebraska?

What can you say of the variety of vegetation?

How does the state rank in value of farm products?

What is the most important crop? What part of the total crop value does it represent?

Name the four leading manufacturing industries?

Of what mineral has Nebraska practically a monopoly?

What are the most important manufactures of Omaha? What per cent of the entire product of the state is furnished by Omaha?

What two achievements of J. Sterling Morton, Nebraskan, entitled him to fame?

How much higher is the western part of the state than the eastern?

Who is the most famous man that the state has claimed as its "son?" Can you name four outstanding facts about his career?

What state most nearly equals Nebraska in size?

How many state normal schools are there? Where are they located? In what city is the state university?

What reason can you advance for a constitutional limit of twenty days for the introduction of bills at each session of the legislature?

In all, the state has about 8,325 miles of railways (1918), and there are over 250 miles of electric lines. The Missouri is navigable, but the construction of railways has rendered it of little use as a waterway.

Education. The percentage of illiteracy is extremely low. The school fund is obtained from the interest on the money provided by the sales of public lands, from a state tax, from fines, from forfeitures and from local tax. The state university and agricultural college at Lincoln is at the head of the school system. There are four state normal schools, at Peru, Kearney, Wayne and Chadron. Besides these, there are a number of important colleges and secondary schools supported by various denominations. Among them are the following:

Bellevue College, Bellevue.
Cotner University, Bethany.
Crieghton University, Omaha.
Doane College, Crete.
Grand Island College, Grand Island.
Hastings College, Hastings.
Nebraska Wesleyan University, University Place.
Union College, College View.
York College, York.

Institutions. Since 1912 the state institutions have been in charge of State Board of Control. The school for the deaf and dumb is at Omaha, that for the blind is at Nebraska City, and the institute for the feebleminded is at Beatrice. The asylums for the insane are at Lincoln, Norfolk and Hastings. There are sailors' and soldiers' home at Grand Island and Milford; a hospital for crippled and deformed children is at Lincoln. The penal institutions consist of a state industrial school for boys at Kearney, a girls' industrial school at Geneva, an industrial home for girls at Milford and a state penitentiary at Lincoln.

Government. The legislature consists of a senate of thirty-three members and a house of representatives of one hundred members, each elected for two years. The legislature meets biennially, and the session is practically limited to sixty days; after the first twenty days no new bills may be introduced, unless by request of the governor in a special message. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer, superintendent of public instruction, attorney-general and commissioner of public lands and buildings, each elected for two years. The judicial department embraces a supreme court, district courts and county courts. The supreme court comprises seven judges, elected by popular vote for six years. Each county has a county judge, whose term is two years.

History. Nebraska was probably visited by Coronado as early as 1541. In 1673 the Platte and Missouri districts were mapped out by Marquette. The present state formed a part of the Louisiana Purchase of 1803, and in 1804–1805 it was visited by Lewis and Clark. As early as 1825 white settlement was begun, the first towns being founded at Omaha and Nebraska City. After a long struggle, in which slavery played an important part (see KANSAS-NEBRASKA BILL), Nebraska was established as a territory in 1854, including parts of Dakota, Montana, Wyoming and Colorado. In 1863 it was reduced to its present limits.

Nebraska became the thirty-seventh state on March 1, 1867, and Lincoln was made the capital in the same year. The struggle for statehood was prolonged by differences between President Johnson and Congress over the state constitution. At the close of the Civil War negro suffrage was a prominent question and this entered into the Nebraska constitution. The 11th Territorial Legislature submitted a constitution to the people, and though it restricted the suffrage to white men, it was approved by the voters by a very small majority. The bill admitting the territory, which passed Congress in 1866, was vetoed by the President, but the next year a similar bill was passed over his veto. Progressive legislation has been marked during the last few years. Cities of more than 5,000 people are empowered to frame their own charters, and all cities are permitted to employ city managers; aliens who have declared their intention to become citizens are allowed to vote: the state became prohibition territory in 1916, in advance of national action; women may vote at all elections. A third constitutional convention will meet in 1920.

Related Articles. Consult the following titles for additional information:

CITIES

Beatrice
Fremont
Grand Island
Hastings
Lincoln
Omaha

GENERAL

Arbor Day
Bryan, William Jennings
Kansas-Nebraska Bill
Louisiana Purchase
Missouri River
Morton, J. Sterling
Platte River
Potash

NEBRASKA, University of, a coeducational state university, founded at Lincoln in 1869 and opened in 1871. It comprises a graduate school, a college of literature, science and arts, an industrial college (including schools of agriculture, mechanical arts and domestic science), a school of fine arts, a school of music, colleges of law and of medicine and a summer school. The university equipment includes a 320-acre farm and libraries containing 132,000 bound volumes, and the institution has supervision over experiment stations at Valentine, North Platte, Scotts Bluff and Culbertson. In normal years the student enrollment is about 4,800, and there is a faculty of about 370.

NEBUCHADNEZZAR, *neb u kad nez'zur,* king of Babylon from 605 to 561 B. C., was the son of Nabopolassar. He checked an Egyptian invasion under Necho in 605, drove the invaders back into Egypt and subjugated the intervening region, Syria and Palestine, carrying to Babylon the sacred vessels of the Temple of Jerusalem and the chief Jews into captivity. When these countries revolted in 586 he returned, destroyed Jerusalem and carried 4,000 Jews into captivity. Near the end of his reign he invaded Egypt. During the peaceful years of his rule he rebuilt in a magnificent manner Babylon and many of the other cities of his empire, and constructed vast temples, aqueducts and palaces. Several inscriptions relating to his reign have been found recently.

NEB'ULA, in astronomy, one of the luminous cloudlike masses visible on very clear nights. About ten thousand are known. The spectroscope has shown that, while a large number of nebulae are composed of star clusters, others are made up either wholly or in part of masses of incandescent gas. Two of the nebulae are visible without a telescope, one in the constellation of Orion, the other in Andromeda. The latter which is the smaller, consists of an oval mass surrounded with several broken oval rings. The Orion nebula is more irregular in shape and contains a number of stars. Both nebulae are of gigantic size; according to the latest theories each is a universe in process of forming out of the plastic substance and gaseous material composing it.

NEB'ULAR HYPOTH'ESIS, a famous theory advanced by Kant and Laplace and developed by Sir William Herschel, which attempts to explain the movements and relations of the celestial bodies. According to this hypothesis, the material composing the solar system was originally a rotating and revolving mass of intensely-hot gaseous matter, that, owing to the action of gravity, gradually assumed a spherical form. As the mass cooled and contracted its outermost parts became separated from the main mass and were swept by gravity into a sort of equatorial ring. This ring, continuing the motion of the parent mass, in time was broken and untimately the matter composing it was gathered into a revolving and rotating sphere. As the central mass kept on cooling, other rings were successively thrown off, and in time the solar system was evolved. The nebular hypothesis has been superseded by the planetesimal hypothesis (see Geology, subhead *Planetesimal Hypothesis*).

NECKER, *na kair',* Jacques (1732–1804), a French statesman and financier. At the age of eighteen he became a clerk in a Paris banking house, and in course of time accumulated a large fortune as a banker. In 1777 he was made director-general of finances. Official corruption under the preceding reign had caused a large deficit, to which the American war made great additions. Necker endeavored to meet the exigency by loans and reforms, and above all, to fund the French debt and establish annuities under the guarantee of the State. His suppression of abuses made enemies at court, and he resigned and retired to Switzerland. The errors of Calonne, his successor, as minister of finance, occasioned Necker's recall, in 1788. In 1789 the advisers of the king succeeded in inducing him to dismiss and banish Necker. No sooner was his removal known than all Paris was in a ferment. The Bastille was stormed, and the king found himself compelled to recall the banished minister. Necker's first object was to restore peace and secure safety of person and property. But he was not equal to the political, or even the financial, crisis, and he resigned in September, 1790. Necker's daughter was the famous Madame de Staël.

NECROMANCY, *nek'ro man si,* sometimes called the Black Art, is a form of divination in which the dead are supposed to answer questions concerning the future. Necromancy originated in the East and is one of the most ancient superstitions. It was practiced by the Greeks, and the works of Homer and other early Greek writers contain frequent

references to it. It is also mentioned in the Old Testament, where it is severely censured. Necromancy was practiced by the nations of northern Europe during the Middle Ages, and later it was united with sorcery. See SPIRITUALISM.

NE'CROPOLIS, among the ancients, a cemetery in the vicinity of a city, particularly that of Alexandria. In Egypt the burying grounds were sometimes of vast extent. The necropolis at Thebes extended for miles along the west bank of the Nile. The necropolis at Ghizeh, dominated by the Pyramids, was another extensive cemetery of the ancient Egyptians.

NECTAR, *nek'tur,* in Greek mythology, the drink of the gods, one of the means by which they retained their eternal youth. See AMBROSIA.

NECTARINE, *nek'tur in,* a species of peach having a smooth skin and firm pulp. See PEACH.

NEEDLE, a small instrument of steel, pointed at one end and having, at the other, an eye, or hole, through which is passed a thread for sewing. The earliest needles were made of bone, ivory, wood and bronze. The first steel needles were made in Nuremberg, in the latter part of the fourteenth century, and until the last half of the nineteenth century needles were made almost wholly by hand.

The principal steps in making needles are the following: The wire, which comes to the manufacturer in coils, is cut into pieces of the length of two needles, called *blanks.* The blanks are then straightened by being rolled on a stone or iron table, after which they are pointed by being fastened to a rubber band, so arranged as to give them a rolling motion while the ends are brought against a rapidly revolving grindstone. From fifty to sixty needles can be pointed at once. After the pointing, the blanks pass to a machine which slightly flattens them in the middle and marks the places for the eyes. A second machine punches the eyes, and the needles, still joined in pairs, are then strung on two wires. They are then cut apart between the eyes, and each wire has a row of needles strung on it. The heads and eyes are then finished, and the needles are tempered, polished, sorted and placed in packages for the market. Notwithstanding all the complicated machinery used in this manufacture a needle passes through the hands of seventy workmen before the process is completed. England is the leading country in the manufacture of needles, and those of the best quality are made there. Most of the needles used in the United States are of English make.

Needles for knitting, crocheting, jacquard loom weaving, sewing machines and various other purposes have their size and form adapted to the use for which they are constructed.

NEGAU'NEE, MICH., in Marquette County, three miles east of Ishpeming, on the Chicago & North Western, the Duluth, South Shore & Atlantic and the Lake Superior & Ishpeming railroads. It is in the vast iron-producing region, on a high ridge known as Iron Mountain; the first iron ore in the region was discovered here. Iron mining and shipping is the principal industry, and lumbering is also carried on. The place was settled in 1870, and was incorporated three years later. Population, in 1910, 8,460; in 1917, 9,571 (Federal estimate).

NEGLIGENCE, *neg'li jens,* in law, the omission to do that which ought to be done. When such want of care results in injury to another or when it involves a wrong done to society, it renders the guilty party liable either to an action for damages or to trial for misdemeanor. In law there are recognized three degrees of negligence; *ordinary,* the want of ordinary care or diligence; *slight,* the want of slight care or diligence, and *gross,* the want of unusual care or expected diligence.

NEGOTIABLE, *ne go'she a b'l,* **PAPER**, written contracts which can be transferred. A distinction is made between *negotiable* instruments and *assignable* instruments. The former are enforceable by the transferee in his own right, without the risk of being met by any defense that would have held good against the transferrer. The latter gives to the transferee only such rights as the transferrer held. The most common forms of negotiable instruments are bills of exchange, promissory notes and checks, the common characteristic of these instruments being that they are security for, and are representative of, money. However, these instruments are negotiable only when payable to the order of a certain person or to bearer, or when endorsed by the person to whom they are payable. See PROMISSORY NOTE.

NEGRITOS, *na gre'toze*, the name given to several groups of negrolike peoples—the Micopies, Sakai, Aetas, and Tapiro—found in the Andaman Islands, certain of the Philippine Islands, the Malay Peninsula and the interior of New Guinea. The nose is small, flattened or turned up at the tip, and the hair is soft and frizzled. The various tribes speak distinct and mutually unintelligible dialects.

NEGRO, the general name for a division of the human race whose chief characteristics are a dark skin, woolly or kinky hair, flat nose, thick lips and long skull. The original home of the negro is the region in Africa from the Sudan to the Tropic of Capricorn. The Sudanese negroes are considered the best representatives of the group; another important type is the Bantu stock of Central and South Africa. The Bantu group includes such well-known tribes as the Basutos, Bechuanas and Zulus. In the East Indies, New Guinea, Melanesia (the islands east of Australia) and Madagascar there are certain negroid tribes resembling negroes chiefly in color of skin, but authorities for the most part do not classify them as true negroes. The same is true of the dwarf negroid tribes of Africa and the Pacific islands. The negroes of the Americas are chiefly of West African descent.

Negroes as a race are more emotional than white peoples, but authorities are not agreed on the prevalent idea that they represent a lower intellectual type. In the United States the rapidity with which they became civilized has often been contrasted with the aloofness of the Indian, whose tribal instincts were uprooted with difficulty.

Education of the American Negro. Since the close of the Civil War systematic efforts have been made to give the freed slaves and their descendants an education. Through the agency of institutions like the Hampton and Tuskegee institutes thousands of young men and women of the colored race have become self-supporting American citizens. In the field of elementary education there is much to be done. In 1917 the United States Bureau of Education issued a report on the subject, in which it was stated that there was a pressing need for increased public school facilities for negroes, and an equally pressing need for competent teachers. Improved conditions are expected from this realization of the situation.

Related Articles. Consult the following titles for additional information:
Fisk University
Hampton Normal and Agricultural Institute
Peabody Educational Fund
Slater Fund
Tuskegee Normal and Industrial Institute
Washington, Booker T.

NEGRO RACE, or BLACK RACE. See Races of Men.

NEGUS, the title of the king of Abyssinia. This ruler's full title is *negus negusti*, meaning *king of kings*.

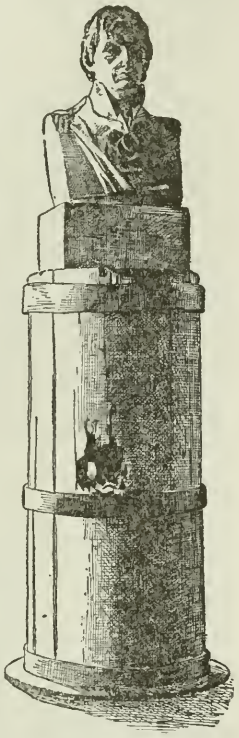
NEHEMIAH, a distinguished and pious Jew, born in captivity, who was made the cup-bearer of Artaxerxes, king of Persia. He was sent (445 B. C.) as governor to Jerusalem, with a commission to rebuild the walls of that city, thus protecting it from attack. He did much to promote the city's prosperity and instituted many reforms. He went to Jerusalem again in 433, this time for the purpose of enforcing certain Jewish observances and of abolishing certain abuses among the Jewish people. The book of *Nehemiah* is an account of his activities.

NEIGHBORHOOD CENTER. See Community Center.

NELSON, B. C., on the Kootenay River, twenty miles west of Kootenay Lake. It is on the Canadian Pacific and the Great Northern railroads, is the center of the mining industry of the region and produces silver, gold, coal, lead, copper and zinc. Population, 1911, 4,476.

NELSON, Horatio, Viscount (1758–1805), the most celebrated of English admirals. At the age of twelve he entered the navy as a midshipman, and was rapidly promoted. On the outbreak of the war with the French Republic he was made commander of the *Agamemnon*, a vessel of sixty-four guns, and assigned to the Mediterranean. He assisted at the siege of Bastia and at Calvi, losing his right eye in the latter engagement. For his brilliant maneuvers at the Battle of Cape Saint Vincent he was made rear-admiral and was assigned to the task of bringing troops from Elba. He next attacked the town of Santa Cruz, on the island of Teneriffe, but was unsuccessful. In 1798 he was sent to the Mediterranean; he followed Napoleon to Egypt, and in the Battle of Aboukir Bay destroyed the French fleet. For disobedience to orders sent to him in July, 1799, Nelson was recalled, but in 1801 he was employed on the expedition to Copenhagen, in which he effected the destruction of the Danish ships and batteries.

The great period of Nelson's life begins in 1798 with his activities in the Mediterranean in connection with Napoleon's Egyptian expedition. His brilliant victory over the French fleet in the battle of the Nile meant the failure of that expedition, since it cut Napoleon off from his base of supplies.



HORATIO NELSON
and part of the flagstaff of the Victory, in London.

When hostilities with France were renewed in 1803, Nelson, aboard the flagship *Victory* and as commander in chief of the fleet, again was active in the Mediterranean. When the French fleet, after a two-years' blockade, slipped out of the harbor of Toulon, Nelson started in pursuit and engaged it in the conflict known as the battle of Trafalgar. Although the enemy had been joined by the Spanish squadron, he won the victory—the greatest victory of his life, and his last, since he was mortally wounded—in the greatest naval combat of the age. It was during this engagement that Nelson displayed to his fleet the famous flag signal, "England expects every man to do his duty."

Nelson, although frail of body, possessed an indomitable spirit; and this, together with his quick comprehension and masterful and prompt action, gave him the first place among English naval heroes. His body is interred in Saint Paul's Cathedral, London.

NELSON RIVER, a river of Canada, the most important stream in Manitoba. It issues from Lake Winnipeg and after a winding course of about 400 miles falls into Hudson Bay. Numerous rapids and falls retard navigation, but the river is navigable for steamboats for about eighty miles from its mouth.

NELUM'BO, a large family of water plants, resembling water lilies, found in Northern Africa and in warm regions of Asia and of North America. The distinguishing feature of the plant is a gorgeous blossom, with crisp, satiny petals, characteristic of lilies, and a thick circular fringe of yellow stamens surrounding a large seed receptacle. One species with rose-colored flowers, the sacred lotus of the Hindus and people of Tibet, has been cultivated since remote times in China and Egypt, where the

NELUMBO
Showing seeds and enlarged receptacle

roots, stalks and seeds are used as food. A North American species, with yellow flowers, grows as far north as Ontario. It is commonly called *water chinquapin,* but the favored name is *lotus,* or yellow water lily. This plant grows abundantly in five localities in the United States, notably near Grass Lake, Illinois, where there is a thickly-crowded bed covering 600 acres. When the flowers are in full blossom they present a beautiful appearance.

NEMEAN, *ne'me an,* **GAMES**, one of the four great national festivals of the ancient Greeks, so called from Nemea, a valley in the Peloponnesus where the games were celebrated in midsummer, every two years. The games consisted of the usual athletic contests. Eleven of Pindar's odes are in celebration of victors at the Nemean games.

NEM'ESIS, in classical mythology, the goddess of fate, who apportions to men what they deserve. In Homer she is a sort of personification of divine justice.

NEOCENE, *ne'o seen,* **EPOCH**, a term used by the United States Geological Survey to designate a period in the middle of the Cenozoic Era. It corresponds to the Miocene and Pliocene epochs of European geologists. See GEOLOGY; TERTIARY PERIOD.

NEPAL, *ne pawl',* a small kingdom in the Himalaya Mountains, entirely independent in the conduct of its internal affairs but recognizing British management in all its foreign relations. A British Resident is the only outward evidence of the empire's influence. Such an official has been accredited to the country since 1815; he concerns himself only with British interests.

Nepal lies between Tibet and British India. Its greatest length is 500 miles; its greatest width, 150 miles; the area is about 54,000 square miles, about that of the state of Arkansas. The mountainous regions are cold, but the lowlands in the south are hot. The ruling classes, called Gurkhas, a Rajput race, have done but little to develop the mining of iron, copper, lead and coal which abound in parts of the kingdom.

The population is estimated at 5,000,000. The capital is Khatmandu (population, 50,000).

NEPHRITE, *nef'rite*, a compact variety of amphibole, ranging in color from white to dark green. Numerous carved ornaments made from this mineral, chiefly in Chinese and Mexican collections, are known as *jade*. It was formerly believed that a piece of nephrite worn or carried on the person would cure kidney diseases, hence the name, derived from a Greek word meaning *kidney*.

NEPHRITIS, *ne frī'tis*, the term applied to any disease arising from inflammation of the kidneys. Bright's disease, one of the most serious of kidney disorders, is described in alphabetical order under that heading. Any disturbance of the kidneys should be carefully diagnosed by a competent physician, as interference with the proper working of these organs is liable to affect other vital organs. See KIDNEYS.

NEP'IGON. See NIPIGON.

NEP'ISSING. See NIPISSING.

NE'POS, CORNELIUS, a Roman author of the first century B. C., the contemporary of Cicero and Catullus. The only extant work attributed to him is a collection of short biographies. These biographies contain many errors, but supply information not obtainable elsewhere.

NEP'TUNE, in classical mythology, the god of the sea, known to the Greeks as Poseidon. He was a son of Saturn and Rhea and a brother of Jupiter and Pluto and was regarded as inferior in power to Jupiter only. Neptune was not entirely satisfied with his share of the universe and attempted at one time to take Jupiter's kingdom from him, in punishment for which attempt Jupiter condemned him to serve for a time Laomedon, king of Troy. Laomedon set him to build the walls of the city, and in this he was assisted by Apollo. The treacherous Trojan king, however, refused to pay to the gods the rewards which he had promised, and Neptune, to punish him, created a great sea monster, to which a beautiful girl was sacrificed each year. This punishment continued until the monster was finally killed by Hercules.

Neptune also attempted to acquire the supreme power over the city of Athens, and for this purpose he entered into a contest with Minerva, agreeing that the city should be named for the one who created the most useful gift. Minerva created the olive tree, and this was regarded as of greater benefit to mankind than the horse, Neptune's gift, and the city was accordingly named *Athens*, from Minerva's Greek name, Athene. Neptune was represented as a man of middle age, somewhat resembling Jupiter, but with less of dignity and kindliness in his aspect. He rode about over the surface of the sea in a chariot drawn by sea horses, and waves were stilled at his approach.

NEP'TUNE, the eighth planet from the sun and, so far as is known, the outermost member of the solar system, its mean distance from the sun being about 2,800,000,000 miles. It is about 33,000 miles in diameter and about one and three-fifths times as far from the sun as Uranus, which is next nearer. It revolves around the sun once in 164 of our years. Neptune is wholly invisible to the naked eye, and it is difficult to find and study through the telescope. It was discovered in 1846 in a position which had been indicated independently by two different astronomers. Many had searched for it, and it was at last found at the exact point where it must be to produce the otherwise unaccountable motions that had been observed in Uranus. This is regarded as one of the great triumphs of astronomy. Soon afterwards it was discovered that Neptune has one moon, moving about it from east to west. Through the telescope the planet is so faint and far away that little can be learned about it, and it appears only as a faint body of bluish tint. See PLANET.

NEREIDS, *ne're idz*, in classical mythology, sea nymphs, daughters of Nereus and Doris and constant attendants on Neptune. According to some accounts they were human in form; according to others, they had the tail of a fish. They were usually represented as riding about in the sea on horses or dolphins.

NE'REUS, in classical mythology, the father of the fifty Nereids, the wise "old man

of the sea," who lived in a cavern in the depths of the Aegean and revealed what he knew only by compulsion. He was seized by Hercules when asleep; although he attempted to escape by assuming various forms, he was forced to disclose the whereabouts of the apples of the Hesperides.

NERO, (A. D. 37-68), a Roman emperor, the son of Cneius Domitius Ahenobarbus and of Agrippina, the daughter of Germanicus. His mother's second husband, the Emperor Claudius, adopted him, and when Nero was about seventeen years old his mother poisoned Claudius and secured the throne for her son. In the year following his accession Nero disposed of Claudius' son Britannicus, the rightful heir, by poison. Some time afterwards, to please one of his favorites, he caused his mother to be put to death, and then had his wife Octavia murdered.

NERO

The affairs of the empire were at this time in a deplorable state; wars raged abroad and general discontent prevailed at home. The emperor, entirely lacking in restraint, gave himself up to the most disgusting excesses. In July, 64, occurred the burning of Rome; Nero, charged with having caused the calamity, to divert popular indignation accused the Christians and persecuted them unmercifully. His debaucheries, cruelties, unjust taxation occasioned several unsuccessful conspiracies against him. He retaliated with wholesale executions, Seneca and Lucan being victims. Finally the Senate openly declared him an enemy to the country, and Nero, to escape arrest, stabbed himself.

NERVA, *nur'va* (A. D. 32–98), a Roman emperor, who displayed great wisdom and administrative ability during his reign. He twice held the consulship before his election by the Senate to succeed Domitian in A. D. 96. He was in turn succeeded by his adopted son, Trajan.

NERVES, *nurves*, slender whitish cords that start from the brain or spinal cord and radiate all over the body, ending in the cells and fibers of the different organs. Nerves, or nerve trunks, as they are more properly called, are not single structures, but are bundles of nerve fibers tied together with connective tissue. A particular nerve trunk may contain hundreds of nerve threads that are distributed to different parts of the body. The nerve elements of nervous tissue are called *neurones*. The connective tissue is known as *neurolgia*. For the character and function of nerves, see NERVOUS SYSTEM.

Nerves, Cranial, the nerves which originate at the base of the brain and pass directly from these centers to the various organs of the head and face and the upper part of the thorax. In structure the cranial nerves are more simple than the spinal nerves, and in function they include both sensory and motor nerves (see NERVOUS SYSTEM). They are arranged in twelve pairs. The first pair constitutes the nerve of smell (see SMELL). The second pair comprises the optic nerves, or nerves of sight (see EYE; VISION). The third pair has nerve fibers distributed to the muscles of the eyeball, and, together with those of the fourth and sixth pairs, these nerves produce all the movements of the eye, including those of the iris and the eyelids. There are two roots to the fifth pair, containing both sensory and motor nerves. This pair divides into three branches, the first sending fibers to the mucous membrane of the nostrils and the muscles of the skin of the forehead and upper eyelid, the second sending branches to the lower eyelid, the skin of the nose, temples, cheeks, upper lip, palate and the teeth of the upper jaw; the third divides into three branches and is distributed to the side of the head, the external ear, the skin of the lower part of the face, the mucous membrane of the mouth, the tip of the tongue and the teeth and the muscles of the salivary glands of the lower jaw.

The nerves of the seventh pair are distributed to the muscles of the face and are composed almost entirely of motor fibers, which control the muscles of expression. This nerve is sometimes called the nerve of expression. The eighth pair constitutes the nerve of hearing (see EAR). The ninth pair contains sensory and motor nerves, and some of its fibers constitute the nerves of taste, while others extend to the muscles of the pharynx and the mucous membrane at the back of the nose and pharnyx. Another branch controls the secretions of the parotid glands.

The tenth pair, generally known as the *pneumogastric* nerve, has the longest and most widely distributed trunks. The nerves are both motor and sensory, and the branches

extend to the pharynx, esophagus, larynx, windpipe, lungs, heart, stomach and intestines, and probably to the liver and the kidneys. The motor fibers of this nerve control all muscles of these organs. The fibers extending to the heart have an inhibitory function, and those extending to the lungs control respiration. The eleventh pair controls the movements connected with swallowing and the respiratory movements associated with any effort. The nerves of the twelfth pair are distributed to the muscles of the tongue and control its movements in swallowing and in speech.

NERVOUS DISEASES, disorders caused by changes in the structure of nerve fibers or centers due to some irregularity of nerve function without actual change in structure. Such diseases may arise from degeneration of inflammation of nerve substance, from pressure of tumors, from the lowered nervous action which comes from general bad health, and from other causes. Many diseases of the nerves may be cured by a change of habits and observance of hygienic rules.

Related Articles. Consult the following titles for additional information:

Aphasia	Insomnia	Neurasthenia
Apoplexy	Locomotor Ataxia	Neuritis
Catalepsy	Nervous System	Neurosis
Epilepsy	Neuralgia	Paralysis
Hysteria		Saint Vitus's Dance
Insanity		

NERVOUS SYSTEM. The human body may be compared to a great enterprise which is being conducted by a vast army of laborers, all working under the supervision of a master director. He is constantly in communication with his workers, and sees to it that they so coöperate with each other that work is carried forward harmoniously and effectively. In the human body the various organs represent the laborers, and the nervous system the directing force. Just as a business house, an army, or a country must have a central supervising system, so must the body. The parts of this human directing force are the brain and the spinal cord, the nerve trunks radiating from them, and the ganglia. These latter are rounded or oval masses that serve as centers from which the nerve trunks of the sympathetic system radiate (see subhead below).

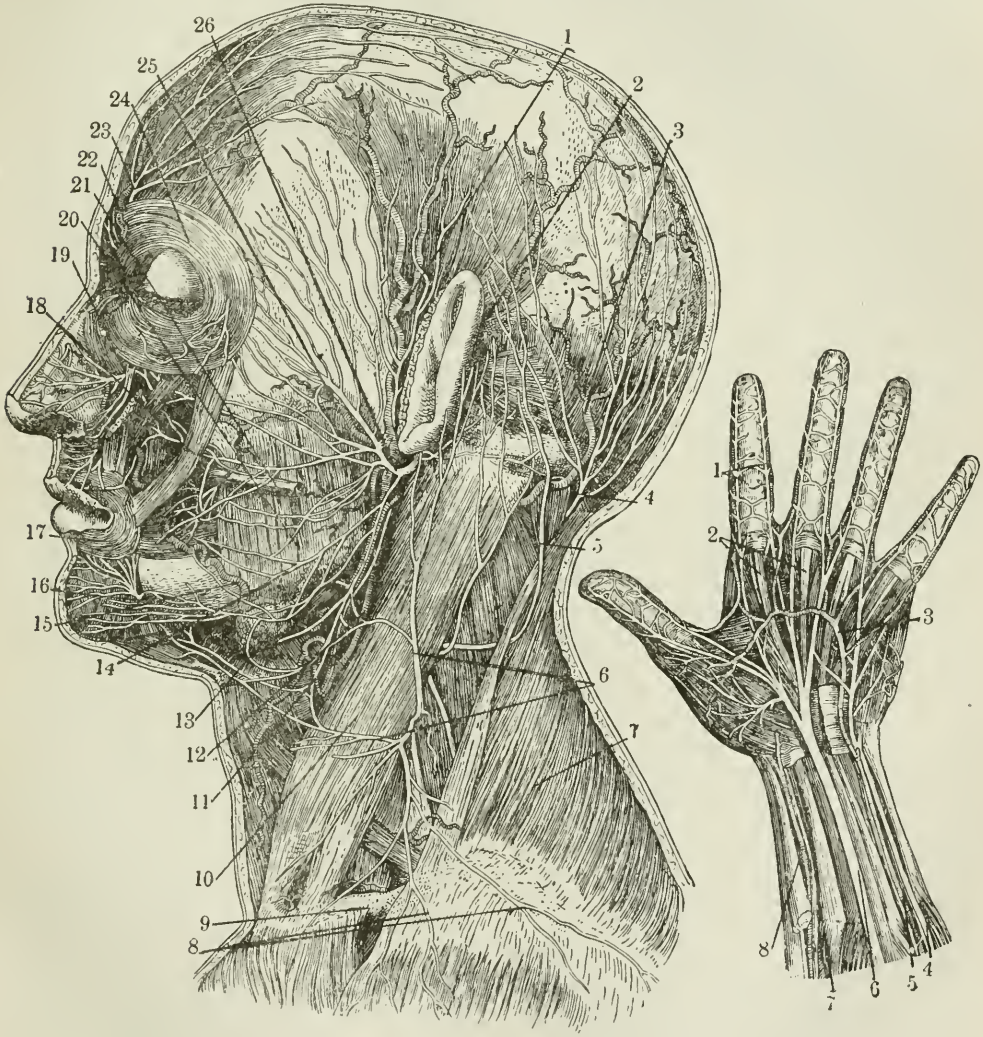
The Cerebro-Spinal System. This division of the nervous system includes the brain, the spinal cord and nerves branching off from them. The *spinal cord* is a mass of nerve matter filling the canal of the spinal column and extending from the medulla oblongata to the middle or lower margin of the first lumbar vertebra. It is about eighteen inches long and is divided by deep fissures into right and left halves, each of which consists of anterior, lateral and posterior columns. The outside of the cord is composed of white nerve fibers, and the inside consists of gray matter, forming an irregular mass whose vertical structure somewhat resembles the letter *H*. At the lower extremity the spinal cord divides into a number of nerve trunks, some of which continue downward within the spinal column to the sacrum. In the lower part of the neck there are also enlargements, from which nerves branch off to the arms, and in the lumbar regions are similar enlargements, from which branch the nerves to the lower extremities. Between these points the spinal nerves branch off in pairs upon each side of the cord and pass out of the spinal column through the openings between the vertebrae. In all, there are thirty-one pairs of these nerves, each pair consisting of two sets of nerve fibers—sensory and motor.

The sensory, or *afferent*, nerves originate in the posterior column of the spinal cord, and before joining the motor nerve the fibers form a ganglion. These are the nerves of feeling, which transmit impressions from without through the spinal cord to the brain centers. The motor, or *efferent*, nerves originate in the anterior column of the spinal cord, but do not form a ganglion before joining the sensory nerve. The sensory and motor nerves meet and constitute a pair as they emerge from the spinal canal and run side by by side to their extremities. Wherever one divides, the other makes a similar division, until in their final subdivisions they become so small that the fibers cannot be distinguished. Motor nerves are nerves of motion and convey impulses from the nerve centers outward.

These nerves look like white cords and are called nerve trunks when they branch from the spinal cord. Each one consists of a central axis of gray matter, usually known as the *band axis*, enclosed in a sheet of white, fibrous nerve tissue. The nerves then interweave and form networks, or plexuses, of nerve fibers, and in their last divisions they constitute a complete network in the skin, where the sensory nerves are so numerous that

a prick from the finest needle anywhere on the surface of the body injures one or more of them, and the pain arising from the wound makes the person conscious of the injury.

The Sympathetic System. This system consists of a series of ganglia, extending from the head through the neck, thorax and abdomen to the pelvis. In the thoracic and abdominal cavities the ganglia are arranged in pairs on either side of the spinal column and terminate in a single ganglion in the pelvis. The sympathetic nerve centers of the head distribute nerve fibers to the muscles which control the pupil of the eye and to the palate and glands about the mouth. The thoracic ganglia are twelve in number and are all



SUPERFICIAL ARTERIES AND NERVES OF THE FACE AND NECK

1, Temporal artery; 2, artery behind the ear; 3, occipital artery; 4, greater occipital nerve; 5, smaller occipital nerve; 6, nerve of the neck; 7, trapezius muscle; 8, clavicular nerves; 9, clavicle; 10, sterno-cleido-mastoid muscle; 11, outer artery of the head; 12, inner artery of the head; 13, salivary gland; 14, nerves of the lower jaw; 15, outer maxillary artery; 16, nerve of the chin; 17, circular muscle of t e mouth, 18, greater yoke muscle; 19, nerves below the eye; 20, masseter, or chewing muscle; 21, ear passage; 22, arteries of the forehead; 23; nerves of the forehead; 24, eye-closing muscle; 25, facial artery; 26, facial nerve.

NERVES OF THE HAND

1, Nerves of the skin; 2, tendons; 3, arteries of the palm of the hand; 4, elbow nerve; 5, elbow artery; 6, nerve of the forearm; 7, nerve of the under-arm; 8, artery of the under-arm.

connected by a sympathetic cord. They also communicate with the cerebro-spinal nerves. Nerves from these ganglia pass to the different abdominal organs and control the action of the glands whose functions are concerned with digestion and excretion. The two principal ganglia of the abdominal cavity are the largest in the system, and the branches from these unite to form the *solar plexus*, which is situated directly back of the stomach. This ganglion sends nerves to various abdominal plexuses and also to the blood vessels that follow the intestines and the other abdominal organs. These ganglia are also connected with each other by a systematic cord and by spinal nerves with the cerebro-spinal system.

In structure and general appearance the sympathetic nerves resemble those of the cerebro-spinal system. They are less sensitive and slower to act than the cerebro-spinal nerves, and they preside over the vital functions—circulation, digestion, secretion and excretion.

Physiology. The functions of the nervous system are to coördinate the movements of the body and to bring to the centers of intelligence and action communications from the outside world. The nerves of the cerebro-spinal system are arranged in pairs. One nerve of each pair, the sensory, carries impressions from without to the brain, and the other, the motor, carries them from the brain and other nerve centers outward. A nerve can be aroused to action artificially by any of the following means: Mechanical action, such as touching, striking or pinching; a change of temperature, provided it is sudden, as when the hand is brought in contact with a hot or cold object; chemical action, such as that of a strong acid or alkali; electricity. The stimulus arising from any of these agencies is caused by the suddenness of action. A slow rise or fall in temperature will not give rise to a nerve impulse. There are also many stimuli to action from within the body, which are recognized by their outward manifestations, such as the movements arising from the decision to perform a certain act, as throwing a ball or writing a letter. There are other acts of stimuli that act upon special nerves, such as the optic, auditory and olfactory.

The nature of nerve impulse is not well understood, but it is known to be wavelike in its movements, and it traverses the nerves at the rate of about 100 feet per second. All impulses belong to one of two classes, those that produce feeling and those that produce motion. Both kinds traverse the nerves in both directions. Each kind originates in the class of nerves to which it belongs; motor impulses cannot be excited in, or made to traverse, sensory nerves, nor can sensory impulses be developed in or made to traverse motor nerves. The nature of the impulse is the same, whatever the cause that excites it, and within certain limits its strength is proportional to the strength of the exciting cause. Impulses arising in one set of nerves, as the sensory, are transmitted to the other, as the motor, through nerve centers in which the fibers of these nerves intermingle. If one lays his hand upon the point of a tack, the injury excites an impulse in the sensory nerve. This is carried inward until the fibers of the injured nerve mingle with those of the corresponding motor nerve, when the impulse is transmitted outward along the motor nerve and causes the hand to be withdrawn from the object. Movements of this sort are known as reflex.

Hygiene. The nervous system is the most sensitive organism of the body, and consequently it is most easily influenced by unfavorable conditions. The first requisite to its health is a good supply of pure blood. About one-fifth of the blood in the body is required to nourish the brain, and the other organs of the nervous system require a proportionately large amount. If the blood is impure the brain and nerves are not properly nourished. Pure air, plenty of exercise and nourishing food are essential to pure blood and thus to the health of the nervous system. Another important requisite is a sufficient amount of sleep and rest.

Many drugs used for the alleviation of pain are beneficial when administered under the direction of a physician, but they are decidedly injurious when taken indiscriminately, and their continuous use soon produces a habit which it is almost impossible to break. Among drugs whose use should be avoided, except when prescribed by a physician for a limited time for the alleviation of pain, are chloral, cocaine, opium, morphine and numerous coal tar preparations, such as antifibrin and antipyrin. These drugs act directly upon the nerve centers, dulling their sensitiveness, preventing proper nutrition of the nervous system

BIRDS' NESTS

1, Red-Eyed Vireo (1-3).
2, Redstart (1-3).
3. American Goldfinch (1-3).
4, Bluebird (1-3).
5, Humming Bird (1-2).
6, Phoebe (1-4).
7, Meadow Lark (1-5).
8, Bluejay (1-5).
9, Baltimore Oriole (1-5).

and in every way impairing its usefulness.

The habitual use of alcoholic and malt liquors and tobacco has a similar effect. These substances are especially injurious to the young, whose nerves and brain are in a formative condition. Perhaps the greatest danger arising from the use of any drug or narcotic is the tendency to form an unnatural appetite for it, which increases with the habit, until the person becomes overpowered by the craving. For these reasons, as well as many others of which the limits of this article will not admit mention, substances of this sort should be strictly avoided.

Related Articles. Consult the following titles for additional information:

Blood	Eye	Nervous Diseases
Brain	Ganglion	Senses, Special
Breathing	Medulla Oblongata	Spinal Cord
Circulation	Nerves, Cranial	Reflex Action
Ear		

NEST, the name given to the homes built by birds, chiefly as safe places in which to hatch their eggs and rear their young. Nearly all birds build nests of some sort, and the marvelous instinct that leads every bird to build its nest exactly as its parents did before it, is one of the strangest things in nature. In nest building birds rarely give any attention to their own comfort, but they prepare a place which will insure the hatching of their eggs and the protection of their young while they are helpless. A few species, however, build no nests at all, but drop their eggs into the nests of other birds and abandon them to the foster parents. For instance, the American cowbird will lay its eggs in the nest of the yellow warbler. Not infrequently the warbler resents the presence of this foreign egg and builds a second nest above the first, abandoning its own eggs in so doing. Cases are known where a nest has been built in this way in three tiers before the warbler was able to remain in undisturbed possession of her own nest.

Ground Nests. There are other species that lay their eggs upon the bare rocks or in little holes in the sand and sit patiently upon them there. Most of the water fowl and many of the shore birds build their nests upon the ground. In nearly all cases some attempt is made at concealment, and even when the nests are rudest, the bird still remembers to make them harmonious with their surroundings, or to put them in some inconspicuous place. The wild turkey will never leave her nest until she has safely covered the eggs with leaves. Although some of the ground nests are little more than rude platforms of twigs, others are elaborately woven and carefully lined with soft moss or even with down plucked from the breast of the bird herself.

In the tropics, some birds collect large piles of vegetable matter, and after it has decayed for some days, they will lay their eggs in holes in this mass, which in rotting furnishes the heat to hatch the young chicks. The kingfishers, sand martins and other birds excavate deep burrows into a bank, usually facing the water, and lay their eggs in rude little nests at the end. These burrows are usually not straight. The kingfisher's gallery may turn abruptly to the right or left. The petrel found in the United States digs a very tortuous gallery of considerable length, so that its nest is frequently directly under the opening. In the southwestern parts of the United States the burrowing owl lives in the homes of the prairie dogs.

Varieties of Tree Nests. The most remarkable nests are those which are built either in trees or in small shrubbery above the surface of the ground. Here the diverse habits of the birds show themselves at once. The robin and certain other birds make a foundation of clay, which they cover with twigs and leaves and line with hair or other soft substances. The clay is molded and carefully plastered in position, but neither the robin nor the swallow, which builds a purely clay nest, will use the structure until it is well dried. Some of the bottle-shaped clay nests of the swallows are curious affairs, with protruding necks bent downward so that the opening of the nest is from below. Woodpeckers dig their way into dead trees or stumps. The ivory-billed woodpeckers are strong enough to excavate a nest in the hardest wood. Many other birds build in holes or crevices in trees and stumps that they have not excavated for themselves. An example of this class is seen in Fig. 4 of the color plate.

A familiar example of the best of the nest work is that of the Baltimore oriole, whose slender hanging nest, far out on the tip of some slender twig, is well protected against invasion (see Fig. 9). The weaver birds make curious, swinging, bottle-shaped structures, which are entered from below, the nest itself being built within, on the side of the bottle. In Mexico a flycatcher builds a remarkable structure, sometimes three or four feet long by two wide, on one side of

which is an opening leading into the nest. Other small and timid birds build their nests in crevices on the outside of the flycatchers' home. Some of our birds build exquisite little nests, and nothing is prettier than the delicate work of the ruby-throated hummingbird, as may be seen in Fig. 5 of the color plate. The tailor bird sews the leaves of its nest together. The great variety and wonderful forms of the nests make it impossible to give any extended description of them all.

NES'TOR, a Greek hero, son of Neleus, king of Pylos. He took part in the hunting of the Calydonian boar, in the Argonautic expedition and, although he was at that time very old, in the Trojan War. During that struggle he was the wisest adviser of the Greek chiefs.

In modern times a person whose judgment is unerring or who shows great wisdom in the solution of questions of moment is popularly referred to as the "Nestor of Congress," the "Nestor of the press," etc.

NET, an open fabric, made of thread, twine or cord, woven into meshes of fixed dimensions, firmly knotted at the intersections. Nets are used for a great variety of purposes, as for protecting fruit trees, for collecting insects, for hammocks and for screens, but chiefly for hunting and fishing. The chief kinds of nets used in fishing are the trawl, the drift, the seine, the kettle, or weir, and the trammel, or set net. The *trawl* is a triangular bag, with an arrangement for keeping its mouth open, and it is drawn along the bottom of the water. *Drift* and *seine* nets are very long in proportion to their breadth and differ from one another only in the manner in which they are employed. The seine has a line of corks along one of its long borders, and a line of leaden weights along the other, so that when thrown into the water it assumes a perpendicular position. It is used near the shore, being dragged to land with any fish it may enclose, by ropes fastened to the ends. The drift net is not loaded with lead, but floats in the water, and is used especially in herring fishing, the fishes as they drive against it becoming caught by the gills. *Kettle* and *weir* nets are structures fixed on stakes placed along the coast between high and low water. *Trammel* or *set* nets are also fixed between stays, but act like drift nets. See FISH AND FISHERIES.

NETHERLANDS, THE, or HOLLAND, a kingdom on the western coast of Europe, forming, with the coastal region of Belgium, the "Low Countries" of that continent. With an area but slightly greater than that of the state of Maryland, the Netherlands is one of the most important of the small states of the world, and its people are everywhere honored for their sturdy independence, industry and integrity. This small state governs a great colonial empire (see subhead *Colonies*, below), and has as subjects about seven times as many people as live in the kingdom.

The word *Nederlands*, as these people write it, means *lower lands*, and is an appropriate name for a country that for centuries has been saved from inundation only by the construction of great dikes. *Holland*, which is the more common name for the kingdom, belongs properly to two provinces, North and South Holland. The word is supposed to mean *hollow land*. Outsiders usually call the people of the Netherlands *Hollanders*, or *Dutch;* the latter is a corrupt form of *Deutsch*, which means German. Reasonably enough, the people prefer their proper designation of *Nederlanders*.

Location and Area. The Netherlands touches Germany on the east and Belgium on the south, and its west and north boundaries are shore lines of the North Sea. The land area, 12,582 square miles, will eventually be increased about 530,000 acres by the draining of the Zuider Zee (*zi'der ze'*), a large shallow arm of the North Sea, nearly land-enclosed. Centuries ago the land below the waters of the Zuider Zee was covered with a dense forest having within it a lake of moderate size. By the gradual overflow of the waters of this lake the country for miles about became a soggy marsh, and in the thirteenth century the region was swept by an inundation of the North Sea. Thousands of villages were destroyed and the entire geography of that portion of the Netherlands was wholly changed. For many years the Hollanders have been considering the reclamation of the land stolen from them by the

sea, and in 1913 the national legislature, or States-General, passed an act authorizing such reclamation. The outbreak of the World War, in 1914, necessitated a postponement of this plan, but early in 1919 the matter was again taken up by the States-General. It was then planned to spend about $50,000,000, to be used in building a dike across the mouth of the gulf, and in draining the land of water. Such is Holland's plan for the conquest of a lost province.

The People and Cities. In 1916 the kingdom of the Netherlands had a population of 6,583,227, or 523 inhabitants to the square mile. Maryland, the American state corresponding to it in size, has about one-fifth as many people. In 1916 there were in Holland thirty cities with populations over 24,000, as compared with three for the American state. Amsterdam, the Dutch metropolis, had a population of 628,404, about 39,000 more than Baltimore. Holland's first five cities, in order of size, are Amsterdam, Rotterdam, The Hague (the capital), Utrecht and Gröningen.

The Netherlanders belong to the Teutonic branch of the human family, and in many respects are like their thrifty, industrious German neighbors. The inhabitants of Limburg province, however, which adjoins Belgium, seem more akin to the Belgians. Among the peasants of the provinces one still sees the picturesque Dutch costume made familiar by pictures. The Hollanders are a religious people, and permit complete freedom of worship. Nearly two-thirds of the inhabitants of the country are Protestants, and the greater part of the remainder are Roman Catholics. Most of the Protestants are members of the Dutch Reformed Church. There are over 100,000 Jews.

Language and Literature. The language spoken in the kingdom, as well as in the East and West Indian colonies of the Netherlands and by the Boers in South Africa, is popularly called Dutch. It is closely related to Low German, or Plattdeutsch, and appears in a number of dialects. Flemish, spoken in Limburg and Brabant provinces, and in Belgian Flanders, is almost identical with Dutch.

The earliest Dutch literature consists of versions of the Arthurian legends, the song of Roland and other French romances, and some of these date from early in the thirteenth century. A version of *Reynard the Fox*, produced about 1250, is the first noteworthy example of literature in the Dutch language. The Old Testament had been translated and the *Life of Jesus* produced before the Reformation, which affected Dutch literature strongly, as it did that of other countries. The contest with Spain late in the sixteenth century gave rise to many battle songs and hymns in praise of liberty. By the beginning of the eighteenth century, poetry and the drama, which had flourished during the previous century, had become so greatly affected by French literature as to retain little of their distinctively national character. During the nineteenth century perhaps the most noteworthy men in Dutch literature were Lennep, Dekker and Maartens, novelists; Hasebroek, an essayist; the poets Genestet, Da Costa and Ten Kate, and the critic Ten Brink. See MAARTENS, MAARTEN.

Art. See PAINTING; SCULPTURE.

Education. Since 1900 education has been compulsory; the school age is from six to thirteen. Private schools, including those under denominational control, are under government supervision and inspection, and receive state aid. About three-fifths of the children attend public schools. Above the primary schools are the industrial, professional and burgher schools, and the gymnasia; besides vocational courses, these institutions give those taught in the ordinary American high school. Instruction in them is not free, but they are well attended. There are four public universities, located respectively at Leiden, Utrecht, Gröningen and Amsterdam. In 1918 the Veterinary School at Utrecht and the Agricultural School at Wageningen were created universities.

Surface and Drainage. The Dutch have an old proverb which runs, "God made the sea, but we make the shore." For centuries the people have fought the encroachments of the sea. Some portions of the surface of the country are from sixteen to twenty feet below sea level, and nearly all parts are too low for natural drainage. In great part the coast is so low that, were it not for massive dikes, large areas would be inundated. In the interior, also, dikes are a common feature, being built to protect portions of land from the lakes and rivers or to enable swampy pieces of land to be reclaimed by draining. These enclosed lands are called *polders*, and by the formation of these polders the avail-

able land of the country is being constantly increased in area. Lakes and marshes are converted into fertile fields, and considerable areas are even rescued from the sea. The windmills seen everywhere are used constantly in the work of draining and pumping.

Almost the only highlands in the Netherlands are the sand hills, about 100 to 180 feet high, which form a broad, sterile band along the coast of South Holland and North Holland, and a chain of low hills, probably of similar origin, southeast of the Zuider Zee. The highest elevation, 1,050 feet, is in the extreme southeast, in Limburg. The general aspect of the country is flat, tame and uninteresting, and about one-fifth of the whole surface consists of marsh, sand, heath or other unproductive land.

The coast line of the Netherlands is very irregular, the largest indentation being the Zuider Zee. In the same line with the sand hills, extending past the mouth of the Zuider Zee, runs a chain of islands, namely Texel, Vlieland, Ter Schelling, Ameland and others, which seem to indicate the original line of the coast before the ocean broke in upon the low lands. The most important rivers of the Netherlands are the Rhine, the Maas, or Meuse, the Scheldt and the Yssel. The Rhine is over one-half mile wide where it enters the country. It soon divides, the south arm, which is the more important division, taking the name of Waal and uniting with the Maas. The north arm, communicating with the Yssel, takes the name of Lek. The Maas, entering the Dutch Netherlands from Belgium, receives the Roer. Of the Scheldt, little except the mouths is within the boundary of the Netherlands. The navigable canals are collectively of more importance than the rivers. The chief of these are the North Sea Canal, fifteen miles long, between the North Sea and Amsterdam, and the North Holland Canal, forty-six miles long, between Amsterdam and the Helder. There are numerous smaller canals, all of the towns and many of the villages being connected with one another in this manner. Most of the domestic traffic of the country is over these canals. Lakes are very numerous.

Climate. The climate of the Netherlands is humid, and there are few sunshiny days. The annual rainfall is about thirty inches; rain falls about 204 days in the year. The range of temperature is not great, as the average temperature for the coldest months is slightly over 35° F., the average temperature for the hottest months slightly over 64° F.

Industries. As the land of this coastal plain is composed largely of débris brought down to the sea by the agency of ice or water, minerals are very scarce. Coal is mined in small quantities in Limburg. Peat is very plentiful, and the cutting of peat is an industry of some importance. Gardening and agriculture have attained a high degree of perfection. Wheat, while of excellent quality, can be grown only in favored portions of the southern provinces; rye, oats, buckwheat, horse beans, beets, madder and chicory are more common crops. Tobacco is cultivated in the provinces of Gelderland, South Holland and Utrecht; flax in North Brabant, the south of North Holland, Friesland and Zeeland; hemp, sugar beets, oil seeds and hops, in various parts of the kingdom. Culinary vegetables are cultivated on a large scale. Large quantities of them are sent to England, and the exportation of the seeds forms an important article in Dutch commerce. The cultivation of flowers has been carried to a point unequaled in any other country of Europe, and flower seeds and bulbs are exported to all parts of the world.

Stock raising is an important industry, especially in the coast provinces. Cattle, horses, sheep, swine and goats of excellent breed are reared in great numbers. Dairy products, especially cheeses, are marketed in immense quantities. In the estuaries of the great rivers, in the coast waters and in the open sea, fishing is very extensively carried on. Sprats and oysters are the chief products of the coast fisheries, and herring is the principal product of the deep-sea fisheries. Hundreds of thousands of herring are taken annually, and the process of curing these fish is a Dutch invention, which has been very widely copied.

Because of the lack of coal and iron, the Netherlands has never developed as a great manufacturing country, but textiles, silks and velvets are produced in profitable quantities, and Delft is still a famous center of the manufacture of glazed earthenware. The Dutch also make tobacco pipes of excellent quality. An industry of more than national renown is that of diamond cutting, chiefly carried on by the Jews of Amsterdam.

Transportation and Commerce. The canal system is so general that railroads are of importance chiefly for international, rather than internal, commerce. There are about 2,400 miles of railway in operation, besides 1,800 miles of tramways and 2,000 miles of canals. In the winter time the canals are crowded with men, women and children, skating for purposes of business or pleasure.

The Netherlands is one of the important trading countries of the world. The foreign commerce is chiefly carried on with Germany, Great Britain, Belgium, the Dutch East Indies and the United States. Rotterdam and Amsterdam are the centers of the foreign trade. The importation and re-exportation of the products from the Dutch colonies throughout the world is one of the chief branches of the commercial activity. Free trade is a national policy.

Colonies. The colonial possessions of the Netherlands are found chiefly in the East and West Indies. They cover an area of about 783,000 square miles, and have an estimated population of 48,000,000. The island of Java is the most important of these dependencies. Other possessions include the islands of Sumatra, Borneo and Celebes; Surinam, or Dutch Guiana, on the north coast of South America, and Curaçao, an island north of Venezuela.

Government. The kingdom is divided into eleven provinces—North Brabant, Guelders, South Holland, North Holland, Zeeland, Utrecht, Friesland, Overyssel, Groningen, Drenthe and Limburg. These are divided into 1,120 communes. In each province there is a representative body, the members of which are elected by direct vote for four years. These local bodies, called provincial states, pass ordinances pertaining to their respective provinces, but all such ordinances must be approved by the sovereign.

The national legislature, the States-General, is composed of two chambers, the First (*Eerste Kamer*) and the Second (*Tweede Kamer*). The former has fifty members, elected by the provincial states for nine years. The Second Chamber has one hundred members, elected by the people for four years. All legislative measures originate in the Second Chamber.

The sovereign appoints as an advisory and executive body a state Council (*Raad van State*) of fourteen members, which is consulted on all important matters. There is also a Cabinet responsible to the States-General, corresponding to the Cabinets of Great Britain, France and other European countries.

History. The Netherlands comprised originally the territory embraced by the present kingdoms of the Netherlands and Belgium. The Romans, who subjugated the native tribes in the first century of the Christian Era, ruled the country until about the beginning of the fifth century, when the Franks crossed the Rhine and conquered the southern part. Although for a time the Frisians in the northern part of the country preserved their independence, about the eighth century the whole territory was incorporated in the Frankish Empire, and the people were converted to Christianity. When Charlemagne's empire was divided after the death of his son, Louis the Pious, the region of the Netherlands was divided into three parts, the northern part falling to Germany, the central to Lotharingia and the southern to France.

Gradually the northern province became distinctly German in language and customs, and the southern part became French, while the central province combined the characteristics of the two others. In the latter part of the Middle Ages the cities of the Netherlands, especially Bruges, Ghent and Antwerp, rose to great importance through their commerce and manufactures. In the fourteenth century the entire territory passed under the rule of the Dukes of Burgundy, and through the marriage of Mary of Burgundy, the daughter of the last duke, with Maximilian of Austria, the Low Countries became a possession of the House of Hapsburg. Under the grandson of Maximilian, Charles V, the Netherlands were first formally united with the Spanish crown.

This union was disastrous for both countries, because the greater part of the inhabitants of the Netherlands were strongly Protestant, while Spain was the most radically Catholic country of Europe. Charles V, who had been born in the Netherlands and loved the Dutch people, did little toward enforcing the Catholic religion, but his son, Philip II, oppressed the Dutch beyond the limits of endurance. Finally, under the leadership of William of Orange and the Counts Egmont and Hoorne, the people rose in rebellion. The Duke of Alva was sent with a Spanish army to the country and was instructed to deal with it as conquered territory. Persecution

began at once, and several of the most prominent and patriotic citizens, among them the Counts Egmont and Hoorne, were put to death. In 1568 William of Orange, who had escaped death by withdrawing from the country, returned and undertook its liberation. During the war which followed, many prosperous Dutch towns endured sieges and were sacked when captured. The hatred for Alva increased, and as Philip II was not satisfied with the effects of his rule, he recalled him and sent in his place Requesens.

In 1576 the southern provinces entered into an alliance with the northern provinces, which was known as the Pacification of Ghent; but Alexander Farnese, who became viceroy of the Low Countries in 1578, was able by diplomatic measures to separate the southern provinces from the northern and to induce the former to return to their allegiance to Spain. The northern provinces, however, by the Union of Utrecht, in 1579, declared their independence of Spain. William of Orange now became the ruler of Holland and Zeeland, and the Duke of Anjou, the brother of Henry III of France, assumed control of the other provinces. In 1584 William of Orange was assassinated. From this time on, Philip was too much occupied with affairs in France and England to give much attention to the Netherlands, but Austria carried on the struggle against the United Provinces, and although the Dutch were everywhere successful on the sea, the country was desolated by the wars and a twelve years' truce was concluded in 1609.

The independence of the Netherlands was now recognized by all the powers except Spain, but it was not fully assured until the Peace of Westphalia, at the close of the Thirty Years' War in 1648. In the seventeenth century the Netherlands became one of the foremost commercial and maritime powers in the world, and for a long time maintained dominion on the sea. The southern provinces were ruled first by Spain and then by Austria, and in 1797 they came under the power of the French Republic. In 1806 Napoleon made the Netherlands into a kingdom for his brother Louis Bonaparte, and in 1810 this kingdom was united with France. The Congress of Vienna in 1815 joined Belgium and the Netherlands in a single kingdom with William I, the son of the last stadtholder, as king. This arrangement was very unsatisfactory, as the inhabitants of Belgium were almost all Catholics and the inhabitants of the Netherlands were with few exceptions Protestants. In 1830 Belgium declared itself independent, and although the king of the Netherlands made determined efforts to put down the revolt, the European powers at length intervened and guaranteed the independence of Belgium.

The people of Holland under William II and William III obtained increased freedom and prosperity. Upon the death of William III, in 1890, Wilhelmina became queen, under the regency of her mother. In 1908 she became of age, and was formally crowned queen. In 1898 The Hague was chosen as the meeting place of the International Peace Congress, and following this came the establishment at The Hague of an International Tribunal for arbitration.

Sorely Tried by War. The period of the World War was critical for the Hollanders, as they were restricted in their commerce both by the allied blockade and the German submarine warfare. At times the importation of necessary foodstuffs was so curtailed that the poorer classes suffered greatly. In spite of these difficulties the little kingdom maintained its neutrality and won the respect of all the belligerents, especially as it gave impartial aid to refugees of all countries. In the spring of 1918 considerable feeling was shown against the United States because of the President's requisition of eighty-seven Dutch ships in American harbors, to be used for allied war purposes. Fortunately the incident caused no break between the two countries, though the Netherlands government, fearing German retaliation, protested vigorously against President Wilson's action. Early in 1919 most of these ships were returned.

At the close of the war there was much social unrest in Holland, as in many other countries throughout the world, and for a time a bolshevik revolution was feared. Another cause of anxiety was the feeling aroused when the former emperor of Germany sought refuge in Holland at the time of his abdication. The government, considering him a private individual, refused to interfere with him, as that would violate the right of sanctuary. In 1919 the country consented to deliver him to the allied nations for trial.

Related Articles. Consult the following titles, and others referred to in them, for additional information:

GEOGRAPHY

Amsterdam	Haarlem	Rotterdam
Borneo	Hague, The	Scheldt
Celebes	Java	Sumatra
Delft	Leyden	Utrecht
Guiana, Dutch	Rhine	Zuider Zee

HISTORY

Belgium, subhead History	Tromp, Martin
Bonaparte, Louis	Wilhelmina
Charles V	William I, Prince of Orange
Philip II	World War

NETTLE, *net'l*, the name given to a large family of plants, most of them covered with extremely fine-stinging hairs. Nettles originated in Europe and to-day are used in many countries for fodder. They yield a tough fiber, which was employed in Germany during the World War as a substitute for hemp. In Dresden a thread is produced from nettles, which is so fine that sixty miles of it weigh only two and one-half pounds. One kind of nettle is used in China to make Chinese grass-cloth, and various other species are used for textile purposes. A yellow dye is made from nettle roots; green dye is produced from the leaves and stalks.

NETTLE TREE, a name applied to several trees which belong to the nettle family but lack the tiny stinging spines. The common, or European, nettle tree grows to the height of thirty or forty feet and is frequently planted for ornament in Southern France and Northern Italy. The wood is useful for various purposes. One species, sometimes called the *sugar berry*, is one of the larger trees of the genus, often attaining a height of from sixty to eighty feet. It is a native of North America from Canada to Carolina. Another variety, the American nettle, is often called *hackberry*.

NEUCHATEL, *nu sha tel'*, a lake in the western part of Switzerland, eighteen miles north of Lake Geneva. It is the third lake in size in Switzerland, twenty-four miles long and from two to five miles wide. Its shores, which are in part low and marshy, are not so picturesque as those of other Swiss lakes. Regular lines of steamers ply between the cities of Neuchâtel and Estavayer.

NEUCHATEL, SWITZERLAND, the capital of the canton of the same name, on Lake Neuchâtel, twenty-five miles west of Bern. It has some beautiful streets and interesting buildings, among which the most noteworthy is the twelfth-century abbey church. The city possesses a library of 100,000 volumes, a museum of fine arts, a museum of natural history, an observatory and a number of schools. Watches and jewelry are manufactured, and the trade of the city is considerable. Population, 1918, estimated, 23,850.

NEURALGIA, *nu ral'ji a*, a term which means *pain in a nerve*. Neuralgic pains most frequently have their seat in the head or face, but they may occur in other parts of the body. Although the nerves ache in neuralgia, the disease arises from unhealthful conditions elsewhere, and not from alteration in the nerve structure. In this respect does neuralgia differ from neuritis, which is inflammation of the nerve. The neuritis pain is steady, and the affected nerve is tender; in neuralgia the pain is intermittent. Neuritis, if not checked, causes a wasting away of the muscles supplied by the inflamed nerve. This is not true of neuralgia. Thin blood and lowered vitality, alcoholism and pressure on a nerve are some of the causes of neuralgia. Anaemic people are especially subject to it, and the remedy in such case lies in building up the system. Facial neuralgia is sometimes caused by infections in the teeth or nose, and when these parts are treated properly, the pains disappear. Those subject to neuralgic pains should avoid exposure to cold and dampness, take necessary rest, and eat nourishing food and avoid mental strain. Drugs should not be used unless prescribed by a reliable physician. See TIC DOULOUREUX.

NEURASTHENIA, *nu ras the'ni a*, or general exhaustion of the nervous system, is a common ailment in civilized countries. It comes as a result of continuous strain or excess of any sort. Overwork produces a large proportion of the cases, but excessive use of tobacco and stimulants or vicious habits of any sort are causes. The disease affects the sexes about equally and is usually chronic, because the causes which produced it have been long standing and the restoration of power in the nerves themselves is always a slow and difficult process. The symptoms of neurasthenia are varied; the functions of almost every organ may be affected by it and may show their weakness by the symptoms which are characteristic of diseases of that organ. Nervousness, irritability, loss of sleep and impaired digestive functions are always present to a greater or less degree. When there are no organic diseases connected with it, neurasthenia may be cured, especially in its earlier stages, if the causes are removed and proper attention is given to diet and rest. Rest and freedom from care and worry, in

connection with active out-door life, are the best remedies.

NEURITIS, *nu ri'tis*, inflammation of a nerve which generally manifests itself by severe pain. It commonly attacks the nerves of the arm and hand. If the disease is not checked the parts become numb, and the muscles lose their power of action. Neuritis of the optic nerve is a cause of blindness. Nerve inflammation may be caused by injury, infection, exposure to cold or overstrain. Some forms yield to massage treatment, but nearly all cases need the attention of a physician.

NEUROP'TERA, a large order of net-winged insects. It includes alder flies, snake flies, dusty wings, ant-lions, aphis lions, and golden-eyed, lace-winged flies. All are carnivorous and feed on other insects. Some are aquatic, but most of them live on land. The wings are four in number, and are crossed by numerous veins. The head is large, and the antennae slender. Although having certain points of resemblance, the various families differ markedly in structure and in life history.

NEURO'SIS, a general term applied to various disorders of the nervous system, in which there is no alteration of structure, but a number of annoying or painful symptoms. To one class of neurosis the term *occupational* is applied. A familiar example is writers' cramp, contracted by those who use the pen to excess and who write under mental stress. Overwork of the muscle is the cause, and the symptoms are numbness of the hand and inability to write. Neurosis of the circulation, digestion and other functions are also common, and are usually the result of a morbid mental condition. Rest, freedom from worry and sane living are the best remedies for persons troubled with nervous disorders. See NERVOUS DISEASES.

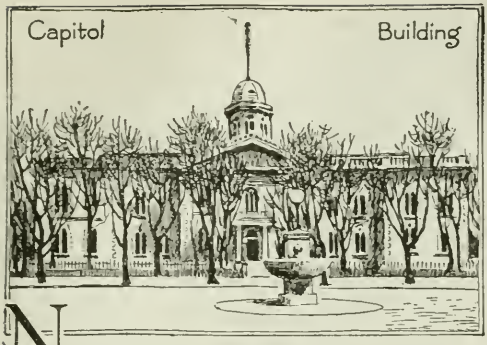
NEUROTIC, *nu rot'ik*, a medical term employed with reference to nerves of the nervous system. As applied to a person, it means one who suffers from hysteria, neurasthenia or other nerve weakness. The word has been used to designate any drug having a tendency to produce certain effects upon the nerve centers.

NEUTRALITY, *nu tral'i ti*, from the Latin *neuter*, meaning *neither*, a word describing the attitude of a nation which shows no preference by word or deed between other nations engaged in war. To be neutral is to be an impartial observer; to help one antagonist in the slightest degree and refuse to do as much for its adversary is to violate neutrality and be confronted with the possibility of being drawn into the struggle.

When two or more nations declare war upon each other, the executives of all countries not involved issue to their people proclamations of neutrality, warning them what their conduct must be towards the belligerents. Sometimes neutrality is difficult to maintain, particularly if the sympathies of a whole people are almost entirely with one belligerent, and even more especially if the boundaries of a neutral nation touch those of a warring country. In the latter event it may become necessary to resort to *armed neutrality*. This may be explained by references to history still vivid in all minds. Switzerland touched the borders of both France and the German Empire during the World War (1914–1919); the Swiss army throughout the whole war guarded its frontiers, and would have repelled with force any acts of either belligerent which would have affected its neutral position. The same course was taken by Holland, whose borders touched Germany and Belgium.

Neutral nations may deal with countries at war, selling them any commodities they need, including munitions, if the same privileges are offered all belligerents impartially. However, a neutral nation may not sell a warship to a belligerent, neither can it allow its harbors to be entered by a warship of a warring power except for repairs, the time then permitted to be decided by the government of the neutral, and usually not more than twenty-four hours.

NE'VA, a river of Russia which issues from Lake Ladoga at its southwestern end, and after flowing westward for forty-five miles discharges into the Gulf of Finland through several mouths. The city of Petrograd is built on islands in the river delta about ten miles from the Gulf. Connected through a system of canals with the Volga, the Neva is an important commercial route. It constitutes the most northerly section of the inland waterway connecting the Caspian Sea with the Baltic. The river contains a great volume of water, and in places its channel is over a half-mile wide. In some places extensive engineering works have been constructed, sometimes at great cost, to make it navigable.



NEVADA, one of the largest states in the American Union, only five being larger, but in population forty-eighth. Indeed, there are sixty-four cities in the United States each containing more people than live upon the 110,690 square miles which comprise Nevada. The population in 1910 was 81,875, less than half the number that are required in other states to entitle them to one Representative in Congress. However, the number of people nearly doubled between 1900 and 1910, and the Federal Census Bureau estimated the population in 1918 to be 114,742.

Nevada is called the SILVER STATE, because of the wonderfully rich mines of silver discovered there in 1859. California is on the west, Utah and Arizona are east, Oregon and Idaho are north, and Arizona and California are south.

Surface and Drainage. The most of the state is in the area included within the great basin, and is the bed of an ancient sea whose shore lines can be distinctly traced in a number of places. This basin lies between the Sierra Nevada Mountains, on the west, and the Wasatch, on the east. The average altitude of the plateau is about 4,000 feet, and upon it mountains rise to altitudes varying from 1,000 to over 8,000 feet. The highest point in the state is Wheeler Peak, at about the center of the eastern boundary; its altitude is 13,058 feet. Distributed over the plateau and running principally in north and south directions, are numerous smaller mountain ranges, whose altitudes vary from 6,000 to 8,000 feet. In some sections there are also ranges extending approximately east to west. Many of the ranges contain passes, and others have been worn away so that only isolated peaks remain.

The state has but few rivers, and these are small. In the northern section the Owyhee flows into Snake River and thence to the Columbia. The Humboldt, rising in the northeastern part and flowing in a southwesterly direction for about 375 miles into Humboldt Lake, is the largest river. In the southeastern section a few small streams drain into the Colorado, which forms a part of the southeastern boundary. With these exceptions, the streams of Nevada find no outlet to the ocean. Most of them are mountain torrents, which disappear on reaching the lower levels, either in mountain lakes or in swamps known as *sinks*.

There are a number of lakes. Of these, Pyramid is the largest, with a length of thirty-five miles and a width of ten miles. Lake Tahoe, on the California boundary, 6,225 feet above the sea, is, because of its altitude, its great depth, the clearness of its waters and the remarkable beauty of its surroundings, one of the foremost of American mountain lakes; it is visited by a large number of tourists.

Climate. The climate is dry, mild and healthful. Severe winds seldom blow; the average temperature for January is about 28°, and for July, about 71°. The thermometer occasionally falls as low as 30° below zero and sometimes rises to 110° above, but these extremes seldom occur. The state is the most arid in the Union, the average rainfall being less than 12 inches, and this is very unevenly distributed as to time and locality. Most of the rain occurs between December and May; the northern counties receive double the amount received in other portions, while in many valleys and in the southern part of the state rain seldom falls. Irrigation systems are extensively employed.

Mineral Resources. Nevada is preëminently a mining state, and its development was due to the rich deposits of gold and silver found in the mountains years ago. It was here that the celebrated Comstock Lode, which at one time produced over $38,000,000 worth of bullion in a year, was discovered. Numerous other rich mines have also been located within the state, but when the most valuable deposits had been exhausted, the mining industry declined for a number of years. More recently, however, new mines have been opened in Tonopah and Goldfield, and there has been a second revival of the industry. The annual output of gold is now nearly $9,000,000 a year, though there is considerable fluctuation, and of silver, about

$9,000,000. Lead, zinc, copper, quicksilver and nickel are also found in paying quantities.

Besides the metals, there are extensive deposits of such minerals as borax, soda, silver, potash and rock salt, while marble, granite, alabaster, slate and other valuable building stones are found. Some lignite coal has been mined in Elko county.

Agriculture. The lack of rainfall and the distance from markets prevent agriculture from being largely developed. The soil is generally fertile, and wherever irrigated, it produces abundant crops of hay, cereals and hardier fruits, such as apples, pears and cherries. Along the valley of the Humboldt and the Carson rivers and throughout the west central portions of the state, there are large tracts of irrigated land, and numerous farms are found in these regions. In other sections, where there is an abundance of prairie grass, stock raising has become an industry of some importance. The mild climate enables stock to roam without shelter during the winter, and large numbers of cattle and sheep are raised.

Nine-tenths of the agricultural land of Nevada is irrigated soil; there are over 3,150 miles of irrigation ditches. One of the greatest irrigation projects in the United States is the Truckee-Carson dam (see IRRIGATION).

Manufacturing. The manufactures are few. The most important are connected directly or indirectly with mining, being the smelting and refining of ores and the making and repairing of such machinery and tools as are needed for mining purposes. There are a few local industries, such as flour and grist mills and car repair shops.

Transportation. Nevada has about 2,500 miles of railway. The Southern Pacific and the Western Pacific cross the northern portion of the state; the San Pedro, Los Angeles & Salt Lake road and the Las Vegas & Tonopah also cross the southern part, but the greater portion of the region is without railway communication and depends upon the old-time stage coach.

Education. Considering its sparse population, the state maintains a good system of schools, but at a large expenditure per capita. There is a state university and agricultural experiment station at Reno, a mining school at Virginia City, and normal schools at Eureka, Tonopah and Yerington.

Items of Interest on Nevada

Native animals are few in variety and number; waterfowl, especially pelicans, gulls, ducks, geese and snipe are found near the lakes.

The forest reserves include about 8,000 square miles.

The average size of farms is nearly 1,000 acres.

Stock-raising takes first place among agricultural pursuits; live stock is valued at $5,000,000 a year.

Its mineral wealth alone makes Nevada important: the mines in the Comstock district up to 1917, produced $184,440,000 in gold and $245,600,000 in silver.

A second great discovery of minerals took place in May, 1900, near the present city of Tonopah, and since 1902 the gold and silver production has steadily increased; the annual output of gold is valued at about $20,000,000 and of silver at $7,500,000, giving the state third place as a gold producer and first place as a silver producer.

Nevada also produces 105,000,000 pounds of copper, 30,000,000 pounds of zinc and 28,000,000 pounds of lead.

The state ranks second as a producer of sulphur.

About 1860 unsuccessful attempts were begun to domesticate the camel for the purpose of transportation across the desert; it is interesting to note that till 1898 there was a state law forbidding camels to run at large.

Questions on Nevada

What is the area?

What is its population? How does it rank in population?

What is the character of its surface?

Name five rivers flowing wholly or partly in the state.

What is the average size of farms?

What and where is the Comstock lode?

What is the present annual average value of gold and of silver mined in Nevada?

Name six other minerals found.

How does the state rank as a producer of sulphur?

Institutions. The state maintains a hospital for the insane at Reno, an orphans' home and a state prison at Carson, and an industrial school at Elko. The deaf, dumb and feeble-minded are cared for under state contract in California.

Cities. The largest town in the state is Reno, which in 1917 had 15,514 people (Federal estimate). Carson City is the capital, and Virginia City is next in importance. These towns are within a few miles of one another, in the extreme western part of the state. Goldfield and Tonopah are in the southwestern section.

Government. The legislature is composed of two branches, and the membership of both cannot exceed seventy-five. The senate cannot have less than one-third nor more than one-half as many members as the house of representatives. Members of each branch are elected for two years. The legislature meets biennially, and the session is limited to sixty days. The executive department consists of a governor, a lieutenant-governor, a secretary of state, a treasurer, a comptroller, a surveyor-general, an inspector of mines and an attorney-general, each elected for four years. The courts include one supreme court and a number of district courts, below which are the justice courts and certain special courts of cities and towns.

History. Nevada was first visited by Spanish friars about 1775. After 1825 trappers entered the region, and Fremont crossed it on his way to California in 1843. It was a part of the territory ceded to the United States by Mexico, by the Treaty of Guadalupe Hidalgo, February 2, 1848, and it was constituted a territory in 1861, with somewhat smaller boundaries than at present. Its area was gradually increased until 1866. Nevada was admitted into the Union as the thirty-sixth state on October 31, 1864. Although the Mormons had established a camp in the region in 1848, its real history begins with the discovery of silver there in 1859.

The state has been unfortunate in the decline of silver production, but since 1900 new gold fields have directed renewed attention to Nevada. Some progressive legislation has marked the last few years. The initiative and referendum are in force; eight hours constitutes a day's work for women; merchants cannot use trading stamps to attract business unless they pay a tax of $2,000 yearly; automobilists must file with the state an indemnity bond as security in case of accidents.

Nevada was the first state to fill its quota of soldiers in 1917, and was the only state to get its soldiers ready for entrainment without cost to the United States.

Related Articles. Consult the following titles for additional information:
Carson City Nevada University Reno
Irrigation Virginia City

NEVADA STATE UNIVERSITY, a state university, established at Reno and opened in 1886. It is at the head of the educational system and is the only school in the state of collegiate grade. It maintains courses in arts and science, education, agriculture, civil, mechanical and mining engineering and domestic science. The courses in mining engineering are admirable, as the Mackay family have contributed generously to that department. Reno is also situated in a region affording excellent research material. In connection with the university there is a school of mines at Virginia City. More than half of the students are women. The faculty numbers about fifty, and there are more than 450 students. There are 30,000 volumes in the library.

NEV'IN, Ethelbert (1862–1901), an American composer, born at Edgeworth, Pa. He studied under the best instructors in America and Germany and, returning to his native country in 1887, devoted himself to composition. In 1900 he became an instructor of music in Yale University. He composed many songs and instrumental pieces, including a large number of waltzes. His work is characterized by fine melodic quality, delicacy and originality.

NEW ALBANY, Ind., the county seat of Floyd County, on the Ohio River, opposite Louisville, Ky., and on the Southern, the Baltimore & Ohio Southwestern, the Chicago, Indianapolis & Louisville and the Pittsburgh, Cincinnati, Chicago & Saint Louis railroads. The city has a public library, a city hall, a post office and customhouse, large fair grounds and a national cemetery containing 2,908 graves. It is two miles below the falls in the river and has good water power. The industrial establishments include packing houses, tanneries, engine and boiler works, automobile works, furniture factories, a rug factory, woolen and flour mills, foundries and other factories. The place was laid out in 1813, and was made a city in 1839. Popu-

lation, 1910, 20,629; in 1917, 23,629 (Federal estimate).

NEWARK, N. J., the largest city in the state and the fourteenth in size in the United States in 1918, is the county seat of Essex County, on the Passaic River near Newark Bay, and eight miles from the Hudson River. Five railroads—the Delaware, Lackawanna & Western, the Erie, the Lehigh Valley, the Pennsylvania and the Central of New Jersey —serve the city.

While Newark is considered as practically a great suburb of New York City, it is itself surrounded by numerous beautiful villages situated on hills which lie back of the town; other towns lie across the river and with Newark form a continuous city for several miles, and all are within the suburban zone of the nation's metropolis. The most important residential suburbs are the four Oranges, Glen Ridge, Montclair, Belleville, Bloomfield and Irvington; industrial towns connected with Newark are East Newark, Kearney and Harrison. There is much local pride in this "Greater Newark," with a combined population of over half a million. The number of people in Newark proper was 347,469 in 1910; a Federal estimate in 1918 increased the number to 428,684.

The city is one of the greatest manufacturing centers in the United States, and is called the "Birmingham of America." The total of its products is worth more than $200,000,000 every year. There are thirty entire states which do not reach this value in their manufactured goods. A list of goods made here would include over a hundred items.

There are twenty-eight electric lines connecting Newark with scores of towns in all directions; they carry nearly half a million people daily. Connection with New York City is made by the tunnels under the Hudson River. The city has almost two hundred churches, thirty-five parochial and private schools, twelve hospitals, five orphan asylums and about sixty charitable organizations. It is the home of one of America's greatest insurance companies and of lesser ones which together make Newark the third insurance center in the nation—after New York and Hartford.

The city was settled in 1666 by a colony from Connecticut. Its first name was Milford, which was soon changed, however, to the present name. It was chartered as a town in 1712. During the Revolutionary War it was of considerable note, first as headquarters for Washington and later for the British. In 1836 the town was incorporated as a city. There is in Newark a statue of Lincoln; the figure is seated on a bench, and its lap has been worn shiny by the children of the city who are ever climbing upon the knees.

NEW'ARK, OHIO, the county seat of Licking County, thirty-three miles east of Columbus, on the Licking River and the Ohio Canal and on the Pittsburgh, Cincinnati, Chicago & Saint Louis, the Baltimore & Ohio and several electric railroads. The city is in a region which contains deposits of natural gas, coal and sandstone, and it has manufactures of electric cars, glassware, locomotives, stoves, flour, implements, chemicals and carriages. Shops of the Baltimore & Ohio Railroad are here. The city contains a public library, a Federal building, and an auditorium erected as a memorial to the soldiers of the Civil War. Near the city are extensive remains of the Mound Builders. Newark was settled in 1801. Population, 1910, 25,404; in 1917, 30,317 (Federal estimate).

NEW BED'FORD, MASS., one of the county seats of Bristol County (Taunton being the other), fifty-six miles south of Boston, at the mouth of the Acushnet River, on New Brunswick harbor, which is an arm of Buzzard's Bay, and on the New York, New Haven & Hartford railroad. There are also electric railways to Fall River and Brockton, besides steamboat lines to New York City and other ports.

For over a hundred years it held the distinction of being the greatest whaling port in the world, but since 1860 that industry has steadily declined. New Bedford is now a prosperous manufacturing town. Chief among the industries are great cotton mills, requiring over 32,000 employes; other factories make silverware, paint, cordage, machinery, oils, etc. The city covers an area of about twenty square miles. Three bridges, one of them costing $1,500,000 connect the city with Fairhaven. The educational institutions include a great Textile School; one of the best libraries in the east is here, and the city is the home of the Old Dartmouth Historical Society, with valuable collections of material. The Saint Luke's and the Emergency are the leading private hospitals. Other prominent buildings are a city hall, a county courthouse, a state armory,

NEW BRUNSWICK, NOVA SCOTIA AND PRINCE EDWARD ISLAND

1, Fishing Scene
2, Coal Mining
3, Falls and Lumber Mill
4, Fruits and Vegetables
5, Iron and Steel Works
6, Terminal Docks of the International Railway at Halifax

a Federal building, the Merchants' Bank and Odd Fellows' and Masonic buildings.

The place was settled in 1652, was incorporated as a town in 1787 and chartered as a city in 1847. During the Revolution many privateers were sent out, and the town became a storehouse for captured prizes. September 5, 1778, it was attacked by the British, captured and almost all destroyed. The first ship built in New Bedford was one of those from which the tea was thrown into Boston harbor. Population, 1910, 96,652; in 1917, 121,622 (Federal estimate).

NEWBERN, *nu'burn*, N. C., the county seat of Craven County, 107 miles southeast of Raleigh, on the Neuse and the Trent rivers, and on the Atlantic Coast Line and the Norfolk & Western railroads. It has steamship connection with other coast cities, contains hosiery, knitting, cottonseed oil and lumber mills, ironworks, and fertilizer, cigar, turpentine and other factories; it also exports fish and oysters. The most important structures are a Federal building and a county courthouse. Two good bridges span the rivers. It was settled in 1710 by the Swiss, was for many years an important seaport and was for a time the capital of the province of North Carolina. Population, 1910, 9,961; in 1917, 10,509 (Federal estimate).

NEW BRIT'AIN, CONN., in Hartford County, ten miles southwest of Hartford, on the New York, New Haven & Hartford railroad. It has very extensive manufactures of hardware, cutlery, tools, foundry and machine-shop products, hosiery, knit goods, saddlery and other articles. A state normal school is located here, and the city contains a Roman Catholic cathedral, the New Britain Institute and two parks. The place was settled in 1687 and was chartered as a city in 1871. Population, 1910, 43,916; in 1917, 55,385 (Federal estimate).

NEW BRUNSWICK, *brunz'wik*, one of the eastern provinces of the Dominion of Canada, lying to the east of Maine and Quebec. The Bay of Fundy, famed for its high tides, separates it from Nova Scotia on the south; the Gulf of Saint Lawrence, Northumberland Strait and Prince Edward Island are east; Quebec and Chaleur Bay are north. The greatest extent from north to south is about 215 miles, and from east to west, a little less. The area is 27,985 square miles, which is about 5,000 square miles less than that of its neighbor, Maine. The province has about 550 miles of coast line, which contains a number of good harbors. Population, 1911, 351,889.

Surface and Drainage. The eastern part of the province, bordering on the Gulf of Saint Lawrence, is low, and the coast is marshy; but the southern coast, bordering on the Bay of Fundy, is high and contains numerous bluffs. There is a height of land which extends across the province from the northeastern to the southwestern corner and forms the watershed separating the rivers that flow directly into the Gulf and the Bay of Fundy from those that flow northward. This is a comparatively low ridge, which nowhere attains an altitude of more than 1,500 feet, but there are a few separate peaks which rise from 2,000 to 2,500 feet above the sea. In general, the surface of the province is that of an undulating plain or low plateau.

The Saint John is the principal river, and drains nearly all the western half of the province. It enters the Bay of Fundy by a broad estuary, which is nearly fifty miles long. The most important streams flowing into the Gulf of Saint Lawrence or its coast waters are the Restigouche and the Little Miramichi. The Petitcodiac drains the southeastern part of the province and flows into Shepody Bay, the most northerly projection of the Bay of Fundy. Nearly all of these streams have broad estuaries, which render them navigable for some miles.

Climate. New Brunswick is subject to severe winters and hot summers, although along the coast the changes are not as extreme as in the interior. During the winter the thermometer occasionally falls as low as 30° below zero, and in the hottest summer months it sometimes rises as high as 95°. The coast regions are subject to fogs during portions of the year, but on the whole the climate is healthful, and the extremes of heat and cold cause little suffering, especially in the interior, because of the dryness of the atmosphere. The annual rainfall is a little over forty inches.

Mineral Resources. Some coal of an inferior quality is found in the eastern and south-central sections, but it is not mined to a great extent. There are also deposits of nickel, antimony, manganese and iron ore among the metals, while graphite, gypsum, limestone and a variety of stone suitable for whetstones and grindstones are found in pay-

ing quantities. Natural gas was found in 1911, and New Brunswick is now an important Canadian gas field.

Agriculture. The soil of the lowlands and along the streams is highly fertile, and the climate is well suited to the growing of all crops which can be raised in a cool temperate climate; consequently, these regions are all occupied by farms, but in the uplands and hilly portions of the province the soil is less fertile and yields but slight return to the husbandman. Originally nearly the entire province was covered with forests, which included both hard and soft woods. Among the soft woods, spruce, tamarack and fir predominate, and only a limited portion of the forests has been removed, hence much of the land is still untilled. The chief crops are hay and forage plants, buckwheat, wheat, oats and potatoes. Turnips and other root crops are also grown, and in some sections dairying and the raising of live stock are important branches of agricultural industry. Small fruits are raised in large quantities and marketed in New England cities. Agriculture produces about $20,000,000 yearly.

Other Industries. The fisheries are valuable and furnish occupation for a large number of the inhabitants. On both the Gulf and Bay of Fundy coasts, large numbers of cod, herring, smelt and other salt water food fish are taken, while the lobster fisheries are second to none on the Atlantic coast. Salmon also abound in the streams and lakes and are taken in large numbers. The annual value of the fisheries is over $4,000,000, and fishing is the third industry in value.

COAT OF ARMS OF NEW BRUNSWICK

Many years ago, in the days of wooden sailing vessels, New Brunswick was one of the world's leaders in shipbuilding. The province, then a separate colony, was noted for its ships and its commerce. Of those days the coat of arms is a symbol. The British lion, above, is the sign of loyalty to and union with the Empire.

Among the manufacturing industries, the production of lumber and of lumber and timber products is the most important. The supply of spruce also leads to the manufacture of large quantities of wood pulp. The lumber industry produces about $7,000,000 a year. In some localities the manufacture of butter and cheese is also important.

Transportation. Each coast has a number of good harbors, and there is steamer connection with Portland, Boston and other important cities on the Atlantic coast of the United States. The Intercolonial and Canadian Pacific railways also traverse the province, the former through the eastern portion and the latter through the western. The National Transcontinental (Grand Trunk system) also joins the province with the great West. Each of these lines has branches extending to important manufacturing and trade centers; a cross line from Fredericton to New Castle connects the two systems, so that the province is fairly-well supplied with railway facilities, the entire mileage amounting to about 2,100 miles.

Education. The public school system is controlled by an educational council, of which the provincial superintendent is the head. There are no separate schools for Catholics and Protestants, as is true in Quebec. The courses of study, the methods of instruction and the text-books are uniform throughout the province, and in addition to the elementary schools, normal schools are maintained. The province also provides for those students who wish to pursue a course of study at the University of Fredericton. There are a number of denominational colleges. Of these, Allison College (Methodist) at Sackville is the largest.

Institutions. There is a general hospital at Saint John, also an industrial home for boys, besides instituitons for the deaf and dumb. Hospitals for the insane are maintained in different parts of the province. There is no provincial penitentiary, but convicts are sent to the Dominion penitentiary at Dorchester, an institution maintained by the maritime provinces.

Items of Interest on New Brunswick

The St. John River, which rises in Maine, is over 450 miles long, and is navigable for vessels of moderate tonnage from the city of Saint John to Fredericton.

The Bay of Fundy has a length of 140 miles and an extreme width of forty-five miles.

The Basin of Minas, an extension of the Bay of Fundy, is the scene of Longfellow's *Evangeline*.

The Bay of Chaleur is ninety miles long.

The provincial government has set aside a tract of 10,000 square miles as a national park and game preserve.

The recent law permitting the shooting of stray dogs without liability and the increased use of woven instead of barbed wire for fences is largely responsible for the increase in the number of sheep.

The highest point in the province is Bald Mountain, 2,604 feet.

There are about 650 manufacturing establishments in the province.

There are 1,800 Indians under the control of the agencies.

There are ten Indian schools, with a total attendance of 250; these schools are all Catholic.

The largest cities are Saint John, Moncton, Fredericton, Chatham and Woodstock.

There is little immigration (about 5,000 in 1911), but a steady emigration to the western provinces and to the United States.

Questions on New Brunswick

Compare the areas of New Brunswick and Scotland. Of New Brunswick and Saskatchewan.

What is the highest point in the province?

Where is the Bay of Fundy? The Basin of Minas?

What are the leading crops?

Is dairying an important industry?

What can you say of the growth in sheep ranching?

What is the principal product of the fisheries?

Cities. The two chief towns are Fredericton, the provincial capital, and Saint John, on the Bay of Fundy. Next in importance is Moncton.

Government and Religion. The executive department of the government consists of a lieutenant-governor and a council of six members. The lieutenant-governor is appointed by the Governor-General of Canada, with the advice of his Council, for a term of five years. The legislature consists of a house of assembly of forty-seven members, elected for four years. All local administration is through the county councils.

The inhabitants are largely of English descent, and in religion they are divided between Catholicism and Protestant denominations, the Roman Catholic Church having about one-third of the membership. Among the Protestant denominations, the Anglican Church, Presbyterians, Methodists and Baptists lead.

History. New Brunswick was discovered by Sebastian Cabot in 1498, and with Nova Scotia formed the French colony of Acadia, which continued from 1604 to 1713, during which time it was alternately a possession of the French and the English. In 1713, by the Treaty of Utrecht, it became a British province, but the boundaries were not determined until the Treaty of Paris, which closed the French and Indian wars. In 1755 a large number of the French inhabitants were compelled to leave the province because of their sympathies with the French. In 1784 Nova Scotia was detached, and New Brunswick became a separate province.

At the formation of the Dominion of Canada in 1867, it entered the federation. Separate schools for Protestants and Catholics were abandoned in 1871, after a hard struggle. The province has a public utilities commission for the regulation of rates of companies which serve all the people.

Related Articles. Consult the following titles for additional information:

Chaleur Bay
Fredericton
Fundy, Bay of
Moncton
Saint John
Saint Lawrence, Gulf of

NEW BRUNSWICK, N. J., the county seat of Middlesex County, thirty miles southwest of New York City, at the head of navigation on the Raritan River, on the Delaware & Raritan Canal and on the Pennsylvania and the Raritan River railroads. A fine bridge spans the river. The city is the seat

of Rutgers College, of the Theological Seminary of the Dutch Reformed Church and of the State Agricultural and Mechanical College. There is a public library, the Sage and Gardner libraries, Saint Agnes Academy and homes for orphans and the aged. The place was settled as Prigmore's Swamp in 1681 and was known as Inion's Ferry from 1697 to 1714, when it was named in honor of the British House of Brunswick. It was chartered as a city in 1784. In the Revolution it was the scene of numerous conflicts and was held by the British during the winter of 1776-1777. The commission form of government has been adopted. Population, 1910, 23,388; in 1917, 25,855 (Federal estimate).

NEW'BURGH, N. Y., in Orange County, sixty miles north of New York City, on the Hudson River, five miles above the Highlands, and on the Erie and the West Shore railroads. The manufactures include cotton, woolens, silks, paper, hats, carpets, furniture, leather and other articles. The municipality has a public library, a park, Saint Luke's Home and Hospital, a home for the friendless and a home for children. Hasbrouck House, occupied by Washington for a time during the Revolution, is now used as a museum for war relics. The revolutionary army was disbanded here, and a large stone structure, known as the Tower of Victory, has been erected by the Federal and state governments to commemorate the successful termination of the war. The place was settled by German Lutherans in 1709, was made a village in 1800 and was chartered as a city in 1865. The town is governed on the commission and city manager plan. Population, 1910, 27,805; in 1917, 29,893 (Federal estimate).

NEW'BURYPORT, Mass., one of the county seats of Essex County, thirty-seven miles northeast of Boston, on the Merrimac River, and on the Boston & Maine railroad. The city has a good harbor, and contains manufactures of boots, shoes, cotton cloth, silverware, machinery, hats and other articles. There is a public library, a marine museum, the Putnam Free School, Anna Jaques Hospital, the Dexter House and homes for old ladies and children. Other places of interest are the house in which William Lloyd Garrison was born; the Old South Church, which contains the remains of George Whitefield; Washington Park, and a suspension bridge. The place was settled in 1635, was incorporated as a separate town in 1764 and chartered as a city in 1851. Population, 1910, 14,949; in 1917, 15,291 (Federal estimate).

NEW CALEDONIA, an island in the Pacific, 850 miles east of Queensland, Australia. It is the southernmost of the Melanesian group, and belongs to France. It is 240 miles long, about thirty miles wide, and has an area of about 7,600 square miles. The interior is mountainous and is rich in nickel, gold, copper, lead, cobalt, silver and coal. The island is almost entirely surrounded by a coral reef, five to ten miles from the shore, affording a calm waterway for vessels. The natives, Melanesians, called by the French Canaques, are the best farmers in Oceania. The principal agricultural products are coffee, maize, sugar, tobacco, copra, grapes, cassava and pineapples, wheat and cotton. The island is administered by a governor. Numea, the capital, is the chief port. Population, 50,608.

NEW CASTLE, Ind., the county seat of Henry County, forty miles southeast of Indianapolis, on the Blue River and on Lake Erie & Western, the Big Four, the Fort Wayne, Cincinnati & Louisville and the Pittsburgh, Cincinnati, Chicago & Saint Louis railroads. The leading manufactures include bridge work, sheet iron, steel, furniture, automobiles, and numerous other articles. The Indiana village for epileptics is two miles from the city. Population, 1910, 9,446; in 1917, 14,144 (Federal estimate).

NEWCASTLE, *new'kas'l*, New South Wales, a shipping port on the Hunter River, 102 miles north of Sydney, with which it is connected by rail. It is the chief port for the northern region of New South Wales and is the most important coaling station in the Southern hemisphere. The trade in coal, wool and frozen meats is considerable, and there are copper smelters, foundries, boat factories, carriage works, shipbuilding yards and a steam biscuit factory. The city is well built and progressive. Newcastle is the seat of a United States consul. Population, 1916, estimated, 58,750.

NEWCASTLE, Pa., the county seat of Lawrence County, fifty miles northwest of Pittsburgh, at the confluence of the Shenango and Neshannock rivers, on the Pennsylvania, the Erie, the Baltimore & Ohio, the Pittsburgh & Lake Erie, the Buffalo, Rochester & Pittsburgh, the Western Allegheny, the

Erie & Pittsburgh and the Western New York & Pennsylvania railroads. The city is in an agricultural district, which also contains deposits of coal, limestone, sandstone, fire clay and iron ore. There are nearly 100 factories; the principal products are glass, brick, tin plate, steel, Portland cement, radiators, nails, machinery and paper. Cascade Park is a popular resort. The Y. M. C. A. maintains a public library; there are also two hospitals, Odd Fellows' and Elks' buildings, a city hall and a Y. W. C. A. The place was settled in 1812, and was chartered as a city in 1869. The commission form of government was adopted in 1913. The city operates a garbage disposal plant. Population, 1910, 36,280; in 1917, 41,915 (Federal estimate).

NEWCASTLE-UPON-TYNE, England, a river port and parliamentary borough in the County of Northumberland, on the left bank of the River Tyne, about sixty miles northeast of Liverpool. Located in the midst of one of the largest coal fields in England, it ships out immense quantities of this commodity, a circumstance which has given rise to the expression, "carrying coals to Newcastle," as symbolic of utterly useless labor. Because of its shipping facilities and its location in a rich mineral district, Newcastle has developed as a prosperous industrial and commercial center. It has manufactories of glass, soda, fire brick, chemicals and other commodities, shipbuilding yards, ordnance works and potteries, and one of the largest meat and vegetable markets in Great Britain. Its locomotive and engineering works are mammoth plants, and in this city the English railway system originated.

Newcastle has many notable buildings and educational institutions, including the science and medical colleges of Durham University, a natural history museum and a public library of about 120,000 volumes. The city dates from the Roman period. Its name refers to a castle built in the eleventh century by a son of William the Conqueror. Population, 1911, 266,603; in 1914, estimated, 271,523.

NEWCOMB, *nū'kom*, Simon (1835–1909), an American astronomer and mathematician, born in Nova Scotia. He emigrated to the United States at the age of thirteen, and in 1858 was graduated from the Lawrence Scientific School at Harvard. In 1861 he was appointed professor of mathematics in the United States navy and assigned to duty at the Naval Observatory. He was secretary of the commission which observed the transit of Venus in 1874 and in 1882, the latter from the Cape of Good Hope. In addition to this he directed the observations of several eclipses. In 1897 he retired from the navy and afterwards devoted himself to scientific pursuits. He was editor of the *American Journal of Mathematics*, professor in Johns Hopkins University and a member of numerous royal academies and scientific associations of Europe and America. In many of the American associations he has held the position of president or other important offices, and in 1904 he was president of the International Congress of Arts and Sciences which convened at Saint Louis. He was recognized as the leading authority in his field. Among his important scientific works are *An Investigation of the Orbit of Neptune, Researches on the Motion of the Moon* and *Measure of the Velocity of Light*. Besides these, he has written a number of books for laymen. Among these are his *Popular Astronomy, School Astronomy, The Stars, Astronomy for Everybody* and *Reminiscences of an Astronomer*.

SIMON NEWCOMB

NEW ENGLAND CONFEDERATION, a union formed by the colonies of Plymouth, Massachusetts Bay, Connecticut and New Haven in 1643, under the title *United Colonies of New England*. Its purpose was to secure united action for protection, whether against the Indians, the Dutch, the French or the mother country. During the first twenty years of the union, the confederation was an important force in the colonies, but after that time it rapidly declined, owing to factional disputes and the weakness of its constitution, and in 1684 it went out of existence.

NEWFOUNDLAND, *nū'fund land*, until 1917 a colony of Great Britain; since that year it has been the Dominion of Newfoundland. It was raised to this distinction because of the gallantry of its overseas forces

in the World War. Attached to Newfoundland as a part of the new Dominion is Labrador (which see).

Newfoundland is an island on the eastern side of the Gulf of Saint Lawrence, roughly triangular in form, with an area of 42,734 square miles—slightly greater than that of Ohio. The shores of the island are nearer to Ireland than any other point on the North American continent, the distance being only 1,640 miles. The narrow Strait of Belle Isle separates it from Labrador.

The People. The inhabitants are descended from the original immigrant fisher folk who early came from England, Scotland and France. There is now but little immigration—about 8,000 per year; indeed, the emigration is fully as great. The population of 252,836 (in 1916) is settled almost entirely along the southern coast; the interior is practically uninhabited. Only 3,000 are farmers; 67,000 are fishermen; 2,275 are miners.

The capital is Saint John (32,292 people). Harbor Grace has 4,280; Bonavista, 3,900; Carbonear, 3,540; Twillingate, 3,350.

Surface and Climate. Nearly all the island has a rough surface, though only a part is mountainous, and the elevations are not great. The southwestern coast line is in many places precipitous, some of the elevations reaching 2,000 feet. A few miles back from the ocean the land spreads back to the interior as an uneven tableland. Some of it is barren, and a considerable part is heavily forested, but there is a considerable area of swamps, with many lakes and rivers.

Contrary to general belief, the climate is not so severe in winter as in some parts of the Dominion of Canada, the surrounding water tending to modify it. For the same reason the summers are much cooler than in Canada. The thermometer never records a summer temperature as high as 85°; the average winter temperature at Saint John is 7°. The northeast coast, however, is always colder, owing to the influence of the Labrador Current, which flows southward along that shore from Arctic regions.

Industries. The Grand Banks of Newfoundland are the richest cod-fishing locations in the world; this is the reason that so great a proportion of the people are fishermen. Besides cod, there are taken, also, large quantities of salmon, herring and lobster.

The lumber industry is conducted only to furnish material for paper and pulp; no lumber is exported. There are great paper mills in Newfoundland owned by Lord Northcliffe, to supply paper for his large number of newspapers and magazines in England.

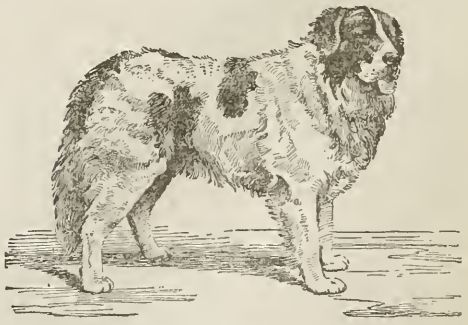
The government is encouraging the people to turn more largely to agriculture, for there are 5,000,000 acres of land suitable for farming. Only hardy crops can be grown; potatoes and turnips are leading products.

Newfoundland is rich in minerals. Copper is mined profitably, and there are deposits of silver, iron, lead, coal, marble, granite and gypsum. The mines are being gradually made productive.

Government and History. The Crown is represented by a Governor-General, as in the Dominion of Canada. The Parliament has the usual two houses, a Senate and a House of Commons.

It is supposed that Newfoundland was discovered about the year 1000 by the Northmen. It was rediscovered by John Cabot in 1497, and in the following century the English took possession of the island; it is therefore Britain's oldest possession in North America. A struggle for supremacy took place between the English and the French, and this interfered with the establishment of permanent settlements on the island. In 1713 Newfoundland and its dependencies were declared by the Treaty of Utrecht to belong wholly to Great Britain, the French reserving a right to fish on certain parts of the coast. Responsible government was granted in 1833, and it remained under a colonial form of control until 1917.

NEWFOUNDLAND DOG, a large, hand-



NEWFOUNDLAND DOG

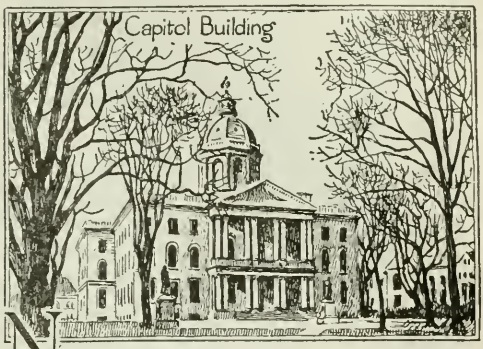
some dog, introduced from the island of Newfoundland. It is usually black or black

and white in color, with large, drooping ears and bushy tail, and in general appearance it is very imposing. It is a splendid water dog, takes to the sea at an early age and has often saved the lives of human beings in danger of drowning. In Newfoundland these dogs are used as beasts of burden and haul wood and provisions on sledges. On account of its great size, its intelligence and its bravery, the Newfoundland dog makes a fine watch dog. Few of the breed are left in Newfoundland, but there are many specimens in Great Britain and the United States.

NEW GLASGOW, Nova Scotia, in Pictou County, on the East River and the Intercolonial Railway. The plants of the Nova Scotia Steel and Coal Company and the Eastern Car Company each employ about 1,200 men. Other establishments produce glass, agricultural machinery, bridges, bricks, mineral waters, steel and wire fencing, lumber and mill products. Besides coal, the district yields limestone, iron ore, spruce and some hardwoods. Population, 1916, 9,000.

NEW GUINEA, *gin'ee*, next to Greenland, the largest island in the world, having an area of about 310,000 square miles. It lies in the Western Pacific Ocean, eighty miles north of Australia, from which it is separated by Torres Strait. At the outbreak of the World War New Guinea was divided among three European nations, Great Britain, the Netherlands and Germany. The British territory, covering 87,786 square miles, and having an estimated population of 252,000, occupies the southeastern part of the island. Kaiser-Wilhelmsland, in the northeast, has an area of 70,135 square miles and an estimated population of 531,000. This region was occupied by Australian forces in October, 1914. The western part of New Guinea is held by the Netherlands, and has an area of 151,789 square miles. Its estimated population is 200,000.

British New Guinea is governed as a part of Papua, which is one of the territories of the Australian Commonwealth. The territory of Papua is made up of New Guinea and a number of near-by islands. In British New Guinea the land is gradually coming under cultivation, and cocoanuts, rubber, sisal hemp and tobacco are raised in profitable quantities. There are three ports of entry, Samarai, Daru and Port Moresby, and between the latter and Sydney there is regular steamship service. Dutch New Guinea belongs politically to the East Indian outpost province of Ternate. Christian missionaries have done considerable educational work in the British and German sections of the island.



NEW HAMPSHIRE, an American commonwealth in the New England group of states, among which it is third in size. New Hampshire was one of the original thirteen states, and was the ninth to ratify the Federal Constitution, thus making that document the fundamental law of the nation. Its popular name, The Granite State, was bestowed in reference to its granite mountains.

Location and Area. New Hampshire touches the Canadian province of Quebec on the north, and is bounded on the west and south by Vermont and Massachusetts. The entire Vermont-New Hampshire boundary is formed by the Connecticut River. On the east New Hampshire adjoins Maine, except for a stretch of eighteen miles at the extreme south, where it is bordered by the Atlantic Ocean. Of all the Atlantic states, New Hampshire has the shortest coast line.

The state ranks forty-third in size among the American commonwealths, and its area of 9,341 square miles is about 200 square miles less than the area of Vermont, and about 1,000 square miles greater than that of Massachusetts. Included in this area are 311 square miles of water surface. In shape the state grows gradually narrower from south to north, its map suggesting a right-angled triangle.

The People. In 1910 New Hampshire had 430,572 inhabitants, being thirty-ninth in population among the states of the Union. In July, 1918, it had a population of 446,352, according to a Federal estimate. Only Vermont, among the New England States, has fewer inhabitants. About one-fourth of the

people are foreign-born, the predominating nationalities being Canadian (both French and British) and Irish. About sixty-three per cent of the people are of the Roman Catholic faith. Of the Protestant bodies the strongest are the Congregational, Baptist, Methodist and Protestant Episcopal. There are nine cities with populations exceeding 9,000; the first five, in order of size, are Manchester, Nashua, Concord (the capital), Berlin and Dover.

Surface and Drainage. The state is noted for its picturesque scenery. The White Mountains, occupying the north-central part, cover an area of about 1,400 square miles and constitute the most striking physical feature. They are a part of the Appalachian system and are divided by the valley of the Saco into two ranges, known respectively as the Presidential and Franconia ranges. The Saco valley, a narrow gorge with steep sides, is famous, and is known as Crawford Notch. There are a number of peaks whose bare, rocky summits rise above the tree line and so reflect the sunlight as to give them the appearance of snow-capped mountains. It is from this peculiarity that they received the name "White Hills," later changed to White Mountains. The Presidential Range has the highest peaks, the best known being Mount Washington (6,293 feet). Adams, Jefferson, Clay, Monroe and Madison are all over 5,000 feet in altitude.

The bases of these mountains are heavily wooded. They abound in deep valleys and narrow ravines, through which flow rushing streams. Many of these gorges are bounded by precipitous cliffs, some of which are more than 1,000 feet high. The most remarkable of these is the cliff overlooking a small lake in the Franconia Range, and containing a celebrated projection known as *The Old Man of the Mountains*. This is a profile formed by projecting rocks and measuring more than eighty feet from forehead to chin, bearing a striking resemblance to a human face. It is supposed that this profile was the foundation for Hawthorne's allegory, *The Great Stone Face*, though the valley does not exist as he describes it.

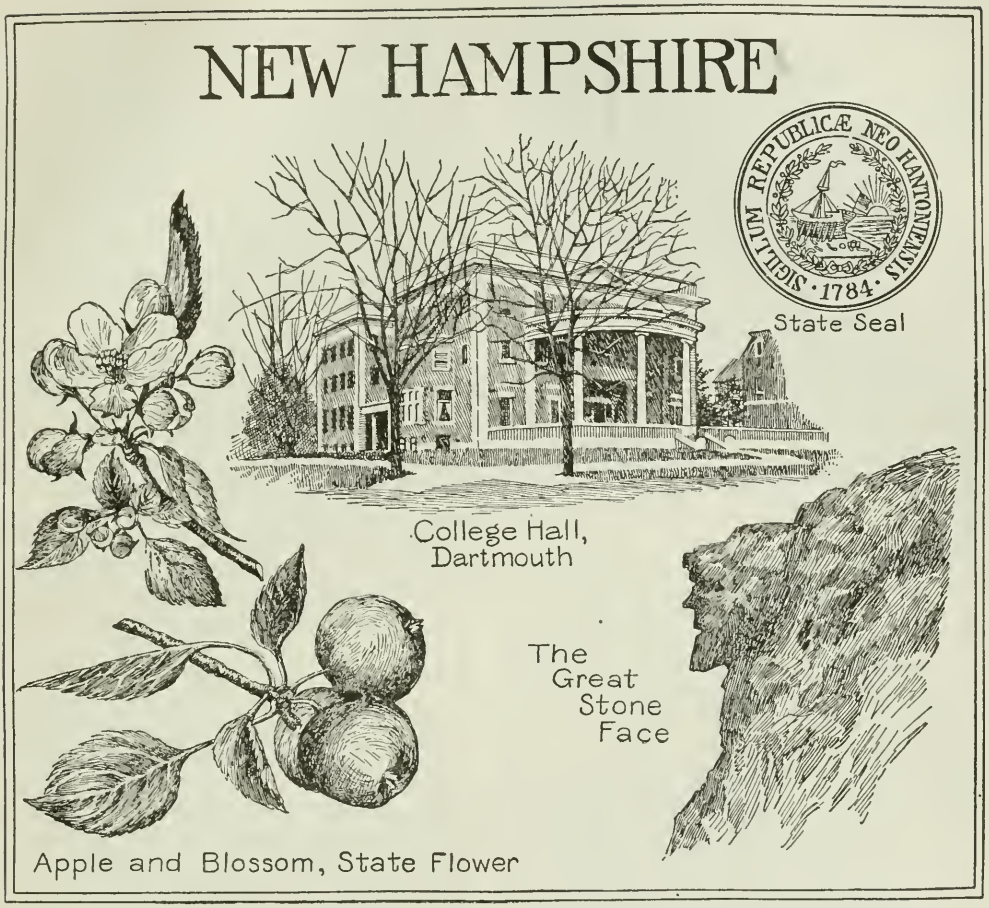
The Connecticut and its tributaries drain the western and northern regions, and the Merrimac and Piscataqua drain the southern and southeastern portions. The banks of the Merrimac are lined with factories, and this river is said to turn more spindles than any other in the world. The mouth of the Piscataqua is a broad estuary. Numerous small lakes, noted for their beauty, are scattered over the state. Lake Winnepesaukee, in the south-central part, the largest, is nineteen miles long, over eight miles wide, and contains 264 islands.

Climate. New Hampshire has a typical New England climate. The winters are severe, and in the northern half snow usually falls to a great depth. The summers are mild and pleasant. The mean annual temperature at Concord is 48°. The annual precipitation is forty-five inches.

Minerals. The chief mineral products are mica and granite. New Hampshire is usually fifth among the states in the production of granite, and is surpassed only by North Carolina in mica. The value of the granite output averages more than $1,200,000 a year. Of other minerals worked, the most important are scythe stones, slate, limestone and brick clay. Mineral waters are found in various places. The total annual yield of mineral products is valued approximately at $2,000,000.

Agriculture. In the river valleys the soil is well suited for farming, but much of the land is too stony to be worked to advantage. From one-sixth to one-fourth of the total area is under cultivation. The principal crops, in order of value, are hay, potatoes, corn, oats and tobacco. Among orchard fruits apples are the most important, and among small fruits, strawberries. Dairying and the raising of live stock and poultry are profitable branches of the agricultural industry. As in other New England states, one finds in New Hampshire many beautiful country estates in regions where farming has been abandoned.

Forests. Although much valuable timber has been cut from the virgin forests, New Hampshire is still an important lumber state. The White Mountains region is all forest-covered. Red spruce, in the yield of which New Hampshire is exceeded only by Maine, is the most important timber from a commercial standpoint, and is used extensively by the paper and wood pulp industries. The state ranks fifth in the production of white pine, though most of the cut is from the second growth. Other valuable woods include sugar maple, birch, beach, white oak and cedar. In 1916 the United States government purchased a tract of 5,000 acres in the



White Mountains, lying on the slope of the Presidential Range. The Federal government now has holdings in New Hampshire covering more than 270,000 acres of forest land, and it controls practically all of the peaks of the Presidential Range.

Manufacture. The state enjoys the advantages of abundant water power, proximity to good markets and excellent transportation facilities, and the southern portion has developed into one of the most prosperous manufacturing regions in the United States. At the thirteenth census New Hampshire was outranked in New England only by Massachusetts and Rhode Island in the production of cotton goods, and among all the states it was seventh in rank. It ranked fourth in boot and shoe manufacture, eighth in the production of paper and wood pulp, and eighth in woolen goods. Manchester and Nashua are the chief factory centers. The annual value of the manufactured products is in excess of $180,000,000.

Transportation. Numerous railways traverse the valleys, and nearly every town of importance has ready access to one or more of these lines. The total railway mileage is over 1,200. In 1917 the Boston & Maine road owned or leased 1,020 miles of the total mileage. The Maine Central has 100 miles. A third road, operating in the extreme north, is the Grand Trunk. The Mount Washington railway makes an ascent of 3,625 feet in two and three-fourths miles, and it is the first of its kind ever constructed. It is operated during the summer for the benefit of tourists.

Government. The legislature consists of a senate of twenty-four members, distributed among twenty-four senatorial districts. The house of representatives consists of members apportioned according to population, all towns, cities and wards having 600 inhab-

Items of Interest on New Hampshire

New Hampshire is over seven times as large as Rhode Island, the smallest state, and about one-twenty-eighth the size of Texas.

The average density of population in 1910 was 47.7 per square mile.

In 1916 there were fifty-seven savings banks in the state, with 246,395 depositors.

An important occupation in the mountain region of the state is the entertainment of summer tourists.

The navy yard at Kittery, Me., is known as the Portsmouth Navy Yard because Portsmouth is its port of entry.

The peace treaty between Russia and Japan was signed at Portsmouth in 1905.

The White Mountains, famous for the beauty of the scenery, are sometimes called the "Switzerland of America."

Mount Washington is the second highest peak East of the Rockies, being exceeded in altitude only by Mount Mitchell, in the Black Mountains of North Carolina.

Manchester ranks sixth among the cities of the Union that make boots and shoes; it also ranks fourth among the cities of New England as a producer of cotton goods, its factories turning out more than 300 miles of cloth daily.

The first bank in New Hampshire was chartered in 1792.

Questions on New Hampshire

Describe the surface of New Hampshire.

What is the most remarkable feature of the Franconia Range of mountains?

What are the principal mineral products? Agricultural products?

How does the state rank as a producer of agricultural products?

Name the important manufacturing centers.

What natural conditions favor manufacturing?

When and by whom was New Hampshire settled?

When did it ratify the Federal Constitution?

itants being entitled to one representative, and one for each additional 1,200 inhabitants, while districts having fewer than 600 inhabitants are entitled to a representative for a part of the legislative term corresponding to the ratio of their population to 600. The members of both houses are elected for two years. The executive department consists of the governor and a council of five members, chosen by popular vote, and a secretary of state, a treasurer and a commissary-general, chosen by joint ballot of the senate and house of representatives.

The judicial department consists of a supreme court, with a chief justice and four associate justices; a superior court, with a chief justice and four associate justices; probate courts and justices of the peace. There is a juvenile court law regulating the procedure for offenders under seventeen. The justices are appointed by the governor and confirmed by the council. A convention for the revision of the constitution may be called every seven years if two-thirds of the electorate vote to that effect.

Education. Since 1647 New Hampshire has had an organized system of education. The state law requires that at least twenty weeks of schooling a year must be provided by every town. The compulsory law requires attendance of children from eight to fourteen years of age during the whole school term. Pupils in towns which do not provide high schools are permitted to attend such schools in other towns, and the expense is met by the state.

New Hampshire organized its school system before the law was passed providing school funds from the sale of public lands, and therefore most of the money for the support of its schools is raised by local taxation. State normal schools are located at Plymouth and Keene; the state agricultural college is at Durham. Dartmouth College at Hanover is the most important educational institution, and one of the leading colleges of the country (see DARTMOUTH COLLEGE). Saint Anselm's College at Manchester is the leading Roman Catholic school. Phillips Exeter Academy at Exeter and Saint Paul's School at Concord are well-known schools for boys.

Institutions. The charitable and corrective institutions include a school for the feeble-minded and a soldiers' home at Tilton; an industrial school at Manchester; a state sani-

tarium at Benton and the state prison and the hospital for the insane at Concord.

History. New Hampshire was first settled about 1623 by fishermen from Massachusetts, in the neighborhood of Dover and Portsmouth. It was granted to George Mason, but his claims were afterwards silenced, and the colony voluntarily united with Massachusetts and remained so with slight interruptions until 1741. New Hampshire took a leading part in the pre-Revolutionary discussion and furnished more than its quota of soldiers to the continental armies. It was among the first states to adopt an independent constitution, and its ratification of the Federal Constitution, June 21, 1788, assured the final adoption of that instrument. Before and during the Civil War, the sentiment of the state was strongly anti-slavery, and it furnished its full quota of troops to the Union armies. Within recent years much progressive legislation has been passed, and in 1917 a state-wide prohibition law was enacted, to become effective in 1918, in advance of national prohibition.

Related Articles. Consult the following titles for additional information:

Berlin	Keene	Nashua
Concord	Laconia	Portsmouth
Connecticut River	Manchester	Saco River
Dover	Merrimac River	White Mountains

NEW HAVEN, CONN., one of the oldest towns in the United States and one of its great educational centers, the thirty-ninth in size, the largest city in the state and the county seat of New Haven County. It is seventy-two miles east and a little north of New York City, on New Haven Bay, four miles from Long Island Sound. The population in 1910 was 133,605; in 1918, 154,865 (Federal estimate).

Distinctive Features. The city is situated on a low plain between two elevations of 360 and 400 feet at the east and west; also two rivers, the Quinnipiac and the West, are on the east and west sides. A great many old elms gave New Haven the name, "City of Elms," but many of these early landmarks have disappeared. There are about 1,200 acres in the park system. The most famous of the parks is a square of sixteen acres in the center of the city close to the educational life of the town, called "The Green." In it stands a church designed by Sir Christopher Wren. West Rock Park (281 acres) contains the "Judges' Cave," where it is claimed that Goffe, one of the signers of the death warrant of Charles I, and his father-in-law Whalley concealed themselves in 1661, when sought by Charles II for punishment.

Yale University (which see), removed to New Haven in 1716. There are a number of good preparatory schools, between fifty-five and sixty public schools, and a trade school.

The city is served by six branches of the New York, New Haven & Hartford Railroad, and by a network of interurban roads. Two lines of steamships operated on the Sound and also to New York City.

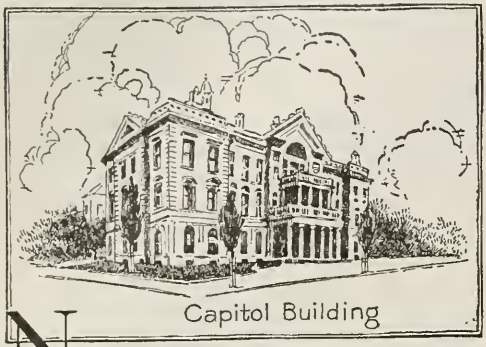
Industries and Buildings. In former days there was a great deal of shipbuilding in New Haven; the industry declined, but was at least temporarily revived in 1917 to meet war necessities. The city is best known, possibly, for its manufacture of clocks, for New Haven clocks are known on three continents. Ammunition and arms factories employ more people, however, than any other industry. A great variety of other manufacturing concerns are in the city.

Some of the university buildings are distinct adornments to the city, besides which there is a great hotel, a white marble courthouse, the New Haven County Historical Society building, churches 150 years old, the great university library of nearly a million volumes, the Ives Memorial Library, a new Federal building, several hospitals and numerous charitable institutions.

Early History. In 1638 a company of Puritians, under Theophilus Eaton and the Reverend John Davenport, settled at the place, called by the Indians Quinnipiac. Two years later the town was given the name of New Haven, and it became the capital of the independent "New Haven Colony." In 1665 this was united with the Connecticut colony, of which in 1701 it was made a joint capital with Hartford, retaining this position until 1873. A force of British took the town on July 5, 1779. In 1784 New Haven was incorporated as a city.

NEW HEBRIDES, *heb'ri deez,* a group of islands in the Pacific Ocean, lying northeast of New Caledonia and northwest of the Fiji Islands. Some are of coral formation, others are of volcanic origin. Their total area is about 5,100 square miles. They are fertile, and produce cocoanuts, breadfruits, bananas, pineapples, oranges and sandalwood. The climate is unhealthful, even for the natives. The inhabitants, which number about 50,000,

are Melanesians, formerly cannibals, but civilized by European influence. The islands are jointly administered by England and France.



Capitol Building

NEW JERSEY, one of the original thirteen states of the American Union, the third (after Delaware and Pennsylvania) to ratify the Constitution. This occurred December 18, 1787. It is one of the Middle Atlantic states. New York is on the north and northeast, the Atlantic Ocean is on the east, and the Delaware Bay and Delaware River separates the state from Delaware and Pennsylvania on the south and west. The area is 8,224 square miles, which makes it the forty-fifth in size, only Connecticut, Delaware and Rhode Island being smaller. However, it was eleventh in population in 1910, with 2,537,167 people. A Federal estimate raised this to 3,080,371 in 1918. The sugar maple tree, rather than a flower, is the emblem of the state.

Surface and Drainage. Most of the state is low land. If all of New Jersey were to be depressed 100 feet fully one-half would be under water. It is divided into four physiographical regions, three of which are in the northern part, and extend across the state in a northeast-southeast direction. The first of these belts is bounded on the west of the Kittatinny Mountains, a continuation of the Blue Mountains in Pennsylvania. The cut through these mountains made by the Delaware River forms the famous Delaware Water Gap, noted for the beauty of its scenery. The mountains of this range do not exceed 1,800 feet in altitude. To the east of the mountains lies the Kittatinny valley, an extension of the Great Appalachian valley, and containing many fertile and highly-cultivated farms.

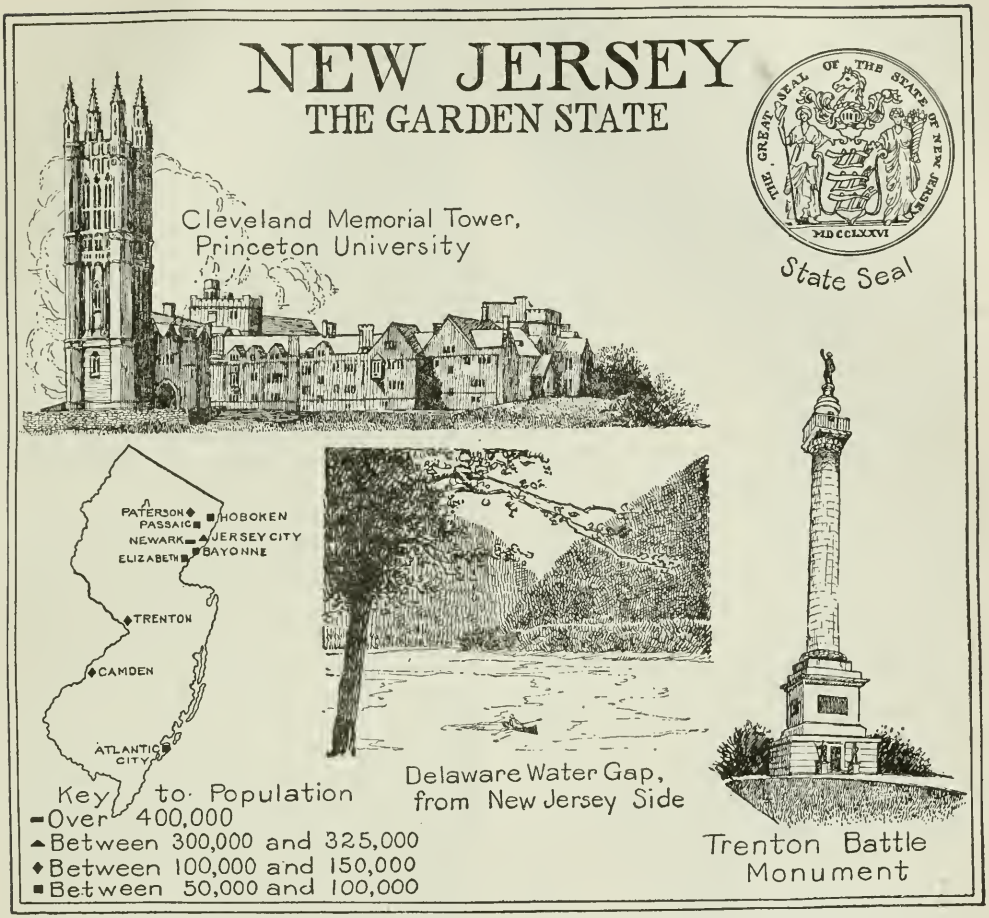
The second region, known as the Highland Belt, is a succession of plateaulike masses, having an altitude of 1,200 or 1,400 feet. Following this is the Piedmont plain, nearly as wide as the other two regions combined, having a variety of surface and containing a number of bold ridges, the most famous of which is the Palisades. The plain descends by gentle undulations to sea level on the coast. The fourth region includes all that part of the state lying south of a line running from Newark Bay to Trenton. This is a belted coastal plain, nowhere more than 400 feet in altitude and sloping gently to sea level.

The western part of the state is drained by the Delaware River, into which flow numerous short tributaries. The rivers flowing into the Atlantic, in the southern part, are characterized by broad estuaries. To the north, the Raritan flows into Raritan Bay, and in the northeastern section are the Passaic and the Hackensack, flowing into Newark Bay.

Climate. New Jersey has a mild, temperate climate, varying considerably between the northern and southern parts of the state. In the eastern part the temperature is modified by sea breezes, which, meeting land breezes, often produce oppressive humidity. The mean annual temperature at Atlantic City is about 52°, and the annual rainfall is about fifty inches.

Mineral Resources. There are quite extensive beds of iron ore in the highland belt, and these have been worked for many years, though the opening of more extensive iron regions around the Great Lakes years ago lessened the relative importance of the production of the New Jersey mines. Large quantities of zinc ore are also obtained, and in the production of zinc New Jersey is second only to Missouri. Among other minerals of importance are limestone and clays suitable for brick and pottery. Large quantities of rock suitable for the manufacture of Portland cement are also found, and this product is extensively manufactured. Another important mineral product is pottery clay, in the production of which New Jersey ranks second among the states. In the southern part sand suitable for glass-making is found.

Fisheries. Its extensive coast line makes New Jersey a favorable location for fishing industries. Many are engaged in oyster farming, and clams, shad, bluefish, cod and menhaden are taken in large quantities. The



canning of small menhaden, under the name of sardines, constitutes an important industry in some localities. The fishing industry is worth over $3,000,000 a year.

Agriculture. The soil is generally fertile and easily tilled. There is an abundance of moisture, and the climate is suitable to the production of fruits, vegetables and cereals. Because of the nearness to New York, Philadelphia and Baltimore, all localities have the advantage of good markets, and the raising of fruit, vegetables and other garden products is an important branch of agriculture. The most valuable crop is hay, worth about $11,000,000 a year; the second in value is potatoes (about $3,500,000), and the third is corn (about $2,000,000). New Jersey is second among the states in the production of blackberries, fourth in pears, flowers and plants, and sixth in strawberries. In those areas containing good grazing land, dairying is practiced to some extent, though it cannot be considered one of the leading agricultural industries. New Jersey is known for its cranberries, which are grown on the marsh lands along the coast, the state producing almost one-half of the entire crop of the country; it is second to Massachusetts.

Manufactures. Considering its size, New Jersey is one of the leading manufacturing states; most of these industries are located in the northern section. Those of the greatest importance are the manufactures of silk goods, cotton and woolen goods, iron and steel products, machinery, sewing machines, pottery, in which the state is second in the Union, terra cotta and tile. In many of the cities there are extensive works for the manufacture of chemicals and tobacco products. Before the advent of prohibition, there were great distilleries. Other localities are also given to the manufacture of jewelry, and

glass is manufactured to some extent in the southern counties.

Transportation and Commerce. New Jersey is remarkably well supplied with railroads, since, in addition to the local roads, several trunk lines running to New York pass through the state. There were 2,443 miles of railroad in 1918. There are also two canals—the Morris Canal, leading from Jersey City to the Delaware River at Philipsburg, and the Delaware-Raritan Canal, connecting the Delaware River with Raritan Bay. The Delaware is navigable for ocean steamers as far as Philadelphia and for other boats to Trenton. The coast contains several good harbors.

Education. The interests of education have not been neglected since the first New Jersey school was founded at Bergen in 1661. The first general school law was enacted in 1693. Princeton College, now Princeton University, was founded in 1746. Not until 1871 was education made free to all children by the passage of a state school tax law. Educational affairs are in the hands of a state board of education of eight members.

Princeton has become one of America's great universities. Among other schools of high rank are the following:

College of Mount Saint Mary, Plainfield.
College of Saint Elizabeth, Convent.
Drew Theological Seminary, Madison.
Rutgers College, New Brunswick.
Saint Peter's College, Jersey City.
Seton Hall College, South Orange.
Stevens' Institute of Technology, Hoboken.
Upsala College, Kenilworth.

There are normal schools at Trenton, Montclair and Newark. There is no state university.

Institutions. The following are the principal public institutions: The school for the deaf at Trenton, the state prison at Trenton, the reformatory at Rahway, a home for boys at Jamesburg, a home for girls at Ewing, a home for disabled soldiers at Kearny, a home for disabled soldiers, sailors, marines and their wives at Vineland, state hospitals for the insane at Trenton and Morristown, a village for epileptics at Skillman and homes for feeble-minded women and children at Vineland.

Cities. In 1918 there were thirty-seven cities each having a population exceeding 8,000. Newark is the largest; the next five, in order of size, are Jersey City, Paterson,

Items of Interest on New Jersey

Except the short boundary line at the north which divides New Jersey from New York, the state is bounded on all sides by water.

The highest point in the state is in the extreme northwest corner and is known as "High Knob;" it has an altitude of 1,799 feet.

New Jersey stands first in silk manufactures, second in Portland cement, and fourth in jewelry.

The state's output of silk is about $65,000,000 yearly; one-third of the total for the United States; Paterson alone produces one-fifth of the total for the country.

Owing to the constant demand of New York and Philadelphia for plants and flowers, this industry is very profitable; New Jersey ranks fourth among the states in the value of flowers and plants raised.

The first railroad in New Jersey was the Camden and Amboy, opened in 1831.

A circle drawn with the City Hall, New York, as its center, and having a radius of twenty-five miles, will include what we may term the New York metropolitan area; nearly three-fifths of the population of New Jersey live in that area.

Questions on New Jersey

Describe the geographical position of New Jersey.

What can you say of the surface of New Jersey?

Why are market gardening and the raising of plants and flowers so profitable?

Name the three leading agricultural products.

What features give New Jersey exceptional fishing facilities?

Describe the mineral resources of the state.

In what particular industry does New Jersey stand second? Fourth? Sixth?

What is the most important industry of the state?

For what is Newark noted?

Trenton and Camden. (See alphabetical list at the end of this article.)

Government. The legislature is composed of one senator from each county, elected for three years, and an assembly of not more than sixty members, apportioned among the counties according to population, and elected for one year. The legislature meets annually. The executive power is vested in a governor, elected for three years. The chief state officers are a treasurer and a comptroller, elected for three years by the senate and assembly in joint session. A secretary of state, an attorney-general, an adjutant general, a commissioner of banking and insurance, a clerk in chancery, a clerk of the supreme court and a superintendent of public instruction are appointed by the governor, with the approval of the senate.

History. The first settlement in New Jersey was made by the Dutch, about 1617. Thereafter it was settled successively by the Swedes and the English, who with the Dutch, maintained a continuous warfare for the control of the territory until 1664, when the English gained control. It was granted by Charles II to the Duke of York and by him to lords Berkeley and Carteret. By them it was divided into two territories, East and West Jersey, and in 1682 an organization, chiefly of Quakers under William Penn, bought East New Jersey, but later relinquished their rights, and the two territories were reunited in 1702. During the French and Indian Wars, New Jersey loyally supported the English cause, but in the Revolution it contributed, besides its militia, more than 10,000 men to the Continental army. It was the scene of some of the most important campaigns of that war, and suffered heavily.

In the Constitutional Convention, the delegates from New Jersey steadily opposed the establishment of a strong central government, the so-called *New Jersey plan* contemplating a union that was to have little authority over the states. In the slavery struggle the state was generally hostile to the institution and furnished its full quota of men to the Union armies. The chief issues in the state politics after the war have been those connected with the taxation and control of corporations. The state has furnished one President—Woodrow Wilson.

Related Articles. Consult the following titles for additional information:

CITIES

Atlantic City, Bayonne, Bloomfield, Camden, Elizabeth, Hoboken, Jersey City, Long Branch, Millville, Morristown, Newark, New Brunswick, Orange, Passaic, Paterson, Perth Amboy, Trenton

GENERAL

Delaware Water Gap, Monmouth, Battle of, Palisades, Princeton University, Princeton, Battle of, Trenton, Battle of

NEW LONDON, Conn., one of the county seats of New London County (Norwich being the other), fifty miles east of New Haven, on the New York, New Haven & Hartford and the Central Vermont railroads, and on the Thames River, about three miles above Long Island Sound. It is a beautiful residence place and a popular summer resort. There are regular steamboats to New York, and the city has a good harbor, with Fort Griswold at the entrance. This fort was built during the Revolutionary War, and is obsolete. The place was once famous as a whaling port. The various industrial establishments include machine shops, foundries, printing-press works, silk mills, shipyards and furniture. The city has several parks, two hospitals, a handsome public library, the library of the county historical society; the Connecticut College for Women and a United States Revenue Cutter School of Instruction.

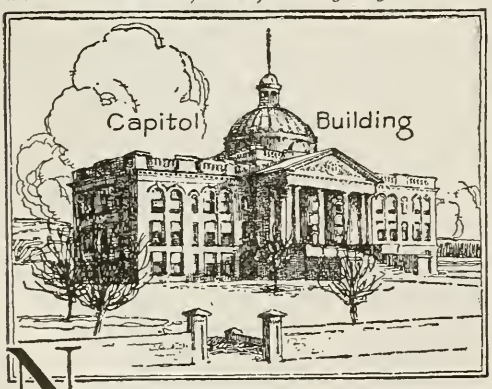
The place was settled in 1646 by John Winthrop, and was known as Naumeag until 1658. In 1781 Benedict Arnold with a large British force, assisted by a fleet, attacked the city, killed a number of the inhabitants and burned most of the wharves and stores. A shaft 127 feet high has been erected as a memorial to the victims. Other places of historical interest are the Hempstead House, one of the oldest in the state; the old town mill, erected in 1646 and still in operation, and the little school in which Nathan Hale was teacher. Population, 1910, 19,659; in 1917, 21,199 (Federal estimate).

NEWMAN, John Henry, Cardinal (1801–1890), a distinguished Roman Catholic divine. He was born in London, the eldest of six children and was educated at Trinity College, Oxford. In 1824 he was ordained in the Church of England. He was vice-president of Saint Alban's Hall (1825–1826) under Doctor (afterward Archbishop) Whately, and later became tutor in Oriel College. In 1828 he became vicar of Saint Mary's, the university church, where his powerful sermons gained for him a commanding position. He took part with Kreble and Pusey in originating the Oxford move-

ment, was a leader in the propaganda of High Church doctrines and contributed largely to the celebrated *Tracts for the Times.* The last of these, on the elasticity of the Thirty-nine Articles, was censured by the university authorities and was the cause of Newman's resignation of his offices in 1843.

CARDINAL NEWMAN

In 1845 he joined the Church of Rome. Newman was ordained a priest of that Church and became head of the oratory of Saint Philip Neri at Birmingham, rector of the Roman Catholic University of Dublin (1854–1858) and principal of the Roman Catholic school at Edgbaston. In 1879 he was created a cardinal. He wrote some remarkable works sustaining the doctrines of the Church of Rome, particularly the *Apologia pro Vita sua* (1864) and the reply to Mr. Gladstone (1875) on the *Vatican Decrees.* He is the author of the well-known hymn, popular in all denominations, *Lead, Kindly Light.*



NEW MEXICO, one of the Southwestern states of the American Union, the fourth in size and the forty-third in population. New Mexico was next to the last territory to attain statehood, being formally admitted to the sisterhood of states just ahead of Arizona. Industrially the state is noted for its great mineral production, as it occupies a part of the rich plateau region south of the Rocky Mountains.

Location and Area. Four American states and one foreign country touch the borders of New Mexico. Its entire northern boundary adjoins the frontier of Colorado, and the western state line coincides with the eastern Arizona boundary. Mexico and Texas are on the south, and Texas also follows the eastern boundary with the exception of about thirty-five miles in the extreme north, where the "Panhandle" of Oklahoma projects westward. The state has three straight boundaries meeting so as to form regular angles, but the southern boundary line is broken in two places. New Mexico has an area of 122,634 square miles, of which 131 square miles are water surface. It is exceeded in size by Texas, California and Montana; its area is nearly twice that of all the New England states combined.

People and Cities. In 1910 the population was 327,301; there were 2.7 people to each square mile. This great state could contain ninety-eight Rhode Islands, but the ratio of the number of inhabitants per square mile to the number for Rhode Island is about 1 to 188. According to a Federal estimate, the population in July, 1918, was 437,015. There are no large cities; Albuquerque, with a population of 14,509, (1917), is the only municipality with over 10,000 inhabitants. Santa Fé, the capital, and Las Vegas, a prominent wool market, are the most important of the other cities.

Besides the English-speaking people, there are in New Mexico a large number of Spanish-Americans, Indians and mixed breeds, called *Mestizos.* There are about 22,000 Indians, of Navaho, Pueblo and Apache stock. Many of these are progressive and industrious, and the terraced villages of the Pueblos are among the most interesting Indian antiquities in North America. The Spanish-Americans, who are slow to adopt modern ways of living, are gradually decreasing in number. About three-fifths of the people in New Mexico are Roman Catholics; Methodists, Presbyterians and Baptists are the largest Protestant denominations.

Surface and Drainage. The state occupies an elevated plateau having its greatest altitude in the west and northwest, and sloping gradually towards the south and southeast. In the Pecos valley near the southern boundary is a small area less than 3,000 feet in altitude, but with this exception the plateau is above 3,000 feet. This plateau is divided into distinctly-marked surface areas, which extend across the state from

north to south. Beginning on the east, the first of these is a region belonging to the Great Central Plain. In the southeastern part this region slopes to the level and arid plateau known as the Llano Estacado, or Staked Plain. West of this region is the Pecos valley, which is the lowest land in New Mexico. From this valley the surface rises westward until it meets the Front Range of the Rocky Mountains.

West of this range is the valley of the Rio Grande, which traverses the state from north to south, and west of this is the great broad plateau which forms the Continental Divide. In the central part are a number of plains covered with grass, lying between isolated groups and mesas of the Front Range. Towards the south these plains are succeeded by barren valleys containing lava beds and salt marshes. There are several lofty peaks, the most prominent being Cerro Blanco, 14,269 feet; Truchas, 13,275 feet; Taos, Costilla, Baldy, Lake and Mora, all over 12,000 feet in altitude.

New Mexico, for a region with a small amount of rainfall, has a large number of rivers. Many of them disappear in the dry season, and none is navigable. The Rio Grande passes completely through the center of the state from north to south and receives many tributaries. The northeastern section is drained by the Red River and its numerous branches. The Pecos rises northeast of Santa Fé and flows south across the Texas line, finally joining the Rio Grande. In the northwest is the Rio San Juan. In the central west are the headwaters of the Little Colorado, and in the southwest are those of the Gila.

Climate. The delightful and healthful air of New Mexico has given it repute as a health resort, especially for consumptive patients. The mean temperature at Santa Fé is 48°, the extremes being from 1° below zero to 70° above zero. The yearly rainfall varies from six inches in the southwest to thirty inches in the mountains in the north.

Agriculture. The greater portion of the state is pasture land, and stock raising, next to mining, is the chief industry. Wherever there is sufficient water, either in streams or in springs, to supply the wants of animals, the grass is amply sufficient to support either cattle or sheep. New Mexico, with over 3,000,000 sheep, is prominent in the sheep-raising industry, ranking fourth among the states. The supply of timber is small, only the higher sections being timbered, and even there not densely. Pine in the mountains, scrub oak and juniper in the lower sections, willow and cottonwood along the river banks are common.

The farm area is about one-seventh of the total land area, and two-fifths of the farms are irrigated. The most profitable crop is hay; corn, wheat, potatoes and oats are next in order among grains and vegetables. Potatoes succeed best in the mountainous regions. The Taos valley is an exceptionally fine wheat country. It is as a fruit-producing region, however, that a large portion of the irrigated land of the state especially excels. The area of fruit and vine culture is being yearly extended. Peaches, plums and apricots come to perfection in the north, and pears, apples, quinces, cherries and other fruits flourish throughout the middle and southern sections. Grapes are abundant from Bernalillo to El Paso, and in some favored spots, like La Joya, farther north.

Mineral Resources. Mining operations have been carried on since the discovery of this region by the Spaniards. Nearly all of the mountainous portions of the state are rich in minerals. Those mined to the greatest extent are copper, coal, gold and silver. The output of copper has greatly increased since 1912, and now is over 100,000,000 pounds a year. Anthracite, bituminous coal and lignite are found, and the yearly output is over 3,000,000 tons. The mining of gold ranks next in importance, and this is followed by silver. Emeralds, turquoises and other precious stones are found in paying quantities, and other minerals worked include zinc, lead, gypsum, iron ore, mica, clay and salt.

Manufactures. The manufactures are limited in extent, but since 1890 they have rapidly increased in number and importance. Most of the industries are connected with the smelting and refining of ore and the construction and repairing of cars and locomotives for the railway lines passing through the state. There are a number of flour mills, some sawmills and numerous carpentry and repair shops in various localities to meet the demands of the surrounding population. The production of large quantities of wool has led to the establishing of several plants for wool-scouring. There are also a number of beet-sugar factories and establishments for canning fruit.

Transportation. The Atchison, Topeka & Santa Fé Railway system enters the state in the northeastern section and extends across it from north to south, following, through a large part of the way, the valley of the Rio Grande River. The western branch of this line extends westward to the Pacific coast and east to Texas and the Gulf of Mexico. A branch of the Southern Pacific enters New Mexico from the east and traverses it in a southwesterly direction to El Paso, thence westward into Arizona and then to the Pacific coast. The other important lines are the El Paso & Southwestern and the Denver & Rio Grande. The total railway mileage is about 3,000.

Education. The large number of Spanish-speaking residents gave New Mexico a high rate of illiteracy in the past, but this rate is rapidly being lowered as the public school system is becoming steadily more efficient. All children between the ages of seven and fourteen are compelled to attend school, and the use of the English language is compulsory. Besides the white schools, with their enrollment of over 75,000 pupils, there are twenty-six Indian schools maintained by the United States government. There is a state director who oversees industrial education, but other public schools are under the supervision of a state superintendent and local boards of education. For higher instruction there are normal colleges at Las Vegas and Silver City, the University of New Mexico at Albuquerque, a school of mines at Socorro, a military institute at Roswell, and a college of agriculture and mechanical arts at Mesilla Park.

Institutions. The state corrective and charitable institutions include a hospital for the insane at Las Vegas, a miners' hospital at Raton, a reform school at Springer, an asylum for the blind at Alamogordo, and the state penitentiary at Santa Fé.

Government. New Mexico is governed under its first constitution, adopted in 1911. All amendments to this document must be ratified by popular vote. The legislative de-

Item of Interest on New Mexico

The present boundaries of the state were defined in 1863.

The railway mileage is about 3,000; the length of railway per inhabitant is five times the average for the United States, but the length per square mile is only one-third of the average.

The Rio Grande is sometimes called the "Nile of New Mexico," because it overflows its banks during the flood season.

Throughout the year there are about 214 days which are neither cloudy nor rainy. There are usually two snows a year in the valleys, but the snow melts quickly.

In 1916 there were twenty-seven savings banks in the state, with 14,463 depositors.

Religious instruction in the public schools is forbidden by law, but religious societies may hold meetings in the schools outside of school hours, under the authority of local boards.

New Mexicans of Spanish descent cling to their old customs, and most of them live in small adobe houses.

Questions on New Mexico

How does New Mexico rank in size among the states?

In what part of the state is the Continental Divide?

Where are the Staked Plains?

Name three important rivers. What parts do they drain?

Characterize the four zones of vegetation.

What per cent of the area is included in farms?

Name four important crops.

What is the most important industry?

What is the value of the annual output of coal? What other minerals are important?

What is the total railway mileage?

What are the chief classes of inhabitants?

What are the leading educational institutions?

What episode on New Mexican soil caused strained relations between the United States and Mexico?

partment consists of a senate of twenty-four members and a house of representatives of forty-nine members, the former serving four years and the latter two. The executive department comprises the governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general, superintendent of public instruction and commissioner of public lands. A supreme court, eight district courts, county probate courts, justices of the peace and other inferior courts established by law constitute the state judiciary.

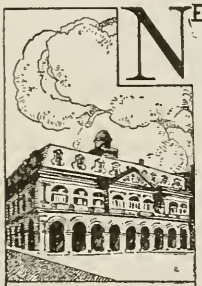
History. The region of New Mexico attracted Spanish explorers in the sixteenth century, and notwithstanding the brave resistance of the Pueblo and Navaho tribes, white settlement gradually made its way. Santa Fé, the present capital, was founded between 1605 and 1616. When Mexico gained its independence from Spain, in 1821, the territory now occupied by the state of New Mexico became a Mexican province, and within the next few years prosperous trade relations were established between the province and the frontier American settlements. During the Mexican War Santa Fé was occupied by United States troops under Colonel Kearny, and by the Treaty of Guadalupe Hidalgo (1848) the territory of New Mexico became a part of the United States. The act of organization became effective in March, 1851. At that time the area of New Mexico was considerably greater than now, and it was increased later by the Gadsden Purchase. With the organization of Colorado and Arizona as territories, the present limits were defined.

In 1906 Congress attempted to provide for the admission of Arizona and New Mexico as one state, but the dissent of the Arizona voters checked this plan, and neither became a state for several years. New Mexico adopted a constitution in 1911, and President Taft issued the formal proclamation of statehood, effective January 6, 1912. The border disturbances of 1915 and 1916 caused great anxiety in New Mexico, and the raid on the town of Columbus by the Villa forces was the immediate cause of an American expedition into Mexico.

Related Articles. Consult the following titles for additional information:

Albuquerque	Las Vegas	Raton
Apache	Mexican War	Rio Grande
Cliff Dwellers	Mexico History	Rocky Mountains
Gadsen Purchase	Navaho	Roswell
Gila	Pueblo	Santa Fe

NEW MEXICO, UNIVERSITY OF, a coeducational university, located at Albuquerque. It was established by act of the territorial legislature in 1889, and was opened in 1892. Since 1911, when New Mexico was admitted as a state, it has been the state university. To the original teachers' and preparatory departments there have been added a commercial school, a college of letters and arts, a college of science and engineering, a summer school and schools of art and music. The Hadley Climatological Laboratory, established to study the effects upon disease of dry climates and high altitudes, is maintained in connection with the university. The faculty numbers between twenty-five and thirty, and there are about 250 students. The library contains 12,000 volumes.


The Cabildo

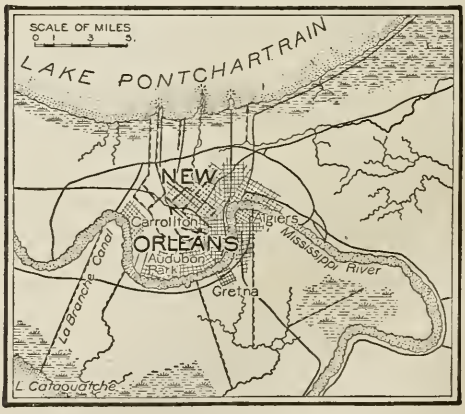
NEW ORLEANS, *awr'le anz,* LA., founded by the French, ceded to Spain and again turned back to France, and in 1803 a part of the Louisiana Purchase by the United States, is one of America's most interesting cities. Excepting Los Angeles, it is the largest city in the country south of the latitude of Saint Louis and San Francisco. New Orleans is the one large city of Louisiana and, next to Natchitoches, is the oldest settlement in the state. It is 923 miles south of Chicago and 639 miles in a direct line down the Mississippi River from Saint Louis. From its location on that river to its mouth in the Gulf of Mexico is 110 miles, although arms of the Gulf extend to less than twenty miles of the city at the east. Population, 1910, 339,075; in 1917, 377,010 (Federal estimate).

New Orleans is called the CRESCENT CITY, because in early days the town stretched along a crescent-shaped bend in the river. To-day it has reached such a growth in each direction that the form is more like that of the letter S. The corporate limits embrace the entire parish (county) of Orleans (nearly 200 square miles), but the city proper is built upon only about forty square miles. This area includes the town of Algiers, across the river, connected with the main city by ferries which run at ten-minute intervals.

The Old French City. There are two distinct parts of the city—the modern American section and old French quarter. The latter remains much as it was a hundred years ago. In that section is the old historic Cabildo, built by the Spanish government in 1795. In this building Spain ceded Louisiana to France, and here France transferred it to the United States. The Cabildo and the adjoining Presbytery (built in 1812) are now historical museums. In the French section is the famous French Opera House, where for many years operatic companies from France sang every winter. The French opera at New Orleans is famous throughout the country. The oldest building is the Ursuline Convent, built in 1730.

In the French quarter the French language is yet spoken by many people, for here live the old Creole families; the French government provides money for schools for children of French parentage. The streets are narrow—this is true also of many streets in the newer parts of town, where traffic can go in but one direction; the buildings are picturesque and in sharp contrast to the business and residential sections of the purely American part of the town.

The Newer City. Modern New Orleans is a city of great banks, tall commercial buildings, parks, metropolitan newspapers and



LOCATION OF THE CITY

palatial hotels. Canal Street, the principal thoroughfare, is 200 feet wide; it runs from the river through nearly the entire length of the city, and divides the French quarter from the modern town. At right angles to Canal Street is Saint Charles Street; they intersect in the heart of the business section. On Saint Charles are many of the finest residences of New Orleans.

CONFEDERATE MONUMENT, GREENWOOD CEMETERY, NEW ORLEANS

Buildings. The comparatively-new City Hall is possibly the most beautiful building in the city; it encroaches on the French quarter, and is modeled after a Greek temple on the Ionic order. The custom house is of granite, but architecturally forbidding. The largest and most famous hotel is the Saint Charles, but the newest and most sumptuously furnished is the tall Grunewald. At the edge of the French quarter is the Monteleone, and outside of the business section, nearer the great railroad stations is the De Soto. Notable among other buildings are the Cotton Exchange, the Sugar Exchange, the post office, the Maison Blanche, the Liverpool, London & Globe, the Tulane-Newcomb, the Morris and the Hibernia.

Education. New Orleans is the seat of one of America's great universities—Tulane—founded in 1834 (see TULANE UNIVERSITY). The oldest institution is that founded by the Ursuline Sisters, in 1730, referred to above. Other schools include the College of the Immaculate Conception and numerous strong business schools. For colored people there are four colleges. Attached to Tulane University is the H. Sophie Newcomb Memorial College for Women. The public school system is modern. There are numerous libraries of importance. The city library is housed in a building provided by Andrew Carnegie; it has branches in various parts of the city. The Tulane University library is large, and is supplemented by that of the Tulane Medical College. Other important public or semi-public collections are Howard Memorial, Parish Medical Society, Bar Association, the State and the Newcomb Memorial College libraries.

Amusements. New Orleans finances the world's greatest pageant each year, called the Mardi Gras, at a cost of about $200,000. It occurs in February, and not a year was missed for two generations until 1918 and 1919, when it was not held because of war conditions (see MARDI GRAS). The French opera, already mentioned, is famous. Along the shores of Lake Pontchartrain, within the city limits, are numerous amusement resorts.

Railroads and Industry. The city is a great ocean port, and its commercial importance is enhanced by eight railroads which terminate here. These are the Illinois Central, the Louisville & Nashville, the Southern Pacific, the Southern, the Texas & Pacific, the Queen & Crescent, the Rock Island-Frisco system and the Louisiana Railway & Navigation Company. Docks for steamships extend for more than eight miles along the river.

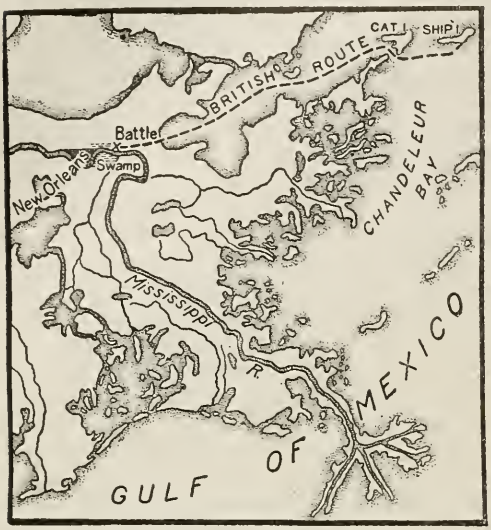
The chief industries are connected with cotton, rice and sugar, but to enumerate all the varied enterprises would be to list hundreds of products which over 30,000 wage-earners are engaged in making. There are more than 850 manufacturing establishments, employing $57,000,000 capital. The total annual output of manufactures is worth fully $80,000,000. The city is second only to New York and Boston in the volume of its export trade. It is one of the greatest cotton markets in the world.

History. The city was laid out by Jean Baptiste La Moyne in 1718 and was named for the Duke of Orleans, who was at that time regent of France. In 1722 it became the capital of the French territory on the Lower Mississippi. In 1762 it was ceded to Spain, together with other French territory, but the inhabitants objected, and when the Spanish governor arrived four years later he was expelled. This gave rise to considerable trouble, during which the leaders in the revolt were severely punished. In 1800, by the Treaty of Ildefonso, the territory was ceded to France, and in 1803 it became a part of the United States, under the Louisiana Purchase. Near the city the last battle of the War of 1812 was fought. The development of the cotton industry gave the city considerable impetus, and it grew to a population of over 100,000 before the Civil War. At the outbreak of that conflict New Orleans was an important military center for the Confederates, until it was captured in 1862 by the Federal forces, under Farragut and Butler, after which it was used as a base of supplies and a point from which to send military expeditions into the surrounding Confederate territory. During the reconstruction period the city suffered from misgovernment, but with the withdrawal of Federal troops and the reëstablishment of home rule, prosperity returned.

Until 1880 the capital of the state was here; in that year it was moved to Baton Rouge. In 1884, one hundred years after the first bale of cotton was shipped from the United States to Europe (it was sent from Charleston, S. C.), a cotton Centennial Exposition was held in New Orleans.

NEW ORLEANS, BATTLE OF, the last battle of the War of 1812, fought January

8, 1815, at Chalmette, near New Orleans. The American force defending New Orleans, commanded by General Andrew Jackson, was made up of Kentucky and Tennessee backwoodsmen and other volunteers. The



LOCATION OF BATTLE FIELD

British force of 7,000 men, commanded by Sir Edward Pakenham, had just landed, direct from England, on the Louisiana coast. The Americans fought behind earth breastworks, and in half an hour after the engagement started completely overpowered their adversaries, who lost 2,500 men, including their leader. Eight Americans were killed and thirteen were wounded. The battle was fought after the signing of the treaty of peace, but neither commander had been notified of this event. The victory made General Jackson the idol of the people and was one important cause of his election to the presidency. See WAR OF 1812.

NEW'PORT, KY., in Campbell County, on the Ohio River opposite Cincinnati, on the Licking River, opposite Covington, Ky., and on the Chesapeake & Ohio and the Louisville & Nashville railroads. Bridges and electric railways connect the three cities. Newport is a popular residence place for Cincinnati business men. It has a city park, and the principal structures are a public library, a courthouse, a city hall, a postoffice, bank buildings and a Masonic Temple. The industrial establishments include a large rolling mill, lithograph and printing works, a watch case factory, a brass foundry and other works. It was settled in 1791 and was chartered as a city in 1850. The city is governed on the commission plan. Population, 1910, 30,309; in 1917, 32,133 (Federal estimate).

NEWPORT, R. I., one of the oldest towns in America, the county seat of Newport County, thirty miles south of Providence, on the island of Rhode in Narragansett Bay, and on the New York, New Haven & Hartford Railroad. The city has a beautiful location and a splendid harbor, with two obsolete forts, Adams and Greble, at the entrance. There is regular steamship connection with New York, Providence and other cities; and the beautiful scenery, equable climate and excellent facilities for bathing, boating and driving have made the place a very fashionable and exclusive summer resort. The old town has narrow streets and quaint houses near the harbor, while the modern section reaches over to the ocean side of the island and is composed of very costly summer residences; it is the most exclusive resort in the United States. There are several libraries, public parks, fountains, statues and monuments. The old state house; the city hall; Redwood Library; Trinity Church; a synagogue, said to be the oldest in the United States; Sayer House, which was the headquarters of the British army in 1777, and the Vernon House, which was Rochambeau's headquarters, are all of interest. The government maintains a torpedo station, a naval training station and a war college on or near the island of Rhode. There are army and navy and civilian Y. M. C. A. buildings and a new Federal building.

The first settlement was made in 1639, and one of the first public schools in America was started here in 1640. In the latter part of the eighteenth century, the place was a great commercial center, and its trade for a time even exceeded that of New York City. During the Revolution it was occupied by British soldiers, and many of the houses were destroyed and the shipping so injured that it never recovered its former commercial position. There is now a large trade in fish, but the other industries are of only slight importance. Population, 1910, 27,149; in 1917, 30,585 (Federal estimate).

NEWPORT NEWS, VA., in Warwick County, twelve miles northeast of Norfolk, on Hampton Roads, at the mouth of the James River, and at the terminus of the Chesapeake & Ohio Railroad. It has a fine

harbor, is reached by several coastwise and foreign steamship lines, and conducts an extensive foreign trade. There are three great drydocks and a shipbuilding industry which employs 8,000 men. There are grain elevators, lumber mills, iron works and coal wharves. The city has an aviation testing plant and training school. Casino Park, along the river in the heart of the city, is an attractive place. Newport News was settled in 1882 and was incorporated in 1896. Population, 1910, 20,205; in 1917, 22,622 (Federal estimate).

NEW RED SANDSTONE, the name of a group of rocks lying between the Carboniferous and the Middle Triassic systems. The formations are loams, shales and sandstones, all of which are usually of a reddish color. The name was given this group to distinguish it from the Old Red Sandstone group which lies below the carboniferous rocks. See CARBONIFEROUS SYSTEM; TRIASSIC SYSTEM.

NEW ROCHELLE, *ro shel'*, N. Y., in Westchester County, sixteen miles from the Grand Central station, New York City, on an arm of Long Island Sound and on the New York, New Haven & Hartford and the New York, Westchester & Boston railroads. It is a residence suburb and has some large colonial mansions, remaining from the Dutch and English periods. The old Leland Castle, which was known for its fine interior decorations, is now occupied by a Catholic seminary. The city has a well-kept park, a Carnegie Library and a hospital. Other prominent structures are a Federal building, Saint Gabriel's Church, a Masonic Temple and a Knights of Columbus building. A monument has been erected to the memory of Thomas Paine, who had his home here for several years. The place was settled in 1687 by Huguenots, some of whom were natives of La Rochelle, France. Population, 1910, 28,867; in 1917, 39,192 (Federal estimate).

NEW SOUTH WALES, a southeastern state of the Commonwealth of Australia, the most populous, though not the largest, of the Australian group. With an area of 309,460 square miles, it is about one-tenth the size of the Commonwealth, and one-third as large as West Australia, the state of greatest area. At the census of 1911 it had a population of 1,646,734 (not including aborigines); in 1917 the population was estimated at 1,867,456. New South Wales is bounded on the north by Queensland, on the east by the Pacific Ocean, on the south by Victoria and on the west by West Australia. Sydney, the capital, including suburbs, is the second largest city south of the equator, ranking next to Buenos Aires.

Physical Features. Near the coast, in an irregular chain, runs the range of mountains which is known as the Great Dividing Range. This chain is called in the northern part of New South Wales the New England Range; in the center, the Blue Mountains, and in the south, the Australian Alps. The Blue Mountains, especially, are very rugged and much broken up by canyons and gorges. To the east of these mountains is a generally fertile strip, which is watered by a number of short, rapid rivers. West of the mountains is a great plateau, which at places is of a semi-desert character. The chief rivers of New South Wales, besides the Murray, which forms the southern boundary, are the Darling, the Murrumbidgee and the Lachlan. There are numerous other rivers in the territory west of the mountains, but most of them are dried up during the dry season.

On the whole, the climate of New South Wales is healthful, but the range of latitude causes variations of temperature. In the north the climate is well-nigh tropical, and at places on the interior plains the temperature rises at times to 130°. The temperature of the coast is much lower. The average rainfall on the coast is about fifty inches, while in the interior it is generally less than twenty inches and in places only ten inches.

Resources. New South Wales has rich mineral resources. Coal fields extend over an immense area, and the total production of the mines is over 8,000,000 tons a year. Copper ore of the richest quality has been found in great abundance, and the annual output has passed 6,000 tons. Tin exists in large quantities, and iron is very generally distributed. Gold was discovered in 1851, and the total output of gold from that date to the present is about 17,000,000 ounces. The annual silver production is over 2,800,000 ounces. Zinc is mined in the silver district, and lead is also worked.

The scarcity of water renders much of the surface far better adapted for pasturage than for agricultural purposes, though where the necessary moisture is present, heavy crops are raised. The chief products are wheat, maize, oats, barley, potatoes, hay and sugar cane, and vines and fruits of various

kinds are also produced. The raising of sheep and cattle, however, is the chief employment of the people, and wool is the most important article of export. In 1917 there were about 35,000,000 sheep in New South Wales. Meats, leather, hides and tallow, as well as live stock, are exported. The manufacturing industries of the colony are not of great importance as yet, but they are growing steadily, and they include tanneries, woolen factories, soap and candle works, breweries, shipyards, foundries, machine shops and clothing factories. There are over 4,400 miles of railway in operation, and there is an efficient telegraph system.

Government, Religion, Education. The constitution of New South Wales provides for a governor, a responsible ministry and a parliament of two houses, consisting of a legislative council, appointed by the English Crown, and an assembly, elected by the citizens of the state. Women have the same voting rights as men. The Church of England has the largest membership of any one Church; the Roman Catholic Church is second. No aid is given to any Church by the state. School attendance is compulsory for children from six to fourteen, and education is free from the kindergarten through the high school. At the head of the educational system is the University of Sydney, and there are various colleges, secondary schools and evening schools.

History. New South Wales was visited by Cook in 1770 and was settled in 1788 as a penal colony. This character it retained to 1839. The most important events in its history since that date have been the establishment of representative institutions; the erection of Victoria into a separate colony in 1850; the separation of Queensland in 1859, and the discovery of gold in 1851 and the consequent increase in population and prosperity. New South Wales became one of the states of the Australian commonwealth in 1901.

There is to be a new Commonwealth capital built in a Federal district which has been established in the southeastern part of New South Wales. The capital city will be named Canbarra. There was worldwide competition among architects on the plans.

Related Articles. Consult the following titles for additional information:
Australia
Murray River
Newcastle
Sydney

NEWSPAPER, next to the public schools the greatest educational factor in the world. A newspaper consists of large folded sheets upon which printed matter appears in columns. Some papers are but four pages in size; country papers and small-town daily papers may regularly issue eight pages, while great city dailies run from twenty-four pages or more on week-days to eighty or more on Sunday. A Sunday paper of 400,000 circulation which prints eighty pages destroys a small forest of trees to obtain pulp for a single edition. All paper regularly employed for newspapers is made very largely from wood.

The influence behind a great daily publication cannot well be estimated; it is enormous, for it may have a million readers every day. The power thus reposing in the hands of one man or of a small group of men may be a power for good or it may be an evil influence; this is determined by the honesty of purpose of those responsible or their tendency to prevert the truth in behalf of personal aims.

Growth of Newspapers. Had not inventive genius provided means of rapid printing and typesetting newspapers would yet be small; they would possess little circulation, and their influence would be lessened because they would reach comparatively few people. Rapid presses are the contribution of Richard March Hoe (1812–1866) of New York, who invented the Hoe "Lightning Press" in 1846; to Rowland Hill of England, who did not reach his ideal but gave his plans to others, who used them; to William Bullock of New York, who in 1865 produced a press that would print 10,000 small papers per hour. Hoe's press had superior merits, and the Hoe idea was developed by 1871 into a press called the web-perfecting press that printed 12,000 papers per hour from stereotype plates curved to fit a cylinder. This machine was the forerunner of the marvelous presses of to-day which print, paste, cut and fold papers of eight pages at the rate of 300,000 copies per hour; sixteen pages at the rate of 150,000 per hour; thirty-two pages

at the rate of 75,000 per hour. Paper is fed into a press from huge rolls; the sheet used on presses of greatest capacity is six feet wide and passes through the press at the rate of 105 miles an hour.

Typesetting for all classes of papers was formerly done by hand, and a hundred compositors might be employed on a metropolitan daily. Numerous mechanical devices were invented, but none succeeded in meeting the demand for fast newspaper work until Ottmar Mergenthaler of Baltimore perfected a machine in 1884 known as the *linotype*. It was so named because it sets a line of type in a single solid piece with the raised letters on one face of the bar, or "slug." Fifteen to thirty machines and operators will do the work on a great daily. This machine is described in the article LINOTYPE.

Organization of a Newspaper. A metropolitan newspaper must employ hundreds of people. While the editorial department and policy most concerns the public, a paper depends as much for its success upon its circulation department. Combined with these a paper should present a pleasing appearance, for which the mechanical department is responsible. Almost of first importance to the financial well-being of the enterprise is the advertising department.

A great paper's editorial department is in charge of an editor in chief. He is either the proprietor or is responsible to the owners, and is held accountable for everything which appears in its columns. Under him is a managing editor, who controls the news editor, telegraph editor, city editor, literary editor, financial editor, etc. Under the city editor are from ten to forty or more reporters. The editorial department, in addition, employs special correspondents in cities and towns throughout its field, who report local matters of interest which are not touched by the great news-gathering agencies.

The circulation manager engages subscription solicitors and directs the distribution of his paper. The mechanical superintendent supervises the pressroom and composing room through foremen in each department. The advertising manager is in charge of all efforts to keep the advertising columns filled. He employs numerous solicitors.

The Worlds' News-Gatherers. There have been organized great associations whose sole duty is to learn quickly of all important world events and telegraph the facts relating to them to newspapers which contract for the service. The foremost organization of the kind in America is the Associated Press. Following closely in importance and influence are the United Press and the International News Service.

Number of Papers. There are nearly 60,000 papers and magazines of all classes in the world. Of those publications which are purely newspapers the United States had in 1918 2,604 which were published daily and 16,599 which were issued weekly. Canada had nearly 1,500, of which about 200 were published daily.

Related Articles. Consult the following titles for additional information:

Associated Press Linotype Printing Press

JOURNALISTS

Bennett, James Gordon
Brisbane, Arthur
Brown, George
Bryan, William J.
Dana, Charles A.
Garrison, William Lloyd
Greeley, Horace
Hearst, William R.
Hincks, Francis, Sir
Howe, Joseph
Howell, Clark
Mackenzie, William L.
Northcliffe, Lord
Pulitzer, Joseph
Stead, William T.
Watterson, Henry
Weed, Thurlow
White, William Allen

NEWT, a small salamander, in appearance resembling a lizard, found in Europe, Asia and North America. The American newt is about four inches long. It is green above and yellow underneath, and has a row of red dots along the side. It lives in ditches and stagnant waters and feeds on smaller aquatic animals. The eggs are laid under water and the young behave much like tadpoles. They soon change form and color, becoming bright vermilion all over, and leave the water, to hide under leaves and logs and feed on worms. When two or three years old they return to the water to breed. Of European species the crested newt, which is olive-brown with white lateral blotches, is widely distributed. See SALAMANDER.

NEW THOUGHT, a new name for an old idea. It designates a mental attitude which asserts the power of mind over matter. Unlike Christian Science, New Thought does not deny the existence of matter, but affirms that spirit is the ultimate reality; and that circumstances and conditions are largely influenced by the power of mind. In other words, "life is what we make it." Philosophically, it is a modification of idealism. There are perhaps 300 or 400 centers of New Thought teaching in the United States and Canada.

NEWTON, ISAAC, Sir (1642–1727), a famous English natural philosopher and

mathematician, born at Woolsthorpe, Lincolnshire. His greatest claim to fame lies in his discovery of the law of gravitation. He entered Trinity College in 1660, and in 1665 took his master's degree. A few years later he was made professor there. His career was not exclusively academic, for he was at one time a member of Parliament and at another warden of the mint. In 1703 he was elected president of the Royal Society, and held the position until his death. He was buried in Westminster Abbey, where a beautiful monument has been erected to his memory.

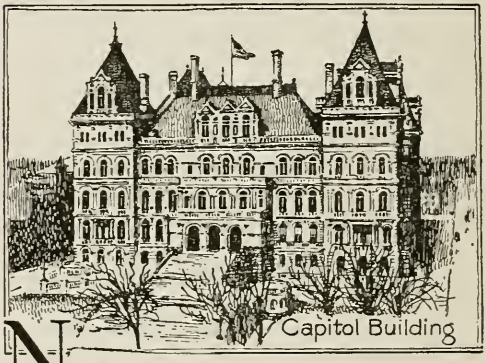
ISAAC NEWTON

Newton was one of the greatest discoverers of his age. Besides giving to the world the law of gravitation, he produced the binomial theorem, and added much to contemporary knowledge of light and color. His notes on light and color were published under the title *Optics*. Newton made further contributions to astronomical knowledge by inventing a refracting telescope. His greatest work is the *Principia Mathematica* (Mathematical Principles), which is the foundation of the later sciences of physics and mathematics.

NEW WEST'MINSTER, B. C., former capital of the province, now the county town of Westminster County, on the Fraser River and the Canadian Pacific, the Canadian Northern and the Great Northern railroads. The river is here a mile wide, and provides an excellent harbor. The most important industry of the town is the salmon fishing and canning. The trade is large in lumber and furs, and there are machine shops, carriage works and foundries. Population, 1911, 13,199.

NEW YEAR'S DAY, the first day of the year, which differs in time in various systems according to the mode of reckoning; thus in Russia, Greece and other countries where the Julian calendar is used, New Year's Day is celebrated on the English 13th of January. The Jewish New Year begins September 6. Among the ancient nations the time set as the beginning of the year differed also, but all treated it with some special observance.

In the early Church any celebration of the day was at first forbidden, but later the day was made a Christian festival. Prior to the sixteenth century, even in Christian countries, different days were recognized as the beginning of the year, and it was not until 1752 that January 1 was declared by the Parliament of Great Britain as the opening day of the year for that country. In most countries where celebrations have been held on New Year's Day, these have consisted largely in resting from ordinary labors and feasting, and the custom of keeping watch on New Year's Eve and ushering in the new year with mutual good wishes. The "ringing in" of the new year with bells and the interchange of visits on New Year's Day are old customs.



Capitol Building

NEW YORK, one of the thirteen original states, is now the richest and most populous commonwealth of the American Union. It is popularly known as the Empire State, because of its supremacy in population and industrial and commercial progress; the name New York was bestowed in honor of the Duke of York, in 1664, when the Dutch colony of New Netherland passed under English control.

Location and Area. The state belongs to the Middle Atlantic group. Only the southeastern portion borders on the Atlantic Ocean, but this contact with the sea has been vastly important in determining the supremacy of the Empire State. New York City, on its splendid natural harbor, is one of the greatest ports in the world. Most of the eastern state line lies adjacent to Vermont, Massachusetts and Connecticut, with Lake Champlain forming part of the Vermont boundary. Lake Ontario and the Saint Law-

rence River separate New York on the northwest from the Canadian province of Ontario, and Quebec lies due north. Lake Erie, the Niagara River and a small section of Pennsylvania bound the state on the west, and New Jersey and Pennsylvania touch it on the south. New York is like an irregular triangle in shape, with the greatest extent (326 miles) from east to west. From north to south it extends 312 miles.

Though first in population among the American commonwealths, the state is twenty-ninth in size, and its area of 49,204 square miles is about one-third that of Montana. It has 1,550 square miles of water surface.

People and Cities. In 1910 the population of New York was 9,113,614, and the density per square mile, 191.2. In density the state was surpassed by Rhode Island, Massachusetts, New Jersey and Connecticut. Over three times as many people live in England as in New York, though the two are nearly equal in size. According to a Federal estimate the state had 10,646,989 inhabitants in July, 1918, about half of whom live in New York City. The total urban population in 1915 was 74.8 per cent of the whole, for New York has twenty-two municipalities with populations exceeding 25,000, and five with more than 100,000 inhabitants. The first ten cities, in order of size, are New York, Buffalo, Rochester, Syracuse, Albany (the capital), Yonkers, Schenectady, Utica, Troy and Binghamton.

New York has a higher percentage of foreign-born than any other state, the total number being 2,748,011 in 1910. Russians are found in greatest number, with Germans and Irish closely following. Roman Catholics constitute the largest religious body, and among the Protestant denominations the Methodists are most numerous. The Episcopal Church is especially strong in New York City, and that city is also a great Jewish center.

Surface Features. New York has a great diversity of surface, but it is easily divided into six physical regions, including Long Island. The first is the Adirondack region, which occupies all of the northern and eastern portions and comprises over 5,000 square miles. This section is characterized by mountains which rise abruptly, beginning a short distance west of Lake Champlain. The Adirondacks are comparatively low mountains, Mount Marcy, the highest peak, attaining an elevation of only 5,344 feet. Their sides are heavily timbered with pine, spruce and other woods, and the valleys contain numerous lakes. Vast tracts of this region are still wild forests. A large state park has been created in the heart of these mountains, in order that the forests may be preserved. To the south, the mountains slope to the Mohawk Valley, and to the southwest they descend to the lake shore plain, which borders Lake Ontario.

The second mountain region occupies a narrow belt in the southeastern border, extending north to about the head of Lake Champlain. This contains an extension of the Appalachian Mountains, which cross New Jersey, and the border of the Hoosac range, forming the boundary between Massachusetts and New York. It slopes gradually towards the Hudson River and is a well-watered and fertile region, not very abrupt and easily cultivated.

West of this and south of the Mohawk valley is the Catskill region, which is a somewhat broad plateau, upon which rise the Catskill Mountains, covering an area of over 500 square miles. These are in the form of a group, rather than a range, and their highest peak, Slide Mountain, has an altitude of 4,205 feet; a few other peaks reach about 3,000 feet. Many of their slopes are wooded, the intervening valleys are fertile, and this region, like that of the Adirondacks, is a favorite summer resort.

Extending westward from the Catskill region and covering that portion of the state between the southern boundary and the lake shore plain and Mohawk Valley is the great plateau region, well watered by numerous streams and lakes, and valuable for agricultural products. The southern part of this is quite broken, and along the Pennsylvania line the counties contain numerous high hills and deep valleys. The highest part of this plateau is in Otsego County. Here the Delaware and the Susquehanna rivers have their sources. The northern part of the plateau consists of slightly-rolling country, dotted here and there by patches of woodland, but mostly under a high state of cultivation.

To the north of this is the lake shore plain, which rises gradually from Lake Ontario in two terraces, the first of which was the former shore of the lake. This plain is divided near its western extremity into two sections by a formation of hard limestone, forming

the cliff over which the cataract of Niagara plunges into the gorge of Niagara River, and it is also over this terrace that the Erie Canal descends at Lockport. The surface of this region is slightly undulating, with a gentle slope towards the lake. Extending from the southeast point of Lake Ontario to the Hudson River in the vicinity of Albany is the low, narrow valley of the Mohawk River, characterized by its nearly level slope. This afforded the natural route for the construction of the Erie Canal, to which New York owes so much of its industrial prosperity. Long Island is a part of the coastal plain and is low and nearly level.

Rivers and Lakes. The drainage of New York is nearly as complex as its surface. With the exception of the northeastern counties, the eastern part is drained through the Hudson River, which is the most important stream wholly within the state. Its chief tributary, the Mohawk, waters the central portion. The northeastern portion is drained through Lake Champlain into the Saint Lawrence; the northwestern counties are drained directly into this stream, while the lake shore plain contains a few short rivers flowing into lakes Ontario and Erie. The Delaware and the Susquehanna have their sources a little east of the center. The extreme southwestern part is drained through the Allegheny River into the Ohio, and thence to the Mississippi. Many of the streams contain deep gorges and beautiful waterfalls. Chief among the latter are Niagara Falls, Glens Falls; the falls of the Genesee River; Taughannock Falls, near Cayuga Lake, the highest in the state, having a fall of 230 feet, and the falls of the Mohawk, where it enters the Hudson, near Cohoes.

New York contains a large number of lakes, either wholly or partly within its boundaries. Located in the Adirondack region, in the region just to the south of it and in the central part of the state, are hundreds of lakes of all sizes, adding much to its scenic beauty. Worthy of note in the eastern part is Lake George, about forty miles in length. In the plateau region, directly south of Lake Ontario, is a group of long, narrow, navigable lakes called the Finger Lakes, nearly parallel to one another, with their greatest length from north to south. The most important of these are Cayuga, Seneca, Canandaigua, Onondaga and Keuka. To the northeast of these is Lake Oneida, and in the southwestern part of the state is Chautauqua Lake, noted as a summer resort.

Climate. The climate is varied, with a range wider than that of any of the other Atlantic states. Those portions which are under the influence of ocean, sound and lake winds are more even in temperature. Other regions suffer severely from the early frosts of autumn and the late frosts of spring, from extremes of heat in summer and of cold in winter. In the Adirondack region the summer is delightful, but the winters are long and severe. The mean annual temperature of the state is 47°; the average annual precipitation is about forty-one inches.

Mineral Resources. In the Adirondack region there are valuable deposits of iron ore, the annual yield of which is about 1,500,000 tons in favorable years. The greater part of the output is taken from the mines along the southeastern shore of Lake Champlain. Among the states, New York is fifth in the production of iron ore. Clay suitable for the manufacture of brick, tile, pottery, terra cotta and porcelain is found in abundance along the Hudson and in Long Island, and the annual value of clay products exceeds $11,800,000. There are also profitable quarries yielding granite, limestone, marble, trap rock and sandstone, the yearly production being valued at about $7,000,000. In the output of its quarries New York is next to Pennsylvania and Vermont. Over 5,600,000 barrels of Portland cement are produced annually, and in this commodity New York ranks with the first five states. New York and Michigan are the two leading salt states; both states have been producing over 10,000,000 barrels annually for years, and the output of New York has reached over 14,000,000 barrels. In the mining of gypsum and the production of fibrous talc New York ranks first among the states, and it is also a leading state in the production of aluminum, emery, abrasive garnet, graphite, millstones, feldspar, iron pyrite and infusorial earth. Other important mineral resources include crude petroleum, natural gas and mineral waters. The Saratoga mineral springs are world-famous, and there are about forty similar springs. The total value of the mineral output is about $50,000,000.

Agriculture. More than half of the state is under cultivation, and New York ranks twelfth among the states in value of farm

NEW YORK

Empire State

1, Nursery.
2, Hay Harvest.
3, Grapes.
4, Apples.
5, Peaches.
6, Jersey Cows.
7, Dairy Products.
8, Marble.
9, Salt.
10, Building Stone.
11, Statue of Liberty.
12, Freight Steamer.
13, Lock on Erie Canal.
14, Cloth.
15, Clothing.
16, Brick and Tile.
17, Niagara Falls.

products. The rainfall is abundant, and the climate is well suited to all products that can be raised in a medium temperate climate. In general, the farms are small and under a high state of cultivation. About 4,500,000 acres are devoted to hay, which is the leading crop in value. Among the cereals, oats and corn are most important. New York is the first buckwheat state, and also first in potato and apple production.

The variety of surface, the means of transportation and the variations in climate give agriculture a wide diversity of interests. The counties along the lower part of the Hudson are favorably situated for market gardens and for producing dairy articles for the city trade. Through the plateau regions, the soil and climate are better suited to the growing of cereals and fruits, and here large quantities of potatoes, corn, oats, beans, apples, peaches and plums are raised. In the northwestern part, which includes the western slope of the Adirondack region and the eastern portion of the lake shore plain, the farmers are chiefly engaged in dairying, producing butter and cheese in large quantities. The bulk of the cheese produced in the United States comes from New York and Wisconsin. This industry also extends quite generally across the central part of the state. In the central counties hops are extensively raised. The raising of live stock is confined very generally to dairy cows and other cattle, while horses, sheep and swine are found in sufficient numbers to supply local demand. Large quantities of grapes are raised in Western New York.

Manufactures. New York is the leading state in the Union in manufactures, both in extent and variety of products, which include almost everything that is made. Though chiefly centering around New York City and Buffalo, the factories are widely distributed through other parts of the state. The forest regions of the Adirondacks and Catskills give rise to the manufacture of considerable lumber in these localities. Some lumber is also produced in the south-central counties. Along the Hudson are the largest brick works in the world.

The most important industry with respect to amount and value of products is the manufacture of men's and women's clothing, and in this activity New York easily leads all the other states. The state is also first in printing and publishing, and New York City is the headquarters of scores of newspapers and periodicals. The manufacture of foundry and machine-shop products, including typewriters, sewing machines and agricultural tools, is next in importance, with the textile industry following closely. New York is one of the leading textile states, and in some special lines, including the manufacture of carpets and rugs, it holds first rank. This group of industries includes the making of knit goods and hosiery, cottons, woolens, worsteds, felts and silk. Other lines of manufacture in which New York has an important place are slaughtering and meat packing, the making of flour and grist mill products, and the manufacture of tobacco goods.

Troy is the great American center for the manufacture of collars, cuffs and shirts, while Rochester leads in the production of optical instruments and cameras. The great water power developed at Niagara Falls has fostered numerous industries in that part of the state, some of which are found nowhere else in the country. Among these are plants for the production of aluminum, nearly the whole output of which is made here. Canning is also a thriving industry, especially in the central part of the state. The output includes milk products, large and small fruits, vegetables and soups. In a single year the state produces manufactured goods having a total value of between three and four billion dollars.

Transportation and Commerce. The entire state is amply supplied with railways and navigable streams and canals. The New York Central & Hudson River Railway, extends from New York City northward to Albany, then westward to Buffalo. This system contains numerous other lines, running either parallel to its main line or acting as feeders for it. The total railway mileage is nearly 9,000, and there are about 1,100 miles of navigable waterways, including the State Barge Canal. This system includes the Erie Canal, which was a decisive factor in developing the state.

In commerce New York surpasses all other states. About one-third of the exports and nearly two-thirds of the imports of the United States pass through the port of New York City. In 1917 the exports passing out of the harbor had a greater value than the combined exports of Asia, Africa and Australia. Besides this, much of the domestic

traffic between the East and West passes through the state, and there is an enormous coastwise trade.

Government. By the present constitution, adopted in 1894, the legislature consists of a senate of fifty-one members, chosen for two years, and a house of representatives, called the assembly, of 150 members, chosen annually. The membership of both houses is apportioned by districts according to population, but county lines are not broken in forming these districts. The constitution provides that no one city (meaning New York City) can ever have more than half of the membership of the state senate. The executive department consists of a governor, a lieutenant-governor, a secretary of state, a comptroller, a treasurer, an attorney-general and a state engineer and surveyor, elected for two years. The other officers, as well as administrative boards having charge of charities, health and railroads, are confirmed by the senate. Women and men have voted on equal terms since 1918.

The state courts consist of the court of appeals, which is the highest court, and is composed of a chief justice and six associates, elected for fourteen years; a supreme court, composed of 101 judges, each elected for fourteen years; four appellate divisions of the supreme court; county courts; surrogate courts; city courts; justices of the peace; police justices and a court of claims.

Cities and towns manage their local judicial affairs through courts which they establish under acts of legislature. Because of the large number of cities within the state, they have been divided by the legislature into three classes, the first class including those of 175,000 or more inhabitants, the second including those between 50,000 and 175,000 inhabitants, and the third, those below 50,000 inhabitants. Each class is allowed to organize its government according to general laws established by the legislature. Dating from 1916, the question of revising the constitution may be submitted to the people for a vote every twenty years.

Education. The public schools are under the control of the state board of regents, consisting of twelve members elected by the legislature and known as the University of the State of New York. The regents are elected for twelve years, one retiring each year. The executive head of this body is the commissioner of education, who has general charge of all common, high and special schools supported by the state. Three assistant commissioners aid him in his responsibilities. Since 1917 the township school system has been in operation. The state is divided for school purposes into township districts, of which there are more than 10,000. These are under the supervision of 982 town boards of education. Besides these there are special districts for villages having 1,500 inhabitants or employing fifteen or more teachers. Villages of 5,000 or more inhabitants which employ a superintendent of schools, and cities are also outside the township system. The state maintains a state college for teachers at Albany, and normal schools at Brockport, Buffalo, Cortland, Fredonia, Geneseo, New Paltz, Oneonta, Oswego, Plattsburg and Potsdam. There are three training schools for teachers in Greater New York, and similar institutions at Albany, Buffalo, Cohoes, Jamestown, Rochester, Schenectady, Syracuse, Watertown and Yonkers. Special training classes are also a feature of about 113 of the high schools.

New York has scores of colleges, universities and special schools. The largest of these is Columbia University, located in New York City, on Morningside Heights. Another notable university is Cornell, at Ithaca. Though not strictly a state institution, it has received from the state a grant of land for the establishment of a college of agriculture and mechanical arts. There are, besides, six state-supported agricultural schools. New York University, located in the Bronx, New York City, is also a notable institution. It is not a state university. Under national control is the United States Military Academy at West Point. The following list gives the most important of the other institutions of higher learning:

Adelphi College, Brooklyn.
Buffalo University, Buffalo.
Clarkson Technical School, Potsdam.
Colgate University, Hamilton.
College of the City of New York, New York.
Elmira College, Elmira.
Fordham University, New York.
Hamilton College, Clinton.
Hobart College, Geneva.
Manhattan College, New York.
Niagara University, Niagara.
Polytechnic Institute, Brooklyn.
Pratt Institute, Brooklyn.
Rensselaer Polytechnic Institute, Troy.
Rochester University, Rochester.
Saint Lawrence University, Canton.
Smith College (for women), Geneva.

Items of Interest on New York

In area New York is equal to three-fourths of all New England, but is only one-fifth as large as Texas.

The latitude of the southern part of the state is about the same as that of Madrid and Naples.

For thirty miles, between Weehawken, N. J., and Haverstraw, N. Y., the Hudson has cut a deep channel between high cliffs of volcanic rocks; these cliffs, called "The Palisades," are famous for their scenic beauty.

In recent years there has been a movement towards the preservation of the forests in the Adirondacks and Catskills, so that the state now has forest reserves covering more than 1,825,000 acres.

The state ranks next to Vermont in maple sugar production.

In manufactured products New York leads all other states; of thirty-nine "chief" industries enumerated in the United States census reports, New York stands first in twenty-seven.

In 1910 the total power used in New York manufacturing was 1,181,000 horse power.

Troy makes 85.8 per cent of the collars and cuffs made in the United States, while the whole state makes 92.3 per cent of the total for the country.

Over a dozen lines of steamships ply the lakes from Buffalo; about twelve great trunk lines of railroad meet there; it is also the western end of the Erie Canal.

The grain elevators of Buffalo have a capacity of about 22,000,000 bushels, being second only to those of Chicago and Duluth.

The water system of New York City could supply all the world with drinking water, and its electric lines, elevated, surface and subway, carry nearly twice as many passengers in a year as travel on the steam railroads of the entire country.

How does New York compare with other states in the extent and variety of its manufactures?

What recent legislation has been enacted?

In value of fishery products New York ranks third among the Middle Atlantic states; the yield has an annual value of about $5,000,000. Oysters are the most important catch.

New York is next to California in amount of area devoted to vineyards. Horticulture is a thriving industry, and florists find a ready market for hothouse plants.

In 1916 New York was second to Wisconsin in the number of milch cows. The state produces about 105,500,000 pounds of cheese a year.

The oil fields of New York are a continuation of those in the neighboring state of Pennsylvania.

The state has a special department for the conservation of natural resources, and two public service commissions, one of which acts for New York City.

There are forty-three congressional districts in the state.

In 1874 the death rate in New York City was 27.9 in every thousand; in 1917 it was 13.76 in a thousand. There are enough babies born in that city a year to make four cities the size of Roanoke, Va.

Questions on New York

To what group of states does New York belong?

What states form its boundaries? What waters?

How does New York compare in size with California? With Texas?

Into how many physical regions is New York divided? How are they characterized?

What is the most important river in the state?

Name three important falls. How have they affected the industries of the state?

How does New York compare with other states in the production of iron ore?

In the production of what minerals does New York rank first?

What are the chief agricultural products?

How does New York rank in the production of buckwheat, potatoes and apples?

Syracuse University, Syracuse.
Union University, Schenectady.
Vassar College (for women), Poughkeepsie.
Wells College (for women), Aurora.

Institutions. The state maintains over 500 charitable and penal institutions, under the supervision of boards of charities, correction and lunacy. The asylum for feeble-minded children is at Syracuse, and that for feeble-minded women at Newark. The school for the blind is at Batavia, and that for crippled and deformed children at West Haverstraw. The hospitals for the insane are at Willard, Binghamton, Buffalo, King's Park, Gowanda, Middletown, Ogdensburg, Poughkeepsie, Rochester, Utica and Central Islip. At Matteawan and Dannemora there are asylums for insane criminals. The penal institutions are in charge of a superintendent of state prisons and include the prisons at Ossining (Sing Sing), Auburn and Clinton, and the Great Meadows prison at Comstock. Penitentiaries for the confinement of offenders who receive short sentences are county institutions and are located in New York, Kings, Erie, Monroe, Clinton and Albany counties. There are also a number of reform schools and industrial institutions for juvenile offenders, a house of refuge for women, and epileptic colonies.

History. In 1609 the Frenchman Champlain and the Englishman Hudson, who was in the employ of the Dutch, both entered the territory of New York, the former descending from Canada by way of Lake Champlain, the latter ascending the Hudson River. Owing to their alliance with the Iroquois Indians, the Dutch were the first to establish prosperous settlements, and they maintained a profitable fur trade for years. In 1624 Albany was settled, and two years later New Amsterdam (now New York City) was founded. The Dutch came into constant collision with the English on the east and the Swedes and English on the south, and finally were forced to relinquish their hold on the territory in 1664, when New York, New Jersey and Delaware were all conquered by England and granted to the Duke of York.

For a time the colony prospered under liberal rule, but it was later made the victim of worthless and unscrupulous governors. It suffered severely by the invasions of French and Indians in the wars of the eighteenth century. In the early days of the pre-Revolutionary struggle the colony was about evenly divided between Tories and patriots, but the latter gradually gained the upper hand, and some of the most defiant actions of the whole struggle were taken by New York. An independent government was organized in 1775, and a constitution was adopted in 1776, which remained in force forty-five years. The second constitution was adopted in 1822, the third in 1846, the fourth and present one in 1894.

New York was one of the first states to ratify the Articles of Confederation (1778), but it opposed a strong Federal government, two of its three delegates withdrawing from the constitutional convention. It was the eleventh state to ratify the Constitution (July 26, 1788). The Federalists were at first dominant in the state, but after 1800 for more than twenty years the Anti-Federalists were in power. The Erie Canal was constructed between 1817 and 1825. Though a free state, New York was divided in the slavery struggle, and during the early years of the war the Democrats, or anti-administration party, were in power. Nevertheless, it was one of the strongest supporters of the Union cause and furnished 467,000 troops to the Federal army.

Within recent years many progressive laws regarding workmen's compensation, child labor, pure food, mothers' pensions, etc., have been passed, and in November, 1917, by a referendum vote the state adopted woman suffrage. The same year the state organized a state police force similar to the one which had been operating for years in Pennsylvania.

Related Articles. Consult the following titles for additional information:

CITIES

Albany	Hornell	Olean
Amsterdam	Hudson	Ossining
Auburn	Ithaca	Oswego
Batavia	Jamestown	Plattsburg
Binghamton	Johnstown	Poughkeepsie
Brooklyn	Kingston	Rensselaer
Buffalo	Little Falls	Rochester
Cohoes	Lockport	Rome
Corning	Middletown	Saratoga Springs
Cortland	Mount Vernon	Schenectady
Dunkirk	Newburgh	Syracuse
Elmira	New Rochelle	Troy
Fulton	New York	Utica
Geneva	Niagara Falls	Watertown
Glens Falls	North Tonawanda	Watervliet
Gloversville	Ogdensburg	Yonkers

RIVERS

Allegheny	Hudson	Niagara Falls and River
Delaware	Mohawk	

MOUNTAINS

Adirondack	Catskill

LAKES

Cayuga	Erie	Oneida
Champlain	George	Seneca

HISTORY

Clinton, DeWitt
Erie Canal
Hudson, Henry
New York State Barge Canal
Revolutionary War in America

EDUCATION

Barnard College
Butler, Nicholas M.
Columbia University
Cornell University
Draper, Andrew S.
Military Academy, U. S.
New York, College of the city of
New York University
Syracuse University
Vassar College

UNCLASSIFIED

Hall of Fame
Liberty, Statue of
Long Island
Palisades
West Point

Peter Stuyvesant, One of the first citizens

NEW YORK CITY, one of the greatest seaports in the world, the metropolis of the United States and of the Western hemisphere, and the home of over half of the residents of New York state. In this city there are more people than live on the entire continent of Australia, or in any one of half the nations of the earth. It is the largest city in the world under a single municipal government, for its population of nearly 6,000,000 exceeds that of London proper by about a million. If the metropolitan area of London be included the English metropolis may be called the world's largest city, but the scores of towns and villages that surround the capital of the British Empire are not strictly within its corporate limits. In 1910 New York had a population of 4,766,883; according to a Federal estimate, this had increased to 5,215,879 by July 1, 1918. It is a combination of five boroughs, each a great city in itself, and it extends over a dozen islands.

Location and Geography. It is usually said that New York is situated at the mouth of the Hudson River, which flows into the Atlantic Ocean through New York Bay. A statement of this sort, however, gives one no idea of the somewhat complica- -ography of this huge port. The smallest borough, but the nucleus and business center of the city, is the long, narrow island of Manhattan, which is bounded on the west by the Hudson River; on the east by the Harlem and the East rivers, the latter connecting New York Bay and Long Island Sound; on the north by Spuyten Duyvil Creek, which joins the Harlem and the Hudson; and on the south by the great Bay which forms one of the finest harbors in the world. Manhattan Borough is about thirteen miles long and less than two miles in average width, but it receives annually imports whose value exceeds that of the combined imports of South America, Africa and Australia. Several small adjacent islands belong to this borough.

North and east of Manhattan lies a growing residential section, the borough of the Bronx (constituted a separate county in 1913). It is separated from upper Manhattan by the Harlem River and Spuyten Duyvil Creek. A portion of the western boundary of the Bronx is formed by the Hudson River, and it is bounded on the east and south by Long Island Sound and the East River. The borough of Brooklyn, occupying the western end of Long Island, and coextensive with Kings County, was even at the time of its annexation (1898) a busy city of a million inhabitants. Its population is now nearly 2,000,000. This borough has water boundaries on three sides, its water front including the East River, New York Bay and the Atlantic Ocean. Coney Island, a famous pleasure resort, is a part of the borough. Lying north and east of Brooklyn is the borough of Queens (Queens County), including several Long Island towns and cities, and a number of islands in Jamaica Bay. The fifth borough, Richmond County, is formed by Staten Island, which lies between Brooklyn and the New Jersey mainland.

Besides the islands mentioned, Greater New York includes Blackwell's, Ward's and Randall's islands, in the East River, containing the city benevolent and penal institutions; Governor's Island, Liberty (formerly Bedloe's) Island and Ellis Island, in Upper New York Bay, and several smaller islands. Governor's Island, which has an area of sixty-five acres, is used by the Federal government for military purposes. Liberty Island, near the north end of the Bay, contains the famous colossal statue, *Liberty Enlightening the World,* popularly known as the Goddess of Liberty. Ellis Island is internationally famous as an immigrant-receiving station of the United States government. The area of the entire city, including water surface, is 327¼ square miles; there are 285 square miles of land surface.

Upper New York Bay is one of the finest harbors in the world, having an area of near-

ly fifteen square miles. It is connected with the Lower Bay, which is practically a part of the Atlantic Ocean, by a strait called the Narrows, which separates Brooklyn and Staten Island. This strait is about a mile in width, and is guarded by two forts, Hamilton and Wadsworth, the former in Brooklyn and the latter opposite, on Staten Island.

Famous Streets. The most important and most famous thoroughfare in New York is Broadway, which runs northward from Battery Park, at the southern end of Manhattan Island, and is continued under the same name far beyond the limits of the borough in which it starts. For the first two miles it extends almost due north, dividing the borough into nearly equal parts. It then swerves to the northwest, and after reaching the vicinity of Central Park, runs parallel with the Hudson for several miles. In the lower Broadway sections are found the towering office and commercial buildings that give the city its characteristic skyline. Above 38th Street Broadway becomes the center of a busy theatrical district, in which scores of theaters, vaudeville halls and moving picture houses contribute to the reputation of the "Great White Way." Still farther north it traverses the better-class residential districts.

Wall Street is known throughout the world as the financial center not only of New York but of the Western hemisphere. In fact, the name has come to be used as a synonym for American capitalism. This street is not long, as it extends only from lower Broadway (at Trinity Church) to East River, but it is of international importance. Fifth Avenue, the name of which stands for wealth and luxury, is another famous thoroughfare. It runs northward from Washington Square, and above 59th Street skirts the eastern side of Central Park. From 30th Street to 59th this broad, handsome avenue is the center of an exclusive shopping district. On it also are found scores of pretentious churches, club houses, hotels and homes of the wealthy.

Riverside Drive, which follows the Hudson River from 72nd Street to Spuyten Duyvil Creek, is the most beautiful resident street in New York. Millions of dollars have been spent in the construction of other drives and boulevards, of which the Harlem Speedway, extending for two miles along the western bank of the Harlem River, from 155th Street north, is one of the finest. A handsome viaduct now connects Riverside Drive with the Heights to the north of its terminus.

Parks and Monuments. Small squares or parks serve as breathing places in the densely-crowded city. Washington Square, Union Square and Madison Square are among the most noted of these. All are surrounded by fine buildings, and each has its own peculiarities. At the south end of the island is Battery Park, in which, in the building which was formerly Castle Garden, is located the Aquarium. Riverside Park is a strip of land running along the Hudson River from 72nd Street to 129th.

Central Park is the greatest park in New York, and is one of the finest in the world. It is a rectangle lying between Fifth and Eighth avenues and 59th and 110th streets. The northern half of the park has been left almost in a state of nature, and nothing could be more beautiful, for it is hilly and heavily wooded, abounding in high rocky ledges. Among the other attractions of Central Park are beautiful landscape gardens, walks and bridle paths, lagoons, statuary, playgrounds and a zoölogical garden. The largest and most attractive park in Brooklyn is Prospect Park, which has beautiful driveways and statuary.

In the borough of the Bronx are Bronx Park, Van Cortlandt Park and other tracts, great portions of which are still entirely in a state of nature. In the Bronx Park are the zoölogical gardens and the botanical collection, which are visited daily by thousands of people. In Van Cortlandt Park golf links, ball grounds and polo grounds afford opportunities for summer games. A delightful seaside resort is Pelham Bay Park, on Long Island Sound.

New York's most impressive monument is the bronze statue of *Liberty Enlightening the World.* In Washington Square is the marble Washington Arch, completed in 1892 and erected by popular subscription at a cost of $128,000. In Central Park is a granite obelisk known as Cleopatra's Needle. This obelisk was hewn and inscribed by Thothmes III, although one of its sides is also inscribed with the victories of Rameses II, a king who lived three centuries afterward. The obelisk was presented to the city of New York by Ismail Pasha and was brought to America at the expense of William H. Vanderbilt.

STATUE OF LIBERTY, IN NEW YORK HARBOR
The gift of the Republic of France to the people of the United States.

WOOLWORTH BUILDING, NEW YORK CITY

The tallest building in the world, with stores and offices on 55 floors. The observation platform is 755 feet above street level.

There are a number of beautiful statues and fine figures in marble and bronze in different parts of the city, especially in Central Park and the public squares. Among these are a granite statue of Alexander Hamilton; a bronze statue of Shakespeare by J. Q. A. Ward, in Central Park; a noble equestrian statue of General Sherman by Saint Gaudens, on the Plaza at Fifth Avenue and 59th Street; a bronze figure of Peter Cooper by Saint Gaudens, south of Cooper Union; a bronze statue of Lafayette by Bartholdi, in Union Square, and the colossal figure of Washington by Ward, at the Subtreasury in Wall Street.

The tomb of General Grant is a marble temple at the north end of Riverside Park, and is one of the most conspicuous objects in the northern part of the city. The Soldiers' and Sailors' Memorial Arch fronting Prospect Park, Brooklyn, and the Prison Ship Martyrs' Monument in Fort Greene Park, Brooklyn, are among the finest in the city.

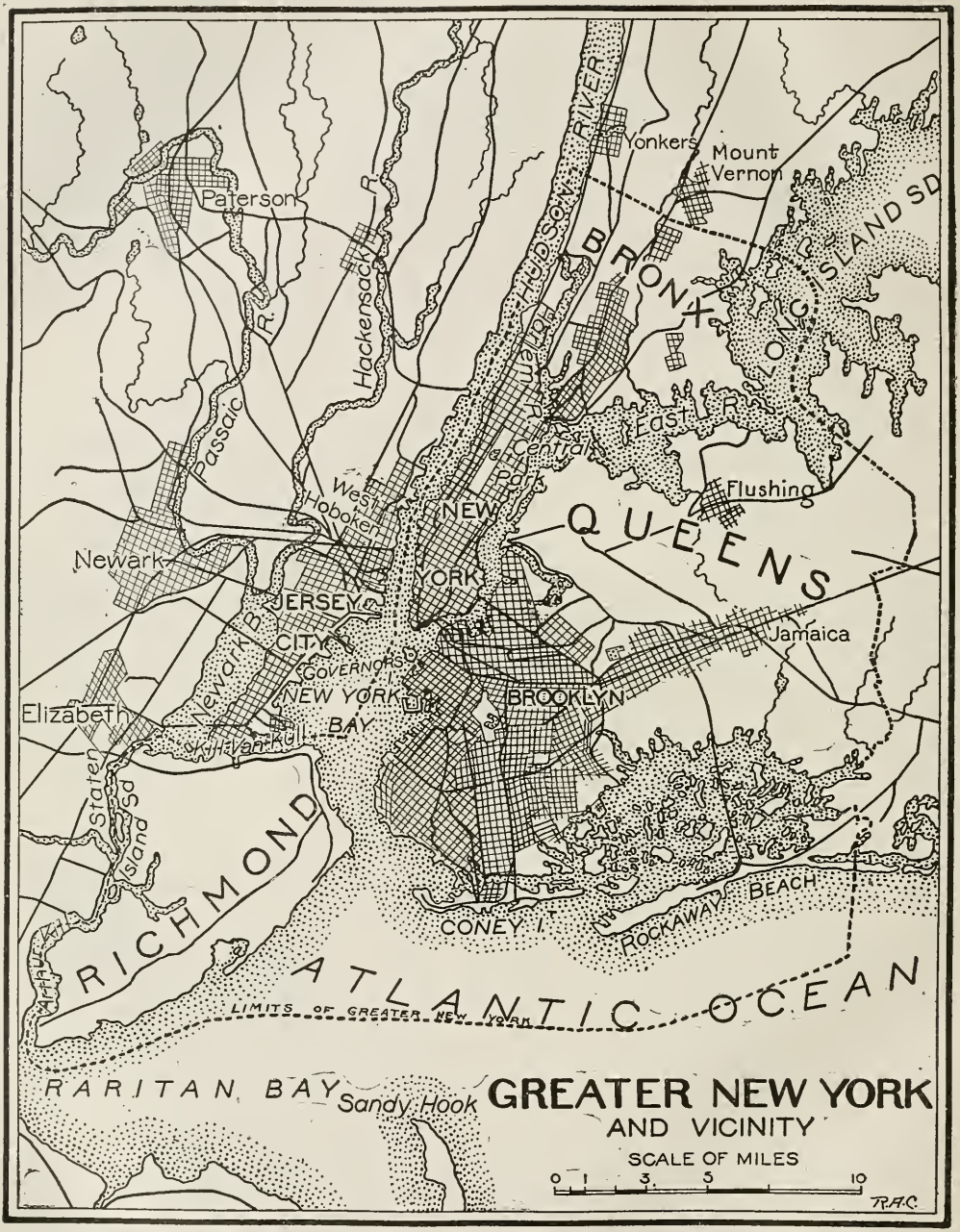
Public Buildings. The buildings used for city government purposes are in the vicinity of City Hall Park, which is on Broadway less than a mile from its southern terminus. In the center of this plot of green is the old City Hall, a beautiful structure erected more than a century ago. It contains the offices of the mayor and other city officials. The new Municipal Building, containing the city department offices, is on Park Row and Center Street, facing the City Hall. This is twenty-four stories high and cost about $12,000,000. On Center and Chambers streets is the imposing Hall of Records, and not far distant is the Criminal Courts Building. The "Tombs," or city prison, is connected with the Criminal Courts Building by a "Bridge of Sighs." On Broadway and Park Row is a branch of the postoffice, formerly the main building, a handsome structure built in Doric and Renaissance style. The main postoffice is west of the Pennsylvania Railroad station, on Eighth Avenue, between Thirty-first and Thirty-third streets.

Of the scores of towering financial and commercial buildings that give New York its reputation as a city of "skyscrapers," probably the best known is the Woolworth, on Broadway opposite the postoffice. Including the tower, this building contains fifty-five stories, and is the tallest office building in the world. At the top is an observation platform from which one can obtain an extraordinary view of the city and surrounding waters. Other great buildings of note include the Equitable Assurance, the Metropolitan Life, the "Flatiron," the Clearing House, the Chamber of Commerce, the Astor, the United Bank, the Subtreasury, the New York Stock Exchange and the Custom House.

Churches. The most noted church of New York is probably the old Trinity Church, located on Broadway at the head of Wall Street. In the churchyard are buried some of the famous personages of early times, including Alexander Hamilton. Grace Church, on Broadway and 11th Street, Saint George's, with its lofty spires, on Stuyvesant Square, and the Roman Catholic Saint Patrick's Cathedral, on Fifth Avenue and 50th Street, are all interesting churches. The last is the finest Gothic edifice in America. It is built of white marble, in the form of a Latin cross, and it has two beautiful spires rising to a height of 323 feet. On a rocky bluff on Morningside Park, overlooking Harlem Plains, is the Episcopal Cathedral of Saint John the Divine, now in process of construction. It will probably not be completed for many years to come. The total cost will be in the neighborhood of $10,000,000, and in vastness of dimensions and beauty of design, it is expected to take a leading place among the great churches of the world.

The quaint little Church of the Transfiguration ("Little Church 'round the Corner"), on 29th Street near Madison Avenue, is a place of special veneration to actors. Among its attractions is a beautiful memorial window to Edwin Booth. Other churches of note include the John Street Methodist, the Saint Nicholas Dutch Reformed, the Broadway Tabernacle (Congregational), the Jewish Temple Emanual, the Fifth Avenue Baptist and the Fifth Avenue Presbyterian.

Hotels and Clubs. Within a single square mile in the heart of Manhattan there are enough hotels to serve 50,000 people. Among the first-class hostelries are the Waldorf-Astoria, Biltmore, Knickerbocker, McAlpin, Belmont, Manhattan, Murray Hill, the Commodore, Astor, Ritz Carlton and Pennsylvania, the latter opened in 1919. The Commodore and the Pennsylvania have over 2,000 rooms each. The Plaza and the Majestic are well-known family hotels, and the Martha Washington, on 29th Street, is reserved for women. Of more than 200 clubs, of



special note are the Union League, the Lambs, the Players, the New York Athletic, the New York Yacht, the Army and Navy and the Knickerbocker. Many of the buildings housing these organizations are beautiful and imposing structures.

Institutions. The most important universities in the city are Columbia, on Morningside Heights, and New York University, in the Bronx. The College of the City of New York, at 138th and Convent Avenue, is a free institution for men; Hunter College is for women, at Park Avenue and Twenty-sixth street. There are scores of art, musical and professional schools, and various seminaries and colleges under denominational con-

trol. Cooper Union is a notable institution for working people.

New York has one of the largest city public libraries in the world, the collections of which are housed in a white marble building on Fifth Avenue between 40th and 42nd streets. Besides its great collection of books and manuscripts, the library possesses many valuable paintings, sculptures and pieces of pottery. Of the various museums the most famous is the Metropolitan Museum of Art. The museum building, a handsome structure on Fifth Avenue side of Central Park, contains original paintings and statuary, together with reproductions of famous creations of foreign lands, collections of jewels and porcelain and miscellaneous objects of art of great value. The museum is open to the public daily. On the west side of the Park at 77th Street is the Museum of Natural History, a magnificent building in which is one of the finest collections in natural history to be found in the New World. The Aquarium at Battery Park is widely known for its collection of salt and fresh water life.

Water Supply. See AQUEDUCT; CROTON AQUEDUCT.

Transportation and Communication. There are numerous railroads connecting New York with other cities in the United States; submarine cables, wireless telegraph stations and ordinary telegraph and telephone connections place the city in communication with all parts of the world. The principal railways are the Erie, the New York, Ontario & Western, the Lackawanna, the Philadelphia & Reading, the Lehigh Valley, the Central of New Jersey, the New York & Harlem River, the New York Central & Hudson River, the Pennsylvania, the West Shore, the Baltimore & Ohio and the New York, New Haven & Hartford. The New York Central and the New York, New Haven & Hartford have a great terminal station on 42nd Street and Park Avenue, Manhattan. The Pennsylvania station, located on 33rd Street and Seventh Avenue and connected with New Jersey by tunnels under the Hudson River, and with Long Island by tunnels under the East River, is one of the finest depots in the world. The other lines terminate on the west bank of the Hudson and transfer passengers and freight by ferries or tunnels.

New York has electric railways running the length of the Island on several of the principal streets and avenues, numerous cross-town lines and a very complete system of elevated railway lines, which run from the south end of the Island into the Bronx. Besides these, there are subway lines operated in connection with the elevated system. The urban transportation system of New York is the most extensive of any in the world, and represents an investment of hundreds of millions of dollars.

Ferries cross the Hudson and East rivers. Tunnels under these rivers also connect Jersey City and Hoboken, N. J., with Manhattan, the Bronx, Brooklyn and Queens, carrying throngs of people to and from the city night and day. The East River is spanned by four wonderful bridges, the Brooklyn, Williamsburg, the Queensboro and the New Manhattan, all suspension bridges fixed so high above the river as not to impede navigation. The Harlem River is also crossed by remarkable bridges, among which is High Bridge, which carries the old Croton Aqueduct. Hell Gate, a once-dangerous channel in East River between Long Island and Manhattan, is spanned by a great railroad bridge having the largest arch of any in the world.

Industry and Commerce. In manufactures, New York is by far the leading American city. The capital invested is enormous, and the variety and value of the articles made is almost beyond estimate. The most important industry is the manufacture of clothing, the value of the annual output exceeding that of all the manufactures of almost any other American city. In the printing and publishing business New York also far outranks any other city of the United States. There are approximately 25,000 manufacturing establishments in the vicinity of New York, and the city is the center of an industrial section that extends into surrounding states.

Under normal conditions about half the foreign commerce of the United States passes through the port of New York, and the coastwise trade is even larger than the overseas. The port facilities for taking care of the vast commercial business are unsurpassed.

Government. The charter of New York, as revised in 1901, has incorporated in it the important provisions which had proved satisfactory in the former city of Brooklyn and other American and European cities. The chief changes relate to the establishment of the borough system and to the provisions

which permit different localities to manage most of their own affairs. The executive power of the city is vested in the mayor and the heads of the different boroughs. The mayor, who holds office four years, appoints heads of departments and commissioners, except the comptroller of finance and officials under the control of the borough presidents. He is chairman of the board of estimate and apportionment, which consists of the mayor, the comptroller, the president of the board of aldermen and the presidents of the several boroughs. He is subject to removal by the governor, after a hearing, upon charges.

The president of each borough holds office for four years. He presides over the local improvement board and exerts some powers of a mayor. He is also a member of a board of aldermen and has the same power to vote as any other member of that body. The board of aldermen, consisting of seventy-three members, elected for two years in separate districts is the legislative body, and passes ordinances and resolutions which the mayor has the power to veto, though by a two-thirds vote it may pass laws over his veto, unless they require the payment of money, in which case a three-fourths vote is required.

History. The first white man known to have visited Manhattan Island was an Italian, Giovanni Verrazano, who, sailing in the French service, entered the harbor in 1524. In September, 1609, Henry Hudson, in the service of the Dutch East India Company, explored the harbor and river, and soon after the Dutch began trading with the Indians. But the first serious attempt at colonization began in 1623, when a band of thirty Dutch settlers arrived. Peter Minuit, the first governor, brought with him in 1626 another company of colonists and, having bought Manhattan Island from the Indians for the equivalent of twenty-four dollars, christened the town New Amsterdam.

Under Minuit and his successors, Wouter Van Twiller, William Kieft and Peter Stuyvesant, the colony prospered and grew, until in 1653 it numbered about 800 souls. In that year it was incorporated as a city. In 1664 Charles II of England granted the New Netherlands to his brother, the Duke of York, who took possession of the city and renamed it New York. The Dutch regained the city in 1673, but a year later they gave way to the English.

Questions on New York

An outline suitable for the study of a city the size of New York will be found with the article CITY.

How does New York compare in population with London? With Paris? With Berlin?

Describe the geography of Greater New York. What are its water boundaries?

What use is made of the various islands in the vicinity of Manhattan?

Describe the harbor of the city. How is it guarded?

What street is the financial center of the Western hemisphere?

What is the largest park in Manhattan? In Brooklyn?

From what country was the famous obelisk in Central Park transported?

Locate and describe the tallest office building in the world.

What is the "Little Church 'round the Corner"?

What facilities does the city offer the art student?

Would the student of natural history find New York helpful?

How does the city obtain its supply of drinking water?

What modes of transportation are there across the East River?

In what two lines of industry does New York surpass all other American cities?

What powers does the mayor of Greater New York possess?

How is the history of the city connected with that of the Netherlands?

When was New York a capital of the United States?

What is the distance from New York to Chicago? to Washington? to New Orleans? to Denver? to San Francisco?

What is the most famous street?

What is the name of the university with the largest attendance credited to any school in America?

What two great railroad depots are on Manhattan Island?

What part of the state's population is in this one city?

In 1686 the first city charter was issued, and in 1690 the first intercolonial congress was held in New York. The first printing press was established in the city in 1696; the first free school was opened in 1705, and the first newspaper, the *Gazette,* was founded in 1725. In 1732 a stage line was established between New York and Boston, but it was not until twenty-four years later that the Philadelphia stage began running. In the early part of the summer of 1776 a large part of the American troops were quartered in the city, and on July 8 the Declaration of Independence was publicly read to the soldiers and citizens. The next day the statue of George III on Bowling Green was torn down, but in September of the same year the British occupied the city and held it from that time until "Evacuation Day," November, 25, 1783. From 1785 to 1790 Congress met in New York in the old Federal Hall, the site of which is now occupied by the Subtreasury; here Washington was inaugurated in 1789.

In 1807 Fulton's steamer, the *Clermont,* began making trips between New York and Albany, and in 1812 the first steam ferry to Long Island was opened. The completion of the Erie Canal gave an impetus to the growth of the city, which since that time has increased its population at a rate never equaled by any other municipality. Two cholera epidemics, a great fire with much loss of life, a financial panic and several riots were events which seemed serious at the time, but which never delayed the city's progress. For several years after the Civil War the city suffered from political frauds perpetrated by the "Tweed Ring," but in 1871 the ring was effectively broken up. In 1898 the first charter for the organization of Greater New York was adopted, and the history of the city since that date has been one of almost uninterrupted prosperity.

Related Articles. Consult the following titles for additional information:
Blackwell's Island
Brooklyn
Bridge, subhead Suspension Bridges
Castle Garden
Cleopatra's Needles
Columbia University
Cooper Union
East River
Ellis Island
Hell Gate
Hudson River
Liberty, Statue of
Long Island
Manhattan Island
Metropolitan Museum
New York, College of the City of
New York University
Sandy Hook
Staten Island
Subway
Tammany Society
Tunnel
Tweed, William W.

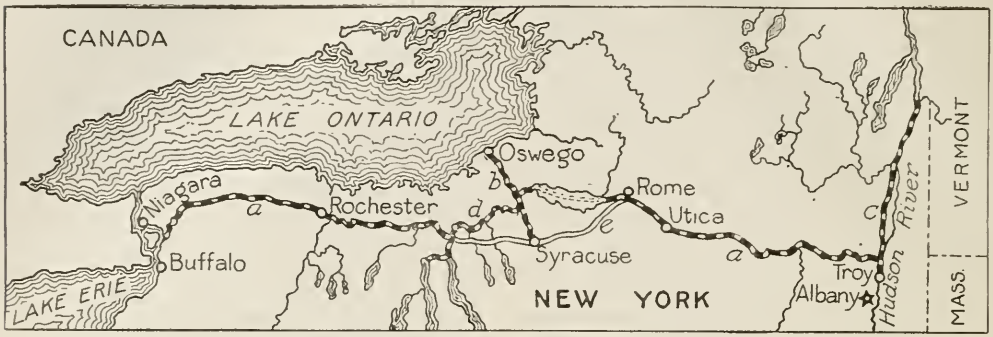
NEW YORK, College of the City of, a men's educational institution supported by the city of New York. The college was established by the board of education in 1848, under the name of the New York Free Academy. Its purpose was to provide educational advantages for those unable to pay tuition. It developed steadily, and in 1866 its name was changed to the College of the City of New York. Three years of preparatory work and four of college instruction are given, but there are no graduate courses. In 1917 courses in civil, electrical, mechanical and chemical engineering were instituted. Equipment is free and no tuition fees are required. An evening college is maintained for those who cannot attend day sessions, and there are extension courses. The enrollment in the day sessions is about 3,000, and there are about 4,000 enrolled for evening sessions and vocational subjects. Preparatory students, who meet in Townsend Harris Hall, number about 1,300. The faculty numbers about 235. There is a library of 67,000 volumes.

NEW YORK, University of the State of. See New York (state), subhead *Education.*

NEW YORK STATE BARGE CANAL, a canal system in operation in the state of New York, comprising four waterways formerly operated individually. These are the Erie, the Champlain, the Oswego, and the Cayuga and Seneca canals. The Barge Canal is the result of various enlargements and improvements of the four existing canals, the work having been authorized by the legislature and electorate of the state in 1903. Construction began in 1907, and the system was finished and ready for operation in 1917. A practical test of the Barge Canal was made in November, 1917, when two submarine chasers made the trip from Oswego, on Lake Erie, to Troy, on the Hudson. The experiment demonstrated that the great canal was in every respect a success.

Of the four canals comprising the system, the Erie is the most important. It is 339 miles in length, connecting Buffalo, on Lake Erie, with Albany and Troy, on the Hudson. The Champlain Canal, sixty-one miles in extent, runs from Whitehall, on Lake Champlain, to Watervliet, near Troy. The third canal, the Oswego, extends from Oswego, on Lake Ontario, to Syracuse. It is twenty-three miles in length. Of the same length is the Cayuga and Seneca Canal, connecting Montezuma, on the Seneca River, and lakes Cayuga and Seneca. The minimum depth of the Barge Canal is twelve feet, and it varies

in width from ninety-four to 125 feet, except when it follows natural watercourses, when it is occasionally 200 feet wide. There are fifty-seven concrete locks—thirty-five on the Erie division, eleven on the Champlain, seven on the Oswego and four on the Cayuga and Seneca. These are of standard dimensions, and permit the locking at one time of two boats of about 1,500 tonnage. In connection with the system there are forty dams. To complete the Barge Canal required an expenditure of about $150,000,000. It is expected that it will greatly decrease the cost of shipping grain and freight from the West to Eastern ports, and be an important factor in the future development of the country.



ROUTE OF THE BARGE CANAL

NEW YORK UNIVERSITY, a nonsectarian institution established in 1831 in New York City. It is partly coeducational, and is not a state university. Its founders wished to have the institution of service to as many as possible, and the different departments were therefore established in centers where they would be available to the greatest number of people.

The university consists of a college of arts and pure science, a school of applied science and a summer school, at University Heights, in the Bronx; a school of Law, a graduate school, a school of pedagogy, a school of commerce, accounts and finances, the Washington Square collegiate division and a women's law class, located in the University Building in Washington Square; a medical school, which is united with the Bellevue Hospital College, at First Avenue and Twenty-sixth Street; and the New York State Veterinary College, at 141 West Fifty-fourth Street. In 1917 Jacob H. Schiff presented a fund of $50,000 to endow a division of public affairs. Since 1908 an Extramural Division has been in operation. This was organized to give university courses outside the university buildings. In normal years there are between 8,000 and 9,000 students and a faculty of more than 500. The library contains over 134,000 volumes. Memorial Library, at University Heights, contains the Hall of Fame (which see).


Natives cooking in a hot spring

NEW ZEALAND, *ze'land*, DOMINION OF, a part of the British Empire, lying in the south seas, over 1,200 miles east of Australia, in a lonely position and so isolated that it is little known by the majority of people. However, it is in many respects the most advanced country in the world, for it has solved many of the governmental and economic problems which other nations are now confronting with feelings of uncertainty.

New Zealand occupies a position in the southern hemisphere whose latitude is comparable to that latitude in the United States from Northern Mississippi to Lake Superior. It consists mainly of two large islands—North Island (44,468 square miles) and South Island (58,525 square miles). A number of small islands are near the mainland, bringing the area of the dominion to 103,581 square miles, a little greater than that of New York, New Jersey and Pennsylvania.

Isolation of New Zealand. This dominion of the south seas is 1,233 miles from the nearest large land mass, that being the distance by steamer to Sydney, New South

Wales. To other ports of the world the distances are as follows:

Wellington to Melbourne, 1,481 miles.
Wellington to San Francisco, 5,905 miles.
Auckland to Honolulu, 3,836 miles.
Auckland to San Francisco, 5,934 miles.
Auckland to Vancouver, 6,235 miles.
Auckland to Panama, 6,593 miles.

The Land. The surface of the North Island is characterized by low hills and tablelands, densely forested. There are several volcanic peaks in the islands, of which the highest is the extinct volcano Ruapehu, over 9,000 feet in height; Tarawera and Tongariro are more or less active volcanoes. There are a number of lakes of volcanic origin, of which the largest is Lake Taupo, which has a diameter of twenty-two miles and an enormous depth. The coast line of North Island is much indented, but as most of the bays are obstructed by bars, good harbors are few.

The physical features of South Island are very different. There are no volcanoes and the coast line is regular. Along the western coast runs an elevated mountain range, which is known as the Southern Alps and which rivals in its rugged beauty the European Alps. The height ranges from 8,000 to over 12,000 feet. Forests cover the mountains to the snow line. On the western slope are great glaciers, while on the eastern slope extends a series of lakes, of which the largest and most beautiful is Lake Wakatipu.

Extending through 13 degrees of latitude and having a greatly diversified surface, New Zealand has necessarily a very varied, though a remarkably healthful, climate. In temperature it resembles France and North Italy, but the humidity is considerably greater. Rapid changes are a notable feature of the weather.

Nowhere in the islands is the sea more than sixty miles distant, and frequently its roaring can be heard many miles inland. The country is famous for its boiling springs, great glaciers, geysers that rival those of the Yellowstone, and fiords like those of Norway and the western coast of Canada.

Natural Resources. With mineral wealth New Zealand is liberally supplied. Coal is obtained in many parts, and the production is about $1,000,000 a year; copper has been worked on a small scale. Gold is the greatest natural resource; it is worked both in North and South Island, and is produced to the extent of $6,000,000 a year. Silver, copper, tin, antimony and manganese are found. Of the flora, the most characteristic forms are the ferns, of which there are about 130 different species. In some places these form almost the only vegetation over immense districts. Another characteristic plant, and one of great economic value, is the flax plant. A number of forest trees, among which is the kauri, or damar pine, furnish valuable timber. New Zealand is singularly deficient in animals, there being probably not a single indigenous mammal. Rabbits have been introduced and have multiplied so as to become a pest; and pigs now run wild, as well as cats. Pheasants, partridges, quail and deer have also been successfully introduced. The native birds are remarkable neither for numbers nor for beauty of plumage. Pigeons and parrots are the most common, and the apteryx, a peculiar wingless bird, is the most interesting. The gigantic wingless birds known as moa are now extinct.

Agriculture. The soil and climate of New Zealand are well adapted to the production of every English and American grain, grass, fruit and vegetable. In the gardens of the warmer valleys, fruits of a semi-tropical character, such as the pomegranate, citron, orange and olive, may be raised. The largest crops are of oats; wheat and barley are next in importance. Stock raising, especially sheep grazing, is an industry of primary importance in New Zealand. There are about 25,000,000 sheep in the colony, and by far the most important exports are wool and frozen meat.

People and Education. The original natives of New Zealand, called Maoris, are said to have emigrated from the Navigator's or the Sandwich Islands centuries ago. Split up into numerous petty tribes, their numbers have been so much reduced that they now do not exceed 50,000, all of whom, with the exception of a few hundreds, are located in the North Island. By missionary efforts a great part of them have been converted to Christianity. They have acquired in many instances considerable property in stock and cultivated lands, and in the neighborhood of the settlements they are adopting European dress and habits. Most of the white people not born in New Zealand emigrated to the islands from some part of the British Empire. About seventy per cent are native born. The leading church is the Church of England.

Elementary education is free, secular and compulsory for children from seven to four-

teen years old. Secondary education is provided for in numerous high schools and grammar schools, for attendance in which a small fee is required. At the head of the higher education is the University of New Zealand, an examining body empowered to grant honors, degrees and scholarships, and affiliated with this are several colleges throughout the colony. There are also training schools for teachers, art schools, engineering institutions and theological schools.

New Zealand's Advancement. Mention has been made of governmental and economic measures which have marked the dominion's development. These have been due very largely to the demands of labor, and may be summarized as follows, the years named being the date of enactment:

1870—National ownership of railroads was effected.

1881—A land tax, which succeeded in breaking up many large estates; this is the single-tax idea.

1892—The government began to buy large estates whose owners complained of taxes, and it leased these lands in small parcels for 999 years. The rental to the state was nominal, and made the tenant virtually owner of his premises.

1893—An income tax was adopted; the right to vote for members of the General Assembly was given to women.

1894—Arbitration of labor disputes was made compulsory.

1898—Old-age pensions were provided.

1899—A universal minimum wage law was passed.

1906—A law was passed authorizing the government to loan money to workers at 4½ and 5 per cent.

1908—The 999-year lease was abolished and one for sixty-six years was substituted, with renewal privilege; in the same year to participate in a strike was declared to be punishable by a fine of $50; emigrants were compelled to possess $500 for the parents and $250 for each child over twelve years of age.

1910—Compulsory military training for boys between the ages of twelve and eighteen was adopted.

Cities. There are four cities each having a population in 1916 exceeding 20,000. These are Auckland, 133,712; Wellington, 95,235; Christchurch, 92,733 and Dunedin, 68,716.

Government and History. New Zealand was first discovered by Tasman in 1642, but little was known of it until the visits of Cook in 1773 and 1777. The first permanent settlement was made by missionaries in 1815; in 1841 it was formally separated from New South Wales and placed under its own independent governor, and in 1852 it received a constitution and a responsible colonian government. Troubles with the natives of North Island about land gave rise to frequent Maori wars, and as late as 1886 a disturbance about land arose. In 1865 the seat of government was removed from Auckland to Wellington. The movement toward state socialism became prominent in 1890; progress in this direction is outlined above.

On September 26, 1907, designation of the Colony of New Zealand was changed to the Dominion of New Zealand. In the South African War, New Zealand loyally supported Great Britain, and in 1914, after Great Britain had declared war against Germany, a New Zealand expeditionary force seized the German possessions in the Bismarck Archipelago. The dominion, without solicitation, furnished more than its quota of soldiers for the war, and provided a battleship, the *New Zealand,* which it presented to the mother country.

The chief of the government is a Governor-General, appointed from London. There is a Ministry responsible to the people, and a General Assembly of two houses—the Legislative Council and the House of Representatives.

Related Articles. Consult the following titles for additional information:

Apteryx	Dunedin
Auckland	Maoris
Christchurch	Single Tax
Cook, James	Wellington

NEY, *nay,* MICHEL, Duke of Elchingen, Prince of the Moskva (1769-1815), a marshal of France. He entered the military service in 1788 and was a member of a regiment of hussars when the French Revolution broke out. He rose by degrees to the rank of general of division and distinguished himself in the Rhine campaign. Appointed marshal of the Empire by Napoleon in 1805, he achieved a victory over the Austrians at Elchingen and took part in the battles of Jena, Eylau and Friedland. In the Russian campaign he conducted the rear guard in the disastrous retreat. In the campaign of 1813 his skill and courage decided the victory of Lützen and were of the greatest service at Bautzen and Dresden. When Napoleon abdicated and the Bourbon dynasty was established, Ney took the oath of allegiance to the king and received a command; but when the emperor landed from Elba his old general joined him at Lyons

and opened the way to Paris. When the allies entered Paris he escaped in disguise to the provinces, but was finally arrested, brought back to Paris, tried for treason and executed.

NEZ PERCE, *na pair say'*, an Indian tribe who formerly lived in the eastern portions of Washington and Oregon and in Central Idaho. After giving up their lands and taking new ones, they became displeased at the inroads of the miners upon their new territory, and under Chief Joseph they began a war in which their masterly leader for a long time defeated the regular United States troops. In fact, Joseph finally surrendered only under a promise to be returned to his old reservation. The government proved false to its word, and the Indians were moved into the former Indian Territory. More than half their number quickly perished there by disease, and in 1884 they were returned to a reservation in Northern Washington.

About 2,000 of the tribe are now living in two reservations in Washington and Idaho. Their name, meaning *pierced nose,* was applied by the French to those tribes that were accustomed to piercing the nose, but this particular tribe did not apparently practice this custom.

NIAGARA FALLS, N. Y., in Niagara County, on Niagara River at the point of location of Niagara Falls (which see), one of the great scenic wonders of America. The city is twenty-three miles north of Buffalo, on the Michigan Central, the Lehigh Valley, the Erie, the West Shore, the Wabash and the New York Central railroads. There is also interurban connection with Buffalo and with Niagara Falls, Ontario. Three notable suspension bridges connect the city with the Canada shore. The state has made 412 acres adjoining the Falls into a state park, and there are two smaller parks.

The city is a mecca for sightseers, many thousands visiting the Falls every year. It also possesses unusual educational advantages in De Veaux College (Protestant Episcopal) and Niagara University (Roman Catholic). There are two hospitals, a Carnegie Library and a Federal building. Hotels of all classes provide amply for visitors.

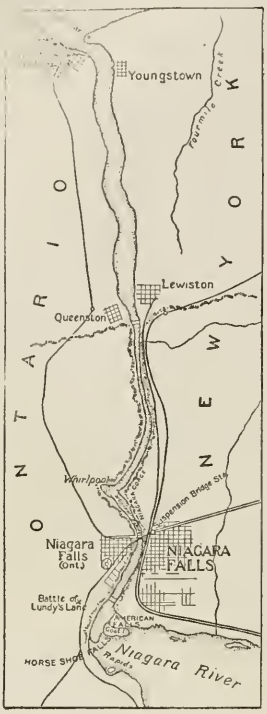
Niagara Falls has become a great manufacturing center since the unlimited water power from the rapids in the river have been available by law for use. There is one of the greatest shredded-wheat factories in the world; other industries include paper and flour mills; electric heaters; carborundum, graphite, carbide and carbon works, and electrochemical works. The city has been governed on the commission plan since 1915. Population, 1915 (state census), 42,433.

NIAGARA FALLS, Ont., in Welland County, on the Niagara River, between Lake Erie and Lake Ontario, opposite Niagara Falls, N. Y. It was formerly called Clifton. Its geographical position makes it a great railroad center; practically all of the great trunk lines, including the Canadian Pacific, Canadian Northern, Grand Trunk, Michigan Central, Wabash, and Erie systems, have connections here. The great water power of the falls furnishes abundant power for many industrial establishments; the most important of these produce silverware, iron and steel, chemicals, leather and leather goods, neckwear, hosiery and hats, firearms, paper and paper boxes. The city has one of the finest park systems in the world, and it is the center of a boulevard system which extends from Lake Erie to Lake Ontario. Its location at the great Falls makes it a great resort for tourists all seasons of the year. Population, 1911, 9,248.

NIAGARA FALLS AND RIVER. The Falls of Niagara and several miles of the course of Niagara River constitute one of the scenic wonders of the world. The river connects Lake Erie with Lake Ontario and separates the state of New York from the province of Ontario. It is thirty-three miles long and has a fall of 331 feet between the two lakes. In the upper part of its course, for about sixteen miles, the stream flows through a broad plateau, with scarcely any valley. Near the lower edge of this plateau is Grand Island, whose area is 17,000 acres, separating the river into east and west branches. After the branches reunite, the river flows quietly for a short distance and has a channel between two and three miles wide, which contains a number of islands. It then narrows and make a rapid descent, forming the rapids over which the river falls fifty-two feet in a short distance. At the foot of the rapids are the Falls, which are divided by Goat Island into two cataracts, known as the Canadian, or Horseshoe, Falls, on the west, and the American Falls, on the east.

The cataract is caused by the river's falling over a ledge of hard limestone, which is underlaid by layers of softer rock. This ledge

outcrops a few miles south of Lake Ontario, and the Niagara Gorge, below the Falls, has been formed by the wearing away of this rock by the cataract during the thousands of years that the river has occupied its present channel. The tremendous velocity of the water as it approaches the edge of the Falls throws it out from the foot of the cliff to a distance of forty or fifty feet; it was even greater before so much water was withdrawn above the Falls for power for factories.



The lower strata of the rock under the Falls have been worn away more rapidly than the upper layer, over which the water is precipitated, thus forming a sort of cave, into which visitors can enter, both at the outer end of the Canadian Falls and near Goat Island on the American side. In each of these places paths have been excavated and platforms built, which enable sightseers to obtain a magnificent view of the Falls. The place of entrance near Goat Island on the American side is known as the Cave of the Winds. The Canadian Falls, which are by far the larger, have an extent, measured on the curve, of 2,950 feet, or on the chord of the circle, of 1,230 feet. Their height is 158 feet, and the depth of the water near the center of the fall exceeds twenty feet. The American Falls have a length of 1,010 feet and a height of 167 feet, but the volume of water is only one-twentieth of the total flow over the precipice. The Canadian Falls are therefore much greater, though of less vertical height. Over the precipice between 400,000 and 500,000 tons of water fall every minute, fed by the mighty reservoirs of the Great Lakes.

Below the Falls. Here the river flows through a gorge for about seven miles. For a good portion of the way the gorge is deeper than the height of the falls, and its sides are nearly perpendicular, so that it can be ascended in only a few places. For a portion of its course through this gorge the water moves quietly but when it reaches a point about two miles below the Falls, it is precipitated over another series of ledges, forming the famous Whirlpool Rapids, which in many respects excel the Falls in grandeur. Here the turbulent waters race at a speed of thirty miles per hour. Below these rapids the river makes a sharp turn to the left, and the force of the current has worn in the rock a large circular basin, around which the tumbling waters continue to flow, striving to find an outlet in the channel below. This forms the Whirlpool, which is the greatest maelstrom in the world. Below the Whirlpool the slope in the gorge is more gentle, and the waters flow with continually decreasing velocity until they reach the Ontario plain, about seven miles from the mouth of the river.

The river and Falls furnish some of the grandest spectacles of natural scenery in the world, and are visited by thousands of tourists every year. In order that these places of interest could be visited without unnecessary expense and annoyance, the state of New York in 1885 secured control of the tract of land adjoining the Falls and established Niagara Falls Park, which includes Goat Island and other small islands adjacent to it. The year following, the Canadian government established Victoria Park, on the opposite side of the river. An electric railway extends down the gorge to near Lewiston, following the foot of the cliff, and crosses to the Canadian shore, which it follows back to the city. The lower suspension bridge now connects these lines; the visitor can make a circuit of the region, passing on one side on the top of the bluff and on the other at its foot, thus obtaining excellent views of all points of interest.

The Niagara gorge near the Falls is spanned by three bridges; the first is a steel arch bridge for carriages and electric cars, about one-eighth of a mile below the Falls; the second, the cantilever bridge of the Michigan Central Railway, about two miles below the Falls; and the third, the steel railroad bridge of the Grand Trunk Railway, which was erected to replace the old suspension bridge, the first large structure of its kind

NIAGARA FALLS
The American Falls in the foreground

erected in America (see BRIDGE, subhead *Suspension Bridges*).

The Whirlpool may be viewed in a thrilling but safe ride on an aerial cable railway, 1,800 feet long, built in 1916 on the Canadian shore. It is the only one of its kind in America. In the passenger car twenty-four people can be seated and twenty others may find standing room.

Harnessed for Industry. The building of power houses and factories along the shores of Niagara River and Falls threatened for a time to destroy the grandeur of the view, by turning the main current from its natural channel, leading over the Falls, to underground sluiceways and tunnels, where it generated power. The amount of water thus used had already made an appreciable difference in the volume of the cataract, and plans were completed for large extensions of the plants, when by a joint effort of the governments of the United States and Canada in 1910 provision was made for restricting the amount of water used for industrial purposes. This amount is 20,000 cubic feet per second on the American side and 36,000 cubic feet on the Canadian side. Much of the power produced by this flow is converted into electrical energy by means of great turbine wheels, and the electricity is conveyed by wires to considerable distances. Buffalo's street cars are run by power thus received from the Falls, but about three-fourths of the 300,000-horse power generated is demanded in the two cities facing the cataract.

Welland Canal. The commerce of the Great Lakes passes from Lake Erie to Lake Ontario through the Welland Canal, in Canada, constructed nearly parallel to the river. See WELLAND CANAL.

NIBELUNGENLIED, *ne'be loong en leet*, one of the earliest and the greatest of national German epics, which, in some form or other, has existed from the thirteenth century. It is of unknown authorship and is, like most of the great national epics, rather a growth from separate ballad poems than a performance completed at any one period. It was originally founded on the story of Sigurd in the *Elder Edda*, and additions were made to it from time to time. The main story, with Norse foundation, is as follows:

Odin, Loki and Hörnir, to appease Rodmar, whose son they had killed, steal for him all Andvari's gold, including a magic ring. With the gold goes a curse, the leitmotif of the whole story. Rodmar, for the sake of his gold, is murdered by his sons, Fafnir and Regin; Fafnir runs away with the entire treasure and, in the form of a dragon, watches over it. Regin, a smith, plots vengeance. Sigurd, son of a slain hero, Sigsmund, comes to Regin to learn his craft. He hears of Fafnir, and determines to kill him. From fragments of a sword Odin had given his father, he wields a mighty weapon and slays the dragon. Burnt by a drop of the dragon's blood, he raises his burning finger to his lips, and instantly understands the language of birds, who tell him that Regin plans treachery. Sigurd slays Regin and with the treasure sets out. On a hill encircled by fire he finds Brunhild, sleeping. He wakens her with a kiss, and the two plight their troth.

Again Sigurd wanders. At the court of King Giuki the Queen gives him an enchanted drink, and he forgets Brunhild. Gunnar wishing to marry Brunhild himself, enlists Sigurd's aid in the quest. In the general misunderstanding Sigurd marries Gudrun, Gunnar's sister, and Brunhild marries Gunnar. This perversion of affairs—the operation of the curse—ends in tragedy for everyone. Sigurd is murdered, and Brunhild slays herself upon the funeral pyre. The gold had been stolen by Gudrun's brothers and hidden in the Rhine, and when they were treacherously murdered on account of it the secret of its whereabouts perished.

The story of the Nibelung treasure and its curse forms the basis of Wagner's trilogy *The Nibelung Ring*, though his music drama differs in many particulars from the original folktale, and into it is woven a beautiful symbolic and logical philosophy of life.

NICARAGUA, *nik a raw'gwah*, the second largest of the Central American republics, Guatemala being ninety square miles larger. It is almost exactly the size of the state of New York. The country would have attained worldwide importance had the Nicaragua Canal been built, but to-day it is of no more note than some of its neighbors. The area is 49,200 square miles; the population, in 1914, was 703,540.

The Country. The extension of the Rocky Mountains of North America, called the Cordillera of Central America, extends through the republic nearly parallel to the Pacific Ocean, which borders the country on the west. Between the mountains and the ocean are depressions, one of which contains lakes Nicaragua and Managua. The mountain peaks reach an altitude in places of nearly 6,000 feet. East of the highlands the land slopes to the plains on the Caribbean shore, at the east, though mountain spurs of low altitude also extend eastward. Honduras is north, and Costa Rica is south.

Though close to the Pacific Ocean, the waters of the two large lakes above mentioned flow to the Caribbean Sea through the San Juan River, on the southern boundary; this stream is for the greater part of its course about one-third of a mile wide. The other rivers are for the most part short and unnavigable because of bars near their mouths. Bluefields, on the Caribbean, has direct steamship connection with New Orleans, 1,236 miles north. The Pacific port is San Juan del Sur; by steamer it is 2,700 miles from San Francisco, and 4,210 miles from Honolulu. The capital is Managua, on the lake of the same name.

The People. The eastern coast is largely the Mosquito Territory, once an international issue, the home of the Mosquito Indians. In the eastern section are also the Zambo Indians and negroes from various West India islands, particularly Jamaica. This eastern part of the country is not adapted climatically to white men, except at Bluefields and a few other points along the coast.

In the western section there are about 17,000 white people of pure Spanish descent and many thousands of Indians. There is little communication between the east and the west. The Indians do all the work, and are obedient and industrious. Nearly all the people are Roman Catholics.

Resources. The chief agricultural product is coffee, and most of the plantations belong to Americans and Germans. In the east bananas are a great source of wealth, and a million and a half bunches are shipped from Bluefields every year. Cotton, tobacco, rubber, corn, breadfruit, cocoanuts and rice are also grown. Thousands of square miles are densely forested. In the highland region cattle raising is profitable.

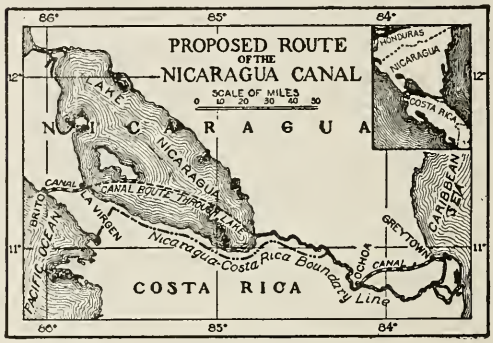
Government. The republic is governed by a President, elected every four years, and a Congress of two houses, elected every four years by universal suffrage. Education is in a very backward state, the majority of the people being illiterate.

Related Articles. Consult the following titles for additional information:

Central America	Mosquito Territory
Leon	Nicaragua, Lake
Managua	Nicaragua Canal

NICARAGUA, LAKE, an extensive sheet of water in Central America, in the republic of Nicaragua, about 100 miles long from northwest to southeast, and about forty-five miles wide at its broadest point. It is about 110 feet above the Pacific Ocean, thirteen miles distant. The river San Juan flows from the southeastern extremity into the Caribbean Sea, and at its northwestern extremity the lake receives, through the Tipitapa River, the waters of Lake Managua. Lake Nicaragua contains several islands, the largest of which is Ometepe. For this proposed use of Lake Nicaragua, see NICARAGUA CANAL.

NICARAGUA CANAL, a canal projected across the Isthmus of Nicaragua, to connect the Atlantic and Pacific oceans. As originally surveyed, this canal was to extend from Greytown, on the Caribbean Sea, to Brito, on the Pacific Ocean. The length was 183.86 miles, of which 70.51 was to be through the San Juan River and Lake Nicaragua. In



1849 a concession for constructing a canal was granted a company headed by Cornelius Vanderbilt. However, nothing practical was accomplished for forty years.

In 1889 the Maritime Canal Commission was organized, and this was followed in 1899 by the Walker Commission, authorized by the United States Congress to report upon the practicability of the enterprise. This commission made a favorable report, and for a time it seemed probable that the canal would be constructed in accordance with its recommendation. However, before negotiations with Nicaragua were completed in 1902, the Panama Canal Company of France offered to sell its franchises and property to the United States for the valuation placed upon them by the canal commission. This offer was accepted, and interest was transferred to the Panama Canal (see PANAMA CANAL). In 1916 a treaty was concluded between the United States and Nicaragua by which the latter conceded to the United States the perpetual right to build a canal over any route in Nicaragua desired.

NICE, *nees,* (Italian, *Nizza*), FRANCE, one of the most attractive cities of the French Riviera, situated on the Mediterranean, near the base of the Alps, eighty-four miles northeast of Toulon. The city is the capital of the department of Alpes-Maritimes. Its location is beautiful, and as the climate is mild and invigorating, the city is very popular as a health resort during the winter. There are two divisions of the town, the old and the new, the latter made beautiful by many handsome squares and public buildings. The Casino, the cathedral, the theatres and the public library are among the most noteworthy buildings in the city. Nice possesses silk, cotton and paper mills, oil mills and manufactories of tobacco, leather, soap, wine and straw hats. It exports large quantities of fruits, perfumes and wines. Previous to 1860 this city belonged to Italy, but in that year it was ceded with other territory to France, as reward for aid rendered Italy in the war against Austria. Population, 1911, 142,940.

NICE, COUNCILS OF, ecclesiastical councils held at Nice, or Nicaea, in Asia Minor, in 325 and A. D. 786. The object of the first council, which was convened by Constantine, was to settle the controversies which had arisen in regard to the doctrine of the Trinity. The session lasted about two months. A creed was adopted which in its later form is known as the Nicene Creed. The council of 786, summoned by Empress Irene, with the concurrence of the pope, decreed that images were to be used as aids to devotion. See ICONOCLASTS.

NICENE, *ni'seen,* or *ni seen',* **CREED,** a summary of the chief tenets of Christian faith, adopted by the Council of Nicaea in A. D. 325. The Creed has a place in the liturgies of the Greek, Roman and Anglican churches and in most Protestant doctrine.

NICHOLAS I PAVLOVITCH, *nik'o las pahv'lo vich* (1796–1855), emperor of Russia, ascended the throne in 1825, on the death of his brother Alexander I. He made war on Persia; joined in the Treaty of London, which secured the independence of Greece, and took part with the allied powers in the destruction of the Turkish fleet at Navarino in 1827. This affair led to war between Russia and Turkey, in which the latter was defeated. Nicholas suppressed the Polish insurrection, which broke out in 1830, with relentless severity, and in 1848 he assisted Austria in putting down the rising in Hungary. Early in 1852 began the Russian effort to take over the holy places and assume the protectorate of the Greek Church. This led to the Crimean War, before the close of which Nicholas died.

NICHOLAS II, *nik'o las,* (1868–1918), former czar of Russia, the last of the famous Romanoff dynasty. From his accession to the throne in 1894 until March 15, 1917, he was the revered "Little Father" to 180 millions of deeply religious Russians and the autocratic ruler of the largest empire in the world. On June 16, 1918, according to the best authority obtainable, while a prisoner in the hands of the self-constituted Bolsheviki government, he was cruelly shot to death. Such is the brief summary of the life of a weak, but well-disposed, unfortunate monarch. Had he been favored with other surroundings the whole course of events in Russia might have been changed.

NICHOLAS II

As the eldest son of Czar Alexander III, Nicholas was proclaimed czarevitch (heir to the throne), at his birth. Wide travel supplemented his education, and in 1894, at the age of twenty-six, he became czar. In that year he married a German princess, Alexandra of Hesse, who always despised the Russians. Four daughters were born to the royal household before an heir to the throne was assured in 1904 in the birth of Alexis. (Under the Salic law no woman could rule the Russians.) The character of the reign of Alexander III was thoroughly autocratic. Nicholas had not the strength to maintain his father's iron autocracy or to adhere to a more liberal policy, towards which he showed occasional tendencies. His weakness frequently led him to concessions which later were arbitrarily withdrawn. Thus discontent throughout the empire continually increased.

In his foreign relations Nicholas was an advocate of peace. In 1899 he instituted the Peace Conference at The Hague, but was drawn into war with Japan in 1905, and because of his alliances was thrown into the

World War in 1914 at its inception. The part that Russia played in the first two years of that struggle was tremendous; it saved the allied cause. German intrigue at the Russian court and in the army, fostered by the czarina, who was wholly German in her sympathies, led to the demoralization of the czar's armies; treason in high places undermined the Russian structure, and the czar was reported to be considering a truce with Germany.

A climax was reached when a revolution, carefully planned, deposed Nicholas on March 15, 1917. He was held a prisoner in his palace, and with him, his family. When the second revolution occurred in November, the Bolsheviki government sent him to Tobolsk, Siberia, then to Ekaterinburg, where the whole family was said to have endured privation, insult and incredible hardship. His death was later reported in substantial detail. Whether his family was put to death at the same time was not known positively, though a statement to that effect was authorized.

Related Articles. Consult the following titles for additional information:

Bolsheviki	Russia
Peace Conference	Salic Law
International	World War

NICHOLAS, Saint (?–about 326), a Roman Catholic saint whose name has come to be synonymous with Santa Claus. In the fourth century, according to tradition, there lived a kindly Saint Nicholas who worked many miracles and was greatly beloved. From early times feasts were held in his honor in Europe, and in many places in Germany the sixth day of December, the day of his death, is still set apart as a sacred day. He is also the patron saint of the Russian Church. Inasmuch as his feast day was celebrated shortly before the Christmas season, he acquired a new character, that of the Santa Claus beloved by children. The name Santa Claus (or Klaus) is the Dutch corruption of his real name, and it is chiefly in his rôle of the children's friend that he is known among non-Catholics.

NICHOLSON, *nik' 'l son,* Meredith 1866–), an American writer, born at Crawfordsville, Indiana, and educated in the public schools of Indianapolis. Butler and Wabash Colleges conferred on him the honorary degree of A. M. (1901–1902), and the latter the degree of Litt. D. (1907). Mr. Nicholson is a member of the National Institute of Arts and Letters. Since the publication of his first book, *Short Flights,* a volume of verse, about twenty works, including poems and essays, but chiefly novels, have come from his pen. These include *The Hoosiers, The House of a Thousand Candles, The Port of Missing Men, Rosalind at Red Gate, The Siege of the Seven Suitors, A Reversible Santa Claus, The Valley of Democracy* and *Lady Larkspur.*

NICIAS, *nish'e as,* an Athenian statesman and general, active during the Peloponnesian War. He was one of the leaders of the aristocratic party, and was the opponent, after the death of Pericles, of the demagogue Cleon. In the campaigns against the Spartans, he met with some successes, and in 421 he brought about a peace between Sparta and Athens, known as the Peace of Nicias. When, in 415, he was appointed one of the leaders in the expedition against Sicily, he used his influence to prevent the expedition, but in vain. His fleet suffered a defeat, and his troops, retreating across Sicily, were forced to surrender. Nicias himself was put to death by the Syracusans (413 B. C.)

NICK'EL, a metal of a whitish color, of great hardness, and when perfectly pure, malleable and ductile. It is about nine times heavier than water. It unites in alloys with gold, copper, tin and arsenic, which metals it renders brittle. With silver and iron, its alloys are ductile. Nickel is found in all meteoric stones, but the most important mines are at Sudbury, Ont., from which more than half the world's supply is obtained. Next to the Sudbury mines, the greatest production is in New Caledonia, but there were discovered in 1918 great deposits in the Celebes, which may in time rival the Sudbury district. Nickel, mixed with brass in varying proportions, is now well known and largely used as *German silver,* or *nickel silver.* One-fourth of the American 5-cent piece is nickel (the remainder being copper).

NICOBAR, ISLANDS, *nik o bahr',* a group of nineteen islands in the Indian Ocean, at their nearest point 130 miles from Sumatra. With the Andaman Islands they form an extension of the chain which includes Sumatra and Java. Twelve are inhabited. The area of the group is 635 square miles. The soil is fertile, and cocoanuts, oranges, sugar and bamboo grow in abundance. The natives depend for their support largely on the trade in cocoanuts and copra.

The islands, together with the Andamans, constitute a British Indian province, and they are administered by a chief commissioner, with headquarters at Nancowry. Population, 7,000.

NICOTINE, *nik'o teen*, or *nik'o tin*, a transparent, colorless, oily vegetable substance, one of the alkaloids, and a poison. A small quantity in a pure state has been known to cause death. It is found in the leaves, roots and seeds of tobacco, the quantity varying from two to seven per cent of the composition of the plant. Cuban (Havana) tobacco contains only 2 per cent; Connecticut, .035 per cent; Wisconsin, .038 per cent; Kentucky, .061 per cent; Virginia, .068 per cent. Turkish tobacco contains hardly a trace.

The smoking habit is condemned because of the presence of nicotine in tobacco. Smoking would be an exceedingly dangerous habit if indulged to excess were it not for the fact that most of the nicotine, as it becomes heated, passes off in smoke. The boy who smokes for the first time may become very ill; his distress is due to the fact that his system is affected by the presence of a strange and active drug. See ALKALOID; TOBACCO.

NIELSEN, *nel'sen*, ALICE (1876–), an American dramatic soprano. She was born at Nashville, Tenn., and studied music at San Francisco. In 1872 she was married to Benjamin Nentwig, and from 1893 to 1902 starred in comic opera. Subsequently she studied at Rome and afterwards appeared in grand opera at Milan, Naples and London. She toured the United States with the Don Pasquale and San Carlos opera companies; she was associated in 1910 and 1911 with the Boston Opera Company, and was later connected with the Metropolitan Opera Company of New York.

NIEMEN, *ne'men*, a river of Europe, which rises in the northern part of the government of Minsk, Russia, flows westward, then northward, then westward again into Prussia, where it is known as the Memel. After a course of about 500 miles it enters the Kurisches Haff, a lagoon of the Baltic Sea, at Heiderkrug.

NIETZSCHE, *ne'cheh*, FREDERICK (1844–1900), one of the most original and daring of German philosophic writers, was born at Rocken, Saxony, and educated at Bonn and Leipzig. From 1869 to 1879 he was a professor at Bäsel, and for the next ten years devoted himself largely to writing; from 1889 until his death he was insane. Nietzsche has been held responsible by many for the war spirit in Germany, though he has perhaps had more English than German readers. He denounced religion, particularly Christianity, and taught that the end and aim of existence should be to produce a superior race—supermen—who should mercilessly dominate the earth. According to his system of eugenics, the strong should not waste their energies helping the weak, but should crush them out of the way. His most widely read books are *Thus Spake Zarathustra* and *Beyond Good and Evil.*

NIFLHEIM, *nif''l'hime*, in Scandinavian mythology, the region of endless cold and everlasting night, ruled over by Hel. Besides the wicked, all those who died of sickness or of old age were cast into Niflheim; and as existence there, even for the good, was but a negative sort of happiness, many men and women preferred to put themselves to death rather than to meet the fate of one who died in his bed.

NIGER, *ni'jur*, or **JOLIBA**, *jo le'bah*, a great river of Western Africa, after the Nile and the Congo the largest on the continent. It rises only 150 miles from the sea, in the French Guinea and northeast Sierra Leone frontiers. It flows north and northeast; then, describing a great curve, turns near Timbuktu and flows southeast, entering the Gulf of Guinea through a great delta consisting of a network of channels and islands extending along the coast 150 miles. Locally it is known in its upper course as Joliba, in the middle as Issa, and Mayo, and as Kwara, or Quorra, near its mouth. Its total length is about 2,500 miles. At Sego, about 340 miles from its source, it enters upon a fertile tract of country, which continues until Timbuktu is reached. Here large islands divide the river channel, and its tendency is to spread over the flat country in a network of small streams. Below Timbuktu it narrows to a width of 300 feet, flows through a rocky gorge, then through a desert region, after which it enters a fertile and populous territory. The Nun is the only one of the mouths which is navigable for large vessels. It is comparatively free from rapids, and with its tributary, the Benue, furnishes access—and the only water access—to Central Africa. It is continuously navigable to Rabba, 460 miles from its mouth.

NIGERIA, *ni je'ri a*, a colony and protectorate of Great Britain, in West Africa. The former German colony of Kamerun is on the east, the Gulf of Guinea is south, and the French possession of French West Africa and Dahomey are north and west. The present capital (1919) is Lagos (population, 60,000), but the British are building a new seat of government at Kaduna, in the interior.

Nigeria contains 335,700 square miles. The parent colony of Nigeria is small—1,400 square miles. The protectorate contains Northern Provinces (255,700 square miles) and the Southern Provinces (78,600 square miles).

The population of all Nigeria is about 17,500,000; only 2,700 are white. The natives raise corn, cotton, cacao and yams.

Slavery existed in the interior until British authority was asserted in 1900. The present government of the three divisions as a colony and two protectorates dates from 1914, though the coast section has been British since 1861, when it was purchased from a native king. Expansion and civilizing influences have been gradually extending inland.

NIGHT HAWK, in North America the name of a bird closely related to the whip-poor-will (which see) and strongly resembling it in many ways. Unlike the whip-poor-will, it has white wing markings, and prefers the open country to the woods. It has an exceedingly vigorous flight and takes its prey, consisting of beetles and other large insects, on the wing, usually in the evening. It may then be seen flying rapidly, making long descending swoops, with a hoarse whirring of its wings. The night hawk spends the day quietly sitting on the ground. Its eggs, two in number, are laid on the bare ground, with no attempt at protecting them by a nest.

NIGHT HERON, a small, restless bird, resembling the heron and intermediate between it and the bittern. The birds of one American species are about two feet long, have soft ash-gray plumage above, white below, and black markings on neck and head. The head is adorned with three long white feathers. The birds have a hoarse cry and feed, usually at twilight, on aquatic animals. They nest in colonies, in trees, and return to the same places year after year from their migration.

NIGHT'INGALE, a well-known bird of the thrush family, found in Europe, and everywhere famous for the exquisite night song of the male. It is a little brown

NIGHTINGALE

creature, not much larger than the American bluebird, and is modestly clad in a coat of russet-brown. On the moonlight nights the male often sings in woods and shrubbery till long after midnight, but in the daytime it is shy and rarely seen or heard. The bird is referred to in the poetry of all countries and is spoken of by its classical name, philomel, or its Eastern name, bulbul. The name Virginia nightingale is sometimes given the cardinal bird (which see).

NIGHTINGALE, Florence (1820-1910), an English philanthropist, born in Florence, Italy. At an early age she became interested in hospital work, visited the chief military hospitals of Europe and studied nursing in Germany and in France. During the Crimean War hospital accommodations were found to be very defective, and Miss Nightingale promptly volunteered to organize a band of nurses. The offer was accepted by the English government, and within a week she was on her way to Scutari, where she rendered invaluable service to the sick. Later she labored for hospital reform and during the Civil War in America and the Franco-German War she was able to give advice of inestimable benefit. Her *Notes on Hospitals, Notes on Nursing, Notes on the Sanitary State of the Army in India* and

FLORENCE NIGHTINGALE

Life or Death in India gave a tremendous stimulus to the subject of nursing in England.

NIGHTJAR. See Goatsucker.

NIGHT'MARE, a state of oppression, or a feeling of suffocation, which sometimes comes on during sleep, and is accompanied by intense anxiety, fear or horror. The sufferer may feel an enormous weight on his chest and dream that he is pursued by a phantom or wild beast or that he is threatened by some other danger, from which he can make no motion to escape. After a short time he awakens in a state of great terror, often with his body dripping with perspiration. It is supposed that the immediate cause of nightmare is some irregularity in the circulation of the blood in the chest or brain, caused by indigestion or by a strained or unnatural position of the body. Those subject to nightmare should not eat heavily before retiring, and should cultivate poise and mental tranquillity.

NIGHT SCHOOLS. See Evening Schools.

NIGHT'SHADE, a plant belonging to the genus known to botanists as *Solanum*, and found in all continents. The plants have slightly narcotic properties, and some are poisonous. One species is the beautiful bittersweet, a woody vine with flowers resembling potato blossoms and having clusters of tomato-red berries; another is the black nightshade, having white, bell-shaped flowers and black berries; still another is the deadly nightshade, or belladonna, which has black berries the size of cherries, and is poisonous. This last yields a valuable drug, for which it is widely cultivated in parts of Europe. See Belladonna.

NI'HILISTS, the name at first applied specifically to the revolutionary party in Russia which accepted anarchism (see Anarchists), but later applied indiscriminately to Russian revolutionists. This name was first given to the party about 1860 by Turgenieff in his stories of Russian society. Their object was to destroy all forms of government, overturn all institutions, annihilate all class distinctions and sweep away all traditions. For some years this propaganda was spread in printed and oral forms among the serfs by thousands of young people of both sexes. About 1874, however, the Russian government began to interfere, the newspapers which advocated the Nihilist doctrine were suppressed, and large groups of the revolutionists were summarily tried and condemned to death or exile. Thereafter the Nihilists adopted a secret and bloody program, and they were responsible for many outrages, including the murder of Czar Alexander II. The revolutionary teachings of the Nihilists were taken up by the radical Socialists, and after the downfall of the czarist régime, in 1917, the government passed into the control of the group of Socialists known as Bolsheviki. See Russia.

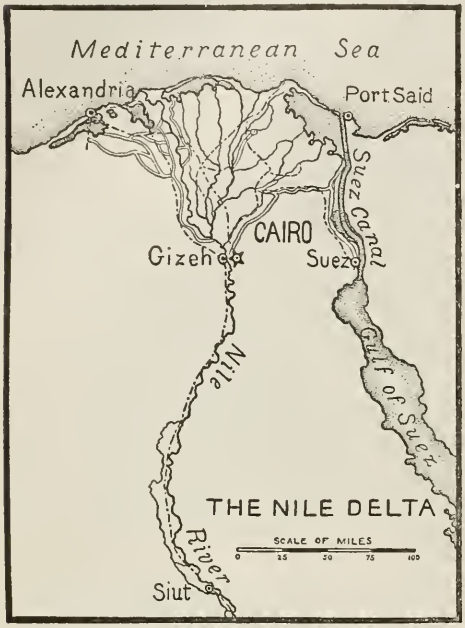
NIJNI-NOVGOROD, *nyeezh'nye nov'go rod.* See Nizhni-Novgorod.

NI'KE AP'TEROS, or **ATHE'NE NI'KE**, Temple of, a beautiful temple of the Doric order, which stood on the site of the entrance to the Acropolis at Athens, built in the Age of Pericles and consecrated to Athene. It was eighteen by twenty-seven feet and had four Ionic columns, thirteen and one-half feet in height, at each end. The frieze contained sculptures representing historical and mythological scenes. The building was torn down by the Turks in the last part of the seventeenth century, but in 1835 it was rebuilt.

NILE, a great river of Africa, which, in its course through Egypt, annually overflows its banks and transforms a barren region into a land of flourishing crops. Next to the Mississippi-Missouri system the Nile is the longest river in the world, being nearly 4,000 miles in length.

Its Course. The main stream, or White Nile, has its source in the equatorial lake, Victoria Nyanza. What is known as the Blue Nile, a much smaller stream, joins the White Nile at Khartum. Near where it flows out of Lake Victoria, the river forms the unimportant Ripon Falls, then flows generally northwest and afterward forms the Falls of Karuma and the Murchison Falls. Then, after a further course of thirty miles, it enters another lake, the Albert Nyanza, at an elevation of about 2,300 feet. From the Albert Nyanza to the Mediterranean the general course of the Nile is in a northerly direction, with numerous windings. Above Gondokoro the river forms a series of cataracts; but between these falls and the Albert Nyanza, a distance of over 150 miles, it is broad, deep and navigable. Not far below Gandokoro it begins to flow more to the west, until it reaches Lake No, where it receives the Bahr-el-Ghazal.

On receiving this affluent the river turns due east for about 100 miles, and then, after receiving the Sobat from the southeast, it flows almost due north to Khartum. It receives its last tributary, the Atbara, from



the Abyssinian frontier. Between this point and the frontiers of Egypt occur several rapids or cataracts, presenting greater or lesser obstacles to navigation. In Egypt, at the head of the Delta, near Cairo, the river divides into two main branches, leading down respectively to Rosetta and Damietta, where they enter the Mediterranean.

At Flood Time. As rain scarcely ever falls in the greater part of the valley of the Nile, the river owes its supplies to the copious rains and the vast lake areas of the tropical regions in which it takes its rise, and its volume thus depends upon the season. It begins to increase in June, attains its greatest height about September and then subsides as gradually as it rose. The ordinary rise at Cairo is about forty feet. During the flood a great portion of the delta and of the valley of Egypt is inundated. This annual inundation, with all the rich soil which it brings, is the chief reason for the fertility of Egypt, and no doubt it was for this reason that the Nile was worshiped as a god, alike by Egyptians, Greeks and Romans. Near Assuan, just below the first cataract, the British government has built a great dam to store water for irrigation.

The dotted lines in the accompanying map indicate the route of the Cape-to-Cairo railway and its connections.

Related Articles. Consult the following titles for additional information:
Assuan
Cape-to-Cairo Railway
Egypt
Irrigation

NILSSON, *nil'sun,* CHRISTINE (1843–), an operatic star very popular with audiences of the latter part of the nineteenth century. She was born in Sweden, where, through the help of a wealthy man who became interested in her, she received a good musical education. In 1860 she made her professional début in opera in the city of Stockholm, appearing four years later in Paris in the rôle of Violetta (*Traviata*). Her career thereafter was a succession of triumphs, both in Europe and the United States. Her voice was remarkably clear, sweet and sympathetic, though less powerful than that of Patti or Melba. Miss Nilsson retired permanently from the stage at the age of forty-four.

NIM'BUS a term applied in art, especially in sacred art, to a halo surrounding the head, in representations of divine or saintly subjects. It was first used in Christian art in the fifth century, and took various forms. The nimbus in representations of God the Father is triangular and has rays extending in all directions; the nimbus in representations of Christ contains a cross more or less enriched; that of the Virgin Mary consists of a circlet of small stars, and that of angels and saints, of a circle of small rays. When the nimbus is of a square form it indicates that the person was alive at the time of delineation.

NIMES, or **NISMES,** *neem,* FRANCE, an important manufacturing city, capital of the department of Gard, 174 miles southwest of Lyons. It has an ancient cathedral, an old citadel and a number of striking public buildings. It is chiefly noted, however, for its Roman antiquities, which include a temple ornamented with Corinthian columns, a huge amphitheater and the famous aqueduct, Pont du Gard, fourteen miles distant. A picture of this aqueduct accompanies the article AQUEDUCT.

Nîmes is the great center of Southern France for trade in silks. The city is supposed to have been founded by a Greek colony, and was for about 500 years in the

possession of the Romans, under whom it attained considerable importance. In the sixteenth century it became a stronghold of Calvinism and it suffered much during the civil wars. It was the birthplace of the novelist Alphonse Daudet. Population, 1911, 80,437.

NIM'ROD a Bible character described in *Genesis* X, 8–12, as a descendant of Ham, a son of Cush, a mighty hunter before the Lord. He is the traditional founder of Nineveh and other ancient cities. His name is to-day used as a symbol for anyone who is fond of hunting.

NIN'EVEH, a dead city of Turkey, at one time capital of the Assyrian Empire. It was situated on the east bank of the Tigris, near the site of the present city of Mosul. Although the town itself covered an area only three miles long and one mile wide, the capital embraced a much more extensive area and included four near-by towns or suburbs. Nineveh was the capital of Assyria from about 1300 to about 606 B. C.; in the latter year it was destroyed by a confederation of Medes, Persians and Babylonians. In 1842 Botta, French consul at Mosul, began to excavate the vast mounds on the banks of the Tigris and discovered the buried ruins. He was followed in the work of investigation by Layard and investigators of the British Museum. Vast palaces, a royal library, sculptures and innumerable small objects of every kind were uncovered, and the walls of the city with their elaborate outworks, moats and defenses were traced. Many of the movable relics were deposited in the British Museum. See ASSYRIA.

NING-PO', CHINA, a city in the province of Che-kiang, one of the ports open to foreign commerce. It is on the Ning-po River, about sixteen miles from the sea. It is surrounded by a wall twenty-five feet high, and its most remarkable edifice is the great Ning-po pagoda, now partly in ruins. The manufactures consist chiefly of silk and cotton goods, carpets, furniture, gold and silver wares and confections. The principal exports are tea, silk and raw cotton. The city is a center of education, having several colleges and a great library. It is also a center of missionary effort. Population, estimated, 470,000.

NIOBE, *ni'o be*, in Greek mythology the daughter of Tantalus, the wife of Amphion, king of Thebes. Proud of her twelve children, she boasted of them to Leto, who had but two, Apollo and Artemis. Those deities, in anger and jealousy, put her children to death. Their bodies lay unburied for nine days and then Zeus changed them to stones. Niobe in her grief, prayed to the gods, who, in pity, changed her into a rock image, in which form she continued to shed tears. The story of Niobe has been a favorite subject in literature and art. It appears, with divergencies in detail, in Sophocles, Aeschylus and Ovid; it has been represented on Greek vases, reliefs and in sculptured groups.

NIOBE

NIP'IGON, or **NEPIGON**, a lake of Canada, in Ontario, about thirty miles northwest of Lake Superior, with 813 feet greater altitude. Its greatest length is seventy miles, and its width, about forty miles. It has rugged headlands, deep bays and many islands. The Nipigon River connects it with Lake Superior. The district is much frequented by sportsmen, for the fishing is excellent.

NIP'ISSING, or **NEPISSING**, a lake of Canada, in Ontario, northeast of Lake Huron, with very irregular coast line. Its length is about fifty-five miles, its greatest breadth, twenty-eight miles. It contains numerous islands, and finds its only outlet by French River into Georgian Bay. This lake provides excellent fishing.

NIP'PON, the former name of Japan. See JAPAN.

NIRVANA, *neer vah'na*. See BUDDHISM.

NI'SAN, a month of the Jewish calendar, the first month of the ecclesiastical year and the seventh of the civil year, corresponding nearly to our March. It was originally called *Abib*, but the name was changed after the Babylonian captivity.

NISH, SERBIA, next to Belgrade the largest city in the country, and the temporary seat of the Serbian government during part of the World War. It is situated on the Nishava River, about 130 miles southeast of Belgrade, at the junction of several railway

lines and highways, and in normal times is a prosperous trading center. Though partly Turkish, it has much the appearance of a typical European city. Nish was anciently a prominent city of the Romans, and was the birthplace of Constantine the Great. It fell to the Turks in 1456, and was occupied by Serbs in 1878. When Belgrade was threatened by the Austro-Hungarians early in the World War (1914), the government offices were removed to Nish, but by December the invaders had been driven out. A year later all Serbia had been overrun by Teutonic and Bulgarian armies, and Nish was under the control of the central powers until the fall of 1918. Population, 24,949.

NI'TRATE, a general term for any salt of nitric acid. The nitrates have many practical uses. Lunar caustic, a compound of the nitrates of silver and potassium, is extensively used in surgery. The nitrates of lead and of iron are used in medicine, and the nitrates of barium and strontium are employed in the manufacture of fireworks.

As fertilizers, nitrates are of great value. Deposits of nitrates are present in small quantities in almost all soils, and enormous accumulations of nitrate of soda exist in Chile and Peru. These latter deposits, which are known as Chile saltpetre, or cubic nitre, are found near the coast and have been produced from remains of marine animals and birds. Chile saltpetre is one of the most important fertilizers known (see FERTILIZERS), and the Chile beds have long been the chief source of supply for American farmers. The United States government recently erected a plant at Muscle Shoals, Ala., to extract nitrogen from the air, to be used in the manufacture of nitrate for fertilizing and other purposes.

NITRE, *ni'tur.* See SALTPETRE.

NI'TRIC ACID, an important and powerful compound, formed of hydrogen, oxygen and nitrogen. When pure, it is a colorless liquid, very strong and disagreeable to the smell and so acrid that it cannot be safely tasted unless much diluted. It does not occur in a free state in nature. It is produced through the action of strong sulphuric acid on the nitrate of sodium or potassium. It is known in the arts as *aqua fortis.*

Nitric acid contains about seventy-six per cent of oxygen and acts as a powerful oxidizer. Copper, tin and silver, when brought into contact with this acid, produce oxides of nitrogen and metallic salt. When moderately dilute it produces a series of useful substances, notably, acetic, oxalic and picric acids and isatin, or white indigo. By replacement of the hydrogen in nitric acid, a series of salts termed *nitrates* is obtained.

Nitric acid is employed in etching on steel or copper; as a solvent of tin, to form with that metal a mordant for fine dyes; in metallurgy and assaying; in medicine as a tonic and as a substitute for mercurial preparations; in the form of vapor, to prevent contagion.

NI'TROGEN, a gaseous chemical element which constitutes about four-fifths of the atmosphere. In a free state it occurs in some nebulae, in some mineral waters and in soils. It is an essential constituent of various animal and vegetable tissues. Nitrogen gas was first isolated in 1772 and was found to be a colorless, odorless and tasteless gas. It combines directly with other elements—lithium, calcium and magnesium, with difficulty—though indirectly it produces many combinations. In combination with oxygen it forms nitric oxide and nitrous oxide (also called laughing gas), nitrogen peroxide and two other compounds of less importance. It is a very inert gas, and will neither burn nor support combustion. The greatest usefulness of nitrogen compounds is in contributing to the support of plant life. It is this element chiefly, drawn from the soil by living plants, that manures are put on to replace.

NITROGLYCERINE, *ni tro glis'ur in,* an explosive substance, appearing as a colorless or yellowish, oily liquid, heavier than water. It is insoluble in water, but dissolves in alcohol or ether. It is prepared by adding glycerine to a cooled mixture of sulphuric acid and fuming nitric acid. The liquid is poured into ten or twenty times its bulk of cold water, when the heavy nitroglycerine sinks to the bottom. When violently struck, nitroglycerine explodes. The volume of gas produced is about 10,000 times the initial volume of the nitroglycerine. The explosive force of nitroglycerine compared with that of an equal volume of gunpowder is as thirteen to one, and it is the strongest explosive known. If any traces of acid are allowed to remain in nitroglycerine, it is liable to undergo spontaneous explosion; hence, it is an exceedingly dangerous article to transport or store, and it is advisable to prepare the substance on the spot where it is to be used and only in such

quantities as may be required for immediate consumption. This method is adopted in many quarries and engineering undertakings. Nitroglycerine has for some time been extensively used in the manufacture of dynamite and smokeless powder.

Related Articles. Consult the following titles for additional information:

Blasting	Explosives
Dynamite	Smokeless Powder

NI'TROUS ACID. See NITROGEN.

NITROUS OXIDE. See LAUGHING GAS.

NIX, in German mythology, the name given to water spirits, male or female. The male nixie is sometimes represented as old, sometimes as young, but usually as a malicious being. The female nixie appears as a maiden, who often falls in love with some young man, whom she entices or draws into the water.

NIZHNI-NOVGOROD, *nyeezh'nye nov'go rod,* or **NIJNI-NOVGOROD,** RUSSIA, capital of the government of the same name, is situated at the confluence of the Volga and Oka rivers, 265 miles east of Moscow. Previous to the revolution of 1917 the city was noted especially for the great annual fair held there late in the summer. It was instituted in 1817, and for a century each fair attracted 500,000 dealers and visitors. After the downfall of the Kerensky government the city was the scene of Bolshevik disturbances. Nizhni-Novgorod is divided into three parts, the upper district, including the citadel, the governor's palace, libraries, schools, the cathedral and public buildings; the lower portion, containing the industrial establishments; and the suburbs, the scene of the fair. Population, 1913, 109,000.

NO'AH, one of the patriarchs of the Old Testament, son of Lamech, described in the book of *Genesis* as being chosen by God for his piety to be the father of the new race which should people the earth after the deluge. Having been warned by God of the coming flood, he built a vessel (the Ark) according to God's direction, and entered it with his family and animals of every kind. After the waters had subsided the Ark rested on Mount Ararat, where Noah gave a thank offering to God and was assured that the earth should never again be destroyed by a flood. As a sign of this promise, God set the rainbow in the clouds. Noah, or the family he represented, lived 350 years after the flood. While modern accounts place Mount Ararat in Armenia, older traditions locate it in the mountains of the Kurds, east of the Tigris.

NOBEL PRIZES, a series of prizes founded by Alfred Bernard Nobel (1833-1896), a Swedish inventor widely known for his invention of dynamite. Mr. Nobel bequeathed $9,000,000, the income from which is annually distributed in five prizes awarded for—

The most important discovery in physics.

The most important discovery or improvement in chemistry.

The most important discovery in physiology or medicine.

The most remarkable literary work of an idealistic nature.

The best work done in the interests of universal peace.

The prizes amount to $40,000 each. The first four are awarded by the Swedish Academies, and the fifth by the Norwegian Storthing. The first prizes were awarded in December, 1901. Four Americans have received prizes:

Theodore Roosevelt, 1906, in the interests of universal peace.

Prof. A. A. Michelson, of the University of Chicago, 1907, for advances in physical science.

Dr. Alexis Carrel, 1912, for distinguished service in the advancement of medical science.

Elihu Root, 1912, in the interests of universal peace.

During the World War, after 1916, no prizes were awarded.

NOBIL'ITY, a class of people possessing high privileges of a social nature, by government favor and hereditary transmission, not enjoyed by the masses. Less frequently political favor accompanies a title of nobility. Classes of nobility in Europe rose in the infancy of the nations and they still exist in a number of them. They are found almost without exception in monarchical governments; republics do not recognize them.

Among the ancient German tribes there were only obscure traces of hereditary nobility. The dignities of the counts of the Franks, the aldermen and great *thanes* of England, as also the *jarls* (in England, *earlas*) of Denmark, were accessible to every one distinguished by merit and favored by fortune. In Venice a nobility grew up consisting of a series of families who gradually acquired all political power.

In England hereditary nobility, that belonging to the titles of duke, marquis, earl, viscount and baron, is now entirely personal and social, though formerly it was connected with the holding of lands. In Spain and Italy still, the same rank depends in great

measure upon property qualifications. France under the empire fostered titles of nobility; the old families still retain the titles, as witnessed by the prefix *de,* but there is now no government recognition. Before the World War *von* and *vom* indicated noble rank in Germany; with the passing of the royal Hohenzollerns princely titles became honors.

In the United States class distinctions were guarded against by the following paragraph in the Constitution (Art. I, Sec. 9):

> 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.

Related Articles. Consult the following titles for additional information:

Baron	Earl
Count and Countess	Marquis
Duke and Duchess	Prince

NOCTURNE, *nok'turn,* a French term meaning *night piece,* applied to any musical composition which expresses a mood inspired by the soft, dreamy, quiet atmosphere of night. Chopin was the greatest master of this style of composition. A picture, such as Whistler's, representing the Thames in darkness, in which is poetically conveyed a sense of the mystery and beauty of night, is fittingly named nocturne.

NODE, an astronomical term used in connection with planetary orbits. All the planets of the solar system revolve round the sun in tracks or orbits slightly elliptical. The plane of the earth's orbit is called the ecliptic. The orbits of all the planets are not in exactly the same plane; that is to say, the plane of each orbit is slightly inclined to the ecliptic. Therefore each planetary orbit intersects the ecliptic at two points, opposite each other in the celestial sphere. The points of intersection are called *nodes.* The node which a planet reaches in passing from the south to the north side of the ecliptic is called the *ascending node;* the other is the *descending node.*

NOGI, *no'ge,* Ki-teu, General Baron (1851–1912), a Japanese general and administrator, famous for his successful siege of Port Arthur during the Russo-Japanese War, extending from May, 1904, to January 1, 1905. He was a member of the famous Samurai caste of feudal Japan, and after the reorganization of the country he entered the army and won distinction in the Satsuma Rebellion, in which he was twice seriously wounded. After the Japanese-Chinese War of 1895 he was made governor of the island of Formosa, which was ceded by China to Japan as a result of that struggle, and showed remarkable ability as an administrator. At the outbreak of the Russo-Japanese War he was placed in command of the third army and was assigned the task of reducing Port Arthur, considered one of the most strongly fortified ports in the world. After the fall of that fortress he joined Oyama's force and took a conspicuous part in the great Battle of Mukden. In 1912 he and his wife committed hara-kiri because they did not wish to survive their beloved Emperor Mutsuhito. See Hara-kiri.

NO'MAD LIFE, that mode of living practiced by tribes who wander about from place to place instead of occupying any one home permanently. *Nomadism* is from the Latin for *roaming.* Those tribes of Central Asia who live chiefly by raising goats, cattle and other domestic animals practice nomadism because they must at intervals seek fresh pasturage areas. Such tribes live in tents and their mode of life is very simple. In North America there are still a few Indian tribes that wander about, notably the pastoral Navahos of Arizona and New Mexico. The Hebrews of the time of Abraham and later were nomads.

NOME, *nohm,* Alaska, on Seward Peninsula, which is a western projection of the territory. The town is about 150 miles southeast of the Alaskan point nearest the Siberian coast, across Bering Strait, and it is the largest settlement in its part of the country. It is the center of a productive gold-mining district, whose output once reached $7,500,000 a year, but is now about $2,250,000 yearly.

The permanent growth of the town dates from 1899. It now has every public service that is at the command of cities in the states. A railroad extends northwest to Shelton. Nome is the center of the educational and commercial activities of a large section of Western Alaska. Population, 1910, 2,600.

NON-COMMISSIONED OFFICER, a soldier who holds the rank of corporal or sergeant. He is above the private and below the second lieutenant. The latter is the lowest commissioned officer. Non-commissioned officers are appointed by the superior officers of the company, battalion or regiment.

There are corporals and sergeants in every department of an army; their pay is about one-half more than that of privates. See CORPORAL; SARGEANT.

NONCONFORM'ISTS, those who refuse to conform to an established church. The name was first applied to those English clergymen who, at the Restoration, refused to subscribe to the Act of Uniformity and were in consequence ejected from their livings. Relief was afforded by the Toleration Act of 1689. The repeal of the Corporation and Test acts in 1828 removed the civil disabilities under which Nonconformists had previously been placed.

NONES, *nohnz*, in the Roman calendar, the fifth day of the months January, February, April, June, August, September, November and December, and the seventh day of March, May, July and October. The nones were so called from their falling on the *ninth* day before the ides.

NON-INTERCOURSE ACT. See EMBARGO.

NONPAR'TISAN LEAGUE, an American organization, mainly of farmers, which through political action seeks control of the government of states in order to carry out its reform program. It is not a political party, but it works through a selected existing political party by becoming numerically strong enough to dominate it. The principal feature of its platform is state ownership of many things usually conceded as belonging under private ownership. The league proposes to compel the state to purchase and manage all grain elevators, to conduct banks in its interests, and to operate many public utilities now under private management.

In North Dakota in 1918 the League elected every state officer, and proceeded to submit its theories to the test of practical experiment. The first result apparent was the hesitation shown by many newly-elected officers towards assuming responsibility for some of the radical changes demanded in the League platform. A serious doubt seemed to exist as to the wisdom of many features of the great experiment; responsibility bred conservatism. There is a concerted effort to extend the sway of the League over the states of the Northwest.

NORDAU, *nor'dow*, MAX SIMON (1849–), a writer of Hungarian birth and a leader of the Zionist movement in Europe. He studied medicine at Budapest and practiced there a short time, then went to Paris. His writings are, in the main, bold attacks on the ethics of modern civilization. Many of his books, written in French or German, have been translated, notably *Conventional Lies of Our Civilization, Paradoxes, The Malady of the Century, The Comedy of Sentiment* and *The Interpretation of History.* The one upon which his fame rests is known to English readers as *Degeneration.* In this he endeavors to prove that the intellectual activity and excitement of the last half century have resulted in the degeneration of once healthy mental condition into emotional sentimentality and impurity.

NORDENSKJOLD, *nor'den shold*, NILS ADOLF ERIK, Baron (1832–1901), a Swedish naturalist and explorer, born in Finland. After taking a doctor's degree in the sciences, he was appointed to some important posts, but becoming obnoxious to the Russian authorities, he left Finland and settled in Sweden. On a North Polar expedition in 1868, he reached latitude 81° 42′. Having turned his attention to Siberia, he decided, after making two successful voyages through the Kara Sea to the Yenisei, to attempt the accomplishment of the northeast passage, or passage by sea round northern Asia to the Pacific. He sailed in July, 1878, was the first to double the most northern point of the Old World, and after passing through Bering Strait reached Japan in September, 1879. See NORTH POLAR EXPLORATION.

NORDICA, *nawr'di ka*, LILLIAN (1859-1914), an American prima donna, whose real name was LILLIAN NORTON. She was born in Farmington, Maine, received her first musical training at the Boston Conservatory of Music, and later studied in Italy and London. She made her début at Brescia in 1876, and first appeared in America in 1895. Her fine stage presence, dramatic power and supreme command of some of the greatest Wagner rôles gave her rank as one of the foremost sopranos who ever lived.

NORFOLK, *nor'fawk*, VA., the second city in the state in size (Richmond being larger) and an important ocean steamship and railroad terminal. It is on Elizabeth River, near its mouth, at the broad estuary of the James River. It is served by the Chesapeake & Ohio, the Norfolk & Western, the Norfolk & Southern, the Virginian, the Southern, the New York, Philadelphia & Norfolk, the Atlantic Coast Line and the Seaboard Air Line rail-

roads. The harbor is large enough to shelter all the navies of the world. About 8,000 vessels enter and leave the port annually.

The trade is principally in lumber, coal, grain, cotton, peanuts, oysters, vegetables and fruit. It is the fourth cotton port in the United States and the leading peanut market of the world. It has one of the largest coaling stations in the world. The most important industrial establishments are cotton-knitting mills, cotton compresses, fertilizer factories, shipyards, tobacco and cigar factories, foundries, machine shops, shipbuilding yards, lumber mills and silk mills. The city has a splendid system of city schools, besides the Norfolk Academy and the Norfolk Mission College for colored students, and it contains four hospitals and a Carnegie Library. Portsmouth (across the Elizabeth River) and Norfolk constitute a Federal customs district. Old Point Comfort is just north of the city, and the Norfolk Navy Yard is in Portsmouth.

Norfolk was organized as a town in 1682 was incorporated as a borough in 1736 and was chartered as a city in 1845. In January, 1776, about nine-tenths of the town was burned by the British under the Earl of Dunmore. The city suffered severely from yellow fever in 1855. It was entered by Virginia troops in command of William B. Taliaferro, in April, 1861, and the navy yard was fired, but little damage was done. Until taken by the Federal forces, in May of the next year, it was the chief naval station of the Confederacy. Population, 1910, 67,452; in 1917, 91,148 (Federal estimate).

NOR'MAL SCHOOL, an institution for the training of teachers. That young people contemplating the teacher's career need special training as certainly as do architects, physicians, or civil engineers, is a principle recognized in all countries where popular education prevails. In the United States the most common type of normal school is that for the training of teachers for elementary or rural schools, and, in particular, the normal school maintained by the state.

The first public normal was opened at Lexington, Mass., in 1839; the first one west of the Allegheny Mountains was established at Ypsilanti, Mich., in 1850. At least one state normal school is now maintained in every commonwealth of the Union, and states as populous as New York and Pennsylvania have from six to ten, or more. These institutions are supported by appropriations made by the state legislature. In most of them a two-years' course is required of those who have been graduated from high schools; longer courses must be taken by students who are not high-school graduates. The curriculum includes elementary branches reviewed with the teacher's needs in view; nature study and other natural sciences; literature, drawing and music; elementary pedagogy and psychology. Practice teaching is an essential feature of every standard normal; and in some cases this teaching is done in the regular city or rural schools.

There are other classes of teacher training schools, notably the normal school maintained by large cities. City normals are conducted on the same principle as the state schools, but usually the training is especially adapted to the needs of the particular city supporting the school. Graduates are permitted to teach in the city schools without taking an examination. Well-known schools of this type are the New York (City) and the Chicago Normal schools. In New York state there are over 100 high schools which have teacher training courses, and this system has been adopted also in several other states. The particular purposes of such classes is to train teachers for the rural schools by means of a one-year course, given usually in the last year of high school.

Still another type of normal school is the so called normal college, which gives more extended professional courses than the ordinary normal, and aims to prepare teachers for high school work. In some instances the normal college is a department of a university, such as Teachers' College of Columbia University, and the School of Education of the University of Chicago. The total enrollment in the United States in both public and private normal schools is about 105,000.

NORMAN ARCHITECTURE, the round-arched style of architecture, introduced at the Norman Conquest from France into England, where it prevailed till the end of the twelfth century. Characteristics of churches in this style are (1) a cruciform plan, with semicircular apse and apsidal chapels; (2) nave arches resting on heavy pillars or clusters of piers; (3) doorways deeply recessed, often decorated with sculpture; (4) windows small, with semicircular arched heads, placed high in the wall; (5) towers, usually one on each side of the façade; (6) vaulted nave.

In course of time the style assumed a more delicate and refined character, passing gradually into the Early English. Besides ecclesiastical buildings, the Normans built many castles and fortresses, the best remaining specimen of which is the Keep of the Tower of London. The churches at Caen, Normandy, and parts of the cathedrals of Durham, Peterborough, Norwich and Canterbury, in England, afford excellent examples of this style.

NORMAN CONQUEST. See WILLIAM I, of England.

NOR'MANDY, an ancient province in the north of France, now divided into the departments of Seine-Inférieure, Eure, Calvados, Manche and Orne. On the decline of the Roman Empire this territory was seized by the Franks, and afterwards, in the tenth century, it was wrested from them by the Northmen, or Normans, from whom it received its name. Charles the Simple gave his sanction to the conquest made by the Normans, and Rollo, their chief, received the title of duke of Normandy. William II, duke of Normandy, in 1066 became king of England (see WILLIAM I, of England), and Normany was annexed to England. On the death of William it was separated from England and was ruled by his son, Robert, but it was afterward again ruled by the kings of England, until Philip Augustus took it from John and united it with France in 1203. Although it was several times retaken by the English, it was finally recovered by the French in 1449–1450. Normandy is one of the richest and most fertile parts of France.

NORMANS (north men), the descendants of the Northmen who established themselves in Northern France (Normandy). The Danish Northmen invaded England first about 787. Bitter struggles followed, until the Danish king Sweyn conquered the country in 1032. His son Canute ruled England until 1042, when the Saxons again gained control. William the Conqueror, who finally overthrew the Saxons in 1066, was himself a Norman (see NORTHMEN). Not only in Normandy and in England, but also in Southern Italy and Sicily Normans established themselves, and Norman princes ruled there from the middle of the eleventh to the end of the twelfth century.

NORNS, in Scandinavian mythology, the three fates. Their names were Urd, Verdandi and Skuld, representing past, present, and future, and they determine the fate of gods and men. Besides these three great norns, there were lesser ones, one to determine the fate of each man as he was born. These inferior norns correspond to the genii of classical mythology.

NOR'RISTOWN, PA., the county seat of Montgomery County, fifteen miles northwest of Philadelphia, on the Schuylkill River and the Schuylkill Canal and on the Philadelphia & Reading, the Pennsylvania and other railroads. The borough is in an agricultural and mining section, and contains a number of large machine works, extensive manufactures of knitting machines, hosiery, underwear, glass, iron, wire, screws, implements, furniture and other articles. There are over fifty factories. It has a state hospital for the insane, the Charity Hospital, homes for girls and aged women and other charitable institutions. Some of the prominent institutions are the McCann Library, a Masonic Temple, a city hall, a county courthouse, a home for aged ladies, the Montgomery County Historical Society, a charity hospital, Saint Joseph's Protectory for girls, the Friends' Home and a county prison. Montgomery Cemetery contains the tomb of Winfield Scott Hancock. Valley Forge is about six miles to the northwest. It was settled about 1688 and was incorporated as a borough in 1812. Population, 1910, 27,875; in 1917, 31,969 (Federal estimate).

NORTH, CHRISTOPHER, the pen name of the Scotch author John Wilson. See WILSON, JOHN.

NORTH, FREDERICK, Lord, Earl of Guilford (1732–1792), an English statesman who was Prime Minister during the American Revolution. He became Prime Minister in 1770 and proved, while honest and well meaning, so subservient to George III that he sometimes carried out a policy of which he did not thoroughly approve. The placing of a duty on tea sold in the American colonies and the Boston Port Bill were among the revolution-provoking measures which he vigorously supported. North was totally blind the last five years of his life.

NORTH ADAMS, MASS., in Berkshire County, twenty-three miles north of Pittsfield, on the Hoosac River and on the Boston & Maine and the Boston & Albany railroads. It is in the Berkshire Hills, at the foot of Greylock, the highest peak in the state. The Hoosac Tunnel and Hudson Park, with a

natural bridge, are features of interest. The city contains a public library, an academy and a state normal school. It has good municipal buildings and a city hospital. There is excellent water power, and the principal manufactures are cotton, woolen and print goods, boots and shoes, cigars, creamery products and machinery. It was settled in 1765, remained a part of Adams until 1878 and was chartered as a city in 1895. Population, 1910, 22,019; in 1917, practically unchanged.

One of the original owners

NORTH AMERICA, the northern division of the two vast land masses comprising the American continent, and the third largest grand division of the world, exceeded in size only by Asia and Africa. It is becoming the most important of all the continents, though that honor is yet reserved to Europe, where there has existed a civilization for more than a thousand years. However, it contains more people who speak a common language than any other except Asia, and in its central section is the richest nation in the world, the United States, much of whose wealth is as yet undeveloped.

Within recent years North America has taken a position in the world which is destined to give it supremacy, particularly as Europe has felt war's devastation and has lost millions of men and billions of dollars in crushing the strongest single nation within its borders—a nation which sought to impose its will upon the world. North America possesses nearly half of the wealth of the world; this continent provides more than half of the world's cotton for clothing, two-thirds of its petroleum, three-fourths of its silver, nearly the same proportion of its gold, almost half of its cereals for bread, more than half of its copper, and, most important of all in industry, over half of its iron.

The continent is for the most part in the north-temperate zone, where the climate is such as to bring man to his highest development. In that zone lie all of the United States and the larger part of the great Dominion of Canada. The extent of the continental land mass is from latitude 9° north, in Panama, to the frozen islands of the Arctic regions, 70° 36′, and from 47° to 168° west longitude. The Alaskan islands extend 20° still farther westward, beyond the international date line to a point as far west as New Zealand.

The greatest length of North America is about 4,500 miles; its greatest breadth is a little more than 3,000 miles. The area is about 8,300,000, which is slightly greater than that of South America but only about half that of Asia. The coast line is quite irregular. The chief projections on the north are Point Barrow, Boothia and Melville peninsulas; on the northeast, Labrador; on the east, Nova Scotia, Florida and Yucatan, and on the west, Lower California and Alaska. The northern and eastern coasts have a number of prominent indentations; on the north is Hudson Bay; on the east, the Gulf of Saint Lawrence, the Bay of Fundy, Delaware Bay, Chesapeake Bay, the Gulf of Mexico and the Gulf of Honduras. On the west, the Gulf of California, San Francisco Bay and Puget Sound are the only indentations of importance. However, all coasts have innumerable smaller indentations, many of which serve as fine harbors. There are numerous islands near the continent and geographically belonging to it. The most noted of these are Greenland, on the north; Newfoundland, the Bermudas, the Bahamas and the West Indies, on the east, and the Queen Charlotte and Aleutian Islands, on the west. Besides these, there are very many islands in the Arctic Ocean. They are, however, frozen wastes and of little importance.

Surface and Drainage. North America is divided into three great physiographic regions. These are the Appalachian highland on the east, the Rocky Mountain highland on the west, and the great central plain occupying the vast interior of the continent and extending from the Arctic Ocean to the Gulf of Mexico. The Appalachian highland consists of a low plateau containing several ranges of mountains, which under different names extend from the Gulf of Saint Lawrence in a southwesterly direction to within about 300 miles of the Gulf of Mexico. The elevations in these mountains do not exceed 6,700 feet, the height of Mount Mitchell, near the southern extremity of the range. Mount Washington, in the White Mountains, is nearly as high. The eastern slope of these high-

RELIEF MAP OF NORTH AMERICA

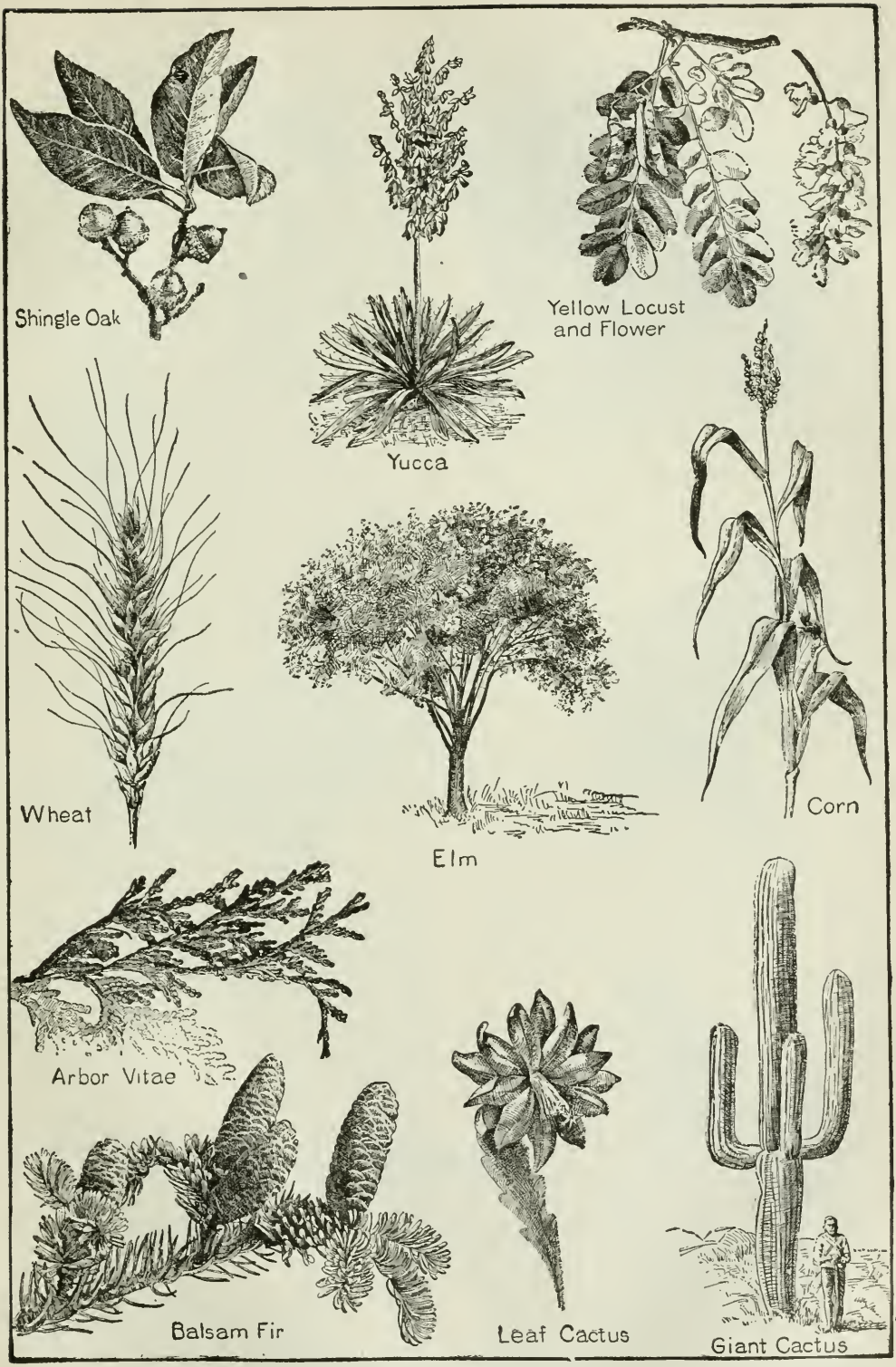
lands is somewhat abrupt and terminates in the Atlantic plain, which varies in width from 50 miles, in the north, to about 300 miles, in the south. The portion of this plain bordering on the ocean is low, but it is bordered inland by the Piedmont region, which is higher and consists of rolling land terminating in the foothills of the mountains. The western slope of the Appalachians is rolling and gradual and terminates in the prairie region of the great central plain.

The Rocky Mountain region extends from Alaska to the Isthmus of Panama, from which point it continues as the Andean system in South America. The name *Cordilleras* is frequently given to this entire mountain system, extending through both of the American continents. The Rocky Mountain highland region consists of a plateau, varying from 3000 to 10,000 feet in altitude and from a width of a few miles, near its southern extremity, to a breadth of over 1000 miles, in Utah and Colorado. Upon this plateau are the various ranges of mountains which make up the Rocky Mountain system. Chief among these are the Rocky Mountains proper, bordering the plateau on the east; the Cascades and Sierra Nevadas, bordering it on the west, and the Sierra Madre, which extend through Mexico. To these might also be added the Coast Ranges, in the United States. The highest elevation of these mountain ranges is found in Mount McKinley in Alaska, the highest point in North America, which has an elevation of 20,464 feet. Other important peaks in this vicinity and nearer the coast are Mount Fairweather, Mount Saint Elias and Mount Logan, each exceeding 18,000 feet in altitude. The system reaches its greatest development where the plateau is widest, in the United States, and bordering this plateau are numerous peaks exceeding 14,000 feet in height. Among the best known of these are Mount Whitney, 14,898 feet; Mount Shasta, 14,380 feet; Pike's Peak, 14,108 feet; Long's Peak, 14,271 feet; Mount of the Holy Cross, 14,006 feet. In Mexico the plateau rises to an altitude of about 7,000 feet and is surmounted by a number of lofty peaks, the most noted being Popocatepetl, 17,520, and Orizaba, 18,250 feet. There are also a number of other peaks exceeding 13,000 feet. In the central part of this highland, where the plateau is widest, the mountains enclose a large area known as the Great Basin, whose waters find no outlet to the sea and which contains a number of salt lakes, of which Great Salt Lake is the largest.

The Great Central Plain is divided by the Height of Land, which extends from Cape Charles in an irregular line north of the Great Lakes to the Rocky Mountains and separates the rivers flowing into the Arctic Ocean from those flowing into the Atlantic and the Gulf of Mexico. This Height of Land is a low ridge which originates in the Laurentian Plateau, but it is not marked by any distinct ranges of hills or peaks. To the north of it the land slopes gradually to the north and northeast and is generally low and quite level, in the extreme northern portion being swampy and forming a tundra similar to that in Siberia. The plain to the south is divided by the Mississippi River into two unequal regions, the eastern, well watered and consisting largely of low and level prairie, and the western, which is broad, comparatively arid and rising from the Mississippi gradually to the foothills of the Rocky Mountain plateau.

The river systems of North America consist of the Arctic system, the Atlantic system, the Gulf stream, the Pacific system and the inland system, draining the great basin. In a detailed description each of these is susceptible of several divisions. The chief streams in the Arctic system are the Mackenzie, the Saskatchewan and the Nelson, while in the Atlantic system the Saint Lawrence, draining the region of the Great Lakes, occupies first place. Other streams worthy of mention are the Hudson, the Delaware and the Potomac. The Gulf system includes the Mississippi, with all its tributaries, draining the greater part of that portion of the United States lying between the Appalachian and Rocky Mountain highlands. To this must be added the Rio Grande del Norte, which drains a portion of the plateau west of the Rocky Mountains. The Colorado, flowing into the Gulf of California, occupies a position peculiar to itself and drains the southern portion of the Rocky Mountain plateau. Of the streams flowing directly into the Pacific, the Columbia and the Frazer are the most important, while in the northwest the Yukon, flowing into Bering Sea, is one of the largest and most important rivers in the Arctic regions.

North America contains a larger number of lakes than any other continent. Aside from the Great Lakes, which have an area of



PLANT LIFE OF NORTH AMERICA 2585

See, also, full-page illustration Plant Life of United States, in article United States.

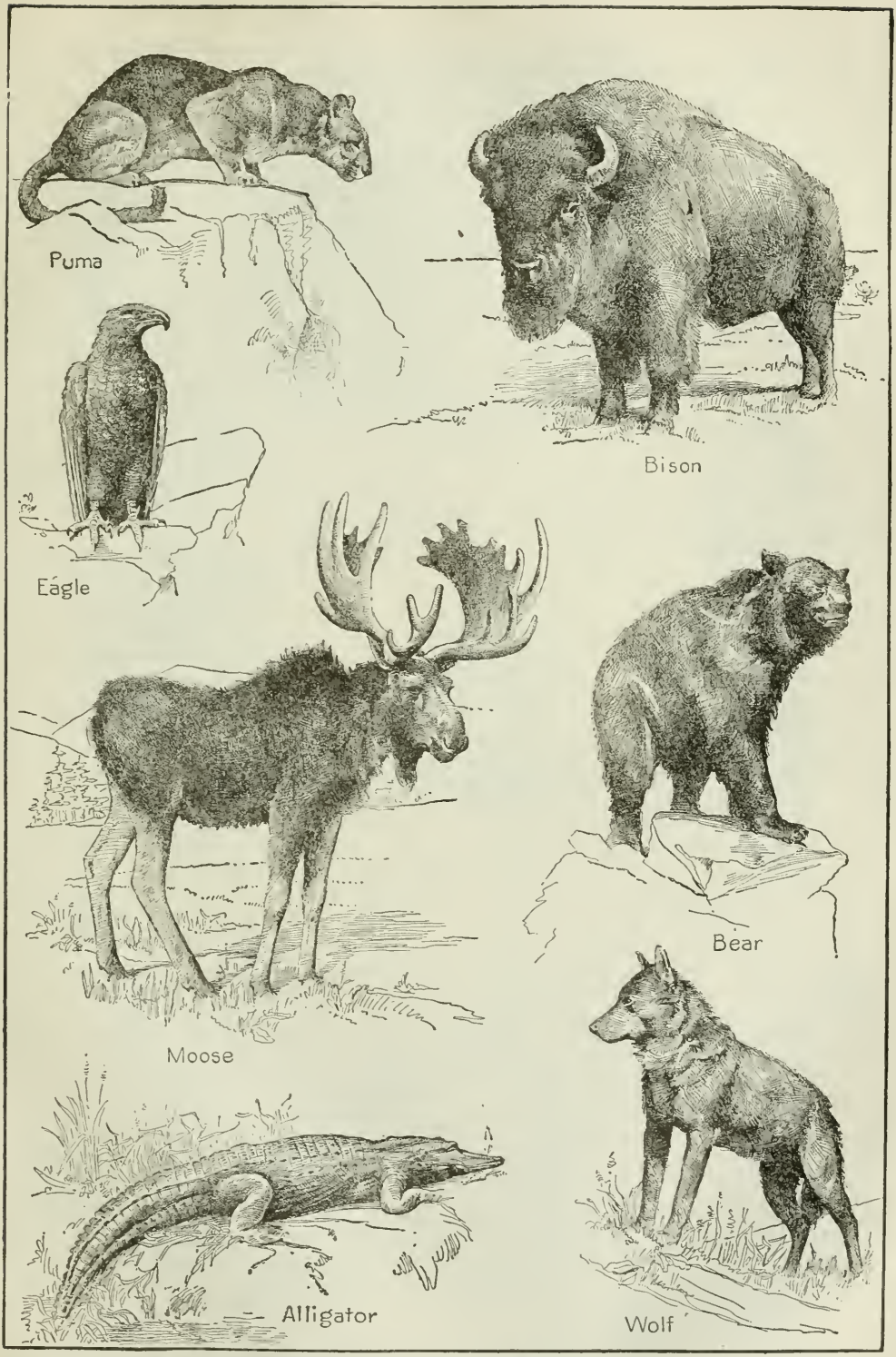
more than 90,000 square miles, there are, in the north, Great Bear Lake, Great Slave Lake and Athabasca Lake, each of which is an inland sea; also, Lake Winnipeg, Lake of the Woods and Rainy Lake. In the regions of both the Appalachian and Rocky Mountain highlands are found hundreds of small lakes, some of which have been formed by glacial action, while others occupy the craters of extinct volcanoes.

Mineral Resources. The eastern half of North America is much the older, and the Laurentian Plateau and the Height of Land constitute the oldest land known. The rocks here are coarse, and their surface has been worn and rounded so that no high elevations are found. South of the Saint Lawrence River and the Great Lakes, these highlands contain valuable deposits of coal and iron, which have been extensively mined in Nova Scotia, Pennsylvania, New York and regions farther south. The coal measures also extend westward into the prairie region, where large areas are found between the Ohio and Mississippi rivers and smaller areas south of the Ohio. In the western part of this plain, and also in certain sections in the Rocky Mountain plateau, are extensive deposits of lignite coal. The Rocky Mountain highland is rich in gold, silver, copper, lead and other minerals, and previous to the discovery of gold in Australia and South Africa, this was the most productive gold region in the world. Large deposits of copper and iron are also found in the vicinity of Lake Superior. Granite, marble, slate and other building stone, as well as clay suitable for brick, tile and pottery, are very generally distributed over the continent.

Climate. North America contains all varieties of climate, from tropical to frigid. The regions bordering upon the Arctic Ocean are so cold that the ground remains frozen throughout the year, but during the short, hot summer it thaws sufficiently on the surface to enable the vegetation of the region to blossom and bear fruit. To the south of this, the climate varies widely between the eastern and western coasts. Owing to the warm winds of the Pacific and the cold winds of the Atlantic, regions having the same latitude on these opposite coasts differ as to their mean annual temperature and amount of moisture. This is well illustrated by the climate of British Columbia and Labrador, the former having a comparatively mild climate, while the latter has winters so severe that it is scarcely inhabitable. In general, places along the Pacific coast have a more equable climate than those along the Atlantic. The great plain in the interior is subject to sudden changes and extremes of heat and cold, because the position of the mountain ranges is such as to allow north and south winds to sweep over it alternately.

The rainfall along the Pacific coast is quite heavy, but the high mountains rob the air currents of most of their moisture, so that the region east of the Cascade and Sierra Nevada mountains is arid. The southern part of the central plain receives its moisture largely from the Gulf of Mexico and is well watered, with the exception of its western border, which is too far from the Gulf to receive the benefit of winds from that direction and is so situated in reference to the Rocky Mountains that the westerly winds are deprived of their moisture before reaching it. Thus, an arid region is constituted, which, however, has sufficient moisture to maintain grass and some other species of vegetation. The Atlantic coast is, in general, well watered. The northern portion of this plain is characterized by deep snows during the winter.

Vegetation. In the extreme north, the vegetation consists of reindeer moss and those flowering plants which mature during the few weeks of the Arctic summer. The southern border of this region is marked by willows and other shrubs. A little southward, forests of conebearing trees, spruce, fir, hemlock and pine, are found. These forests extend across the continent from the region south of Hudson Bay to the Pacific coast, thence southward along the Cascade and Sierra Nevada mountains nearly to San Francisco. In the eastern highland, forests of hard wood and pine are found generally distributed as far south as the Gulf and along the Gulf as far west as northeastern Texas and Arkansas. In the south, these forests consist largely of pine and cypress. The northern part of this forest region extends westward as far as the Mississippi River, and in the vicinity of the Great Lakes the extensive pine areas have given rise to a large lumber industry. In general, the prairie region and the great plains are treeless, except along the banks of streams and around other bodies of water, but originally they were covered with a heavy growth of grass. In the southwestern part



ANIMALS OF NORTH AMERICA 2587

See, also, full-page illustration Animals of the United States, in article United States.

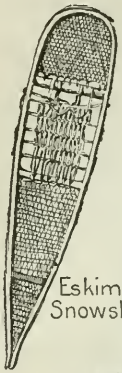
of the United States are extensive growths of cactus. For cultivated plants, see the subhead *Agriculture,* under the various articles on political divisions of the continent.

Animal Life. When first discovered by white men, North America contained a large number of wild animals, including a wide range of species. In the extreme north all of these are still found, the most important animals of this region being the walrus, the polar bear, the fur seal and the caribou, or American reindeer. The Arctic fox, the beaver, the otter, the marten and other fur-bearing animals are also found in this region. In the southern belt of this region, extending as far south as northern Maine, are found the moose and the deer. In the Rocky Mountain region are found the elk, the deer, the Rocky Mountain sheep and, among carnivorous animals, the wolf, the coati and the black, brown and grizzly bears. Large herds of bison formerly roamed over the central plain, but these animals are now nearly extinct, and only a few herds are found in national and private parks. These plains were also the home of the gopher and the prairie dog. In the Appalachian region are found the fox, the raccoon, the possum, the mink, the skunk, the lynx, the wild cat and the black bear, while squirrels and other small animals are found throughout the continent. There are many species of birds, ranging from the highly colored toucans, toward the extreme south, to the wild ducks and geese of the north. The most conspicuous of the larger birds are the gull, the falcon, the vulture, the turkey buzzard, the owl, the wild turkey, the crane, the heron, the flamingo, the swan, the wild goose, the duck and the pelican. Among the smaller birds larks, orioles, thrushes, robins, bluebirds, parrots, swallows, blackbirds and grosbeaks are the most familiar. The reptiles are not conspicuous, most of the snakes being harmless. The only venomous species are the rattlesnake, the copperhead and certain varieties of watersnake. The alligator found in the lagoons around the Gulf of Mexico is the largest reptile on the continent. There are thousands of species of insects, including flies, moths, butterflies, bees and beetles. Some of these are noted for their gorgeous hues, but many of them are conspicuous only for their destruction of vegetation.

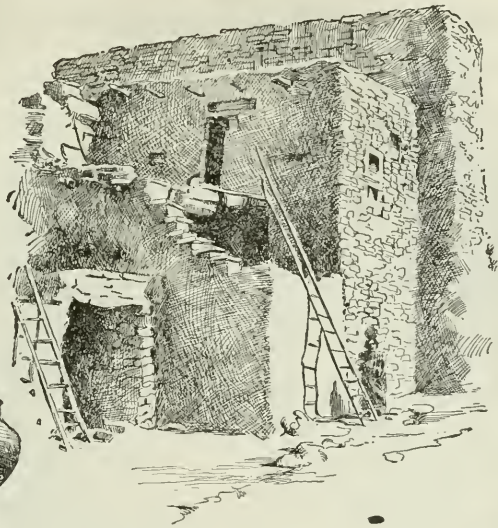
Inhabitants. When North America was discovered it was inhabited by a copper-colored race, to whom the name *Indians* was given. While this race has become nearly extinct, as civilization on the continent has progressed, remnants of it are still found from the extreme north to the south. Among the present inhabitants of North America are found representatives of every European nationality, a large number of people of African descent and a number of Mongolians. In general, in Mexico and Central America people of Spanish descent predominate. The United States contains representatives of every European nation, but those of English descent far outnumber any other. The colored inhabitants of the continent are confined chiefly to the Southern states of the United States, and in the Canadian provinces are found people of English and Scotch descent, while the Province of Quebec is peopled almost entirely by the descendants of the early French colonists.

Political Divisions. The independent countries of North America, including islands, are the United States, Mexico, Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, Cuba, Santo Domingo and Haiti. The colonial possessions are the Dominion of Canada, Dominion of Newfoundland, Belize, or British Honduras, belonging to Great Britain, and the islands of Saint Pierre and Miquelon, belonging to France.

History. America was first made known to the world by Christopher Columbus in 1492. The continent of North America was first discovered by John Cabot in 1497, and the New World was named after Americus Vespucius, who was the first to write a description of it. During the sixteenth century many voyages of discovery were made by the Spanish, Portuguese, English and French. The Spaniards colonized Mexico and made attempts to settle in what is now the southern part of the United States. The French also made attempts to settle on the coast of the United States and along the Saint Lawrence, but no permanent settlements were established in these regions until the beginning of the seventeenth century, when the English settled in Jamestown, Va., in 1607, and at Plymouth, Mass., in 1620. The French made their first settlement at Quebec in 1608. During the century following, the continent was practically divided among Spain, Great Britain and France, but in 1763, at the close of the French and Indian wars, France ceded her claim to Great Britain, and the continent



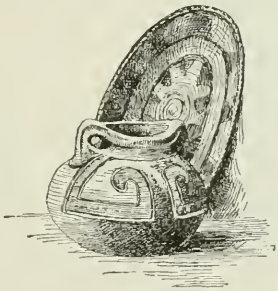
Eskimo Snowshoe



Pueblo, Southwestern United States and Mexico

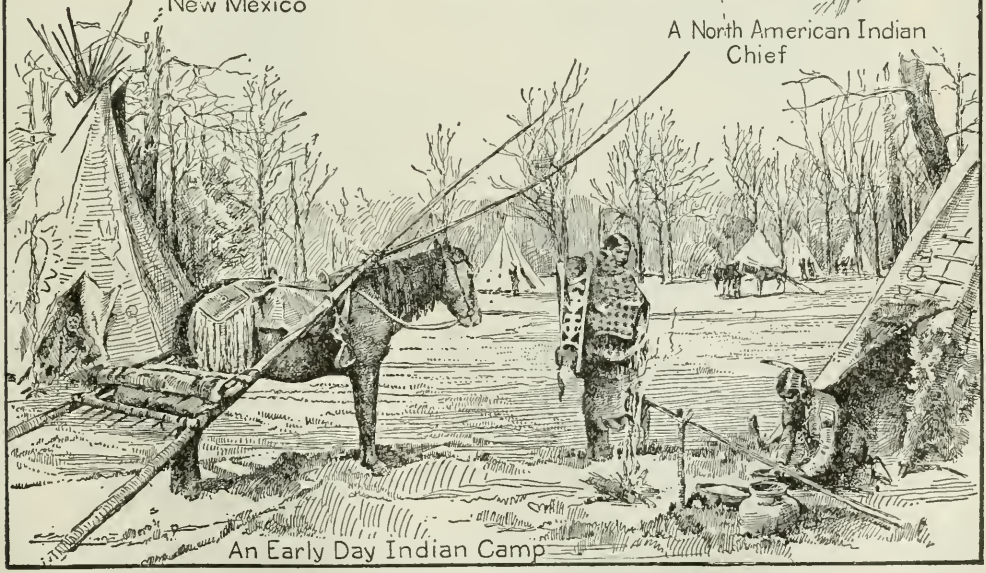
Tomahawk and Arrow

Zuni Woman, New Mexico



Handiwork

A North American Indian Chief



An Early Day Indian Camp

Outline on North America

In preparing an outline of a great continent one is confronted with the necessity of including an almost endless amount of detail or of limiting the record practically to its physical features. The latter is the logical method to employ, for a continent is always divided into countries and the countries still further sub-divided, in detail. In a great land division of the immensity of a continent we seek only general physical characteristics, and leave more intimate study of peoples, governments, industries, and the like until we reach in turn its various political divisions. In the foregoing pages these smaller divisions have been given due consideration.

A satisfactory outline of North America, or of any other continent, should include every important physical feature in its boundaries, definitely named and in a general way located. The chief characteristics of the surface of the continent merit like careful treatment. The following may be considered a typical outline:

I. Position
  1. Latitude 9° to 70° 36″ n.
  2. Longitude 47° 30″ to 168° w.

II. Extent
  1. Length 4,500 mi.
  2. Breadth (greatest) 3,000 mi.
  3. Area 8,300,000 sq. mi.
  4. Rank, 3d.

III. 1. Projections
  (a) North
    Cape Lisburne
    Point Barrow
    Cape Bathurst
    Boothia Felix Peninsula
    Melville Peninsula
    Cape Wolstenholme
    Cape Chidley
  (b) East
    Cape Charles (north)
    Nova Scotia Peninsula
    Cape Cod Peninsula
    Cape Hatteras
    Florida Peninsula
    Yucatan Peninsula
  (c) West
    Lower California Peninsula
    Cape Mendocino
    Cape Blanco
    Cape Flattery
    Alaska Peninsula
  2. Coast Waters
  (a) North
    Arctic Ocean
    Dolphin and Union Strait
    Gulf of Boothia
    Committee Bay
    Ferry and Hecla Strait
    Fox Channel
    Hudson Bay
    Ungava Bay
  (b) East
    Atlantic Ocean
    Gulf of St. Lawrence
    Bay of Fundy
    Massachusetts Bay
    Long Island Sound
    New York Bay
    Delaware Bay
    Chesapeake Bay
    Gulf of Mexico
    Gulf of Campeche
    Caribbean Sea
    Gulf of Honduras
  (c) West
    Pacific Ocean
    Gulf of California
    San Francisco Bay
    Puget Sound
    Strait of Juan de Fuca
    Queen Charlotte Sound
    Strait of Georgia
    Prince William Sound
    Cook Inlet
    Bering Sea
    Bristol Bay
    Norton Sound
    Kotzebue Sound

IV. Islands
  1. Arctic Ocean
    Greenland
    Baffin Land
    North Somerset
    Prince of Wales Land
    Prince Albert Land

- Banks Land
- Parry Islands
- 2. Atlantic Ocean
  - Newfoundland
  - Cape Breton Island
  - Prince Edward Island
  - Anticosti
  - Martha's Vineyard
  - Nantucket
  - Elizabeth Islands
  - Long Island
  - Bermuda Islands
  - Bahama Islands
  - West Indies
- 3. Pacific
  - Revillagigedo Islands
  - Santa Barbara Islands
  - Vancouver Island
  - Queen Charlotte Islands
  - Prince of Wales Island
  - Baranof Island
  - Kadiak Island
  - Aleutian Islands
  - Pribilof Islands

V. Surface
- 1. The Appalachian Highlands
  - (a) Mountain ranges
    - White Mountains
    - Green Mountains
    - Adirondacks
    - Catskill
    - Blue Ridge
    - Allegheny
    - Cumberland
  - (b) Piedmont Plateau
  - (c) Coastal Plain
- 2. The Rocky Mountain Highlands
  - (a) Mountain Ranges
    - Rocky Mountains
    - Cascade Range
    - Sierra Nevada
    - Coast Range
  - (b) Eastern foothills
  - (c) Coastal Plain
- 3. Great Central Plain

VI. Drainage
- 1. Watersheds
- 2. River Systems
  - Atlantic System
  - Gulf System
  - Saint Lawrence
  - Hudson Bay
  - Mackenzie
  - Columbia
  - Colorado
  - Rivers of the Great Basin
- 3. Lakes
  - Lakes of the Appalachian Highlands
  - Lakes of the Great Central Plain
  - Lakes of the Rocky Mountain Highlands

VII. Climate
- 1. Temperature
- 2. Rainfall
- 3. Winds and storms

VIII. Minerals
- 1. Gold and silver
- 2. Iron
- 3. Copper
- 4. Lead
- 5. Other metals
- 6. Mineral fuels
- 7. Building Stone

IX. Vegetation
- 1. Forest areas
- 2. Prairie regions
- 3. Desert regions

X. Animal Life
- 1. Large animals
- 2. Small animals
- 3. Birds
- 4. Fish
- 5. Insects

XI. Inhabitants
- 1. Indians and Eskimos
- 2. Other nationalities

XII. Political Divisions
- 1. Canada
- 2. United States
- 3. Mexico
- 4. Central American states

In studying North America in connection with an outline such as is given above, every important fact regarding the continent is brought to view and in proper sequence to assure a logical development of geographic knowledge. If the teacher will assign one subheading at a time, or divide long subheadings into parts, mastery of all facts is rendered easy, with a certainty that no important item of value has been neglected. The same suggestions can be carried out successfully in connection with all the continents.

Wonder Questions on North America

In what features does North America surpass any other continent?

North America possesses the deepest and grandest gorge in the world, the Grand Canyon; the highest cataract, the falls of the Yosemite, which drop 2,660 feet in three leaps; the largest glacier field, found in Alaska; the world's largest and oldest living things, the "Big Trees" of Sequoia Park; the only natural bridges on the globe; the largest underground cavern, Mammoth Cave of Kentucky; the largest body of fresh water, the Great Lakes; the longest river system, the Missouri-Mississippi; the largest field of radium ore, in Utah and Colorado; the most extensive coal fields; the most valuable silver mines; the most productive petroleum fields.

Are the names North and South America strictly accurate?

The two continents of the Western world could appropriately be called West and East America, for most of South America lies east of the longitude of New York City, and no part of it is as far west as Detroit. South America lies closer to Africa than Chicago does to San Francisco, while the northwesternmost point of North America is but a few miles from the Siberian shore. If it were not for the fogs in Bering Strait one could stand on the American coast and see in the distance the hills of Asia. North America is so far west that the end of the chain of islands off Alaska reaches a point beyond the international date line. The quickest way for a North American to reach the Far East is to travel westward.

If the eastern coast of North America had been like the western, would the history of the United States have been written as it is?

Having only the implements and mechanical inventions known before the nineteenth century, no people could have colonized a coast country like that on the western border of the continent. From Lower California to the Canadian border there are but two good harbors, the estuaries of the Sacramento and the Columbia rivers, and high mountains all along the coast rise almost out of the sea. The Atlantic coast of the United States twists and turns in endless variety, forming scores of good harbors, and it presented to the early settlers from Europe an ideal country for colonization. The mountains in the east are not high, and are back of the great coastal plain that was so admirable a site for thriving cities. Nature turned the favorable side of the continent toward the nations best qualified to develop it. Had conditions been reversed there probably would have been no United States as it exists to-day.

What size and shape had North America in the early stages of its existence?

At the close of the earliest geological era the principal nucleus of the continent was a land mass occupying what now corresponds to the eastern half of Canada, the Adirondack region of New York and a projection southward east of the Blue Ridge. From this nucleus the continent grew westward by successive upheavals of the earth's crust. The oldest mountains are the Laurentian Highlands of Canada; the youngest are the lofty ranges of Southern Alaska, in which is found Mount McKinley, the highest peak on the continent.

If the waters of the sea were removed, how would the continent appear through a gigantic telescope, viewed from space?

If we could view the continent somewhat as astronomers now examine the moon, we would see a huge triangular plateau resting in a vast trough representing the ocean bed. Around the border we would see a continuous margin sloping toward the depths of the basin. This is the continental shelf, the submerged part of North America. The surface of our great plateau would appear rough, but the tops of the highest peaks would not be so high above the level surface of the land as the highest parts of the continental shelf would be above the bottom of the trough. The West Indies and other islands would appear like giant mountains rising from the ocean floor.

What are the dimensions and character of the continental shelf?

The great fringe around North America extends southward to within 500 miles of the equator, and probably reaches nearer than that to the North Pole. The water covering it is 100 fathoms deep (about 600 feet). Counting the irregularities of its border, its circumference is about equal to that of the earth, or 25,000 miles. It is about fifty miles in average width, and has an area of about 1,000,000 square miles. It is composed chiefly of sediment washed from the land, and deposits of mud and ooze, formed by the hard parts of myriad plants and animals living in the sea. In the northern regions the shelf has been partially built up by the debris carried seaward by shore ice and icebergs.


ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
HUDSON BAY
BERING SEA
GREENLAND
ICELAND
BAFFIN LAND
ALASKA
YUKON
MACKENZIE
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEWFOUNDLAND
NOVA SCOTIA
Mt. McKinley
Yukon R.
Great Bear L.
Great Slave L.
Athabasca
Winnipeg
Hudson Strait
Davis Strait
Baffin Bay
Greenland Sea
Denmark Strait
Vancouver I.
Queen Charlotte Islands
Dixon Entrance
Juneau
Sitka
Edmonton
Calgary
Regina
Montreal
Ottawa
Quebec
Halifax
Labrador
Newfoundland
Iceland
Reykjavik
Godthaab
Frobisher Bay
Resolution I.
Southampton I.
Melville I.
Ellesmere I.
Axel Heiberg I.
Prince Patrick I.
Banks I.
Victoria I.
King William Land
Boothia Pen.
Melville Pen.
Cumberland Sd.
Foxe Channel
Foxe Basin
Hudson Bay
James B.
Gulf of St. Lawrence
Anticosti I.
Prince Edward I.
Cape Breton I.
Bering Strait
Chukchi Sea
Beaufort Sea
Gulf of Anadir
Kamchatka Pen.
Aleutian Is.
Unimak I.
Pribilof Is.
St. Matthew I.
Nunivak I.
Kuskokwim R.
Yukon Flats
Mt. Logan
Mt. Fairweather
Chicagof I.
Baranof I.
Prince of Wales I.
Queen Charlotte Is.
Vancouver I.
Strait of Juan de Fuca
Mt. Baker
Mt. Rainier
Columbia R.
Fraser R.
Cascade Range
Rocky Mts.
Peace R.
Athabasca R.
Mackenzie R.
Great Slave L.
Great Bear L.
Lake Winnipeg
Lake Winnipegosis
Lake Manitoba
Lake of the Woods
Lake Superior
Lake Nipigon
Lake Abitibi
Lake Mistassini
Lake Nichicun
Lake Amadjuak
Lake Nettilling
Lake Harbour
Lake Melville
Lake St. John
Lake Athabasca
Lake Reindeer
Lake Winnipeg
Lake Seul
Lake Athapuscow
Lake Clinton-Golden
Lake Baker
Lake Garry
Lake Rey
Lake Aberdeen
Lake Chesterfield
Lake Ennadai
Lake Dubawnt
Lake Yathkyed
Lake Tha-anne
Lake Winnipeg
Lake Winnipegosis
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Lake Garry
Lake Rey
Lake Aberdeen
Lake Chesterfield
Lake Ennadai
Lake Dubawnt
Lake Yathkyed
Lake Tha-anne


NORTH AMERICA
ENGLISH STATUTE MILES
0 100 200 300 400 500
KILOMETERS
0 200 400 600 800
1. Vermont
2. New-Hampshire
3. Massachusetts
4. Connecticut
5. Rhode Island
6. New Jersey
7. Delaware
8. Maryland
Hammond's 8 x 11 Map of North America.
C.S.Hammond & Co., New York.
Longitude West from Greenwich
F 120 G 110 H 100 J 90 K 80 L
UNITED STATES
MEXICO
GULF OF MEXICO
CARIBBEAN SEA
WEST INDIES
CENTRAL AMERICA
SOUTH AMERICA
PACIFIC OCEAN
ATLANTIC OCEAN
HAVANA
CUBA
HAITI
JAMAICA
Kingston
BAHAMA ISLANDS
TROPIC OF CANCER
EQUATOR
BOGOTA
COLOMBIA
VENEZUELA
ECUADOR
QUITO
HONDURAS
TEGUCIGALPA
NICARAGUA
COSTA RICA
PANAMA
SAN SALVADOR
GUATEMALA
NEW ORLEANS
San Francisco
Denver
Chicago
New York
Washington
Baltimore
Philadelphia
St. Louis
Cincinnati
Pittsburg
Atlanta
Charleston
Savannah
Jacksonville
Mobile
Memphis
Nashville
Louisville
Indianapolis
Detroit
Buffalo
Boston
Portland
Montreal
Quebec
Toronto
Hamilton
Bermuda Is. (Br.)
Cape Hatteras
Cape Canaveral
Key West
Tampa
Havana
Matanzas
Cienfuegos
Santiago de Cuba
Kingston
Port au Prince
Santo Domingo
Puerto Rico
Barranquilla
Maracaibo
Caracas
Bogota
Buenaventura
Guayaquil
Quito
Panama
Colon
Limon
San Jose
Managua
Lake Nicaragua
Tegucigalpa
Comayagua
Belize
Merida
Progreso
Campeche
Veracruz
Tampico
Monterey
Chihuahua
Mazatlan
Guadalajara
Acapulco
Salina Cruz
Tehuantepec
Isthmus of
Panama
Gulf of Darien
Gulf of Mexico
Gulf of Tehuantepec
Gulf of California
Lower California
Sierra Madre
Rio Grande
Colorado R.
Mississippi R.
Missouri R.
Ohio R.
Great Salt L.
Salton Sea
Death Valley
Mt. Whitney
Grand Canyon
Yellowstone
Niagara Falls
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Lake Winnipeg
Hudson Bay
Labrador
Greenland
Iceland
Alaska
Aleutian Is.
Hawaiian Is.
Galapagos Is.
Cocos I. (C.R.)
Malpelo I. (Col.)
Revillagigedo Is. (Mex.)
Guadalupe I.
Tiburon I.
Santa Barbara Islands
Los Coronados
Farallone Is.
Alijos Rocks
Bahama I.
Eleuthera I.
Abaco I.
Matlinly I.
Long I.
Berry Is.
Andros I.
New Providence I.
Cat I.
Exuma I.
Mariguana I.
Caicos Is.
Turks I.
Caicos Bank
Crooked I.
Inagua I.
Navassa I.
Jamaica Channel
Yucatan Channel
Gr. Cayman I.
Gr. Abaco I.
Dominican Rep.
Haiti
Puerto Principe
Santiago
Holguin
Nuevitas
Matanzas
Cardenas
Sagua la Grande
Cienfuegos
Trinidad
Manzanillo
Pinar del Rio
Isle of Pines
Gulf of Honduras
Puerto Cortes
Gulf of Fonseca
Gulf of Nicoya
Gulf of Panama
Gulf of Dulce
Mosquito
Gold Providence I. (Col.)
St. Andrews I. (Col.)
Old Providence I. (Col.)
Bluefields
San Juan del Norte
Limon
Colon
Panama
Chiriqui
Darien
Cocos I. (C.R.)
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Limon
Colon
Panama
Chiriqui
Darien
ST. THOMAS I.
ST. JOHN I.
ST. CROIX I.
CARIBBEAN SEA
Tortola
Virgin Gorda
Anegada
Jost Van Dyke I.
St. Tobago I.
Hans Lollik Is.
Brass I.
Thatch Cays
Narrows
Coral Bay
Rem Head
St. Thomas Harbor
Long Pt.
Lucas Pt.
Peter I.
Norman I.
Salt River Pt.
Christiansted
Buck I.
East Pt.
Hams Bluff
Frederiksted
Mt. Eagle
Great Pond Bay
Robin's Bay
Long Point Bay
Pt. Krauss
Lime Tree Bay
S.W. Point
Miles
0 5 10 15 64 30

was divided between Great Britain and Spain. After the American colonies established their independence, by purchase and conquest, the United States obtained possession of the Spanish territory north of Mexico.

Related Articles. The geography, government, history, industries and people of each political division are treated in these volumes in the articles on the respective countries and states. Accompanying each article is a list of related topics. For more general information see the following titles:

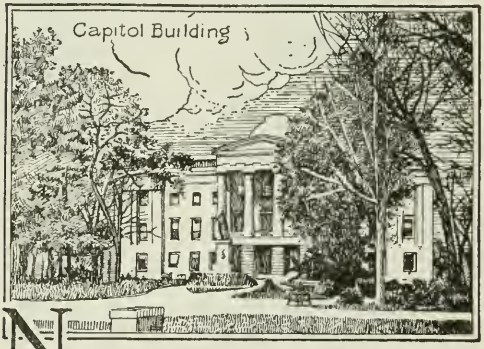
GENERAL

Aztec	Gold	Piedmont Region
Coal	Indians	Silver
Columbus, Christopher	Iron	Vespucius, Americus
Forests	Lumber	

NORTHAMP'TON, Mass., the county seat of Hampshire County, eighteen miles north of Springfield, on the Connecticut River and on the Boston & Maine and the New York, New Haven & Hartford railroads. Smith College for women is located here. The city has a number of public institutions, including the Clarke Institute for Deaf Mutes, two hospitals, a state insane asylum, a home for aged women, Burnham Classical School for girls, an agricultural school, Academy of Music, the public, Forbes and Lilly libraries, and Capen School. There is also here a unique and interesting work of home culture clubs, planned and inaugurated by George W. Cable, for the improvement of the people, using three large buildings for social meetings and educational classes. There is a state armory. The city is located on elevated ground, amid beautiful scenery, near Mount Tom and Mount Holyoke. Both of these peaks are ascended by railways and afford magnificent views. The principal manufactures are silk, cutlery, brushes, lumber products, hardware, furniture, hosiery and various other articles. The place was settled by a company from Springfield in 1654 and was chartered as a city in 1883. Jonathan Edwards was a minister here from 1727 to 1750. Population, 1910, 19,431; in 1917, 20,006 (Federal estimate.)

NORTH BAY, Ont., the county town of Nipissing County, on Lake Nipissing and the Canadian Pacific, Canadian Northern, Grand Trunk, Grand Trunk Pacific and Temiskaming & Northern Ontario railways. The Canadian Pacific Railway has extensive repair shops here and the town is also known as the gateway to the Cobalt and Porcupine mining districts. It is an important point for tourists and sportsmen, since there is excellent fishing and hunting in the immediate vicinity. It has two separate schools and a provincial normal school. The town owns and operates its water works, and is well lighted by electricity and gas. Population, 1916, about 10,000.

NORTH CAPE, a rocky promontory on the island of Magerö, off the northern coast of Norway, in latitude 71° 11″ north, considered as the extreme northern point of Europe, although it is a few minutes south of Knivskjoerodde, a few miles west of it. The northernmost point of the European mainland is Cape Nordkyn, forty-four miles east of North Cape, in latitude 70° 7′.



NORTH CAROLI'NA, one of the foremost manufacturing and agricultural states of the Southern group, popularly known as the Old North State and the Tar-Heel State. North Carolina is represented on the American flag by one of the thirteen stripes, for it belonged to the group of original colonies that united to win independence. Only Minnesota and Florida among the states of the Union surpass it in extent of water surface, and within its boundaries is the highest point east of the Rocky Mountains.

Location and Area. North Carolina is south of Virginia, the most northerly of the South Atlantic states. Its entire eastern boundary is formed by the ocean, and South Carolina and Georgia adjoin it on the south. North Carolina is bounded on the west by Tennessee, the two states being separated by the Great Smoky Range. With a gross area of 52,426 square miles, it ranks twenty-seventh in size among the states. Its water surface, which reaches a total of 3,686 square miles, is augmented by the lagoons and sounds that indent the coast. Alabama is almost the same size as North Carolina, being only 428 square miles smaller. Arkansas exceeds it by about 900 square miles.

The People and Cities. In population North Carolina is the sixteenth state, the census of 1910 showing 2,206,287 inhabitants, or 45.3 per square mile. In July, 1918, the population was 2,466,025, according to a Federal estimate. Over one-third of the inhabitants are negroes, and there are nearly 8,000 Indians, but the percentage of foreign-born is almost negligible. The state has twelve cities with populations exceeding 9,000, the largest of which, Charlotte, had an estimated population of 40,759 in 1917. The next five, in order of size, are Winston Salem, Wilmington, Durham, Asheville and Raleigh, the capital.

The Baptists, who include about half the church members, are the strongest religious body. Next in number are the Methodists. Other sects include the Presbyterians, Lutherans, Disciples of Christ, Episcopalians, Congregationalists and Roman Catholics.

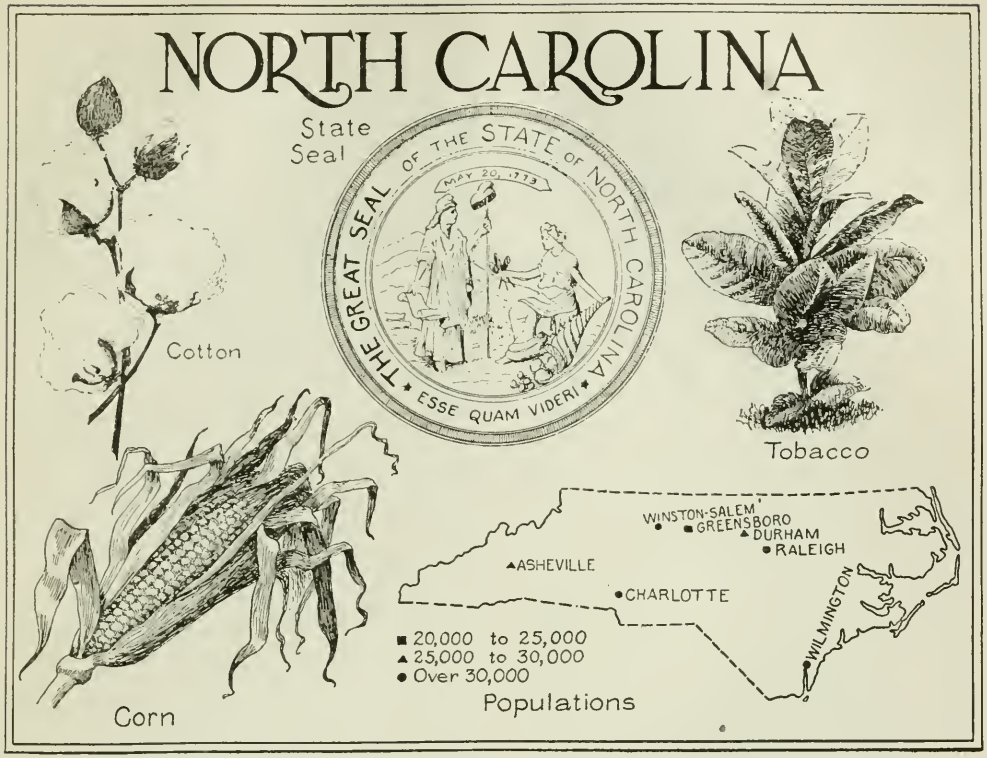
Surface and Drainage. The state is naturally divided into three surface regions—the low coastal plain, the Piedmont plateau and the highlands. The first, extending inland from 120 to 160 miles, varies in altitude from sea level to less than 500 feet; the eastern portion of this consists in many places of lagoons and swamps, of which Pamlico and Albemarle sounds are the most prominent. These shallow indentations are separated from the sea by a low bar, which extends along the entire coast, and the chief projections on this bar constitute capes Hatteras and Lookout. The coastal plain has its western border at the Fall Line and is succeeded by the Piedmont plain, or plateau, which occupies a region extending westward until it meets the foothills of the Appalachian mountain system.

The Piedmont region varies in altitude from 200 to 1,200 feet. The surface is rugged and hilly in the western part, but quite level or undulating in the eastern. This region is separated from the western plateau of the state by the Blue Ridge Mountains. The western highland region, including the Great Smoky and Black mountains, ranges in elevation from 1,000 to 6,000 feet. Mount Mitchell, in the Black Mountains, with an altitude of 6,711 feet, is the highest point east of the Rocky Mountains, and there are a number of other peaks in the vicinity that have altitudes of 6,000 feet or more. The region is heavily timbered, and the valleys between the mountains are threaded by numerous streams. Because of its scenery and salubrious climate this part of North Carolina is a favorite resort, both summer and winter.

The region west of the Blue Ridge is drained into the Mississippi through the Hiwassee, the Little Tennessee, the French Broad, the Wautauga and the New rivers, the largest of which are the Little Tennessee and the French Broad. East of the Blue Ridge the rivers flow directly into the Atlantic or southward into South Carolina and thence to the ocean. Beginning with the west the important streams, in their order, are the Catawba and the Yadkin, which flow into South Carolina; the Cape Fear, the Neuse, the Tar, the Roanoke and the Chowan, which flow into the Atlantic. The Tar and the Neuse find outlets through Pamlico Sound, and the Roanoke and the Chowan flow into Albemarle Sound. There are no lakes of importance.

Climate. North Carolina lies on the same parallel of latitude as the central Mediterranean basin; its climate is modified by the proximity of the ocean on the east and the great mountain system on the west. The mean temperature for the state is 59° F. January is the coldest month of the year, but the thermometer rarely registers as low as zero. July is the warmest month, but the temperature is rarely higher than 91°. The rainfall is uniformly distributed throughout the year, the average precipitation being fifty-two inches. The average snowfall is five inches, but snow seldom remains on the ground more than a day or two, except in the mountain section. The storms on the Atlantic coast, especially off Hatteras, are violent and often destructive to shipping. Asheville, in the Blue Ridge Mountains, is one of the most popular winter resorts in the South.

Mineral Resources. The mineral products have a total annual value of about $3,500,000. Clay and stone products lead in value of output. The state ranks first in the production of kaolin, used extensively in the manufacture of white earthenware, porcelain and wall tile. Its quarries yield granite, limestone and sandstone to the value of nearly $1,500,000 a year. Granite almost as white as marble is quarried at Dunn's Mountain. North Carolina is the first mica state, its white mica being equal in quality to that found anywhere in the world. The yearly output of this mineral is valued at about $300,000.



Before the discovery of gold in California, North Carolina was an important state in the production of this metal, and though its output is at present not large compared with that of the great gold-mining states, this state still holds first rank in the East. The yearly output is over 6,000 ounces. Other minerals include magnetite ore, mined in Avery County and regarded a valuable source of pig iron; talc, which is widely distributed; zircon and monazite, used in the manufacture of incandescent light mantles; copper, lead, feldspar, abrasive garnet, gems, quartz and a small quantity of silver.

Fisheries. The sounds and estuaries along the North Carolina coast are valuable fishing grounds, and supply large quantities of shad, oysters and herring. Diamond-back terrapin, turtles, alewives, clams, bluefish, bass and mullet are also caught in paying quantities. The state is giving systematic attention to oyster culture and to the study of the shad and terrapin fisheries.

Agriculture. About four-fifths of the inhabitants of the state are engaged in agriculture, and over two-thirds of the land area is devoted to farms. With its great variety of soil and climate, the state produces many different kinds of crops, and in 1917 it ranked eleventh among the states in total value of agricultural products. Only Texas and Georgia, among the Southern states, were ranked higher. In acreage corn is the leading crop, nearly 3,000,000 acres being under cultivation. In favorable years the output reaches 60,000,000 bushels, about one-sixth that of Illinois, the leading corn state. The most valuable crop under normal conditions is cotton, to which about 1,450,000 acres are devoted. The cotton crop varies considerably, ranging from 570,000 bales to over 800,000. In 1917 the output was valued at $78,945,000.

Tobacco, the third crop in value, is cultivated on 325,000 acres. With an annual crop of about 200,000,000 pounds, North Carolina is second only to Kentucky as a tobacco state. Wheat is second to corn among the cereals, nearly 10,0000,000 bushels being harvested a year. Other products include peanuts, potatoes, sweet potatoes, oats, hay and orchard fruits. Rice is grown in small quantities along the rivers. The uplands of the Piedmont plateau contain

the choice farm lands. Stock raising is of minor importance, but dairying is becoming a profitable industry in the uplands and mountain valleys.

Manufactures. The rivers of the Piedmont region furnish an abundance of water power, and the mountain streams provide numerous sites for mills. Since 1890 manufacturing interests have been rapidly developed, and the annual output of manufactured products is now valued at about $290,000,000. The most important of the manufacturing enterprises is the production of cotton goods, widely distributed over the state, factories being located in every section. The state does not produce a sufficient quantity of cotton to supply these mills, for in number of spindles North Carolina is second only to Massachusetts. The second industry in importance is the manufacture of tobacco goods, followed by the enterprises connected with the lumber industry. Large areas in the state are covered with hard wood and with yellow pine. These give opportunity for lumbering and also for transforming the lumber into finishings for interiors, furniture, casings and various other articles. The manufacture of rosin, tar and turpentine is also an important branch of the lumber industry. This is followed by the making of cottonseed oil and cake, and this, by the manufacture of flour and grist mill products. Other industries of importance are the tanning and curing of leather and the manufacture of fertilizers. In 1914 North Carolina ranked eighteenth among the states in value of manufactured products, and second among the Southern states, being surpassed only by Texas, which no other Southern state can hope to overtake.

Transportation and Commerce. North Carolina has four great railway systems, the Atlantic Coast Line, the Southern, the Norfolk Southern and the Seaboard Air Lines. There are also a number of less important lines and branches. The total mileage exceeds 5,500. The customs districts are Wilmington and Pamlico, and the chief exports are tar, turpentine, rosin, lumber, cotton, tobacco, flour and fish. Wilmington has the best harbor, is the commercial metropolis and has steamship lines to New York, Philadelphia and Baltimore. The Dismal Swamp Canal affords communication between Albemarle Sound and Norfolk, on Chesapeake Bay.

Government. The legislature consists of fifty senators and 120 representatives, all elected for two years. The legislature meets biennially. At the head of the executive department is the governor; assisting him are a lieutenant-governor, a secretary of state, an auditor, a treasurer, a superintendent of public instruction and an attorney-general, each elected for four years. These officers, with the exception of the lieutenant-governor and attorney-general, constitute a council of state, which acts in an advisory relation to the governor. The latter has no veto and little appointive power. The courts consist of a supreme court, comprising a chief justice and four associates; superior courts, district courts and justices of the peace. A superior court is required to hold sessions in each county at least twice a year. Local courts are established in towns and cities by the legislature, according to the needs of the different localities.

Education. Long before the Civil War North Carolina took an advanced position in educational matters, and the state as rapidly as possible has increased the state fund for public education. Separate schools are provided for white and colored pupils, and out of a total school enrollment of about 650,000, nearly 200,000 are negroes. There is a compulsory-attendance law, and the illiteracy rate is lower than in seven other states of the South and South Central groups. A superintendent of public instruction exercises general supervision over the school, and there are county superintendents and local committees. The state makes appropriations for instruction in farm life and the industrial arts. These courses are given in county schools of specified qualifications.

The University of North Carolina is at Chapel Hill; the College of Agriculture and Engineering is at Raleigh; the state normal and industrial college for white women is at Greensboro. The state has established an agricultural and mechanical college at Greensboro and several normal schools for the colored race. Besides these institutions, there are numerous colleges and secondary schools, supported by religious denominations and by private enterprise. Among these are Davidson College at Davidson, Trinity College at Durham, Guilford College at Guilford, Wake Forest College at Wake Forest and Red Spring Seminary at Red Spring. Among schools especially designed

Items of Interest on North Carolina

Raleigh, the state capital, lies in the same longitude as Niagara Falls and the Panama Canal, and in the same latitude as Gibraltar, Crete and Southern Japan.

North Carolina is almost as large as all the New England states together.

With the exception of Long Island, Pamlico Sound is the largest sound on the Atlantic Coast; it is one of the greatest fishing centers on the coast.

Every variety of soil is to be found in the state, but the Coastal Plain has the most varieties, including black loam, sandy, gray, yellow and red clay, and gravelly sand loams.

North Carolina has over 100 kinds of trees, nearly half of which are of considerable commercial value; many of the trees found in other sections of the country—oak, chestnut, hickory, maple, birch, hemlock, pine, fir, elm—besides others not so common elsewhere—as the palmetto, American olive, yellow pine and the large-leaf umbrella—are found in abundance.

North Carolina leads all other states in herring fisheries and is second in shad.

North Carolina leads all states in the raising of peanuts, and is second to none in the quantity and value of sweet potatoes raised.

The growing of garden truck, melons, and bulbs for the flower trade is a thriving industry.

Questions on North Carolina

To what group of states does North Carolina belong?

How is its surface divided?

What part of the population is engaged in agriculture?

How does North Carolina rank as a producer of cotton? Of tobacco? Of peanuts? Of sweet potatoes?

What is the leading manufacturing industry? Name five other important manufactures.

How many miles of railroad has the state?

Name five important cities and tell why each is important.

for colored students are Shaw University at Raleigh, Livingston College at Salisbury and Biddle University at Charlotte.

Institutions. The charitable and penal institutions of the state include hospitals at Morgantown, Raleigh and Goldsboro; a school for the white deaf at Morgantown; homes for the white blind and colored blind and deaf, at Raleigh; an institution for the feeble-minded at Kingston; a tuberculosis sanitarium at Aberdeen; a soldiers' home at Raleigh; a colored orphanage at Oxford; a training school at Concord, and the state prison at Raleigh. All charitable and correctional institutions are controlled by a state board of charities.

History. North Carolina was first explored by the Raleigh expeditions late in the sixteenth century, but it was first permanently colonized after 1630 by settlers from Virginia. In 1663 it was granted to a group of the king's favorites, whom he named lord proprietors. In 1669 they attempted to establish a government based on the so-called Fundamental Constitution, the work of John Locke; but the effort was vain, owing to the cumbersome and unsuitable provisions of the document. In 1728 the proprietors sold their rights to the Crown, and North Carolina and South Carolina, which had been previously united, were governed as separate royal provinces. North Carolina took a prominent part in the struggle against England and was among the first to advise the Declaration of Independence and to adopt an independent constitution. In the war it was the scene of important engagements.

North Carolina long refused to ratify the Federal Constitution, but it finally added its approval November 21, 1789. After the war it steadily prospered, the only serious hindrance being its relations with western settlers, who at one time set up a separate state of Franklin, which was dissolved, but which finally became the state of Tennessee. Though a slave-holding state, North Carolina constantly opposed secession until after Lincoln's first call for troops, when a popular convention passed the resolution, May 20, 1861. Thereafter it furnished double its quota of troops (120,000) and suffered the heaviest losses, both of men and of wealth, throughout the war. The reconstruction contest was fought vigorously in North Carolina, but the state was readmitted to the

Union June 25, 1868. A new constitution was adopted in 1876 and in 1900 it was amended so as practically to exclude negroes from suffrage, by means of educational and property tests. Prohibition was adopted in 1908.

Related Articles. Consult the following titles for additional information:

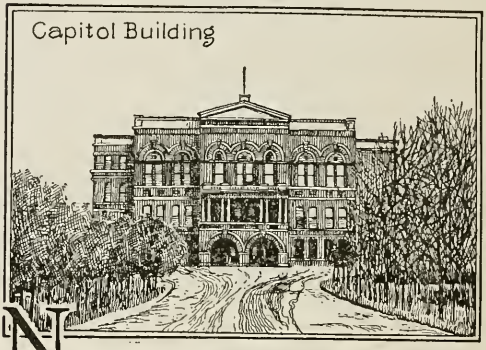
Albemarle Sound	Greensboro
Appalachian Mountains	High Point
Asheville	Newbern
Black Mountains	Pamlico Sound
Cape Fear	Piedmont Region
Cape Hatteras	Raleigh
Charlotte	Roanoke River
Durham	Wilmington
Elizabeth City	Winston Salem

NORTH CAROLINA COLLEGE OF AGRICULTURE AND ENGINEERING, an industrial college founded at Raleigh in 1889 and supported by state and national appropriations. It maintains departments of agriculture and chemistry, schools of civil, electrical and mechanical engineering, a textile school, a veterinary school, a summer school in agriculture and a department of vocational education, established in 1917. The agricultural experiment station is connected with the college, and the combined institutions lead in the industrial education of the state, which is making rapid progress. The faculty numbers about sixty, and there are over 500 students. The college library contains 10,000 volumes.

NORTH CAROLINA, UNIVERSITY OF, a state coeducational university established in 1789 at Chapel Hill and opened for instruction in 1795. The present organization includes a college of liberal arts, a college of applied sciences, a graduate school and schools of law, mining, pharmacy and engineering. There are nearly 100 members on the faculty, and there are over 800 students. The library contains 80,000 volumes. The university buildings, numbering more than a score, are on a campus of fifty acres.

NORTHCLIFFE, ALFRED CHARLES HARMSWORTH, first Baron (1865–), the most influential newspaper man in the world, according to competent authorities. Harmsworth was born in Dublin County, Ireland, and began his career in London in 1888 with the founding of a small sheet called *Answers.* In 1894 he bought a failure, the *Evening News,* and made it profitable; in 1896 founded the *Daily Mail,* and in 1898 launched *Harmsworth's Magazine.* The latter was abandoned after several years, but he added other magazines to his properties. In 1908 he gained control of England's mightiest daily journal, the *London Times,* known for years as "The Thunderer." He has built great paper mills in Labrador to supply his numerous publications.

In 1904 Harmsworth was made a baronet and two years later was raised to the peerage as Baron Northcliffe. During the World War his voice and pen violently attacked whatever of mismanagement he thought existed in the British government, and his influence was very great. His unselfish patriotism was never questioned, but his attitude kept him out of the coalition Cabinet. In 1917 he was sent to the United States at the head of the British War Commission, on business connected with the economic phases of the war.


Capitol Building

NORTH DAKOTA, sixteenth in size among the states of the American Union, has its northern limits at the international boundary, with Manitoba and Saskatchewan at the north. The Red River separates it on the east from Minnesota; South Dakota is south and Montana is west.

In population the state was thirty-seventh in the Union in 1910, in which year it had 577,056 people. A Federal estimate in 1918 raised the number to 791,437. The area is 70,837 square miles, which is nearly twice that of Indiana. The state flower is the golden rod. The word *Dakota* is an Indian term meaning *allies,* referring to the Sioux confederation which once controlled the section. The popular name is THE FLICKERTAIL STATE.

Surface and Drainage. The state belongs to the great central plain. The eastern end, which is part of the valley of the Red River of the North, is nearly level and has an elevation of from 800 to 1,000 feet. This valley expands toward the north, until it reaches

a width of sixty miles near the Canadian boundary. The western edge of the valley rises gradually into rolling prairie, which reaches its greatest elevation in a height of land extending diagonally across the state from the northwest corner, and known as the Plateau du Coteau du Missouri. This plateau divides the state into two nearly equal portions. On its south and west, the surface slopes directly, and in sections quite rapidly, to the Missouri River. That portion of the state west of the plateau is more rolling and broken, in the southeastern part becoming quite abrupt, though it contains no high peaks. The highest land is Sentinel Butte, 2,711 feet high, near the western boundary.

The portion of the state belonging to the valley of the Red River is drained through this stream ultimately into Hudson Bay. The principal tributaries of the Red River from Dakota are the Sheyenne, which flows southerly, then northeasterly and enters the main stream north of Fargo, and the Pembina, which rises in Manitoba and enters the Red River a little south of the Canadian boundary. The greater part of the state is drained by the Missouri, although this stream receives no important tributaries from the east. The Yellowstone joins it just after both rivers cross the western boundary, and the other chief tributaries, proceeding southward, are the Little Missouri, the Heart and the Cannon Ball. A portion of the north central, between Turtle Mountains and the plateau, is drained by the Souris, or Mouse, which enters the state from the Province of Saskatchewan and, after doubling on its course, flows into Manitoba and unites with the Assiniboin. The state contains few lakes. The most important of these is Devils Lake, northeast of the center. This is a large body of brackish water, surrounded by trees and noted as a summer resort.

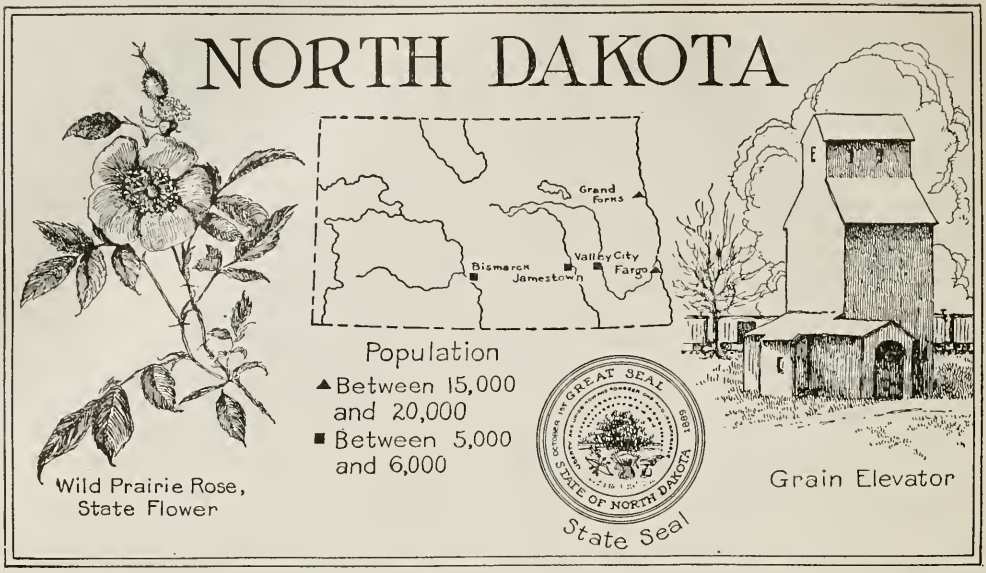
Climate. The winters are somewhat severe, but the dryness of the atmosphere renders the sensible temperature no greater than in latitudes farther south. The snowfall is light, but storms (blizzards) from the northwest occur several times during the season. Summer follows winter in quick succession, and is characterized by warm, pleasant days and cool nights. The mean annual temperature is 39.4°. The mean annual rainfall varies in different localities. At Fargo it is 27.17 inches; at Pembina, 21.91. The eastern half of the state has sufficient rainfall for agriculture by ordinary methods, and in the western part, dry farming is successful.

Mineral Resources. Clays from which excellent brick and pottery are made abound in various localities; building stone is found in the Turtle Mountain region, and the region west of the Missouri is underlaid with extensive deposits of lignite coal of good quality. This is the only mining industry of importance. The output has increased to nearly 600,000 tons annually.

Agriculture. The soil in the eastern half is unusually fertile and of great depth, especially in the valley of the Red River. The climate is especially suited to the raising of spring wheat, and North Dakota has long been known as the leading state in the production of the variety of wheat known as Number 1 Hard, which is the best for the manufacture of flour. In 1915 the crop reached almost 160,000,000 bushels, but two years later was only 58,000,000 bushels. The average is about 80,000,000 bushels. More spring wheat is raised than in any other state. Only Saskatchewan in North America excels it in production. This part of Dakota contains the largest farms under cultivation in the United States, but the average farm is now 382 acres. The central and western parts are given to general farming and stock raising. Besides wheat, the important crops are flax, oats, barley, corn and potatoes. The rainfall in the western part is scant, but this region is well adapted to grazing, and large numbers of cattle, horses and sheep are raised.

Manufactures. The leading industry in this line consists of the manufacture of flour and other grist mill products. Numerous flour mills are located throughout the wheat-growing region. Considerable quantities of butter and cheese are made, and brick is manufactured in many localities. Nearly one-fourth of the value of manufactured products is derived from Fargo and Grand Forks factories. There are fewer than 900 factories in the state.

Transportation. The Missouri River is navigable throughout its entire course in North Dakota. The Great Northern and Northern Pacific railroads cross the state from east to west, and the Pacific Coast line of the Chicago, Milwaukee & Saint Paul Railroad crosses the southwestern corner. This line has branches extending northward to Fargo and other points. The other trunk lines are also connected by numerous cross



lines. In 1918 there were over 5,275 miles of railway.

Education. One-eighteenth of all the lands in the state are reserved for public school purposes, and these, when sold, will create a school fund of more than $50,000,000. In addition to this appropriation the state contributes largely for the state institutions. The public schools are under the supervision of a state superintendent, and the high schools under a board of education. There is a department of high school inspection and an inspector of rural and graded schools. Each county has a county superintendent, responsible for the licensing of teachers and for the conduct of the schools in his county. The state university at Grand Forks is at the head of the public school system. There are state normal schools at Mayville, Valley City, Minot and Ellendale, an industrial normal school at Ellendale, a school of forestry at Bottineau and a scientific school at Wahpeton. The state agricultural college is at Fargo. The Fargo College is an important institution of collegiate grade; Jamestown College is at Jamestown, and Wesley College is at Grand Forks.

Institutions. The school for the blind is at Bathgate, the institute for the feebleminded is at Grafton and the school for the deaf and dumb is at Devils Lake. There is a soldiers' home at Lisbon, an insane asylum at Jamestown, a penitentiary at Bismarck, and a reform school at Mandan.

Cities. Fargo and Grand Forks are the only towns each with more than 8,000 inhabitants. Bismarck is the capital.

Government. The legislature consists of a senate that cannot contain fewer than thirty, or more than fifty members, and a house of representatives that must have not fewer than sixty, nor more than 140, members. The senators are elected for four years; the representatives, for two years. The legislature meets once in two years, and the sessions are limited to sixty days. The executive department consists of a governor, a lieutenant-governor, a secretary of state, an auditor, a treasurer, a superintendent of public instruction, a commissioner of insurance, three commissioners of railroads, an attorney-general and a commissioner of agriculture and labor, each elected for two years. The courts consist of a supreme court of five judges, elected for six years, and twelve district courts, presided over by a judge for each district elected for four years. Local courts are established in counties and cities.

History. North Dakota was a part of the Louisiana Purchase. The first real and permanent white settlement was probably established by French-Canadian settlers near Pembina in 1807. In 1812 Lord Selkirk, by mistake, built his fort south of the Canadian line. In 1851, a large portion of the territory was opened to white settlement, part being attached to Minnesota Territory and part to Nebraska Territory. Dakota

Items of Interest on North Dakota

The general shape of the state is rectangular, with an extreme length of 360 miles and an extreme width of 210 miles.

West of the Missouri River are the "Bad Lands," bad for the farmer and traveler, but not for the ranchman.

Among the lakes and sloughs of the prairies, wild ducks and geese are abundant; of song birds, the horned lark, bobolink and lark-sparrow are most common.

North Dakota has no mountains, forests or large bodies of water to influence the extremes of temperature; the seasons are sharply marked, both summer and winter coming suddenly.

The summers are short, but as there is sunlight for sixteen hours a day in midsummer, the crops grow well.

North Dakota's forest area is about 600 square miles, less than one per cent of the total area; no other state has such a relatively small forest area.

The state ranks first in the production of flaxseed.

There are four Indian reservations in North Dakota; Devils Lake, Turtle Mountain, Fort Berthold and Standing Rock.

Questions on North Dakota

What is the area of North Dakota? What is its extreme length? Its extreme width?

Describe the surface of the state.

Name the principal rivers and describe briefly the drainage.

What is the average rainfall?

What is the area of North Dakota's forests?

How does the state rank in the production in flaxseed?

What minerals are found?

Is manufacturing important? What industry leads?

What is the railway mileage?

When was the state admitted to the Union?

What new political party controls the state?

What is the only lake of importance?

Territory was organized in 1861. Yankton was the capital until 1883, when Bismarck became the seat of government. In 1889 provision was made to admit Dakota into the Union as two states, both being admitted November 2, of that year. Since that time its great agricultural resources have given it exceptional prosperity.

Advanced political ideas have obtained a popular hold in the state, and it was the first state to be held politically by a so-called radical party. Every department of the state government in 1918 came under the control of the Nonpartisan League (which see). The state was prohibition territory before the adoption of the national Constitutional amendment. Women vote for Presidential electors.

Related Articles. Consult the following titles for additional information:

Bad Lands	Grand Forks
Bismarck	Louisiana Purchase
Devils Lake	Nonpartisan League
Fargo	Red River of the North

NORTH DAKOTA, UNIVERSITY OF, a state university established at Grand Forks in 1883. It maintains colleges of liberal arts, law, engineering and education, a school of commerce and a school of medicine. In connection with the university are a mining substation at Hebron and a biological station at Devils Lake, a public-health laboratory, the United States Weather Bureau and the Geological Survey. In addition to the regular work of the university, extension courses are maintained. Women are admitted to all departments and constitute about one-half of the enrollment. Tuition is free. The faculty numbers over ninety, and there are about 1,000 students. The library contains 62,000 volumes.

NORTHER, the name given a cold north wind, which blows over Texas and the Gulf of Mexico. In winter it produces a cold wave and in summer a cool wave. These winds sometimes start as far north as the Northwest Territory in Canada and proceed southward, extending a blanket of cold air over the entire Mississippi Valley. They are usually predicted from twenty-four to thirty-six hours in advance, and warnings of their approach are given by the Weather Bureau.

NORTHERN LIGHTS. See AURORA BOREALIS.

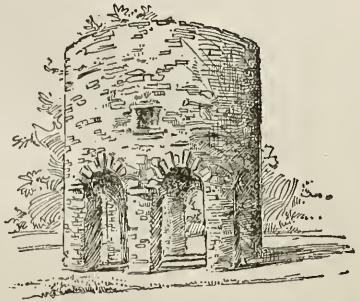
NORTHERN TERRITORY, a vast area, 523,620 square miles in extent, in the north-

THE NORSEMEN IN AMERICA

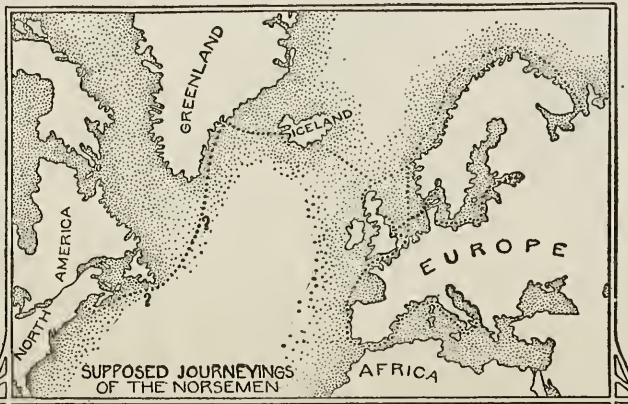
A VOYAGE OF EXPLORATION

A TYPE OF NORSEMAN

A WAR GALLEY



OLD STONE MILL AT NEWPORT
ATTRIBUTED BY SOME TO THE NORSEMEN



SUPPOSED JOURNEYINGS
OF THE NORSEMEN

LEIF ERICSON, LEADER OF THE NORSEMEN
FROM A STATUE IN BOSTON

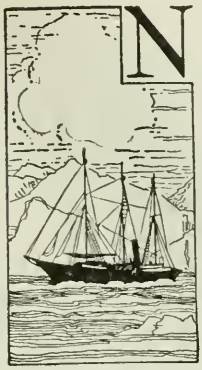
ern part of Australia. The white population is only about 3,500; the aborigines are believed to number 20,000. Until 1911 the government was administered by South Australia, but upon the establishment of the Commonwealth the Federal government assumed control of the territory.

There is some agricultural activity, and mining prospects are good. A railway now reaches from the southern part of the continent to the north coast, a distance of 2,230 miles; it brings the time for travel from London to Adelaide to seventeen days.

The capital of the territory is Darwin, formerly called Palmerston, on the north coast. See AUSTRALIA.

NORTH GERMAN CONFEDERATION, the union, in 1866, of the German states north of the Main, under the leadership of Prussia. When first organized it included eighteen states; later the number was increased to twenty-two. A constitution was adopted which was in the main that of the later German Empire. With the unification of Germany after the Franco-German War the confederation became merged in the larger organization. King William I was on the Prussian throne at the time of confederation; he became Emperor William I in 1871 when the Confederation was taken into the Empire.

NORTHMEN, or **NORSEMEN**, a name applied to the bold sea rovers who, in their small, sharp-prowed, open vessels, ravaged Great Britain and other parts of northern and western Europe from the eighth to the eleventh century. They were known to the inhabitants of the British Isles as Danes and Eastmen. To the inhabitants of the eastern coasts of the Baltic and the Mediterranean shores and of the Orkneys, the Hebrides and Northern France, where they made permanent settlements, they were known as Normans. They left colonies in the Faroe Islands and in Iceland, whence some of them went to Greenland (982). One of their navigators, Leif Ericson, according to legend, in 1002 visited the coast of New England. The Northmen called themselves *vikings*, and their leaders *sea-kings*. They were a vigorious race, fond of warlike adventure and worshipers of the gods Thor and Odin. The chief causes of their plundering expeditions were, no doubt, the crowded population and scarcity of food in their native homes, as well as their natural love of adventure.



NORTH POLAR EXPLORATION. The region about the North Pole of the earth is a vast stretch of snow-covered lands and ice-bound seas, with the average temperature far below freezing point. That such a region has tempted explorers for centuries is a testimony to the courage and perseverance inherent in human nature.

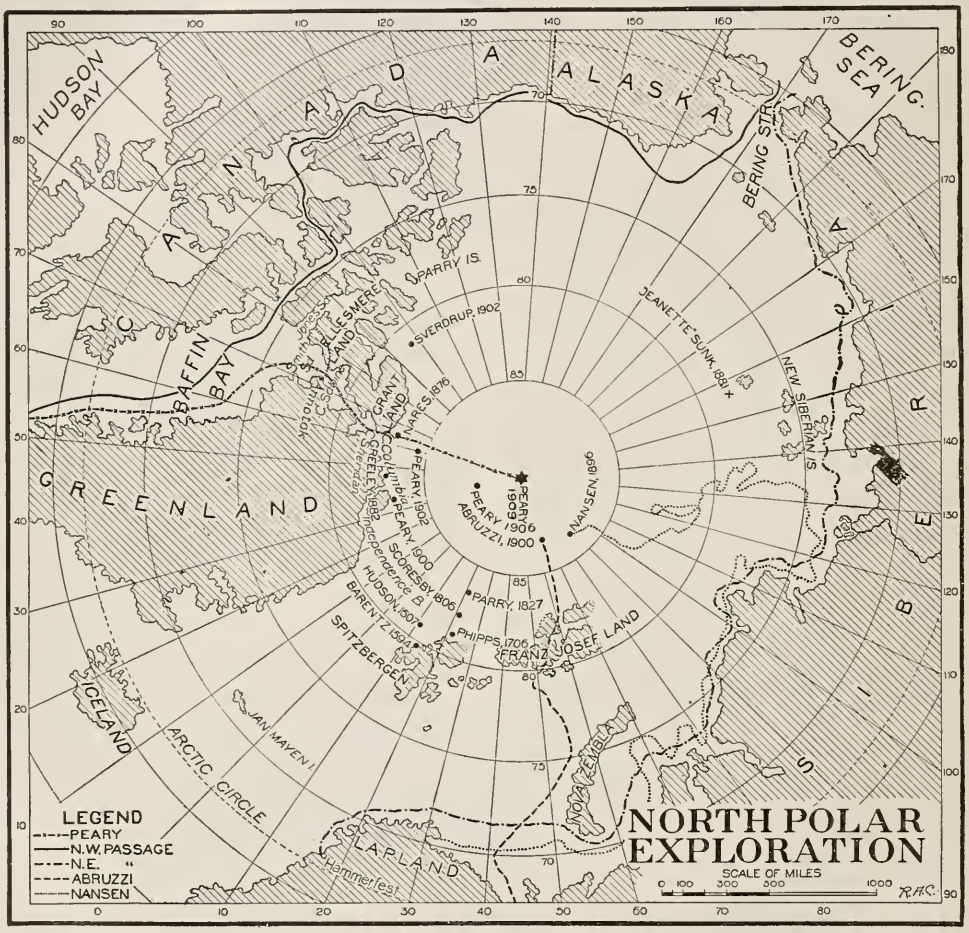
What called forth those expeditions to the frozen north, which have cost the lives of so many brave men? The earlier expeditions, undertaken soon after Columbus led the way to a New World, were inspired by commercial aims. Men were desirous of finding a new water route to India, and it was believed that a passage leading to Asia lay along the northern coast of North America. During the seventeenth century a new impetus was given to Arctic exploration through the interest in the seal and whale fisheries. Later, about the middle of the nineteenth century, interest shifted to scientific investigations, and ultimately the civilized world began to look forward to the discovery of the North Pole. The realization of that hope forms the great climax in the fascinating story of North Polar exploration. It was an American, Robert E. Peary, who found the Pole.

Peary's Expedition. Peary's discovery was the crowning achievement of nearly a quarter of a century spent in Arctic exploration. The expedition which resulted in his triumph left New York in the Steamer *Roosevelt* in July, 1908, and reached Etah, the most northerly inhabited point in Greenland, on August 8. Thence the *Roosevelt* went to Cape Sheridan, where it went into winter quarters September 5. The party began the dash for the Pole February 15, 1909, and the destination was reached April 6.

No other expedition for Arctic exploration had been so perfectly organized and completely equipped as this. It embodied the results of Commander Peary's long experience in the Polar regions, and practically provided for every contingency that might arise. While in winter quarters Peary hauled his supplies by sledges to Cape Columbia, whence the "dash to the Pole" was to start. The expedition left Cape Columbia in six

divisions, each a day apart, and at the start the outfit consisted of 7 white men, 19 Eskimos, 140 dogs and 23 sledges. As the march proceeded, these divisions returned to Cape Columbia from time to time until at last only one division remained. During the advance, igloos, or Eskimo huts, were built at each camp. These furnished the most desirable shelter for the men, and were in readiness for the party on their return march. With the exception of the drowning of Professor Marvin of Cornell, the entire expedition returned to the starting point without loss of life.

Besides reaching the Pole, the Peary expedition was able to add important data to the information previously gained about the Arctic regions. On his advance march Commander Peary took frequent soundings, and by these showed that the ocean increased in depth soon after leaving Cape Columbia. These soundings show the Arctic Ocean about the Pole to be 12,000 or more feet in depth. This discovery tends to dispel the idea previously current that this was a shallow ocean. It also points to a strong inference that there is no large body of land near the Pole; indeed, this has practically been proved.



On his other expeditions to the Arctic regions Peary explored and mapped the northern coast of Greenland and made extensive explorations of the Arctic Archipelago. On his return voyage in 1897 he brought from Cape York a meteorite which is the largest of its kind that has ever been discovered.

Cook's Expedition. Dr. Cook accompanied Mr. J. R. Bradley on a hunting expedition to northern Greenland in July, 1907. The boat on which the party sailed was not constructed for navigating the polar seas, so

that Cook was obliged to winter at Annotok, a long distance south of Cape Columbia. From Dr. Cook's account it appears that during the winter he transferred his baggage to Ellesmere Land, whence he started for the Pole February 19, 1908. His route was to the west of Peary's and instead of returning by the same route, his return was still further west. The return trip was greatly prolonged by meeting spaces of open water, and the dangerous conditions of the ice, so that Dr. Cook and the few Eskimos who remained with him throughout the journey were compelled to pass the winter of 1908–1909 on the south shores of Jones' Sound. For this reason he was unable to send the news of his discovery at an earlier date. Dr. Cook landed in Copenhagen September 5, 1909, where he was received with high honors by the Danish government and the learned societies of the city.

The Controversy. Dr. Cook was unknown as an Arctic explorer, neither was he known to be engaged in an expedition to the Pole. For these reasons his announcement was a great surprise to the world of science, and many geographers and learned societies withheld their acceptance of his statement until his records could be examined by competent authority. Dr. Cook submitted his record to the University of Copenhagen. After a most careful examination his records were not found to substantiate his claims. The matter, however, was not dropped with the verdict of the University, and further investigations showed that Cook's claim had no foundation in fact. Commander Peary submitted his records to the National Geographic Society at Washington. The Society approved the records, stating that they fully substantiated Peary's claims to the discovery of the Pole.

History. Soon after the discovery of the New World, mariners believed that by sailing northward along the coast of North America a passage westward to Asia would be found, which would be much shorter than routes then used. The route from the Atlantic to the Pacific has always been known as the Northwest Passage, and before the middle of the nineteenth century more than 200 voyages had been attempted for its discovery. The English were the first explorers, beginning with John Cabot in 1497. He was followed by Sebastian Cabot, Frobisher, Davis and others, and in 1806 William Scoresby reached latitude 81° 30′ north and added considerable to the previous knowledge of the coast of Greenland. Among early explorers sent out by the Dutch was Henry Hudson, an Englishman acting for a Dutch company, who explored Hudson Bay and surrounding waters in 1609 and 1610.

During the eighteenth century whaling vessels frequented the Arctic regions, and their commanders brought back considerable knowledge of those inhospitable shores. In 1845 an expedition under Sir John Franklin was sent out to discover the Northwest Passage. The entire company perished, and for more than ten years no trace of them was found. The desire to find, and, if possible, to relieve Franklin and his followers, led to numerous expeditions conducted by England and the United States.

Among the most celebrated commanders of expeditions for the relief of the Franklin party were Doctor Kane, of the United States, who gave the first popular and systematic account of the polar regions, and Hayes, who accompanied Kane and afterward conducted an expedition of his own, reaching latitude 81° 35′ north. He was followed by Hall, who reached latitude 82° 16′ in 1871, but died on his return. In 1875 Nares reached a point north of Grinnell Land, in latitude 83° 20′.

During 1882 and 1883 several stations were established by the United States and European nations, which coöperated with one another for the purpose of making a scientific study of the magnetic and climatic conditions of the region. The American station, under the command of A. W. Greely of the United States army, was located on the eastern coast of Grinnell Land and Lady Franklin Bay, 81° 44′ north. The station was maintained nearly two years, when the party retreated southward and was rescued in June, 1884. Only seven of the thirty-two men survived.

A sea route to the East by way of the Siberian ocean was also the goal of numerous explorers. This route is known as the Northeast Passage, and it was first navigated by the Swedish explorer Nils Nordenskjöld. He sailed from Sweden in 1878, passed through Bering Strait, and reached Japan in 1879. In 1915 a Russian explorer, Vilkitsky, successfully made the Northeast Passage by sailing westward from Bering Strait, reversing his predecessor's route.

Lieutenant De Long of the United States navy, in the *Jeannette,* entered the Arctic Ocean through Bering Strait, but his ship was crushed in the ice and sunk in 1881. De Long and his party attempted to escape by moving southward toward the New Siberian Islands. They became separated in a storm and entered the Lena delta by different passages. De Long and most of his followers perished, while the other party, under Commander Melville, survived and reached home in safety. The Norwegian, Nansen, in 1893 sailed northward from Christiania on the *Fram,* a vessel specially constructed for the voyage. In September he was shut in by the ice and began a northward drift, thus utilizing the ocean current which sweeps from Bering Strait and the vicinity of the New Siberian Islands across the pole toward Greenland.

Another American expedition noted for its elaborate equipment was the Baldwin-Ziegler expedition, which left Tromsö, Norway, in July, 1901, for Franz Josef Land. Baldwin established winter quarters on Alger Island, 80° 24′ north, and had stores deposited in other places, also, so that in case his party should be carried out of its course supplies could be reached.

The farthest point reached up to 1906, 86° 33′, was attained by the expedition under the Duke of Abruzzi, in 1900. The commander accomplishing this feat was the Italian Cagni, of the Abruzzi party. The Northwest Passage by ship was traversed in 1905 by Captain Roald Amundsen in the sloop *Gjoa,* a small ship of forty-seven tons, propelled by a gasoline engine. Amundsen entered the Arctic Ocean through Davis Strait, went westward across Lancaster Sound, then southward and followed the coast to Bering Strait.

The explorations of the Scandinavian, Vilhjálmur Stefánsson, have created much interest within recent years. In 1915 he was sent out to explore the Arctic regions under the auspices of the American Museum of Natural History, the expedition being financed by the Canadian government. On this enterprise he discovered a great mountainous region near parallel 78° north. Resuming his explorations in 1916, he passed the winter of 1917–1918 on Herschel Island, and returned to Vancouver, B. C., in September, 1918. He reported the discovery, exploration and mapping of several islands.

Related Articles. Consult the following titles for additional information:

Abruzzi, Duke of
Amundsen, Roald
Arctic Ocean and Lands
Cabot, John and Sebastian
Franklin, Sir John
Greely, Adolphus W.
Hudson, Henry
Kane, Elisha Kent
Nansen, Fridtjof
Nordenskjöld, Nils A.
Northwest Passage
Peary, Robert E.
Stefánsson, Vilhjálmur

NORTH'ROP, CYRUS (1834–1918), an American educator. He was born at Ridgefield, Conn., and was educated at Yale. In 1861 he became clerk of the Connecticut house of representatives and two years later of the senate. After this he was made professor of rhetoric and English literature at Yale and held this position until 1884, when he was elected president of the University of Minnesota, which position he filled for twenty-seven years with great credit.

NORTH SEA, a large branch of the Atlantic Ocean, lying between Great Britain and the Orkney and Shetland islands on the west and the European continent on the east. Its extreme length is 680 miles; its greatest breadth, 412 miles, and its area, about 200,000 square miles. The North Sea is deepest on the Norwegian side, where the depth is sometimes as great as 1,000 feet. The average depth of the southern part is about 100 feet; of the northern, 400 feet.

The tide is very irregular, owing to the fact that there is a tidal movement from the north and one from the south. Where the two waves meet there is a tidal rise of twenty feet. The fisheries, especially of herring, cod, ling, haddock and flatfish, are exceedingly valuable. Rain, fogs and storms are frequent and navigation is dangerous. Because of the large body of fresh water constantly poured into it by the Elbe, Weser, Ems, Rhine, Meuse, Thames and Humber, the water of the North Sea is slightly less salty than that of the Atlantic.

During the World War the strategic importance of this body of water was appreciated by both belligerent groups. In 1915 Great Britain, by declaring a blockade of Germany, prevented neutral ships from entering German ports on the North Sea, and many naval engagements occurred in its waters. The most important of these was fought by the British and German great fleets in 1916 in the Skagerrak, an arm of the sea between Norway and Sweden. At the close of the war the North Sea was the scene of the surrender of the German fleet to the British.

NORTH STAR, the north polar star, the star *a* of the constellation Ursa Minor. It is close to the true pole, never "sets," and is therefore of great importance to navigators in the northern hemisphere. See POLE STAR.

NORTH TONAWANDA, *tahn a wahn'da*, N. Y., in Niagara County, five miles north of Buffalo, on the Niagara River, the Tonawanda Creek opposite Tonawanda, on the Erie Canal and on the New York Central, the West Shore, the Wabash, the Erie and the Lehigh Valley railroads. It is a very important industrial center and contains extensive manufactures of various lumber products, steam pumps, pig iron, structural steel, radiators and motor boats. The city has a Carnegie Library. Population, 1910, 11,955; in 1917, 14.060 (Federal estimate).

NORTHWEST BOUNDARY. Before the boundary of the United States and Canada west of the Rocky Mountains was permanently established there were years of diplomatic effort. In 1814 a commission established the international line from the Saint Lawrence River to the Lake of the Woods at the 49th parallel. The American commissioners desired that this parallel should mark the boundary to the Rocky Mountains, but the British members rejected the proposal.

After nearly thirty years of joint occupation by agreement agitation for settlement was carried into politics, and the cry, "Fifty-four-forty or fight," was a slogan of the Polk campaign for the Presidency. The British government was not disposed to relinquish its claim to the Columbia River, and proposed that from the mountains to the sea the line should be that river. In 1846 the permanent line was established by treaty. It was decreed that it should follow the 49th parallel to the middle of the channel separating Vancouver Island from the continent, then run south through the channel and through the center of the Strait of Juan de Fuca to the ocean. Both channel and strait were to be always open for free navigation by both nations.

NORTHWESTERN UNIVERSITY, an institution of higher learning located at Evanston, Ill., a suburb of Chicago, on the shore of Lake Michigan. It was chartered in 1851 under the auspices of the Methodist Episcopal Church, and is the largest educational institution under the management of that denomination. Until 1869 the only department was a college of liberal arts. There have since been added a graduate department, a college of engineering, a school of oratory and a school of music, all in Evanston; and schools of law, dentistry, medicine, pharmacy and commerce, in Chicago. Garrett Biblical Institute (on the university campus) and Norwegian-Danish and Swedish theological seminaries, in Evanston, are affiliated with the university, which also maintains two secondary schools, Grand Prairie Seminary at Onarga, Ill., and Elgin Seminary, at Elgin, Ill. Evanston Academy, long maintained as a preparatory department, ceased to exist in 1917.

The great university is the chief center of interest in the beautiful lake-shore city of Evanston, which was named for Dr. John Evans, head of the University corporation at the time of its organization. Northwestern has profited by many generous gifts, and has an endowment of over $5,000,000. Its magnificent gymnasium building, one of the largest in the United States, was the gift of James A. Patten. Among other notable buildings are the men's dormitories, built on the quadrangle plan, and the Dearborn Astronomical Observatory. The libraries of the university possess over 200,000 volumes. There is a student enrollment of over 5,000, and the faculty numbers about 450.

NORTHWEST PASSAGE, the route from the Atlantic to the Pacific by way of the Arctic Ocean, along the north coast of North America. Navigators of the sixteenth century were seeking this passage in the effort to discover a shorter route to India, and the search was kept up at intervals until 1905, when Roald Amundsen, in the ship *Gjoa*, sailed from the Atlantic to the Pacific by way of Davis Strait, Lancaster Sound and Bering Strait. Half a century before this, however, Sir John Franklin's expedition found the historic passage; all of the company perished with the goal in sight. It is an interesting fact that after centuries of heroic endeavor to discover this northern route between the two oceans, the passage is never used as a commercial route. See NORTH POLAR EXPLORATION.

NORTH WEST TERRITORIES, a vast territory in Northern Canada erected from the former districts of Franklin and Mackenzie and a large part of Keewatin. With the exception of the Yukon and the great organized provinces, North West Territories

includes all of Canada, and has an area of 1,242,224 square miles. Before 1912, when the last boundaries were established, it contained 1,921,685 square miles, and in 1867, at the time of Confederation, over 2,600,000 square miles. Settlement of the prairie region and the organization of new provinces took parts of the territory from time to time; in 1912 it was reduced to its present limits by the enlargement of provincial boundaries.

The North West Territories occupy the least valuable part of the Empire's Canadian possessions. The climate is cold; though the short summers are warm, the winters are long and very severe. From timber regions near the southern boundaries the vegetable life decreases to mosses and lichens in the Arctic zone. In 1911 the population was 18,481, but was less after 1912, owing to the loss of over 675,000 square miles of territory. The inhabitants are largely Indians and half-breeds; the few white people are mostly fur traders. See map, CANADA.

NORTHWEST TERRITORY, a name formerly given to the land lying between the Great Lakes, the Ohio River and the Mississippi River, including what is now Ohio, Indiana, Illinois, Michigan, Wisconsin and part of Minnesota. The larger part of this territory was claimed by Virginia, New York, Massachusetts and Connecticut, by reason of their charters and other grants. These claims long stood in the way of the adoption of the Articles of Confederation, since Maryland insisted that the territory should become a part of the United States before a new government was organized. Congress, therefore, promised in 1780 that the territory, when ceded to the United States, should be formed into new states on an equal footing with all the others, and the various states ceded their claims, Connecticut being the last, in 1786. Each, however, retained a small portion for its own special purposes. In March, 1784, a temporary government was established. This was superseded by the Ordinance of 1787. See ORDINANCE OF 1787.

NORTON, CHARLES ELIOT (1827–1908), an American author and art critic, born at Cambridge, Mass., and educated at Harvard University. After a brief experience in mercantile work, in the interest of which he made a trip to India and to Europe, he devoted his energy to scholarly pursuits. From 1864 to 1868 he was with James Russell Lowell, editor of the *North American Review*, and in 1875 he was appointed professor of the history of art in Harvard University and was made professor emeritus in 1900. Mr. Norton was one of the foremost representatives in America of higher culture, and he wrote and spoke frequently upon his favorite themes, literature and art. He edited the letters of a number of our prominent literary men, including those of Emerson, Lowell, George William Curtis, Carlyle and Ruskin. Among his published works are *The New Life of Dante*, *The Divine Comedy of Dante* and *Notes of Travel and Study in Italy*.

NORWAY, oneof the three Scandinavian kingdoms, a long, narrow country extending more than 1,000 miles southward from the most northerly point of Europe. The kingdom of Norway is a monarchy in name, but is one of the most democratic countries in the world. Women enjoy the same political rights as men, and there are no titled classes. From 1814 to 1905 Norway and the neighboring kingdom of Sweden were united under the same king, but in the latter year the union, always distasteful to the independent, proud-spirited Norwegians, was dissolved. The people of Norway are universally respected for their honesty, thrift and love of democratic institutions.

Location and Size. Norway occupies the western part of the Scandinavian peninsula, lying adjacent to Sweden, Finland (including Lapland) and the Russian government of Archangel. Its eastern frontier, which is about 1,500 miles in extent, follows the Swedish boundary for about 950 miles. Norway, extending 300 miles into the Arctic Zone, is a part of the "Land of the Midnight Sun," and its extreme northern tip, Cape Nordkyn, is the northernmost point of the European mainland. The Arctic Ocean washes the northern coast, the Atlantic and the North Sea the western. At the south is the Skagerrak, separating Jutland from Norway and connecting the Cattegat and the North Sea. The country has an area of about 124,643 square miles, a little greater than that of New Mexico, and about three times that of

Ohio. Sweden is the larger by over 48,000 square miles.

People and Cities. The Norwegians exhibit two racial strains, represented by a tall, blond Teutonic type, and a shorter, darker one. The former predominates.

Typical Norwegians are tall, well built and athletic. They nearly all have fair skin, blue eyes and light hair in childhood, but the tendency is to grow darker in maturity. In activities that call for physical courage and endurance these people have always been conspicuous, and we find Norway well represented in the annals of polar exploration. No people on the globe command greater respect than the natives of this far northern land.

In 1910 the population of the country was 2,392,698. These figures show a slight decrease from the statistics for 1900, but Norway has lost more people through emigration than any other European country except Ireland. The great majority of Norwegian emigrants have settled in the northwestern part of the United States, where they have quickly assimilated American customs and become loyal and valuable citizens. In 1910 there were 18,590 Lapps in Norway, and 7,172 Finns. The Lapps live in the north; the bulk of the population is found in the south, and three-fourths of the inhabitants live under rural conditions.

At the census of 1910 Christiania, the capital, was the only city with a population exceeding 100,000. It was credited then with 241,834 inhabitants. There were four cities whose populations exceeded 24,000, the largest being Bergen (76,867). Of all the people dwelling in the sixty-two towns or cities, about half are found in Christiania and Bergen.

Surface and Drainage. The coast of Norway is remarkable for its precipitous cliffs and the fiords which cut deeply into the shore in all directions. These fiords are submerged valleys bordered by high, steep cliffs, and are believed by geologists to be the result of glacial action. Although the length of a line drawn about the outer belt of the rocks of the Norwegian coast would be less than 2,000 miles, the total shore line of the country, including that of some of the larger islands, is about 12,000 miles, half the distance around the earth.

The surface of Norway is mountainous, particularly in the west and north, but the mountains are not, generally, distinct chains, but huge plateaus or tablelands, from which the peaks rise singly or in groups. The highest point in the country and in the Scandinavian peninsula is the Galdhöpiggen (8,400 feet), in the Langfjield Plateau. Immense snow fields and great glaciers descending from the plateaus are among the most distinctive features of Norwegian scenery. Hundreds of islands fringe the coast, the Lofoten group being the most important.

Owing to the narrowness of the greater part of the country, there are few rivers of importance. The only important streams which Norway can claim exclusively have a southeasterly direction and discharge into the Skagerrak. Of these the chief are the Glommen, with its tributary, the Lougen; the Drammen, and the Skein. The slope of all these rivers is steep, and this renders them unfit for navigation. The most important river in the north is the Tana, which, after forming part of the boundary between Norway and Russia, empties into the Arctic Ocean. Lofty waterfalls are numerous throughout the country, and there are scores of lakes, most of which are long and narrow. Four per cent of the surface of Norway is occupied by lakes and rivers, as compared to 0.5 per cent for all of Europe.

Climate. The climate of Norway is, on the whole, severe, but not unbrokenly so, as might be expected. The great extent of the seacoast and the large amount of water within the country have a moderating effect on the climate. On the west coast mild winters and cool summers are the rule, but in the interior the winters are very severe. Far to the south the summer days are long and sunny, but on the shortest day of the year the sun is visible less than six hours. In the north there are two months of winter darkness, as in other Arctic regions. On the western coast, where the rainfall is greatest, precipitation ranges from fifty to eighty inches annually, and at some points it reaches a maximum of ninety to ninety-two inches. On the southeast coast it is about forty-eight inches, while on parts of the plateau the average is only twelve inches.

Mineral Resources. Norway has deposits of silver, copper, pyrites and iron, and all of these minerals are mined to a limited extent. Feldspar and nickel ore are also worked, and marble, building stone, roofing slate and soapstone are produced in suffi-

cient quantities to permit their export. Only on a remote island is there any coal. The mining establishments give employment to about 8,000 persons, and there are about a dozen smelting furnaces in operation.

Fisheries. The fisheries provide a livelihood for over 116,000 persons, and fishing is one of the oldest industries of the country. Codfish is the most important catch; the value of a year's haul has reached as high as $20,000,000. Large quantities are sold fresh for the domestic trade, and a great deal of salted fish and of cod-liver oil is exported. Second in importance to cod is herring, with mackerel, salmon, sea trout and lobsters following. The whale, seal, walrus and shark fisheries are also exploited.

Agriculture. The rugged country of the Norwegians can by no means supply the people with sufficient food. Only one-thirtieth of the whole area is under cultivation, and nearly one-fourth is covered with forests. The highland pastures and barren mountains constitute the remainder of the surface. A list of the commodities requested of the allies in 1918, when the Norwegian government was negotiating for the import of necessities, indicates the needs of the country; the list included bread grains, rice, cocoa, syrup, sugar, fruit (dried and fresh), pork and beef, sauces and pickles. Of the crops raised by the Norwegian farmer, oats is the most important, over 306,000 acres being devoted to this cereal. Potatoes are raised in large quantities, having an acreage of about 114,000. Barley and rye are harvested in limited areas in the north, and wheat in the south. Other crops are hay and mixed corn.

Farming is carried on vigorously and modern implements are used. The farms are generally the property of those who cultivate them, and commonly include a large stretch of mountain pasture, often forty or fifty miles from the main farm, to which the cattle are sent for several months in the summer. The rearing of cattle is an extensive and profitable industry. The horses are vigorous and sure-footed, but some of them are of diminutive size. In the north many herds of reindeer are kept, and they constitute the chief wealth of many of the inhabitants of that region. The dairy products of Norway are excellent and are exported to some extent.

Manufactures. The leading manufacturing industry is the making of lumber products. The greatest forests are of pine, but fine forests of oak are found in the south, and birch forests grow farther north. Timber and lumber constitute about one-third of the total exports of the country. The other lines of manufactures include paper making, distilling, shipbuilding and the manufacture of chemicals, clothing, machinery and metal work, textiles, bone and horn. Though the manufacturing activities show a steady increase, Norway as yet has to import large quantities of manufactured articles.

Commerce and Transportation. The Norwegians are famous sailors. Before the World War the country possessed the largest merchant marine, in proportion to its population, in the world; during the war Norway suffered great losses through submarine attacks, but plans were laid to restore the lost tonnage. A large part of the trade consists in the transportation of freight for foreign nations. The imports of the country far exceed the exports, but the revenue from the carrying trade makes up the deficiency. Bergen, Christiania and Trondhjem are the chief ports.

In the country there are many excellent highways and about 1,900 miles of steam railway. Electric lines are also being constructed.

Education. School attendance is compulsory, the school age in towns being six and a half to fourteen. In the country the beginning age is seven. Of secondary schools there are about fourteen public, fifty-four communal and twenty-five private, most of them being coeducational. The state maintains six normal schools, and there are four private institutions of this class. The only university, the Royal Frederick, is at Christiania. The government makes ample provision for the care of deaf, blind, feeble-minded and neglected children.

Language and Literature. For several centuries Danish (Dano-Norwegian) has been the literary and commercial language of the kingdom, but certain dialects, resembling Icelandic or Swedish, are also spoken. *Landsmaal,* based on existing Norwegian dialects, is attracting much interest. It is a written language originated by Ivar Aasen. Efforts are being made to have it recognized by the government as the official language of Norway.

The producers of the first literature of Norway were the *skalds,* who are known to have composed songs and poems as early

as the ninth century. These oldest *sagas,* while they do not exist in their original form, have in some instances been incorporated in the *Snorra Edda,* and so preserved. The *Elder Edda,* probably composed between the ninth and the eleventh centuries, owed much to Norwegian composers. From the fourteenth century, the date of the union with Denmark, to 1814, the time of the separation from the latter kingdom, Norway had no national literature, its literary history being identical with that of Denmark. As was natural, the first productions after the separation were patriotic songs. The first great national poet was Henrik Wergeland (1808–1845), whose greatest poem is *The English Pilot.* Among others who flourished during the middle of the nineteenth century may be mentioned Johan Sebastian Welhaven (1807–1873), Peter Christen Asbjörnsen and Jörgen Moe. It was Asbjörnsen and Moe who brought to the notice of the world much of the native material contained in the old folk songs and popular poetry.

The greatest figures in Norwegian literature of the nineteenth century are Ibsen and Björnson, dramatist and novelist. Jonas Lie, the author of popular sea stories, and Alexander Kielland, the novelist, were other famous writers of the century. There is at present great activity in many different lines of literary effort.

Government and Religion. Norway is a constitutional, hereditary monarchy. The king is assisted by a Council of State, or Cabinet, the members of which are heads of departments. The legislative power is vested in a parliament, or *Storthing,* which is elected every three years. The Storthing divides itself into two chambers, the *Lagthing,* consisting of one-fourth of the members, and the *Odelsthing.* All bills must originate in the latter chamber. Universal suffrage exists. There are no titles of nobility under the Norwegian government.

The great body of the people belong to the Evangelical Lutheran Church, which is the established national Church. Complete religious freedom prevails, and Norway is reputed to be the most Christian country in Europe. The Methodists and Baptists have the largest number of adherents outside the established Church.

History. It is not until the ninth century that the historical period in Norway begins. In 872 the numerous small kingdoms, which had been divided and ruled over by the petty chiefs, or *jarls,* were united under Harold I. During this century and that which followed Viking expeditions were common, and through intercourse with more civilized parts of Europe, Norway received Christianity. The country reached its height as an independent power under Haakon the Old (1217–1263), and it was during this century, too, that permanent colonies in Iceland and Greenland were founded by Norse adventurers. The grandson of Haakon the Old, who died in 1319, was the last Norwegian king of Norway. Magnus Smek was at his accession king of Norway and Sweden, but in 1355 Norway became nominally independent, with Haakon VI, son of Magnus, as ruler. Haakon married the Danish princess Margaret, who on the death of her husband and son became ruler of both Norway and Denmark. In 1397, by the Union of Kalmar, Margaret brought Sweden also under her sovereignty.

Sweden became independent in the sixteenth century, but Denmark and Norway remained under one rule until 1814. Norway declined in prosperity and importance after the middle of the fourteenth century, when the Black Death ravaged the country and greatly reduced the population. The union with Denmark, too, was far from beneficial to the country, as the kings regarded Denmark as the more important country and treated Norway merely as a province. The long union with Denmark was ended by the Napoleonic struggle, for Sweden demanded Norway as the price of its aid to the allies against Napoleon. Norway was taken from Denmark as a punishment for the adherence of the latter kingdom to Napoleon. The Norwegians refused, however, to agree to the Treaty of Kiel (January, 1814), which ceded the country to Sweden, declared their independence and adopted a free constitution. Bernadotte, the crown prince of Sweden, entered Norway with an army, and although he was not completely successful, the pressure which the other powers brought to bear compelled Norway to accept the Swedish proposals for union, by which the former was allowed to retain its own constitution.

Throughout the nineteenth century Norway constantly resisted all attempts of Sweden to lessen in any way its constitutional rights. The feeling that Sweden, as the

larger country, was in every way considered more than Norway, kept dissatisfaction alive throughout the country, and when, in 1905, King Oscar of Sweden refused the demand of the Storthing, the Norwegian parliament, for a separate consular service, this refusal was made the occasion for declaring the independence of the country. As a proof that the separation was a friendly one, the Storthing invited King Oscar to name one of his sons as king of Norway. Sweden was obliged to submit to the separation, which was arranged in the Treaty of Karlstad, concluded in September, 1905, but Oscar refused to accept the crown for his son, and Charles, brother of Christian X, of Denmark, was chosen ruler, taking the name of Haakon VII. Norway was the first European nation to grant suffrage to women on the same terms as men; local suffrage was granted them in 1901, and parliamentary suffrage in 1907.

During the World War Norway suffered the same privations that were the lot of the other neutrals, but its losses from submarine attacks were much heavier than those of Sweden and Denmark. At the close of the war it was announced officially that 831 ships had been sunk and 1,020 lives lost. Early in the war the three Scandinavian kings met in conference at Malmö, Sweden; they agreed to maintain neutrality and to coöperate for their common protection. In spite of bitter feeling aroused against Germany, Norway remained neutral to the end, though at times the country was reported to be on the verge of war.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Amundsen, Roald
Bergen
Björnson Bjornstjerne
Christiania
Denmark, subhead History
Edda
Fiord
Haakon VII
Hammerfest
Harold
Ibsen, Henrik
Maelstrom
Nansen, Fridtjof
Northmen
North Polar Exploration
Sagas
Skagerrak
Skalds
Sweden, subhead History
World War

NOR'WICH, Conn., one of the county seats of New London County, (New London being the other), fifty miles southeast of Hartford, on the Thames River, at the head of navigation, and on the Central Vermont and the New York, New Haven & Hartford railroads. The city is picturesquely located among the hills and has many fine residences, well-shaded streets and several public parks. It has excellent water power and contains extensive manufactories of firearms, cotton, velvet, silk, stoves, furniture and a large variety of machinery. There is also a valuable trade in lumber, coal, groceries, dry goods and other articles. The city has the Backus Hospital, the Otis Library, a Y. M. C. A. building and the Free Academy, in connection with which is an art museum. Saint Patrick's church and the courthouse are also notable structures. The place was settled in 1659 and was chartered as a city in 1784. Population, 1910, 20,367; in 1917, 21,923; of the town, 29,613.

NORWICH, *nor'rich*, or *nor'rij*, England, on the Wensum River, 114 miles northeast of London. It is noted for many old buildings, a number of which were constructed during the Middle Ages; some of the ancient gates and fortifications still remain. In the center of the city is an old Norman castle, built at about the close of the eleventh century. There is also a cathedral, noted for its great age and lofty spire, one of the highest in England; it was dedicated in 1101. Years ago Norwich became the center of an important textile industry, which has declined. There are also manufactures of agricultural implements, machinery, shoes, mustard and starch. Dyeing and distilling are of considerable importance. Population, 1914, 121,478.

NORWOOD, Ohio, a suburb of Cincinnati on the northeast, on the Baltimore & Ohio Southwestern and the Cincinnati, Lebanon & Northern railroads. There are manufacturing establishments which produce most of America's playing cards, and bookcases, electrical apparatus, pianos, machinery and tools. The place was settled about 1790 and was incorporated as a city in 1902. Population, 1910, 16,185; in 1917, 23,269 (Federal estimate).

NOSE, that part of the breathing apparatus through which the air enters the lungs; also, the organ of smell. In most animals, the nose is the most prominent feature of the face. In some of the lower animals, as the dog, it forms the muzzle, and in others, like the hog, tapir and elephant, it is prolonged into a proboscis.

The nose in man is a triangular pyramid, with a framework of bone and cartilage. The bony portion of the framework consists of the nasal bones, the vomer and the turbinate bone. The cartilage is attached to the vomer, completing the partition between the nos-

trils, and to the nasal bones, completing the framework at the sides. The nose contains front and back passages, known as the *nares*. The front pair form the *nostrils*, through which the air enters. These passages are lined with a mucous membrane, in which, in the upper part of the nostrils, the fibers of the *olfactory nerve* (nerve of smell) are distributed. Inflammation of this membrane causes the symptoms of "cold in the head." Since such inflammation blocks the way to the center of smell, that sense is deadened when one has a cold.

Related Articles. Consult the following titles for additional information:

Breathing	Skeleton
Catarrh	Smell

NO'TARY PUB'LIC, in the United States and Great Britain a person authorized to attest or certify legal documents and to perform certain other official acts. In the United States a notary is usually appointed by the governor of his state, and his jurisdiction does not extend beyond the county for which he is appointed. In most states a notary takes an oath of office and gives bond as security for proper performance of his official duty. In general the powers of a notary are to take acknowledgment of deeds, mortgages and bills of sale and other such legal documents, to protest commercial paper and to take depositions and affidavits.

NOTA'TION AND NUMERA'TION. See ARITHMETIC; ALGEBRA.

NOTES, in commerce. See PROMISSORY NOTE; NEGOTIABLE INSTRUMENTS.

NOTRE DAME, *not'r'dam*, CATHEDRAL OF, a famous Roman Catholic church in Paris, situated on an island in the Seine. The foundations of the building were laid in 1163, and certain parts of it were not completed until the last part of the thirteenth century. Victor Hugo's *Notre Dame de Paris*, written in 1830, led to a complete restoration of the edifice. The architectural style is Gothic. Characteristic features are the two massive towers on the west front and the heavy flying buttresses which support the roof. It was intended to surmount the towers with lofty spires, but these were never erected. From 1182 to the present Notre Dame has been the scene of the most important ceremonies of Church and state in France.

NOTRE DAME, UNIVERSITY OF, a Roman Catholic institution established at Notre Dame, Ind., in 1842, by the head of the Congregation of the Holy Cross. The university maintains a college of arts and letters, colleges of science, engineering, architecture and law, and a preparatory school. All students belonging to the junior college year must take military drill. The institution is particularly well equipped for work in applied science, and its science building and furnishings are valued at $500,000. There are several schools for brothers, novices and young priests, affiliated with the university. It also has several preparatory schools in different parts of the country. The faculty numbers over eighty, and the enrollment is about 1,150. The library contains 90,000 volumes. A new library building, costing $225,000, was erected in 1916.

NOTTINGHAM, *not'ing am*, ENGLAND, a manufacturing city in the County of Nottingham, on the River Trent, 125 miles northwest of London. It is noted as a center of lace manufacture. The most important buildings are the Nottingham castle, which is now an important art museum, the exchange, the postoffice and the townhall. The city is the seat of Nottingham University College. It also contains a mechanics' institute and school of art and has a public library of over 100,000 volumes. Hospitals, churches, parks and charitable institutions are numerous. Besides lace manufacture, the city's industries include the spinning of wool, cotton and silk, the making of hosiery, and the manufacture of chemicals, foundry products and machinery. The county is celebrated in literature as the scene of the adventures of Robin Hood. Population, 1911, 259,904; in 1914, estimated, 264,970.

NOUN, *nown*, in grammar, a word that names any object about which a statement can be made. A noun is called *proper* when it is the name of an individual person or thing, as, *Mary, America; common*, when it is the name of a class of objects, as *book, chair; collective*, when in the singular it names a collection of similar objects, as *herd, flock; concrete*, when it names material objects; *abstract*, when it names a quality, condition or action, as *hardness, bravery*. (See the Seventh Year and Eighth Year sections of the article LANGUAGE AND GRAMMAR, for suggestions on the study of the noun.)

NOVACULITE, *no vak'u lite*, in geology a very finely-grained quartz. In America it occurs in its most perfect form only in Arkansas, and that state supplies it for the making of whetstones and hones.

NOVA SCOTIA, *no'vah sko'shah,* one of Canada's maritime provinces, and the smallest member of the Dominion, excepting Prince Edward Island. It comprises Nova Scotia, which is a peninsula joined to the southeastern corner of New Brunswick, and the island of Cape Breton. The Atlantic Ocean is south, and the Bay of Fundy is north of the peninsula. The area of Nova Scotia is 18,308 square miles; of Cape Breton Island, 3,120; total area of the province, 21,428 square miles. The population of the peninsula in 1911 was 438,986; of the island 53,352. For particulars of Cape Breton Island, see that title.

Surface and Drainage. In general, Nova Scotia consists of low land, sloping gradually to the southwest. Along the shore of the Bay of Fundy are the North Mountains, which extend with slight interruptions across the peninsula from the southwest to the northeast. On the north of the Basin of Minas these are known as the Cobequid Mountains or Hills. They are a continuation of the Appalachian system, but do not here reach a great altitude, nowhere exceeding 1,000 feet.

The Annapolis River flows southwesterly in the valley between the North and South mountains and drains the southwestern part of the province. Other portions are drained by short streams, which are unimportant. The southern and east-central portions contain a number of lakes, some of which are mere arms of the sea, nearly enclosed by land. The most important lake in the peninsula proper is Rossignol, in the southern portion. In the south-central part of Cape Breton Island is Bras d'Or Lake, which is really an arm of the sea.

Climate. Being nearly surrounded by water, Nova Scotia has fewer sudden changes and extremes of temperature than has New Brunswick, but it is subject to heavy fogs. The winters are not intensely cold, and the summers are mild and equable, the highest temperature at Halifax seldom exceeding 86°. The annual rainfall is about forty-five inches.

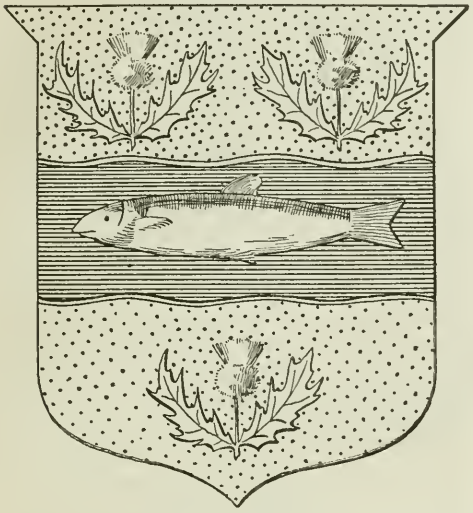
Mineral Resources. Nova Scotia contains some of the most valuable coal deposits in North America, covering 725 square miles, and these are extensively worked. The coal is exported to the other Canadian provinces and to the New England states. There are also large deposits of iron ore, manganese and gypsum on Cape Breton, while antimony is found in the vicinity of Halifax. The presence of iron ore, coal and limestone constitutes a condition favorable for the manufacture of iron and steel. Gold is found over an area of 3,000 square miles; it is of rare purity, but is not obtained in great quantities.

Agriculture. The lowlands along the streams are specially fertile, and the equable climate and abundant moisture adapt Nova Scotia to the raising of hay, grains, root crops and fruits, all of which are produced in large quantities. Formerly the province was covered with forests, and wherever these have been cleared away the land is tilled. Among the cereals, oats, barley and wheat are the most important. Potatoes are extensively grown and are the finest that Canada produces. The river valleys in the southern half of the peninsula are specially well suited to the raising of fruit, and apples are grown and exported from this region in large quantities. The apple crop is the principal agricultural product, the average yield being 1,000,000 barrels a year. Stock raising is also an important branch of industry, and considerable butter and cheese are made.

Other Industries. The fisheries of the province are surpassed in the entire Dominion only by those of British Columbia, and they give employment to a large number of people. The annual output is valued at from $8,000,000 to $10,000,000, on the average, though in 1917 they reached $14,500,000. Cod, halibut and lobsters are taken in the largest numbers.

The manufactures have not been important, there being but about 960 industrial establishments, but manufacturers are now realizing the advantage of the wealth of natural resources. Some coke is made, and on the island of Cape Breton there are iron and steel works. Lumber is manufactured in some regions, and the tanning industry is of some importance. Other industries worthy of mention are the manufacture of cotton goods, the canning of fruit and the refining of sugar.

Transportation. Its extensive coast line and numerous harbors give Nova Scotia excellent facilities for communication by sea. Halifax is its most important seaport and



COAT OF ARMS OF NOVA SCOTIA

The thisles are used as the emblem, because Nova Scotia is "New Scotland." The wavy band bearing a fish is an allusion to the many rivers and deeply indented bays and inlets which are so marked a feature of the province. When properly coloured, the thistles are natural-coloured on a golden background; the fish is silver on a blue background.

has regular steamship connection with European ports, as well as with those of Canada and the United States. The Intercolonial Railway extends the length of the province and has terminal stations at Halifax, Shelburne and Louisburg, so that most of the counties have direct railway communication. The Halifax & Southwestern serve the southern part of the peninsula. Altogether there are (1919) about 1,600 miles of railroad in operation.

Education. The public schools are in charge of a Council of Public Instruction, which comprises the members of the governor's Executive Council; the Superintendent of Education is the chief executive officer. The schools are undenominational and uniform throughout the province as to grading and courses of study. Each county has an academy, and there is a normal school at Truro for the training of teachers. There is no provincial university, but there are several denominational colleges. Among them are the following:

Items of Interest on Nova Scotia

The isthmus which connects Cape Breton Island with New Brunswick is eleven and a half miles wide.

The peninsula is intersected by several chains of hills, the Cobequid Mountains being the principal ones.

In Cobequid Bay, the eastern end of the Basin of Minas, the tides have risen as high as fifty-three feet; on the east coast of the province they seldom exceed seven feet.

Lake Rossignol, in Queen's county, is the largest of the freshwater lakes.

There is considerable game, including moose, caribou, wild ducks, partridge; snipe and plover; the game laws are strict and well enforced.

Bears, foxes and wildcats are still found, but wolves are extinct.

There are wireless telegraph stations at Halifax, Cape Sable, Sable Island and Glace Bay.

The density of population is 23.3 per square mile.

Until 1881 Nova Scotia had the largest shipping tonnage, in proportion to population, in the world.

No attempt at permanent colonization was made till 1604, when Port Royal was founded.

Until 1673 the province was in constant dispute between French and English; by the Treaty of Paris in that year France resigned all claim.

Questions on Nova Scotia

What is the area of Nova Scotia?

What large island is a part of the province?

What is the principal range of mountains?

What is the term sometimes applied to Sable Island? Why?

Name the principal rivers.

What kinds of game are found?

How do the fisheries of Nova Scotia rank?

What is their principal product? Name four other fishes of importance.

What are the leading crops?

Is the production of gold increasing?

Name four leading manufactures.

Which are the principal schools?

Acadia University, Wolfville.
Dalhousie University, Halifax.
Halifax Ladies' College, Halifax.
Kings College, Windsor.
Presbyterian College, Halifax.
University of Saint Francis Xavier, Antigonish.

Government and Religion. The province has a legislature consisting of council and a house of assembly, and the executive authority is vested in a Lieutenant-Governor, appointed by the Governor-General of Canada. For local administration the province is divided into counties, and these are divided into towns.

The inhabitants are largely of English, Scotch and Irish descent. The Protestant denominations, including Presbyterians, Baptists, Episcopalians and Methodists all have large followings. About one-third of the inhabitants are communicants of the Roman Catholic Church.

Cities. The chief city in the peninsula is Halifax, the tenth city in size in the entire Dominion, and the capital of the province; in the island the largest city is Sydney. Other leading towns of the province are Yarmouth and Pictou.

History. Nova Scotia was first visited by the Cabots in 1497, but it was not colonized by Europeans till 1604, when French settlements were made at Port Royal, Saint Croix and other places. Under the French, Nova Scotia, with New Brunswick was known as *Acadia,* or *Acadie.* The French colonists were more than once almost entirely driven out by the English. In 1654 Cromwell took possession of the country, which remained with the English till 1667, when it was ceded to France; but in 1713 the country was again ceded to England. In 1755 almost all the French colonists were forced to leave the country, owing to their hostility to the English, and on this historical event the poem of *Evangeline* was based. In 1763 the island of Cape Breton was annexed to Nova Scotia, but it was separated between 1784 and 1820. In 1784 New Brunswick was detached. Halifax was Britain's most important port in America during the War of 1812.

Responsible government was achieved in 1848, and the public school system was organized in 1864. In 1867 the province became a member of the Dominion of Canada. In 1910 all the province except Halifax was made prohibition territory. In 1917 a terrific explosion of a munitions ship in Halifax harbor killed over 1,200 people, injured about 4,000 and destroyed a large section of the city.

Related Articles. Consult the following titles for additional information:
Acadia
Canada, Dominion of
Cape Breton Island
Evangeline
Grand Pre
Halifax
Sydney
Yarmouth

NO'VA ZEM'BLA, two large islands in the Arctic Ocean, belonging to Russia and lying north of the northeastern corner of European Russia. The two are separated from the mainland of Russia by Kara Strait. The total area of the two islands is about 35,150 square miles. The coasts swarm with seals, fish and water fowl. The interior is covered with stunted shrubs, short grass and moss, and the animals include bears, wolves, foxes, reindeer, ermines and other fur-bearing animals. The islands are almost uninhabited, but Russian hunters and fishers visit them constantly.

NOV'EL, a form of prose narrative that has enjoyed uninterrupted popularity for about two centuries. Thousands of novels are published every year, but there seems to be no lessening of the popular taste for them. While not all that leave the press possess worth, the novel has been the favorite form of writing of some of the greatest men and women of literary history, and it must be regarded as one of the most important forms of literature.

What is a Novel? There are certain requirements that distinguish this class of fiction. While there is no definite limit as to extent, it is generally agreed that the novel is an extended narrative, distinguished in this respect from the short story. A novel, too, has a plot, though authors like Dickens and Thackeray took great liberties with this requirement. Their novels are so involved and loosely constructed that it would be difficult to summarize the story of any of them briefly. Yet in each there is a continuous thread of narrative, even if many other threads cross it and are themselves interwoven.

The novel also presents types of character in a truthful way. It deals with people as they are in everyday life, not as fairies or gods. There is a type of fiction, called the *romance,* in which the characters and situations are so mysterious and unreal that the story lacks the element of reality. The line between these two types is not always

well marked, as in the case of the stories of Sir Walter Scott. His books are often called romantic novels, or historical romances. They have an air of reality, and a background of historic fact, but they are much more adventurous and imaginative than the ordinary character novel. They take the reader away from the matter-of-fact world and give him a glimpse of the world of knighthood and chivalry.

Some critics insist also on another requirement, the love element. Such critics refuse to call Defoe's *Robinson Crusoe* a novel in the strict sense of the term, because it lacks that element. The first English work of fiction that possessed all of the qualifications of the modern novel was Richardson's *Pamela,* published in 1740.

Related Articles. The reader will find in the article Fiction an extended discussion of different types of the novel, and a list of fourteen standard novels. For other information connected with this subject consult the following titles:

GENERAL

Literature
Romance

AMERICAN NOVELISTS

Alcott, Louisa May
Adams, William T.
Alden, Isabella M.
Aldrich, Thomas B.
Allen, James Lane
Atherton, Gertrude
Bacheller, Irving
Bacon, Josephine D.
Barr, Amelia E.
Beach, Rex
Brady, Cyrus T.
Burnett, Frances E.
Cable, George W.
Chambers, Robert
Chester, George R.
Churchill, Winston
Clemens, Samuel L.
Cooper, James F.
Crane, Stephen
Crawford F. Marion
Davis, Rebecca H.
Davis, Richard H.
Deland, Margaretta
Dixon, Thomas J.
Eggleston, Edward
Ford, Paul Leicester
Fox, John, Jr.
Freeman, Mary E.
French, Alice
Garland, Hamlin
Harris, Joel Chandler
Harte, Francis Bret
Hawthorne, Nathaniel
Herrick, Robert W.
Holland, Joshiah G.
Holmes, Oliver W.
Howells, William Dean
Jackson, Helen Hunt
James, Henry
Johnston, Mary
London, Jack
Lorimer, George H.
McCutcheon, George B.
Mitchell, Silas Weir
Morris, Gouverneur
Murfree, Mary N.
Nicholson, Meredith
Page, Thomas Nelson
Porter, William Sydney
Rice, Alice Hegan
Riggs, Kate D.
Rinehart, Mary R.
Rives, Amélie
Roe, Edward P.
Rohlfs, Anna K.
Sinclair, Upton
Smith, Francis H.
Stockton, Francis R.
Stowe, Harriet B.
Tarkington, Newton B.
Terhune, Mary V.
Thompson, James M.
Trowbridge, John T.
Wallace, Lewis
Ward, Elizabeth S.
Wharton, Edith
White, Stewart Edward
Whitney, Adeline D. T.
Wister, Owen
Wright, Harold Bell

CANADIAN NOVELISTS

Barr, Robert
Cotes, Sara Jeannette
Duncan, Norman
Gordon, Charles W.
Haliburton, Thomas C.
Lighthall, William D.
Parker, Sir Gilbert
Roberts, Charles G. D.
Saunders, Margaret M.
Seton, Ernest Thompson
Traill, Catherine P.

ENGLISH NOVELISTS

Austen, Jane
Barrie, Sir James
Bennett, Arnold
Besant, Sir Walter
Black, William
Blackmore, Richard D.
Bronte, Charlotte
Bulwer-Lytton, Edward
Bunyan, John
Caine (Thomas) Hall
Chesterton, Gilbert K.
Collins (William) Wilkie
Corelli, Marie
Craik, Dinah M.
Defoe, Daniel
Dickens, Charles
Disraeli, Benjamin
Doyle, Sir Arthur C.
Ebers, George M.
Eliot, George
Fielding, Henry
Galsworthy, John
Gaskell, Elizabeth C.
Goldsmith, Oliver
Haggard, Sir Henry R.
Hardy, Thomas
Harraden, Beatrice
Henty, George Alfred
Hewlett, Maurice H.
Hughes, Thomas
Kingsley, Charles
Kipling, Rudyard
Lever, Charles James
Marryat, Frederick
Meredith, George
Reade, Charles
Richardson, Samuel
Scott, Sir Walter
Sterne, Laurence
Stevenson, Robert L.
Thackeray, William
Trollope, Anthony
Ward, Mrs. Humphry
Watson, John
Wells, Herbert G.

OTHER NATIONS

Andersen, Hans
Annunzio, Gabrielle d'
Balzac, Honoré de
Björnson, Björnstjerne
Bourget, Paul
Cervantes Saavedra, Miguel de
Daudet, Alphonse
Dumas, Alexandre
Du Maurier, George L.
Gorky, Maxim
Heyse, Paul
Hugo, Victor, Marie
Lagerlöf, Selma
Lesage, Alain René
Maartens, Maarten
Maupassant, Henri Guy de
Merimée, Prosper
Sand, George
Sienkiewicz, Henryk
Tolstoi, Lyoff
Turgenieff, Ivan S.
Zangwill, Israel
Zola, Emile

NOVEMBER, the eleventh month in the modern calendar, but the ninth according to the old Roman method of reckoning. Its name is from the Latin *novem,* which means *nine.* When the Roman calendar was reformed and two new months were added, November became the eleventh month, but retained its name. There were several changes in its number of days, but the present number, thirty, has prevailed since the time of the Emperor Augustus. November is usually referred to in poetry in melancholy terms, for in northern climes it is a time of bare woods and gray days. Bryant's familiar words, "The melancholy days are come," are typical.

Special Days for Observance. Thanksgiving Day, the annual festival of the American people, is always designated by Presidential proclamation as the last Thursday in November. See THANKSGIVING DAY.

Anniversaries for Celebration. The following birthdays of notable people fall in November:

Marie Antoinette, November 2, 1755.
James K. Polk, November 2, 1795.
William Cullen Bryant, November 3, 1794.
Ella Wheeler Wilcox, November 5, 1855.
John Philip Sousa, November, 1856.
Mohammed, November 10, 570.
Martin Luther, November 10, 1483.
Oliver Goldsmith, November 10, 1728.
Friedrich Schiller, November 10, 1759.
Joaquin Miller, November 10, 1841.
Henry Van Dyke, November 10, 1850.
Thomas Bailey Aldrich, November 11, 1836.
Saint Augustine, November 13, 354.
Robert Louis Stevenson, November 13, 1850.
Jacob Abbott, November 14, 1803.

William Pitt, November 15, 1708.
John Bright, November 16, 1811.
Louis A. Fréchette, November 16, 1839.
Asa Gray, November 18, 1810.
James A. Garfield, November 19, 1831.
Thomas Chatterton, November 20, 1752.
Sir Wilfrid Laurier, November 20, 1841.
Mary Johnson, November 21, 1870.
Sieur de La Salle, November 22, 1643.
George, Eliot, November 22, 1820.
Franklin Pierce, November 23, 1804.
Sir Gilbert Parker, November 23, 1862.
Andrew Carnegie, November 25, 1837.
Sir Philip Sidney, November 29, 1554.
Louisa M. Alcott, November 29, 1832.
Jonathan Swift, November 30, 1667.
Samuel L. Clemens, November 30, 1835.

The following important events occurred in November:

Destruction of Lisbon by an earthquake, November 1, 1755.
Close of Thirty Years' War, November 3, 1648.
Denver made the capital of Colorado, November 4, 1881.
Gunpowder Plot foiled, November 5, 1605.
England declared war on Turkey, November 6, 1914.
Jefferson Davis elected President of the Confederacy, November 6, 1861.
American troops occupy Sedan, November 6, 1918.
Battle of Tippecanoe, November 7, 1811.
Second Battle of Ypres begun, November 10, 1914.
German envoys sign armistice terms and fighting in the World War comes to an end, November 11, 1918.
Washington becomes a state, November 11, 1889.
Articles of Confederation adopted, November 15, 1777.
Oklahoma becomes a state, November 16, 1907.
First session of Congress in Washington opens on November 17, 1800.
Treaty signed by the United States and Panama providing for a canal, November 18, 1903.
Gettysburg field made a national cemetery, November 19, 1863.
Vasco da Gama rounds the Cape of Good Hope, November 20, 1497.
Capture of Port Arthur, November 21, 1894.
Battles of Chattanooga, November 23–25, 1863.
Opening of first street railway in New York City, November 26, 1832.
Hoosac Tunnel completed, November 27, 1873.
Abdiction of William II, Emperor of Germany, November 28, 1918.
Preliminary treaty of peace between the United States and England, November 30, 1782.

NOYES, *noiz*, ALFRED (1880–), an English poet, born in Staffordshire and educated at Exeter College, Oxford. In 1907 he married Miss Garnett Daniels, an American. In 1913 he was called to America to deliver a series of lectures at Lowell Institute, Boston, and since then has been well known in America. Noyes is one of the foremost writers of heroic and patriotic verse and the author of numerous critical reviews and stories. A list of his work includes *The Loom of Years; The Forest of Wild Thyme; Drake,* an epic; *William Morris,* in "English Men of Letters Series"; *Collected Poems,* and *Tales of the Mermaid Tavern.* His works with reference to the World War include *The Winepress; Roda,* originally published as *A Belgian Christmas Eve;* and *Walking Shadows,* stories of submarines and of the sea.

N-RAYS, the name given certain peculiar rays of light that were discovered by Professor Blondlot of the University of Nancy, while trying to polarize X-rays (see ROENTGEN RAYS; POLARIZATION OF LIGHT). The name is constituted from the first letter of the word "Nancy," where the discovery was made. N-rays resemble X-rays in some respects and widely differ from them in others. They will penetrate most substances, but not platinum, rock salt nor water. They penetrate a dry cloth readily, but the thinnest fabric, when wet, obstructs them. They render calcium sulphide and certain other substances phosphorescent, provided these substances are first exposed to the sunlight. Experiments show that N-rays exist in sunlight, but are obstructed by clouds and moisture in the atmosphere. Their properties and use are not yet well understood. Attempts to use them in photography have not been successful.

NU'BIA, a name given to a region of Northeastern Africa, bounded by Egypt on the north, by the Red Sea on the east, by Abyssinia and Kordofan on the south and by the Libyan Desert on the west. It is not a political division, as part of the territory is attached to Egypt and the rest to Egyptian Sudan. With the exception of the valley of the Nile, the country is for the most part desert. Suakin, on the Red Sea, is the only practicable port. The Nubians belong to the Arabian and Ethiopian races. They are a handsome people, of dark brown complexion, bold and cheerful and more simple in their manners than their neighbors either up or down the river.

NUISANCE, *nu'sans,* in law anything which occasions culpable annoyance or offense to a person or a community. For example, the playing of musical instruments

late at night and thus interfering with the rest of neighbors is a nuisance; likewise, the operation of a factory in a residential neighborhood is a nuisance. The former, which affects only one or two persons, is a *private* nuisance; the latter, effecting a whole community, is a *public* nuisance.

Nuisances may be dealt with by resorting to the law. A community or an individual may sometimes forestall a nuisance by securing an injunction (which see); but if the nuisance becomes established before any legal action can be taken, then the community or the individual can do nothing but bring suit for damages. In this, as in every other matter concerning human relationships, it is difficult oftentimes to determine where individual liberty ends and the rights of others begin. A street car system for instance, installed in a residential street, may depreciate the value of property and keep the owners awake half the night; but it operates as a public utility, and there is no relief in law for those who are offended.

NULLIFICA'TION, in American history, has meant the declared right of a state formally to suspend a law of the United States within its territory, making it null and void, at will. This right was first declared in the famous Kentucky and Virginia Resolutions of 1798, on the ground that the Union was a compact of independent states. The same right was asserted by the government of Pennsylvania in 1809 and was practically assumed by several New England states during the War of 1812. In 1825 Georgia successfully asserted its right against the government concerning a question of jurisdiction over Indian lands. The most famous instance was in South Carolina in 1828, when John C. Calhoun, in an essay called the *South Carolina Exposition*, argued that each state was a sovereign in itself, the Federal government being its agent, and that the state therefore had the right to suspend a power which it had delegated to its agent. The same doctrine was upheld by Robert Y. Hayne in his famous debate with Daniel Webster in 1830.

In both cases the immediate cause of the declaration was the protective tariff policy which injuriously affected the South. In 1833 the legislature of South Carolina declared the tariff acts of 1828 and 1832 null and void and threatened secession if the government of the United States attempted to enforce the law. Measures of military defense were taken, but President Jackson issued a proclamation declaring his purpose to enforce the law at any cost. A bill known as the Force Bill (see FORCE BILLS) was passed in March, 1833, but compromise was meantime effected, and the nullification ordinance was repealed.

NUMA POMPIL'IUS, the second king of Rome, who is said to have reigned from 714 to 672 B. C., and to have been distinguished as philosopher and legislator. Though his existence was probably more legendary than historical, he was regarded as the founder of the most important religious institutions of the Romans, and the author of many official writings, which were burned by order of the Senate when accidentally discovered 400 years after his time.

NUMBER. See ARITHMETIC.

NUMBER, METHODS OF TEACHING. Instruction in number should secure two results, namely, (1) comprehension of magnitude and magnitude relations and (2) ability to use figures accurately and with facility. At the outset the teacher should understand that numbers are not things or qualities of things, but that number is a relation, which is obtained only through mental processes.

Primary Grades. Children have more or less knowledge of number when they enter school. This is manifested by their tendency to count and to measure. A test will probably show that most of them know number as far as five and that all have the idea of magnitude. The work in these grades should proceed along the following lines:

(1) **Obtaining a knowledge of magnitude and magnitude relation.** This should be done by measurement, since measurement is the foundation of all number work. Pupils should at first be given objects of different sizes, such as blocks of different lengths, and encouraged to compare them. They will express the result of their comparisons in such terms as larger and smaller, longer and shorter.

(2) **Counting.** Pupils should be led to count by noticing the number of objects in different groups, as three marbles, four blocks, five flowers. A serious mistake is often made in teaching children to count by single objects, as by pointing to each of a series of blocks and

counting one, two, three, four. Unless the child already knows what two, three and four are, he gets the idea that these words are names of the different blocks, rather than groups of objects.

(3) **Perfecting the idea of magnitude.** The ideas first obtained are vague, as expressed in comparisons, such as larger, smaller. The pupils should soon be led to form definite ideas of such dimensions as foot, inch, yard, pound, pint and other units of measure in common use. This should be done by using the measures. In primary grades this work will proceed very slowly and in connection with other lessons. In many well-graded schools. lessons in number are not given any separate period during the first year, but are given incidentally in connection with other lessons, such as nature study and language.

(4) **Obtaining an idea of proportion, or relative magnitude.** Pupils should be led to form ideas of the relations of objects of different sizes, such as the relation of an inch cube to a two-inch cube, of a prism two inches long and an inch square to one two inches long and two inches square, and of a pint to a quart. These ideas are obtained by the use of the objects, which should always be at hand when new work in number is attempted.

(5) **Learning to use figures.** Since figures are the symbols of numbers, they should not be introduced until the ideas which they represent are fully understood. Ordinarily they may be introduced about the beginning of the second year. In their introduction the following order should be observed: (a) The idea should be represented by the object; (b) the idea should then be represented by the written word; (c) the written word should be followed by the figure. After the figures have been introduced, in the following lesson the pupils should be tested, so that the teacher may know that they understand what each figure represents. This can readily be done by asking the different pupils to bring the teacher the number of objects which the figure written upon the board represents.

(6) **Gaining habits of accuracy.** Accuracy is essential to success. Unless the teacher insists upon accurate work from the beginning, habits of carefulness are formed which are liable to affect the pupil all through his school life. Most errors result from hasty and careless observation; hence, the pupil should be led to observe carefully and to form definite and accurate conclusions. By continual persistence in this method, the habit of accuracy will be established.

(7) **Gaining facility in arithmetical operations.** As fast as the pupils obtain accurate ideas, they should be drilled in the use of these until they acquire facility. This can be accomplished by devoting a portion of the number period each day to review drills.

(8) **Memorizing the facts of number.** As fast as the facts of number are understood, they should be learned. These facts of elementary number are comparatively few. There are only forty-five in addition and sixty-four in multiplication. When these are learned, they carry with them the primary facts of subtraction and division, and all should be mastered by the time the child has completed his third year in school.

Intermediate and Grammar Grades. In the intermediate grades the work in number usually passes to the work in arithmetic. This is different in degree, but not in kind. The text-book is usually introduced into the fourth grade, and unless the pupils have been prepared for this in the preceding grade the teacher should devote the first few lessons to such review as may be necessary to introduce the class to the book. The same methods employed in the primary grades should be continued and be extended as the needs of the class demand. Objects should be used whenever they are necessary to give the pupils a clear idea of the process under consideration.

In addition to the work in fundamental operations, the pupils of the fourth grade should acquire a clear idea of the common fractions in most general use. The primary idea of fractions should be obtained in the preceding grades, but here this idea should be elaborated and extended until the pupils are able to add and subtract fractions of different denominations as far as twentieths, by reducing them to equivalent fractions having the same denominator. The principles of the reduction of fractions can easily be learned by the use of drawings or paper, which can be folded to represent the necessary divisions.

Teachers often err in not making a distinction between an equal part of an object and one of a group of objects of the same sort, as using one of four apples to represent $\frac{1}{4}$. The difference between one of four apples and one-fourth of an apple should be apparent, but when one illustration is used for the other, it often leads to a confusion of ideas. The teacher should also see that the pupil has a correct idea of the unit value of his result. Failure to do this often leads to ridiculous conclusions. For instance, the division of $\frac{3}{4}$ by $\frac{1}{2}$ gives a quotient of $1\frac{1}{2}$, but when questioned as to what the $1\frac{1}{2}$ represents, the pupil is very likely to have the idea that the number represents $1\frac{1}{2}$ units or wholes.

Many practical problems should be given in these grades. In difficulty they should be kept within the capacity of the pupils, and they should deal with the affairs of daily occurrence. Common weights and measures,

the use of decimals as applied to money and the simple computations found in stores should be thoroughly taught in the fourth grade. These problems should constitute a part of the seat work and a part of the recitation work. The seat work should be done with care and supervised by the teacher; otherwise pupils will fall into the very injurious habits of listlessness and inaccuracy. When this occurs the seat work is of little or no benefit.

Denominate numbers, as far as they are in common use, should be taught in the intermediate grades. This should be done by the use of common weights and measures and their application to such problems as occur in actual business. After these measures have been learned by use, their tables can be memorized. Pupils should also be taught, in connection with this work, to write receipts and promissory notes and to make out bills of items bought and sold. In the higher grades the operations in percentage, including profit and loss, interest and discount should receive special attention, but the books used in these grades usually give such explanations as to render the discussion of special methods unnecessary. See ARITHMETIC.

NUMBERING MACHINE, a machine for impressing consecutive numbers on account books, coupons, railway tickets, bank notes and other forms of commercial papers. One of the principal forms consists of a series of disks or wheels, each numbered to ten on its circumference. All are mounted on one axle, upon which they turn freely, acting upon one another in serial order. The first wheel of the series, containing the units, is moved one figure by each stroke or movement, and when the units are exhausted, the tens come automatically into action and act with the units, so that for every ten units marked off, one ten is marked off. When the disk of tens has moved ten times, the hundred disk moves once. Often there are wheels representing thousands and even ten-thousands.

NUMBERS, BOOK OF, the fourth of the books of the Pentateuch, containing a record of the numbering of the Israelites, hence its name. It gives a narrative of the journeyings of the Israelites from the time of their leaving Sinai to their arrival at the plains of Moab, besides parts of the Mosaic law. Formerly the authorship was attributed to Moses, but modern scholars assert that the book is made up of several parts, each of which had a separate author.

NUMID'IA, an ancient country of northern Africa, corresponding roughly to modern Algeria. It was divided among various tribes, but after the Second Punic War it was united under Massinissa, and several of its rulers became noted in Roman history. In 46 B. C. it became a Roman province, and at the division of the Roman Empire it became a part of the Western Empire.

NUMISMAT'ICS, the science which treats of coins and medals with reference to their artistic, historical and economic value. Present-day usage restricts the term *coin* to a piece of money, usually of metal, and the term *medal* to a small ornamental metal disk made in honor of some person or event. The side of a coin bearing a head, bust, figure or national emblem is called the *obverse;* the opposite side, the *reverse.* The *legend* is printing around the border, while the inscription is the writing in the middle part, or *field.* The space beneath the design, usually occupied by the date, is the *exergue.* In minting, coins are either *cast* or *struck;* when cast they are made by pouring molten metal into molds; when struck, by exerting upon them sufficient pressure with a die to impress a design. The metals most generally employed in making coins are gold, silver, nickel, copper and bronze.

The first coins were probably made in Asia; the oldest in existence are Greek, of the fifth century B. C. In ancient, as in modern times, the coins of kingdoms and empires bore the portrait of the reigning prince; those of free states some characteristic or symbol device. On Egyptian coins are pictured the ibis, isstrum, crocodile; on African, the elephant; on Arabian, the camel. Some of these coins were oval in shape, but most of them were circular. The most beautiful coins ever made are those of the fourth century (B. C.) in Greece; these are the work of some of the greatest of Greek sculptors. Ancient coins are not dated, but the numismatist is able, by reference to the design, to determine with accuracy the period and country to which an antique coin belongs.

The earliest coins of the American colonies were made in Massachusetts in 1652; in 1662 the famous "pine tree shillings" were first minted there. The mint of the United States was established at Philadelphia in 1792.

NUM'MULITE (Latin *nummus,* meaning *money;* Greek, *lithos,* meaning *stone*), a common name given to fossils (see FORAMINIFERA) having somewhat the appearance of money. The shell has no apparent opening, and internally it contains a spiral cavity, divided by partitions into numerous chambers, communicating with one another by means of small openings. Nummulites vary in size from less than one-eighth of an inch to one and one-half inches or more in diameter. They occupy an important place in geology, on account of the prodigious extent to which they are accumulated in the lower Tertiary strata. They occur so abundantly in some parts of the Eocene formation, that the name of *nummulitic limestone* is given to certain of the strata. This series, characteristic of the Old World, often attains a thickness of many thousand feet and extends from the western shores of Europe and Africa through Asia to Eastern China. The pyramids of Egypt are constructed of a stone largely composed of nummulites.

NUN, in the Roman Catholic Church a woman who retires from the world, joins a sisterhood, takes upon herself the vow of celibacy and other vows required by the discipline of her convent and consecrates herself to a life of religious devotion. The first nunnery is said to have been that founded by a sister of Saint Anthony, about A. D. 250, and the first in England was founded at Folkstone, by Eadbald, king of Kent, in 630. At present the number of nuns is largely in excess of that of monks.

NUNCIO, *nun'she o,* an ambassador of the first rank (not a cardinal) representing the Pope at the court of a sovereign. A papal ambassador of the first rank, who is at the same time a cardinal, is called a *legate.* The title of *internuncio* is given to an ambassador of inferior rank, who represents the Pope at minor courts. Formerly the papal nuncios exercised the supreme spiritual jurisdiction in their respective districts, but now in a Catholic kingdom or state which holds itself independent of the court of Rome in matters of state discipline, the nuncio is simply an ambassador.

NUREMBERG, *nu'rem burg* (German *Nürnberg*), GERMANY, a city of Bavaria, situated on the Pegnitz River, ninety-five miles north of Munich. It is surrounded by well-preserved ancient walls, with numerous massive towers and gateways, and the whole is enclosed by a dry moat. The Pegnitz, traversing the city from east to west, divides it into two nearly equal parts, which communicate by numerous bridges. Nuremberg contains a large market place and a number of interesting buildings, among which are the Church of Saint Lawrence, the Church of Saint Sebaldus and the medieval imperial castle, the Kaiserburg. The general appearance of the place is distinctly medieval, and it is one of the quaintest cities of Europe.

Nuremberg has extensive breweries and produces, also, large quantities of toys, fancy articles in metal, carved wood and ivory, as well as chemicals, clocks, watches, cigars, lead pencils and electric supplies. The city is celebrated for the invention of watches in the fifteenth century. Nuremberg was an independent imperial town down to 1806. It was one of the first of the imperial towns to cast its lot for the Reformation, and it suffered extensively during the Thirty Years' War, when Gustavus Adolphus was besieged there by Wallenstein. Before the discovery of the water passage to India, Nuremberg was the great mart for the produce of the East coming from Italy and going to the north. Its trade, though it has declined somewhat, is still important. Population, 1910, 333,142; 1918, 357,141.

NURSE, a person who takes care of the sick, infirm or disabled, or of babies and small children. The nursing field belongs in the main to women. What is known as the *professional nurse* is a woman with special hospital training, who on completion of a prescribed course is granted a certificate, or diploma, that gives her a definite professional standing. Trained nurses are a part of the staff of every hospital, and they are also found in orphanages and other benevolent institutions. Some engage in nursing in homes, and others are connected with social settlements or with visiting nurses' associations, for service among the poor. Trained nurses are becoming a part of the public school system in large cities, and many heads of industrial establishments who employ large numbers of workers also find them indispensable. During the World War thousands of women served in military hospitals in camps and in the cities, under the auspices of the Red Cross Society. The heroism of these women and their devotion to duty form an inspiring chapter in the story of that great struggle.

The Nurse's Training. Every modern hospital includes in its activities a course in nursing. The courses vary from two to three years. The first period of training, lasting from three to six months, is a period of probation; it is a good test of the candidate's aptitude for the work and her seriousness in taking it up. If she is undeterred by these months of hard and disagreeable duties, fatiguing routine and what may sometimes seem to be petty tyranny, she has in all probability the necessary qualifications.

At the end of the probation period the prospective nurse has learned to make herself useful in the wards, gained elementary knowledge of medicines and how to mix them, and has become experienced in making surgical supplies. As a pupil nurse she acquires practical experience in nursing, learns how to assist in operations and covers certain prescribed courses in anatomy and physiology, bacteriology, dietetics, massage, bandaging, etc. Each day is definitely marked off into periods of work, study, rest and recreation and pupils are expected to obey rules implicitly.

Graduate nurses who continue in hospital work do not as a rule receive large salaries, but their remuneration is almost clear gain because lodging, meals, laundry and medical service are furnished free. Ambitious women work up to good positions as head nurses or superintendents of training schools. Private nurses command thirty dollars a week or more, but they are not always assured of regular work. Whatever line of work she takes up, the nurse must be willing to think of others before she considers herself, and to carry on her work of mercy and healing with poise and cheerfulness. See HOSPITAL.

NURS'ERY, in agriculture, a tract of land devoted to raising shrubs or trees for sale. In its broadest sense the term includes the culture of herbs and plants, as well as trees and shrubs, but in America the meaning is restricted as above. Ornamental trees and shrubs are extensively cultivated in the western part of New York state, in the vicinity of Rochester. However, in the United States by far the largest part of the nursery business is confined to the growing of apple trees. Most of these trees are grown by grafting the scions into native stock (see GRAFTING). There are about 4,500 nurseries in the United States, and the capital invested is approximately $53,000,000.

NURSERY RHYMES. See MOTHER GOOSE.

NUT, a hard, one-seeded fruit, containing an oily meat enclosed in a shell. Although it is not, strictly speaking, a nut, the peanut is commercially treated as such. The most common varieties of nuts are the hazelnut, the chestnut, the English walnut, the hickory nut, the pecan and the Brazil nut. The Brazil nut and the cocoanut are products of tropical climates. Almonds, English walnuts, chestnuts and pecans are grown successfully in California and in some other parts of the United States. The walnut crop and the almond crop of California are both valuable, also the pecan crop of several Southern states. Nuts are valuable for food, since they contain suitable proportions of fat and other nutritive matter. When eaten in connection with other food, they are found to be digestible and healthful, and they are now extensively used in the manufacture of "prepared foods."

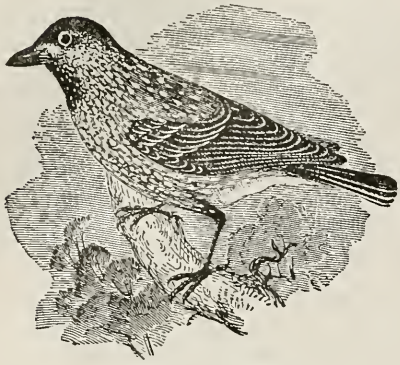
Related Articles. Consult the following titles for additional information:

Almond	Chestnut	Peanut
Betel	Cocoanut	Pecan
Brazil Nut	Hazel	Pistachio
Butternut	Hickory	Walnut

NUTATION, in astronomy, a small, subordinate, vibratory motion of the earth's axis, by virtue of which, if it subsisted alone, the pole would describe among the stars, in a period of about nineteen years, a minute ellipse, having its longer axis directed toward the pole of the ecliptic, and the shorter at right angles to it. The consequence of this real motion of the pole is an apparent approach and recession of all the stars in the heavens to the pole in the same period; and the same cause will give rise to a small alternate advance and recession of the equinoctial points, by which, in the same period, both the declinations and the right ascensions of the stars will be also alternately increased or diminished. This nutation, however, is combined with another motion, namely, the precession of the equinoxes (which see), and in virtue of the two motions, the path which the pole describes is neither an ellipse nor a circle, but a gently undulating ring; and each of these undulations constitutes a nutation of the earth's axis. Both these motions and their combined effect arise from the action of the sun and moon upon the earth.

NUT'CRACKER, a bird common in the mountains of central Europe and sometimes

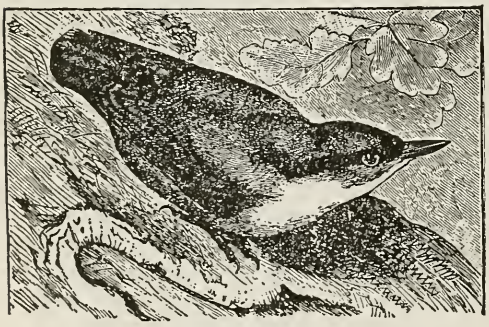
seen in England, so called because of its habit of cracking the seeds of various fir trees (its principal food) by holding the



NUTCRACKER

cones in its claws and hammering upon them with its bill. The bird belongs to the crow family, and is about the size of a jackdaw.

NUT'HATCH, the common name of several very active little birds, that are common in most parts of North America and Europe. They are usually of shy and solitary habits, frequenting the woods and feeding chiefly on insects, which they find in the crevices of the bark of trees.

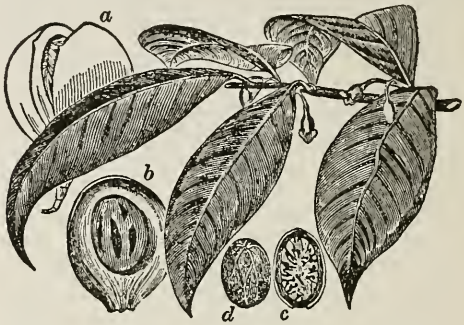


NUTHATCH

They are usually seen head downward, working around the trunk of the tree, peering sharply into the crevices and steadily calling out their rough cries—nasal notes which seem altogether too loud for such small birds. The white-breasted nuthatch of the United States is of a slatish-gray color, with brownish lower parts, white throat and a white line over its eye.

NUTMEG, the kernel of the seed of an evergreen tree growing principally in the islands of the East Indies, used commercially as a spice. The fruit is pear-shaped and about two inches in diameter. When thoroughly ripe it splits open to two nearly equal longitudinal sections, presenting to view the nut or seed, surrounded by a crimson jacket, the *mace* of commerce. When the thin hard shell of the nut is taken off, the wrinkled, oval kernel is exposed; this is the nutmeg of commercial value.

The nutmeg tree has been introduced into



NUTMEG

a, fruit bursting open; b, the same, with one valve removed, showing the seed; c, section of seed; d, seed with the covering removed.

Sumatra, India, Brazil and the West Indies. It reaches a height of twenty or thirty feet, and produces numerous branches. The color of the bark is a reddish-brown; that of the young branches, a bright green. The nutmeg is aromatic, is pleasing to the taste and smell and is much used in cookery. It yields, by distillation with water, a transparent oil, called oil of mace or oil of nutmeg.

NUTRITION, *nu trish'un.* The human body may be compared to a machine that is continuously at work and that must daily be supplied with fuel to keep it going. Unlike the lifeless machine, however, the body has forces within it that keep it in repair and make possible a rebuilding of parts worn out. The process by which the human machine assimilates food, makes use of oxygen, builds up tissues and utilizes energy in doing work is summed up in the term *nutrition.* Many different materials are needed for carrying on this process, and the person who wishes to be well nourished must know what are the essential substances.

Related Articles. In the article Domestic Science the reader will find a complete discussion of this subject under the subhead "What the Body Needs." For other information, consult the following titles:

Food	Digestion
Diet	Vitamines

NUX VOM'ICA, the fruit of a species of *strychnos,* which is found in various parts

of the East Indies. It is about the size and shape of a small orange and has a very bitter, acrid taste. It is a virulent poison,

NUX VOMICA

and from it is prepared an extremely poisonous drug. See STRYCHNINE.

NYASSA, *ni as'sa*, a large lake in Southeastern Africa, southeast of Lake Tanganyika. It is about 340 miles long and forty miles wide, and has an area of 14,200 square miles. The surface is over 1,500 feet above the sea level; the water is pure and abounds in fish. The lake is drained southward by the Shire River, a tributary of the Zambezi. Lake Nyassa was discovered in 1859 by Livingstone. There are missionary stations and trading stations on the shores, and a road has been constructed between Nyassa and Tanganyika.

NYE, EDGAR WILSON (1850–1896), an American humorist, better known as *Bill Nye*. He became famous as a humorous lecturer, writer, and story-teller. *Bill Nye and the Boomerang, Forty Liars and Other Lies* and *Chestnuts* are the titles of some of his volumes, full of puns and witticisms. He wrote also *A Comic History of the United States* and *A Guest at the Ludlow*, a collection of humorous sketches and stories. Mr. Nye was born in Shirley, Maine, spent his childhood in Wisconsin, was admitted to the bar in Wyoming, settled finally in New York and died near Asheville, N. C.

NYMPHS, *nimfs*, in mythology, a class of numerous inferior divinities, imagined as beautiful maidens, not immortal but always young, who were considered as tutelary spirits, not only of certain localities, but also of certain races and families. They occur usually in connection with some other divinity of higher rank. They were believed to be possessed of the gift of prophecy and of poetical inspiration. Those who presided over rivers, brooks and springs were called *Naiads;* brooding over the mountains were the *Oreads.* The *Dryads* and *Hamadryads* lived in woods and trees, the *Nereids* in the sea.

O, the fifteenth letter and fourth vowel in the English alphabet. In form, the letter is derived through the Greek and Latin from the Phoenician, its pictograph having been, probably, an eye. In English, *o* represents two main sounds—the "long *o*" sound, in *note, go;* and the "short *o*" sound, in *not, got.* Besides these, it has several other sounds—the *oo* sound in *move;* the shortened sound corresponding to this, as in *wolf,* and the short *u* sound, in *love.* It is also a common element in diagraphs, as *oo, oa, ou.*

OAHU. See HAWAII.

OAK, OKE, a group of hardwood trees widely distributed throughout the north temperate zone. The oaks differ from other trees in their fruit, or *acorn,* a rounded nut enclosed at the inner end by a woody cup. No other trees bear acorns. An oak is a noble tree, well deserving the title, "monarch of the woods." All but a very few species have large trunks with widely-branching tops, and they not only add much to the beauty of the landscape, but they are of great importance commercially. Oak lumber is used in finishing interiors, in the manufacture of furniture, in shipbuilding, in making frames for machinery and carriages and in basketry, especially in the manufacture of baskets for packing fruit and vegetables. The bark, which varies from dark gray to almost black, is valuable for tanning.

Oak leaves are much used in decorative designs. As may be seen in the illustration, some oaks bear leaves with deeply-notched margins, but those of the live oak, willow oak and a few other species are smooth-edged. The live oak of America and the ilex of Europe are evergreens. The small, inconspicuous flowers of these trees appear in catkins.

OAK LEAVES

a. Bur oak b. Live oak. c. Willow oak. d. White oak.

Kinds of Oaks. The most common species in North America are the white oak, the red oak, the bur oak and the live oak. The *white*

oak is found from Lake Winnipeg, in Canada, to the Gulf of Mexico. It is a large tree, with a stout trunk, and when growing in open spaces it has large, spreading branches. The wood is tough and hard and of a reddish-brown color and is extensively used for numerous purposes where strong wood is required. The *red oak* rivals the white oak in size. When the leaves appear in the spring they are pink, and in the autumn they change to a deep purple. It is from this characteristic that the tree takes its name. It is found in about the same localities as the white oak, and its timber is of equal value.

The *bur oak* is a small species, characterized by its rough bark, irregular branches and dark-colored, coarse-grained wood. The tree is of but little value except for fuel. The *live oak* is found in the Southern states and along the Atlantic coast as far north as Virginia. It often grows to a large size and has oval, dark green leaves, which remain on the tree through the year. It is a valuable timber tree. Among the foreign species the *British oak* in England and in the forests of other European countries closely resembles the white oak. *Cork oak,* common to Spain and Portugal, is valuable for its bark, which is the source of cork (see CORK).

OAK'LAND, CALIF., thirtieth city in size in the United States, in 1918, is the county seat of Alameda County, on the east side of San Francisco Bay, six miles from San Francisco, and on the Southern Pacific, the Atchison, Topeka & Santa Fe and various electric railroads. There are 225 miles of street railways. The city is built upon a nearly level tract of land and is regularly laid out with broad, well-paved streets, which are shaded by live oaks, palms and other trees. Oakland is the favorite place of residence for many San Francisco business men, is noted for its beautiful residences and pleasant streets, and is connected with San Francisco by steam ferries. Three colleges and a number of other educational institutions are located here. The industries include iron works, shipyards, foundries and machine shops, smelting works, cotton, flour and planing mills, tanneries, canning works, windmill factories and marbleworks.

The destruction of the business portion of San Francisco by the earthquake and fire in 1906, caused considerable of the business formerly located in that city to be transferred to Oakland and increased the latter city's importance as a commercial and industrial center. Population, 1910, 150,174; in 1918, 214,206 (Federal estimate).

OAKUM, *oke'um,* the mass of hempen fibers produced by untwisting the strands of old tarred or untarred rope and by pulling apart the loose fibers into a mass. It is used for calking the seams of ships, stopping leaks, and as a filler between looseworn slabs of city pavements. Untarred oakum is usually called *white oakum.*

OASIS, *o a'sis,* a fertile spot in a desert region. It may be merely a spring of water with a few palm trees growing about it, or, as is frequently the case, a tract large enough to support a million people. Usually the soil of deserts needs only water to make it fertile, and where this occurs there springs up an oasis. In some of the larger deserts the hills are of sufficient elevation to intercept rain-bearing clouds, in which case the slopes become clothed with verdure, and the moisture, percolating through them, finds its way out in some valley, perhaps at a remote distance, where it takes the form of a lake, spring or small stream. A celebrated oasis of ancient times was that called Siwah, in the Libyan desert, 350 miles west of Cairo, where stood a famous temple to Jupiter Ammon. Artificial oases are numerous in the North American deserts, where artesian wells and irrigation have reclaimed hundreds of acres.

OATH, a legal term for a sworn statement made before an authorized officer. Persons taking an oath solemnly swear that certain things are true, or they pledge themselves to make truthful statements. Witnesses in court, for example, swear that they will tell the truth, the whole truth and nothing but the truth. Breaking of this pledge, called the *judicial oath,* is a form of perjury. Oaths are also required of persons submitting affidavits. Members of religious sects which take literally the Bible admonition, "Swear not," are permitted, in legal matters, to make a solemn *affirmation* in lieu of taking an oath. Such a declaration is, however, legally binding.

What is called the *extrajudicial oath* is a solemn pledge made privately, the violation of which is attended by no legal proceedings. One's conscience is the judge in such a case. Examples are pledges to abstain from liquor, tobacco and profanity. Officials sworn into public office take oaths, pledging themselves to perform their duties faithfully, and there

is also the military oath required of men enlisting for service in the army. See PERJURY; AFFIDAVIT.

OATS, one of the most important fodder crops cultivated, especially valuable as a grain for horses. Oats is also used extensively in making cereal foods for the table, notably oatmeal and rolled oats. Such preparations are excellent breakfast foods for cold weather, because the grain of which

LEADING STATES IN PRODUCTION
The figures represent millions of bushels per year for an average period of five years.

they are made is a good heat producer. Oatmeal and similar preparations are especially recommended for children.

The grain belongs, with wheat, rye, barley and other cereals, to the grass family. The cultivated species are divided into numerous varieties, distinguished from one another by color, size, form of seeds, quality of straw, period of ripening, adaptation to particular soils and climate and other characteristics. Seeds are sown in drills or broadcast, from two to three bushels per acre being used. Spring is the best time for sowing in northern latitudes, but in southern regions good winter crops are obtained from fall sowings. The grain thrives especially well in a cool, moist climate, and while it is widely distributed and hardy, it cannot be successfully cultivated in hot, arid regions.

IN CANADIAN PROVINCES
Millions of bushels per year.

The yield from oats varies from twenty bushels to eighty bushels per acre, according to soil and climatic conditions. In the United States the average is about twenty-seven bushels to the acre; in Great Britain, about forty. The annual crop of the former country, about 1,261,000,000 bushels, is the largest in the world. The weight per bushel varies from thirty to forty-five pounds, and the meal product is about half the weight of the oats. Iowa, Illinois, Minnesota, Wisconsin and Nebraska, in the order named, produce the largest quantities, but oats are raised in nearly all states. The wild oat, a native of North Africa, is supposed to be the original of all the species. This is rare in America.

OBELISK, *ob'e lisk*, a four-sided shaft, tapering toward the top and usually terminating in a pyramid. The distinguishing characteristic of the obelisk is its extreme slenderness as compared with its height. Because of this, some of the tallest and most tapering are called *needles*. The first obelisks were made by the ancient Egyptians, who erected hundreds of them in honor of their sun god. The Egyptian obelisks were all cut from a solid block of granite, polished and inscribed with hieroglyphics. These hieroglyphics, which in many cases recorded the exploits of the king, were made before the shaft was erected.

Obelisks were frequently erected in pairs at the entrances to temples. Two famous examples are Cleopatra's Needles, erected at Heliopolis by Thothmes III, about 1500 B. C. One of these obelisks now belongs to the British government and stands on the Thames Embankment; the other, owned by the United States, stands in Central Park, New York City. Both were gifts from the khedive of Egypt. The latter is almost sixty-nine feet high, is seven feet, seven inches square at the base, and weighs 200 tons. In the Place de la Concord, Paris, stands one of the pair of obelisks erected before the temple at Luxor; and in front of the Church of Saint John Lateran, Rome, is a shaft 104 feet high, which originally stood at Heliopolis. The finest obelisks still remain in Egypt.

OBERAMMERGAU, *obur ahm'mur gow*, a village in Upper Bavaria, celebrated for the performance, every ten years, of the passion play of Christ's crucifixion and ascension. See PASSION PLAY.

O'BERLIN COLLEGE, a coeducational institution, founded at Oberlin, Ohio, in 1833. It was named for Jean Frederic Oberlin (1740-1826), a Lutheran pastor who spent a

lifetime in educational work in Alsace-Lorraine. The college was one of the first American schools to open its doors to women; in 1841 it awarded the first degrees of Bachelor of Arts believed to have been granted to a woman in America. Almost from the beginning colored students were admitted. Regular college sessions were first held in 1834; in 1835 the school of theology was added, and in 1867 the Conservatory of Music. The student enrollment is about 1,750, and there are about 175 members on the faculty. The college has a library of over 175,000 volumes.

OBESITY, *o bes'i ti,* a term used to signify excessive weight, caused by too great an accumulation of fat in the human body. Obesity may or may not be a disease; it is not so considered unless it interferes with circulation, digestion or other vital functions, and so impairs the health. Obese persons in good health usually object to this condition because it interferes with their comfort or makes them conspicuous. It is the natural thing for healthy persons to grow heavier as middle life approaches, and they should therefore modify their habits if the tendency is too pronounced. Overeating, lack of exercise and heavy drinking are common causes of obesity, but overeating is probably the cause affecting the greatest number of people. Patent preparations warranted to reduce fat are useless. The thing to do is to modify the diet. Fat people must be wary of fats, sugars and starches, for these are the foods that cause the system to accumulate fat.

Related Articles. Consult the following titles for additional information:

Calorie	Domestic Science
Carbohydrate	Food
Diet	Starch
Digestion	Sugar

OBI, *o'be,* or **OB,** the westernmost of the large rivers of Siberia. It rises in the Altai Mountains, flows northwest, then north through the governments or provinces of Tomsk and Tobolsk, and after a course of about 2,500 miles pours into the Arctic Ocean through an estuary, the Gulf of Obi. Its chief tributaries are the Irtysh, the Tchulim and the Tom, and the most important towns on its banks are Barnaul, Kolyvan, Narym, Surgut and Obdorsk.

OBOE, *o'bo,* one of the most important of orchestral instruments. It is made of wood, usually boxwood, ebony or rosewood, and is in three parts, or joints, forming a tapering tube about twenty-one inches long, in this is enclosed a smaller brass tube, which widens into a bell-shaped opening at one end and terminates in a double-reed mouthpiece at the other. In the upper and middle sections there are holes, which the player opens and stops with his fingers to produce the notes. The oboe notes are among the most beautiful heard in an orchestra, and they have a wide range.

OBSERVATORY, *ob zurv'a toh ri,* a building devoted to the observation of natural phenomena, such as the movements of the planets, the nature of magnetic forces and weather conditions. The astronomical observatory is the one of most general interest. The first European observatory was built at Nuremberg by Bernhard Walther in 1472, and this was followed in the sixteenth century by Tycho Brahe's famous observatory on the island of Hveen, near Copenhagen, while another was erected by the Landgrave of Hesse at Cassel, in 1561. Through the labors of Brahe practical astronomy became associated with the universities, and many of them founded observatories. Among the most noted American observatories are the Lick Observatory, in California; the Yerkes Observatory, located at Lake Geneva, Wis.; the United States Naval Observatory, at Washington; and that at Harvard University, Cambridge.

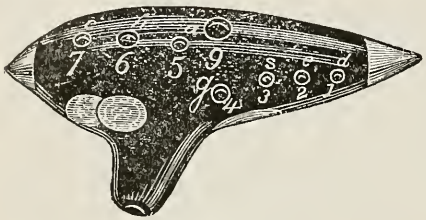
The chief function of the observatories in connection with universities is usually that of teaching, but many valuable observations have been made, and in some institutions a large part of the funds are turned in this direction. The national observatories, of which Greenwich Royal Observatory, England, the Canadian Dominion Observatory, at Ottawa, and the Naval Observatory, Washington, D. C., are good examples, are devoted entirely to the study of astronomical subjects and their application to governmental affairs.

The observatory building must be constructed in a very stable manner, and all the instruments must be kept free from motion, in order to permit the delicate observations that are necessary. Accordingly, foundations separate from the rest of the building are erected, and the instruments are placed on these so that they are entirely out of contact with the walls. The chief instruments used in the observatory are the telescope, which may be in either of two forms; the transit instrument, and the sidereal and the solar clocks.

Related Articles. Consult the following titles for additional information:
Astronomy
Lick Observatory
Naval Observatory
Telescope
Weather Bureau
Yerkes Observatory

OBSID'IAN, a volcanic glass, given its hard, glassy appearance by sudden cooling. It consists of silicate of alumina, with iron and lime or potash or soda, according to the species of feldspar present, and is usually very dark gray or black. The ancient Mexicans and Peruvians made arrowheads, spearheads, knives, mirrors and ornaments of it. The largest known mass of obsidian is Obsidian Cliff, in Yellowstone National Park.

OCARINA, *ok a re'nah,* a musical wind instrument, made of clay and shaped like a



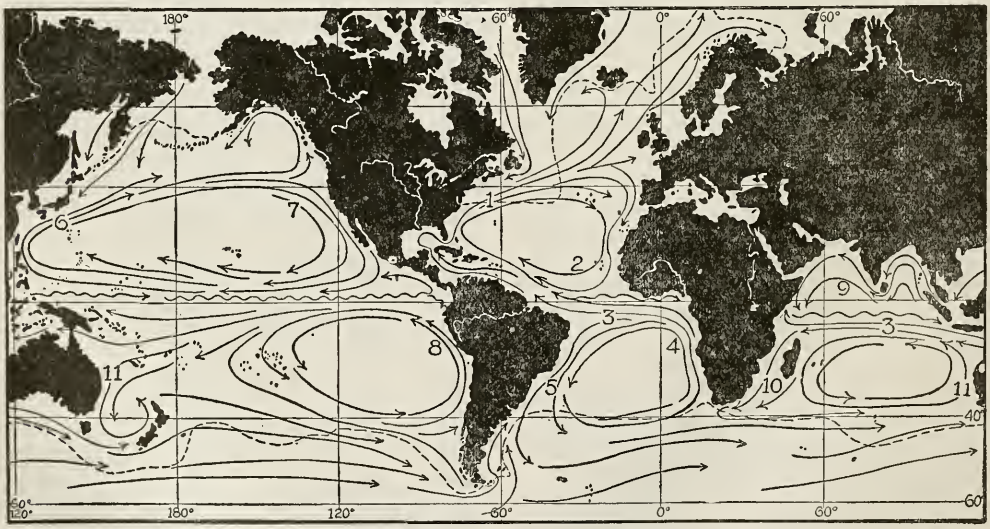
OCARINA

top with a spoutlike projection at one side which contains the mouthpiece. It is classed with musical toys and freaks.

OCEAN CABLE. See CABLE, SUBMARINE.

OCEAN CURRENTS, streams of water, or drifts, flowing regularly through the sea. According to their position currents are classified as *deep sea currents, surface currents* and *drift currents,* and according to their temperature as *warm* and *cold.* Marine currents are very numerous, and taken together they constitute an oceanic circulation which secures a complete interchange of waters in each of the great branches of the ocean. The formation and character of these currents are the result of many different forces—such as variations of water temperature, winds, tides, rotation of the earth and irregularities of shores. Water contracts as it cools until it reaches the temperature of 39° F. Because of this, water in the polar regions is heavier than that in the equatorial regions. This heavy cold water tends to settle to the bottom of the ocean and the continuous settling forces the water below to move forward. Thus there is developed a deep sea current in each of the oceans, moving slowly from the polar to the equatorial regions. As these currents move to the warmer regions they become warmer and gradually rise, coming to the surface within the tropics. Surface currents counter to these flow from the tropics towards the poles. These are currents of warm water. The best illustration of them is the Gulf Stream in the North Atlantic and the Kuro Siwo, or Japan Current, of the North Pacific.

Were it not for the rotation of the earth these currents would take a due north and



THE PRINCIPAL CURRENTS

1—Gulf Stream.
2—Canary Current.
3—Equatorial Current.
4—Benguela Current.
5—Brazilian Current.
6—Japan Stream.
7—California Current.
8—Peruvian Current.
9—Monsoon Current.
10—Mozambique Current.
11—Australian Current.

south course, except where their direction was changed by coming in contact with islands or other obstructions in the bed of the ocean; but because of the rotation the currents moving from the equatorial towards the polar regions are deflected eastward and those moving in the contrary direction are deflected westward. For this reason warm currents usually strike the western coasts of the continents and cold currents the eastern. The effect of these currents upon climate is seen in comparing the climatic conditions of places in the same latitude on the Atlantic coasts of the United States and Europe. The climate of the British Isles is mild because of the influence of the Gulf Stream; Labrador, in the same latitude, has a severe climate because it is affected by a cold current from the north.

In the equatorial regions surface currents flow westward. When these currents strike the eastern coasts of the continents, they divide, a portion going northward and a portion southward, so that in the Atlantic and the Pacific oceans there are practically two systems of currents, those in the North and South Atlantic and those in the North and South Pacific. Because of the shape of the latter ocean, the currents in the South Pacific are less marked than those in each of the other localities. In the center of each of these areas is a large tract of water in which there are either no currents or currents of very low velocity. In the North Atlantic this region is characterized by the gathering of large quantities of seaweed, and it is often known as the Sargasso Sea. *Drift* currents are those broad, general movements of water in the open ocean, in which the water over a large area turns slowly in one direction. They are well illustrated by the drift of the Antarctic Ocean northward and the drift in the southern part of the Indian Ocean.

Related Articles. Consult the following titles for additional information:
Gulf Stream — Labrador Current
Kuro Siwo — Sargasso Sea

OCEAN, *o'shan,* or **SEA,** the vast body of water which covers nearly three-fourths of the surface of the globe. Although no portion of it is completely detached from the rest, the ocean has been theoretically divided into several great basins or areas, namely, the Pacific Ocean, which separates Asia and Australia from America; the Atlantic Ocean, which separates America from Europe and Africa; the Indian Ocean, which intervenes between Africa and Australia; the Arctic and the Antarctic oceans, round the North and South poles, respectively. Between these divisions no very definite limits can be drawn; thus it is impossible to say where the Atlantic or the Pacific ends and the Antarctic or Southern Ocean begins.

There are plains, valleys, mountains and volcanoes on the ocean floor, but the vast bed of the sea is on the whole much more regular than the earth's land surface, for the latter is constantly exposed to the forces of erosion. The average depth of the ocean is 11,500 feet, and the greatest depth—near the island of Mindanao, in the Philippines—is 32,088 feet. This is about 3,000 feet greater than the height of the loftiest mountain in the world, Mount Everest, in the Himalayas. The Pacific is the deepest of the great water divisions.

The waters of the ocean vary as greatly in temperature as they do in depth. The Pacific and Indian oceans are both warmer in low latitudes than the Atlantic, and the mean temperature of the equatorial areas at the surface is about 81.5°; the temperature of the North Atlantic is due to the influence of the Gulf Stream. This high temperature applies only to the surface water of the ocean, for experience shows that in both hemispheres and in all latitudes the water near the bottom of the ocean is exceedingly cold. In low latitudes, water at 32° has been drawn from great depths; while in high latitudes water at 26° has been found. This is accounted for by the supposition that the cold water at the poles, by reason of its specific gravity, sinks to the bottom and spreads throughout the ocean basin.

The saltness of the ocean is due to the presence of various ingredients, chiefly common salt, which are generally found in the proportion of from thirty to forty parts to one thousand. Recent observations have shown that the color and transparency of the water of the ocean are in a large measure dependent on the degree of saltness. In general, it is found that the greater the saltness the greater the transparency, and also that where the saltness is very great the water is of a dark blue color, that where it is less the water is of a lighter blue, inclining to green, and that in the neighborhood of rivers, where the saltness is reduced to a minimum, it is of a greenish-yellow color.

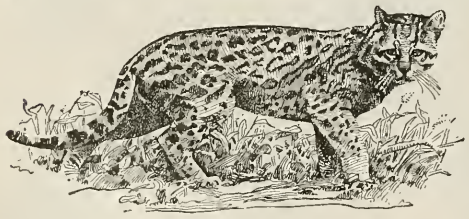
Related Articles. Consult the following titles for additional information:

Antarctic Ocean
Arctic Ocean and Lands
Atlantic Ocean
Geography (Wonder Questions)
Geology (Wonder Questions)
Gulf Stream
Indian Ocean
Kuro Siwo
Labrador Current
Ocean Currents
Pacific Ocean
Polar Exploration
Sargasso Sea

OCEAN GROVE, N. J., a summer resort in Monmouth County, on the Atlantic Ocean, south of New York City about thirty miles by water and fifty miles by rail and on the Pennsylvania and the Central of New Jersey railroads. It is a very popular resort, controlled by the Ocean Grove Camp Meeting Association of the Methodist Episcopal Church, and was founded in 1869. Theatrical performances and the sale of tobacco and intoxicating liquors are prohibited, and strict Sunday laws are enforced. There is an auditorium, seating 10,000 people. The town has many hotels, boarding houses and summer cottages. Asbury Park is to the north, separated from Ocean Grove by Wesley Lake. Population, 1910, 1,600; in summer, 25,000 or more.

OCEANIA, *o she an'i a*, or **OCEANICA**, a term used by geographers to designate that part of the globe containing the innumerable islands of the Southern Pacific. Although it has no definite bounds it may be regarded as including *Australasia* (Australia, Tasmania, New Zealand and adjacent islands), *Melanesia* (Solomon, Bismarck and other archipelagoes east of the above group), *Polynesia* (a group east of the 180th meridian) and *Micronesia* (between Polynesia and the Philippines).

OCELOT, *o'se lot*, an animal of the cat family, found in America, from Texas to



OCELOT

Patagonia. It is about three feet in length and is of a tawny or gray color on the back and sides, and white on the under part of the body. Its coat is beautifully marked with black spots and bars. The ocelot inhabits forests and lives mainly on birds and mice and other small animals. It is killed for its beautiful skin.

OCHRE, *o'kur*, a native clay containing oxide of iron and varying in color from yellow to brown. It is widely used in the manufacture of a brilliant yellow paint of the same name. France leads the world in ochre production, and before the World War Germany was second. The United States was third, deriving its chief supply from Georgia.

O'CON'NELL, DANIEL (1775-1847), an Irish patriot and agitator, born in County Kerry. He was educated at the Catholic colleges of Saint Omer and Douai, in France, was admitted to the Irish bar and soon became distinguished for legal skill and oratory. Turning his energy to politics, he advocated Catholic emancipation and skilfully kept the agitation within constitutional lines. He was elected to Parliament for County Clare in 1828, but was not allowed to take his seat because he was a Catholic and as such could not take the oath required by the Test Act. In the following year, however, he attained his triumph, when the government of the Duke of Wellington granted the Catholic claims. He was returned to Parliament, and remained a member for the rest of his life. In 1841 he called enormous meetings throughout Ireland and raised a cry for the repeal of the union. This agitation Peel and the government determined to put down. They arrested O'Connell, obtained a conviction and sentenced him to twelve months' imprisonment, with a large fine. In a few months the House of Lords reversed this judgment. O'Connell made his last speech in Parliament in April, 1847, and died the following month.

O'CONNELL, WILLIAM H. (1859-), an American Roman Catholic cardinal, born in Lowell, Mass., educated in Boston College and in Rome, where he was ordained in 1884. For ten years his field of work was Boston and vicinity. In 1896 he became rector of the American College at Rome, and in 1901 was consecrated bishop of Portland. Four years later he was commissioned by the pope as ambassador to the mikado of Japan on a missionary project. So successful was he that upon his return in 1906 he was made coadjutor archbishop of Boston and the

CARDINAL O'CONNELL

following year became archbishop of New England. On November 27, 1911, Archbishop O'Connell was made a cardinal.

O'CONNOR, THOMAS POWER (1848–), an Irish journalist and leader in the movement to secure home rule for Ireland, known popularly as "Tay Pay." He was born at Athlone, in the County of Roscommon, Ireland, and was educated in Athlone and at Queen's College, Galway. O'Connor entered journalism early in his career, and was employed on Dublin and London papers. In 1880 he entered Parliament as member for Galway, and became conspicuous as a member of the radical Irish party. In 1883 he was elected president of the Irish National League of Great Britain, and in 1885 was elected to Parliament from Liverpool. He founded and edited several newspapers, including the *Sunday Sun, M. A. P.* and *T. P's Weekly.*

O'Connor spent several months in the United States while America was a belligerent in the World War, being active in the support of the allied cause. Though opposed at first to the Sinn Feiners, he later endorsed the movement for complete Irish independence. In 1919 he was in Ireland participating in that movement. See SINN FEIN.

OCTA'VIA, sister to the Emperor Augustus, was the widow of Claudius Marcellus, when she was married, at the instance of her brother, to the triumvir, Mark Antony. Antony neglected her for Cleopatra, queen of Egypt, but notwithstanding this, Octavia displayed the most noble fidelity to his house and fortunes and devoted herself to the education of his children. At length he divorced her and ordered her to leave his house, a command she obeyed without complaint. She died in 11 B. C.

OCTAVIUS, or **OCTAVIANUS.** See AUGUSTUS.

OCTOBER, *ok toh'ber,* the tenth month of the modern calendar, the name of which comes from the Latin word for *eight,* which is *octo.* According to the ancient Roman reckoning October was the eighth month, but when Julius Caesar reformed the calendar, adding two months, it became the tenth. The name, thus made inappropriate, was retained after several unsuccessful attempts to agree upon a new one. Now, as then, October is one of the long months, having thirty-one days.

In many sections of the United States and Canada it is a season of bright blue skies and golden sunshine, and an ideal time for long jaunts through the woods. The trees are getting ready for the long winter sleep, and their leaves, having given back to the parent stem their stores of plant food, are celebrating their last days of life by donning the most gorgeous shades of russet, red and yellow. The October enthusiast can also tell of flowers that are still in blossom—the golden rod, the fringed gentian, "bright with autumn dew," the wild aster and others. The hop blossom is the special flower of October, and the opal or tourmaline its gem.

Special Days for Observance. This month has a special place in American history, for it was on the twelfth of October that Columbus first sighted an island of the West Indies, the outposts of the great North American continent. *Columbus Day* is a holiday in many cities, and is observed in schools with patriotic exercises. *Hallowe'en,* the last day of October, is not a legal holiday, but to the young people it is a day of special privileges in the way of merry making. In the article HALLOWE'EN the reader will find suggestions for a program suitable for school children.

Anniversaries for Celebration. The following birthdays of notable people fall in October:

James Lawrence, October 1, 1781.
George Bancroft, October 3, 1800.
Rutherford B. Hayes, October 4, 1822.
Jonathan Edwards, October 5, 1703.
Sir Isaac Brock, October 6, 1769.
Jenny Lind, October 6, 1820.
John White Alexander, October 7, 1856.
Edmund Clarence Stedman, October 8, 1833.
John Hay, October 8, 1838.
Cervantes, October 9, 1547.
Winfield Scott Schley, October 9, 1839.
Benjamin West, October 10, 1738.
Jonathan Trumbull, October 12, 1710.
George W. Cable, October, 12, 1844.
Edward Blake, October 13, 1833.
William Penn, October 14, 1644.
Vergil, October 15, 70 B. C.
Noah Webster, October 16, 1768.
Helen Hunt Jackson, October 18, 1831.
James Henry Leigh Hunt, October 19, 1784.
Christopher Wren, October 20, 1632.
Samuel Taylor Coleridge, October 21, 1772.
Samuel F. Smith, October 21, 1808.
Will Carleton, October 21, 1845.
Franz Liszt, October 22, 1811.
Adlai E. Stevenson, October 23, 1835.
Moltke, Count von, October 26, 1800.
Theodore Roosevelt, October 27, 1858.
Desiderius Erasmus, October 28, 1466.
Gertrude Atherton, October 30, 1858.
John Keats, October 31, 1795.

The following important events occurred in October:

Dynamiting of new government buildings at Quebec, October 1, 1885.
John André executed as a spy, October 2, 1780.
King Ferdinand of Bulgaria abdicated, October 3, 1918.
Chinese Senate opened, October 3, 1910.
Costa Rica discovered by Columbus, October 5, 1502.
Battle of the Thames River, Canada, October 5, 1813.
Marquis of Lorne appointed Governor-General of Canada, October 5, 1878.
Battle of Lepanto, October 7, 1571.
Beginning of Chicago fire, October 8, 1871.
Alaska transferred to United States by Russia, October 9, 1867.
Battle of Tours, October 10, 732.
Discovery of the first land in the New World by Columbus, October 12, 1492.
Death in battle of Sir Isaac Brock, October 13, 1812.
Treaty of Peace signed by Russian czar and emperor of Japan, October 14, 1905.
Sale of vodka prohibited by czar of Russia, October 15, 1914.
Execution of Marie Antoinette, October 16, 1793.
John Brown's Raid, October 16, 1859.
Surrender of Burgoyne at Saratoga, October 17, 1777.
King Albert entered Ostend, Belgium, October 17, 1918.
Marriage of Ferdinand and Isabella, October 18, 1469.
Surrender of Cornwallis at Yorktown, October 19, 1781.
Abdication of King Otto of Greece, October 20, 1862.
Meeting of first joint Parliament of England and Scotland, October 21, 1707.
Battle of Trafalgar, October 21, 1805.
Brazil declared its independence, October 22, 1822.
Battle of Agincourt, October 25, 1415.
Battle of Balaklava—Charge of the Light Brigade, October 25, 1854.
Sweden recognized independence of Norway, October 26, 1905.
Columbus discovered Cuba, October 28, 1492.
Dedication of Statue of Liberty, October 28, 1886.
Luther's theses nailed to the Wittenberg Church, October 31, 1517.
Nevada admitted to the Union, October 31, 1864.
Surrender of Turkey in the World War, October 31, 1918.

OC'TOPUS, a genus of deep-sea animals of frightful appearance. The common octopus has a soft, pear-shaped body about a foot in diameter and, extending out from this, eight arms about three feet long, each equipped on the under side with a double row of powerful suckers. The free ends of the arms are tapering; at the base they are connected by a web. The animal does not swim, but moves about the bottom of the sea by means of its arms. It weighs about sixty pounds. These animals are numerous among the coral reefs of the Mediterranean and in the West Indies. Their habits are nocturnal,

THE OCTOPUS

and they feed upon crabs, lobsters and the like. The Chinese use the octopus for food, catching it at low tide by piercing its body with a short stick.

ODD FELLOWS, Independent Order of, a benevolent and fraternal secret society originating in Manchester, England. In 1819 a lodge was organized in Washington, D. C., and in 1843 the American order became independent of that of England. Since 1852 the Canadian branch has been merged with the American grand lodge, which is empowered to create lodges affiliated with it in various parts of the world. The chief purpose of the Order of Odd Fellows is to provide relief and insurance funds for its members; since 1830 about $180,000,000 has been expended for relief, exclusive of life insurance payments. The affiliated women's organization is the Rebekah Lodge, which was founded in 1851 and has a membership of over 1,670,000. The Odd Fellows reported a membership of 2,230, 231 in 1918.

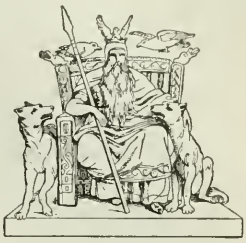
ODE, a lyric poem of dignified tone, usually written under the stimulus of intense feeling and dealing progressively with a single lofty theme. The Greeks called every lyrical poem adapted to singing, an ode. The principal ancient writers who employed this form of verse were Pindar, Anacreon, Sappho, Alcaeus, among the Greeks, and

Horace, among the Romans. As employed by English writers the ode takes either the Pindaric form of strophe, antistrophe and epode, irregularly arranged and contrasted; or, as in its later development, the form of a regular series of regular stanzas. The former style is found in Dryden's *Ode for Saint Cecilia's Day,* while the latter is seen in Shelley's *Ode to a Skylark.* The English poets who carried the ode to its highest point of perfection are Milton, Dryden, Collins, Grey, Coleridge, Wordsworth, Keats and Shelley; among the greatest odes in English, besides the two mentioned above, are Wordsworth's *To Duty* and *Intimations of Immortality;* Shelley's *To the West Wind* and *To Liberty;* Keats's *To a Nightingale* and *On a Grecian Urn;* Tennyson's *On the Death of the Duke of Wellington;* Burn's *To a Mouse* and *To a Mountain Daisy;* Bryant's *To a Waterfowl* and Lowell's *Commemoration Ode.*

O'DER, a large river of Germany, which rises in the extreme southeastern part of the country near the border of Galicia, flows north, then northwest and into the Stettiner Haff, a lagoon of the Baltic Sea, terminating in an estuary of three arms. It is 562 miles long, and is navigable the greater part of its course. The principal cities on its banks are Stettin, Frankfort, Breslau and Oppeln. Its principal tributary is the Warthe. The Oder is connected with the Elbe by the Kiel Canal, and is an important link in the great inland waterway of which it forms a part.

ODES'SA, a seaport on the Black Sea, the largest city of the Ukraine, which declared itself an independent republic after the Russian revolution of 1917 (see UKRAINE). At the outbreak of the World War Odessa was the fourth city in population in Russia, the greatest shipping point of the most fertile region of the country and the seat of the Imperial New Russian University, which enrolled about 2,000 students annually. It was also a great manufacturing center, and a beautiful modern city of fine streets and imposing buildings. Odessa had a troubled career after 1914. It was bombarded during the war by a Turkish fleet, and after the revolution, when the Ukraine made a separate treaty with the central powers, it was the scene of much fighting. It was alternately in the hands of the Austro-Germans and the Russian Bolsheviki, and at the close of the war was occupied by allied troops. Population, 1912, 631,040.

O'DIN, or **WO'DEN**, the chief god of the early peoples of Northern Europe, ruler of heaven and earth, from whom all their other gods were descended. His wife was Frigga, and his sons were Thor and Balder. In Asgaard, the home of the gods, he occupied the highest throne, from which he could see the whole universe. Two ravens sat upon his shoulders, and these he was wont to send throughout the earth to bring him tidings of everything that took place. He was wise and cunning, skilled in magic and poetry. As a war god he held his court in Valhalla, where brave warriors were carried after death on the battlefield, to enjoy an eternal life of feasting and fighting. His exploits and adventures form the theme of much early literature.



ODIN
From an old manuscript.

ODYSSEUS, *o dis'use.* See ULYSSES.

ODYSSEY, *od'i si,* an ancient Greek epic ascribed to Homer, in which are described the wanderings of Odysseus (Ulysses), king of Ithaca, on his return from the Trojan War. At the beginning of his voyage he was wrecked on the coast of Thrace, and in plundering the town of Ismarus lost many of his followers. Escaping thence, he was driven by unfavorable winds to the land of the Lotus Eaters, and from there to Sicily, island of the Cyclops. With twelve companions, he entered the cave of the one-eyed monster, Polyphemus, who devoured six of the intruders. Ulysses made Polyphemus drunk with wine, blinded him with a burning pole and escaped with his comrades. Henceforth he was pursued by the wrath of Neptune, whose son the Cyclops was. After losing all his ships but one, he reached an island where dwelt the sorceress Circe, who turned many of his men into swine. When he left Circe's island he sailed by the island of the Sirens, and after successfully passing Scylla and Charybdis, he reached Thrinacia, the island of Helios. Here his companions killed some sacred oxen, and, consequently, on their next voyage they were all shipwrecked and drowned except Ulysses, who escaped to the island of Calypso.

After remaining eight years he embarked on a raft, his ships having been lost, but was

washed ashore in Phaeacia, where he was discovered by Nausicaa, the king's daughter. On a Phaeacian ship he finally arrived in Ithaca to find his faithful wife Penelope persecuted by suitors. These he speedily overcame and then reinstated himself in his kingdom. See MYTHOLOGY, subhead *The Trojan War.*

OEDIPUS, *ed'i pus,* one of the most tragic characters in Greek legend. He was the son of Laius, king of Thebes. An oracle had foretold that he would grow up to kill his father, marry his mother and bring destruction on his native city. Laius, to prevent fulfilment of the prophecy, sent the child away with a servant with orders that he be left in some wild place to die. A shepherd found the infant, took him to King Polybus of Corinth, who adopted him and brought him up as his son.

After a number of years the prophecy was repeated to Oedipus, and he, believing Polybus to be his father, ran away to escape his predicted fate. On his travels he met Laius, became involved in a quarrel with the old man and killed him. Having guessed the riddle of the Sphinx, he received as reward the throne of Thebes and Queen Jocasta for his wife. Four children were born to them. Then a plague ravaged Thebes and the oracle on being consulted disclosed the cause of the disaster. Jocasta hanged herself, and Oedipus in anguish put out his eyes. Then he wandered forth an outcast, faithfully attended by one of his daughters, Antigone. At Colonus he bade her farewell and entered a dark forest, where, pursued by Furies, he ended his life. Two of Sophocles' tragedies, *Oedipus Coloneus* and *Oedipus Tyrannus*, deal with incidents in the life of the unfortunate king.

OESOPHAGUS, *e sof'a gus,* a tube extending from the pharynx to the stomach, through which food is received into the body. It is also called the *gullet.* This tube is about ten inches long, and is composed of three coats, an outer muscular layer, an inner mucous coat, and an intermediate cellular coat joining the other two. The upper part of the oesophagus is shown in the illustration accompanying the article ABDOMEN.

OFFENBACH, *ohf'en bahK,* JACQUES (1819-1880), a French composer, born of Jewish parents at Cologne. He entered the Paris Conservatory in 1835, became proficient on the violoncello and for some time played on this instrument in the orchestra of the Théâtre Comique. In 1847 he became conductor of the Théâtre Français and subsequently earned a wide reputation as a writer of light opera. *Blue Beard, Princess Trebizond* and *Tales of Hoffmann* are his best known operas.

OG'DEN, UTAH, the county seat of Weber County, thirty-five miles north of Salt Lake City and ten miles east of Salt Lake, on the Weber River, at the mouth of the Ogden, and on the Southern Pacific, the Union Pacific, the Oregon Short Line, the Denver & Rio Grande and two interurban railroads. The city is in a fertile agricultural and fruit-growing section, near the picturesque Odgen Canyon. The falls in the river have been utilized in the development of electrical power, which is used in Ogden, Salt Lake City and other places. The principal industrial establishments are canneries, flour mills, a tin can factory, beet sugar factories, clothing factories, meat packing plants, brickyards and sewer pipe works. There were large brewery interests before the advent of prohibition. An irrigating canal has been constructed, which supplies water to about 150,000 acres of land in the surrounding country, adapted to the raising of fine fruits and berries. The city contains the Weber Stake Academy, Sacred Heart Academy, a Carnegie Library, a state industrial school, and state institutions for the deaf, dumb and blind. The important buildings include a fine union depot, five banks, a number of wholesale houses and a Federal building. The place was settled about 1848, laid out under the direction of Brigham Young in 1850 and was chartered as a city in the next year. Population, 1910, 25,580; in 1917, 32,343 (Federal estimate).

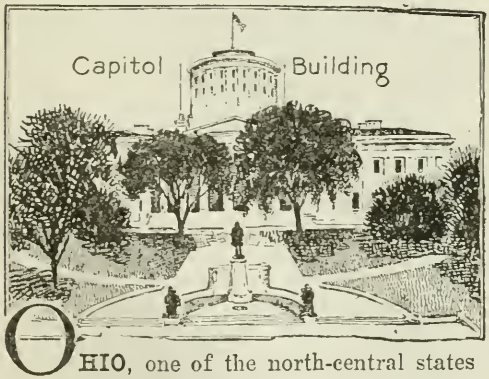
OG'DENSBURG, N. Y., in Saint Lawrence County, 170 miles northwest of Albany, on the Saint Lawrence River, at the mouth of the Oswegatchie River, opposite Prescott, Ont., and on the New York Central and the Rutland railroads. It has a large Canadian trade in grain, lumber, coal and manufactured goods. Water power from the river is utilized, and there are shipbuilding yards, lumber mills and manufactures of silk, flour, gloves and other articles. The city contains five parks, the Ogdensburg Free Academy, a state hospital for the insane, the city and the Saint John's hospitals, an orphanage, a home for the aged and other institutions. The

other prominent structures include a Federal building, a state armory, a city hall, a public library and a Roman Catholic cathedral. The place was settled in 1749 and was chartered as a city in 1868. Population, 1910, 15,933; in 1917, 16,845 (Federal estimate).

O'GLETHORPE, James Edward (about 1696-1785), an English soldier, reformer and colonist, founder of the State of Georgia. He was born at London, entered the army and became a member of Parliament in 1822. As chairman of a committee to investigate the abuses of imprisonment for debt, he conceived the plan of establishing a colony in North America where English debtors and continental Protestants might find a haven. In 1732 he secured a patent to lands in America in the present state of Georgia. He became governor of the new colony, and founded the city of Savannah in 1733. During his career in the colony, he displayed exceptional energy, liberality and executive ability. He returned to England in 1743, became a brigadier-general and took a prominent part in politics until his death.

JAMES E. OGLETHORPE
From an old drawing.

O. HENRY. See Porter, William Sydney.



OHIO, one of the north-central states of the American republic, popularly called the Buckeye State because of the numerous horse-chestnut trees, or buckeyes, that grow there, but are not widely distributed now. Its formal name is borne also by the great river that separates it from Kentucky and West Virginia. *Ohio* is derived from *Ohionshiio,* which was the word used by the Iroquois Indians to express *beautiful river.* Located on the south shore of Lake Erie, which gives it access to the water route to the east, and possessing an abundance of natural gas and coal, a fertile soil and a favorable climate, Ohio has become one of the most prosperous of the American commonwealths.

Location and Size. Ohio is one of the northern tier of states, and it lies about midway between the Mississippi River and the Atlantic Ocean. Lake Erie, lying between it and the Canadian province of Ontario, forms most of the northern boundary, the shore line being 230 miles in extent. The remainder of the northern state line adjoins the southern boundary of Michigan. Indiana touches Ohio on the west, and Pennsylvania bounds it on the east; Kentucky and West Virginia, separated by the Ohio River, lie to the south and southeast.

The greatest length of the state from east to west is 225 miles, and the greatest breadth from north to south is 210 miles. The total area is 41,040 square miles, of which 300 square miles are water. (This does not include that portion of Lake Erie lying south of the international boundary, which passes midway between the northern and southern shores.) Lying in Lake Erie between Maumee and Sandusky bays are a number of islands, several of which belong to the state. Ohio is thirty-fifth in area among the states, and is almost exactly half the size of Kansas, to which it bears a marked resemblance in some respects. Both states are important sources of coal, natural gas and petroleum, and in both corn is the leading agricultural crop.

People and Cities. In 1910 Ohio had a population of 4,767,121, an average density of 117 persons to the square mile. In July, 1917, it had 5,212,085 inhabitants, according to a Federal estimate. It is exceeded in total population by New York, Pennsylvania and Illinois; in density of population it ranks eighth, surpassing Illinois in this respect. In 1910 it was third among the states in per capita wealth, and is fast approaching first place in wealth per capita. Over three-fifths of its inhabitants are native whites of native parentage, and of its foreign-born population nearly one-third are of German descent. The strongest religious denomination is the Roman Catholic; among the Protestants, the Methodists are the most

numerous, followed by Presbyterians, Lutherans, Baptists and Disciples of Christ.

Cities. In 1917, according to Federal estimates, there were twenty-three cities with populations exceeding 20,000, and six which had passed the 100,000 mark. Cleveland (692,259), the metropolis and leading manufacturing center, is the sixth largest city in the Union. The next five cities in order of size are Cincinnati (414,248), Columbus, the capital (220,135), Toledo (202,010), Dayton (128,939) and Youngstown (112,282). Akron was larger than Youngstown in 1919, if immediate suburbs were included.

Surface and Drainage. The eastern part of the state belongs to the Allegheny plateau, and the western part to the prairie region. In general, the surface is rolling and contains no mountains, though a few of the highest hills are designated as mountains by the inhabitants of the locality. A height of land, which is a low, flat ridge, extends in an irregular direction from near the northeastern corner to a point a little north of the middle of the western boundary, and separates the state into two drainage districts, the northern sloping toward Lake Erie and the southern toward the Ohio. To the north of this height of land the surface is more generally level and has a gentle slope. The portion to the south is much larger, and this is deeply cut by streams flowing through it to the Ohio. It is more generally rolling than the northern portion and contains the highest point of land within the state, which is near Bellefontaine, a little west of the center, and has an altitude of 1,540 feet. Some of the bluffs along the Ohio have an altitude of 600 feet, or more. A straight line drawn from East Liverpool to Cincinnati would run north of most of the hilly section of the state.

The chief rivers flowing into Lake Erie are the Maumee, in the northwestern section, the Sandusky, the Cuyahoga and the Grand. The rivers flowing into the Ohio are longer and larger than those flowing into Lake Erie. From the west eastward these are, in their order, the Great Miami, the Little Miami, the White, the Scioto, the Hocking and the Muskingum.

The Muskingum is the longest river lying wholly within the state, and is navigable for 100 miles. Many of the streams are rapid and furnish water power, which is a great aid to the development of manufactures. The rivers flowing into Lake Erie form estuaries at their mouths, which have been converted into excellent harbors in the case of the Maumee and Cuyahoga.

Climate. The climate is generally healthful, though sudden changes in temperature are frequent and extreme. The constantly varying winds, however, greatly lessen the duration of the extremes. In the north the winters are cold, but they are moderated near the lake shore by the milder temperature of the water; the summers and autumns are temperate and pleasant. In the southern portion the winters are comparatively short and mild, and the snowfall is not heavy, the summers are long and hot. The mean annual temperature is about 51°, and the annual rainfall, about thirty-eight inches.

Mineral Resources. In average value of mineral products Ohio is surpassed only by Pennsylvania, West Virginia and Illinois. Its chief sources of mineral wealth are its bituminous coal measures and its deposits of clay, the latter giving rise to the great pottery and tile establishments that contribute so much to the wealth of the state. The southeastern section is the great coal region. Here some of the measures have mean thickness of fifteen feet and an area of 1,200 square miles. The coal is of excellent quality and in favorable periods is mined at the rate of 3,000,000 tons a month. Clay is widely distributed, and the annual output of clay products is valued at over $35,000,000, giving Ohio first rank among the clay-producing states. Petroleum is found in the southeastern part, in large quantities in a small area in and near Cleveland, and most abundantly in the northwestern section. The first field is known as the "Eastern," and the third is called the "Lima." These fields produce nearly 8,000,000 barrels of petroleum a year, but the output was formerly much greater. For about two decades, however, Ohio has ranked seventh among the states in oil production. Natural gas is also found in and near the oil fields and has been extensively used, but the supply has diminished within recent years. For the five-year period ending in 1916 Ohio was fourth in this product, with an average annual yield of 59 billion cubic feet. In the north there are large quarries of stone suitable for the manufacture of whetstones and grindstones, Ohio being the first state in the production of grindstones. Granite, limestone, sandstone and other building material are generally dis-

tributed, and the Berea sandstone is famous. Ohio is also an important source of salt, producing about 4,000,000 barrels a year. In this commodity it is exceeded only by New York and Michigan.

Agriculture. In average years Ohio is the fourth state in value of agricultural products. Over nine-tenths of the land area is devoted to farms, aggregating about 26,000,000 acres, and over four-fifths of this acreage has been improved. With the exception of a small area in the southeastern corner, the soil is fertile and well suited to general agriculture. The region sloping toward Lake Erie contains considerable clay and is well adapted to growing wheat. The bottom lands along the rivers are especially suited to corn, while fruits, vegetables, oats and potatoes are generally grown throughout the state.

In amount of acreage and value of yield corn leads all other crops. About 3,750,000 acres are devoted to this cereal, and the annual output is approximately 150,000,000 bushels. Hay, to which about 3,000,000 acres are devoted, is next in point of acreage, but the annual crop of over 4,000,000 tons is exceeded in value by the wheat harvest. The output of this cereal has passed 41,000,000 bushels, representing the yield from 1,870,000 acres. Oats and potatoes are next in value, and in the latter product Ohio is one of the first ten states. It is also a leading state in the production of general garden produce, and in 1910 had more acres devoted to onions than any other state. Among the Northern states Ohio ranks first in the production of tobacco, which is grown chiefly in the southwest. Its annual crop, which is exceeded in the whole country only by the harvests of Kentucky, North Carolina and Virginia, varies from 60,000,000 to over 99,000,000 pounds. Of the fruits, apples are grown in greatest abundance; the counties bordering on Lake Erie are centers of grape and peach production.

In 1918 there were 3,091,000 sheep in Ohio, which ranks fifth as a wool-producing state. The annual clip, approximating 14,000,000 pounds, is exceeded only by the production of Wyoming, Montana, Idaho and New Mexico. The same year the state had 892,000 horses, 940,000 milch cows and 3,774,000 swine. Ohio is one of the leading states in value of live stock sold and slaughtered on farms, and ranks with the first ten in the production of milk. The best dairy farms are in the northeastern section.

Forests. About one-fifth the surface of the state is forest-covered, the principal woods being oak, hickory, ash, poplar, pine, elm, birch, locust, beech, walnut, chestnut and hemlock. Ohio is a source of valuable hardwood timber, and is a leading state in maple-sugar products.

Manufactures. In value of manufactures, Ohio ranks fifth in the United States in average years, following New York, Pennsylvania, Illinois and Massachusetts. The annual value of its manufactures is about one and one-half billion dollars, which exceeds the total value of agricultural and mining products combined. Nearness to raw materials, accessibility of fuel and excellent shipping facilities have made the state a prosperous center of iron and steel manufacture, in which it is second only to Pennsylvania. Cleveland is the largest center of the industry. The average output of pig iron is approximately 7,000,000 tons, valued at over $90,000,000 and Ohio and Pennsylvania together produce over half of the American output of this commodity. Next in importance to the manufacture of iron and steel products, and closely related to that industry, is the making of foundry and machine-shop products.

In the value and variety of its clay products Ohio has no equal among the states. The clay-working enterprises produce brick and tile in vast quantities, and of the specific products of the industry the most important are sewer pipe and vitrified brick. Nearly nine-tenths of the sewer pipe made in the United States comes from Ohio factories. Various cities in the Ohio River Valley, especially East Liverpool, are important centers of the pottery industry, in which Ohio ranks first, and at Cincinnati is produced the much-prized Rookwood ware. Clay is also used in the manufacture of Portland cement, of which the state produces nearly 2,000,000 barrels a year.

Slaughtering and meat packing, which is carried on most extensively at Cincinnati, the manufacture of flour and grist-mill products, glass making and carriage, wagon and automobile manufacture are other industries of paramount importance. Toledo is a center for the manufacture of cut glass, and Akron for the production of rubber goods, particularly automobile tires. In this industry it is the leading city in the Union, if not in the

world. Dayton is the world's chief center for the making of cash registers, and Cincinnati one of the most important American cities in the manufacture of vaults and safes. Other prosperous lines of manufacture are the production of boots and shoes, the making of tobacco products, the manufacture of agricultural tools, the making of men's clothing and printing and publishing.

Transportation. The high degree of development of the manufacturing industries is largely due to the unusually excellent means of water transportation. Ready communication is possible with the Atlantic coast by means of Lake Erie and the Erie Canal; with the states of the Northwest through the Great Lakes, and with the Mississippi Valley by means of the Ohio River. Canals extend across the state from Toledo to Cincinnati, and from Cleveland, via Columbus, to Portsmouth, but these are now very little used. Besides this system of lakes and rivers, there is a great system of trunk and local lines of railway in Ohio. Notable among the trunk lines are the Baltimore & Ohio; the Cleveland, Cincinnati, Chicago & Saint Louis; the Erie; the New York, Chicago and Saint Louis; the Detroit, Toledo & Ironton; the Pennsylvania, and the Wabash. The railway mileage is over 9,000, and the state also has about 4,000 miles of electric lines.

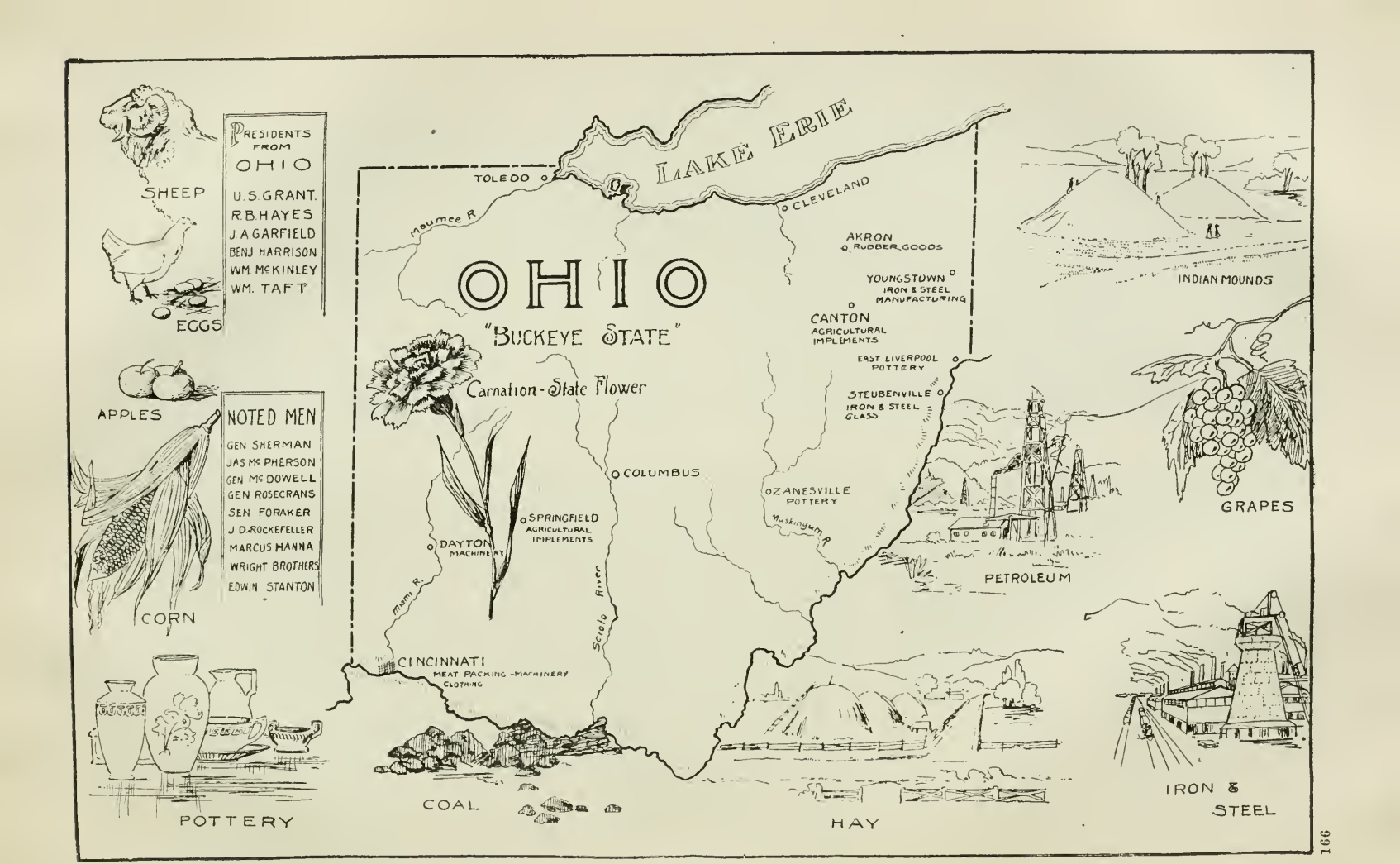
Government. Ohio is governed under a constitution adopted in 1852. It has been several times amended, the last time in 1912, when a large number of progressive provisions were adopted. The question of assembling a convention to revise, alter or amend the constitution may be submitted to the people every twenty years, counting from 1912. The executive department consists of a governor, lieutenant-governor, secretary of state, treasurer and attorney-general, elected for two years, and an auditor, elected for four years. The legislature consists of a senate of thirty-three members and a house of representatives composed of 123 members, elected for two years. The supreme court is at the head of the judicial system. It consists of seven judges elected by popular vote for six years. In each of the appellate districts there is a court of appeals consisting of three judges, elected for six years. Each county has a court of common pleas, the judges of which are elected for six years.

All state, county and municipal officers are nominated in primary elections, and the initiative, the referendum and the recall of elective officers have been adopted. There are statutes relating to female and child labor, workmen's compensation and widows' pensions. In November, 1918, an amendment to the constitution was adopted by popular vote, making the state prohibition territory in advance of national action.

Education. More than $48,000,000 is expended annually for public education, and there are well-enforced laws regarding school attendance, which are compulsory on all children between the ages of eight and fourteen and applicable to unemployed young people between fourteen and sixteen who cannot read or write. A superintendent of public instruction, appointed by the governor for four years, is at the head of the public school system. In many rural districts there are well-organized consolidated schools, the total number of centralized schools being nearly 700, and in townships where this system prevails the pupils are conveyed to school and home again at state expense. Among native whites the illiteracy rate is only 1.5 per cent.

There are three universities under state control, Ohio State University at Columbus, Ohio University at Athens, Miami University at Oxford, and Wilberforce College, for colored students, near Xenia. There are state normal schools at Athens, Oxford, Kent and Bowling Green. The other institutions for higher learning are as follows:

Antioch College, Yellow Springs.
Ashland College, Ashland.
Baldwin-Wallace College, Berea.
Capitol University, Columbus.
Case School of Applied Science, Cleveland.
University of Cincinnati, Cincinnati.
Defiance College, Defiance.
Denison University, Granville.
Eclectic Medical College, Cincinnati.
Findlay College, Findlay.
Heidelberg University, Tiffin.
Hiram College, Hiram.
Kenyon College, Gambier.
Marietta College, Marietta
Mount Union College, Alliance.
Municipal University of Akron, Akron.
Muskingum College, New Concord.
Oberlin College, Oberlin.
Ohio College of Dental Surgery, Cincinnati.
Ohio Northern University, Ada.
Ohio Wesleyan University, Delaware.
Otterbein University, Westerville.
Saint Ignatius College, Cleveland.
Saint Mary's College, Dayton.
Saint Xavier College, Cincinnati.
Toledo University, Toledo.
Western Reserve University, Cleveland.
Wittenberg College, Springfield.
College of Wooster, Wooster.


OHIO
"BUCKEYE STATE"
LAKE ERIE
TOLEDO
CLEVELAND
Maumee R.
AKRON
RUBBER GOODS
YOUNGSTOWN
IRON & STEEL MANUFACTURING
CANTON
AGRICULTURAL IMPLEMENTS
EAST LIVERPOOL
POTTERY
STEUBENVILLE
IRON & STEEL GLASS
Carnation - State Flower
COLUMBUS
ZANESVILLE
POTTERY
Muskingum R.
SPRINGFIELD
AGRICULTURAL IMPLEMENTS
DAYTON
MACHINERY
Miami R.
Scioto River
CINCINNATI
MEAT PACKING - MACHINERY
CLOTHING
PRESIDENTS FROM OHIO
U.S. GRANT.
R.B. HAYES
J.A. GARFIELD
BENJ. HARRISON
WM. McKINLEY
WM. TAFT
NOTED MEN
GEN. SHERMAN
JAS. Mc PHERSON
GEN. Mc DOWELL
GEN. ROSECRANS
SEN. FORAKER
J.D. ROCKEFELLER
MARCUS HANNA
WRIGHT BROTHERS
EDWIN STANTON
SHEEP
EGGS
APPLES
CORN
POTTERY
COAL
HAY
PETROLEUM
INDIAN MOUNDS
GRAPES
IRON & STEEL

Items of Interest on Ohio

Among the most interesting of American antiquities are the mounds built ages ago by a prehistoric race of unknown origin. In Ohio there are over 10,000 of these mounds, of varied shapes and sizes. One of special interest is in the form of a huge serpent.

Ohio is a close rival of Virginia as a "Mother of Presidents." Six Presidents were natives of the state—Grant, Hayes, Garfield, Benjamin Harrison, McKinley and Taft.

The first Methodist mission in the United States was established in 1819 at Marietta, which is reputed to be the oldest settlement in the state.

In 1917 the Ohio legislature passed a law permitting women to vote for Presidential electors, but the law was rejected at a popular election.

The state as a whole has no bonded debt.

About fifty-six per cent of the people live in towns and cities.

Ohio abolished capital punishment in 1912.

The state flower is the carnation.

The first iron works in the state were established at Youngstown, in 1804.

The city of Cleveland was named for Moses Cleaveland, its founder. The change in spelling was adopted by a printer in 1831 because the shorter form exactly fit in his headline space.

In addition to six Presidents, Ohio has been the home of many other famous men, including John Hay, Tom L. Johnson, General Sherman, Lyman Beecher, Marcus A. Hanna, John D. Rockefeller, the Wright brothers and Edwin Stanton.

The first observatory in the United States was erected in Cincinnati, in 1843. John Quincy Adams laid the corner stone.

In 1917 Toledo ranked next to Detroit in number of automobiles manufactured.

In 1846 Ohio and Michigan fought a brief war for the possession of a strip of land including Toledo.

Oberlin College was named in honor of a Lutheran pastor who lived on the boundary of Alsace and Lorraine. In 1841 the college granted the first degrees of Bachelor of Arts awarded to women in the United States.

Ohio is the first state in the Union in the production of maple syrup.

Any Ohio town with a population of 5,000 inhabitants or more is permitted to frame and adopt a charter for incorporation as a city. Any city may adopt the commission form of government.

Questions on Ohio

Describe the surface of Ohio and its drainage.

How does the density of population compare with that of other states in the middle west? With New York? With Rhode Island?

What position does Ohio hold as a producer of maple syrup? Tobacco? Wool?

How does the value of Ohio's manufactures compare with that of agriculture and mining?

What is the leading manufactured product? Name five other important manufactures.

What can you say of the transportation facilities?

How many states touch Ohio? What are its water boundaries?

What is the state's rank in area? Population?

What percentage of the people of Ohio are whites of native birth?

How many cities are there in Ohio with over 20,000 inhabitants?

What is the longest river wholly in the state?

Compare Ohio in one respect with each of the following: Kansas, Pennsylvania, New Mexico, Illinois.

Name four manufacturing centers and state why each is important.

What interesting relics has the state?

What noted men were born in or lived in Ohio?

What effort is made to give the rural districts adequate educational advantages?

How much does Ohio spend a year on education?

Institutions. The state charitable and corrective institutions include hospitals for the insane at Athens, Cleveland, Columbus, Dayton, Lima, Longview, Massillon and Toledo; a hospital for epileptics at Gallipolis; institutions for the feeble-minded, the blind and the deaf at Columbus; a state sanatorium at Mount Vernon; a soldiers' and sailors' home at Sandusky; a boys' industrial school at Lancaster and one for girls at Delaware; a state penitentiary at Columbus; a prison farm at London; a state reformatory at Mansfield; and a reformatory for women at Junction City.

History. Ohio was probably entered by La Salle as early as 1670, and the French took formal possession of the whole Northwest in the following year. A few years later conflicting claims arose between the French and the English regarding this territory, which were set at rest by the Treaty of Paris in 1763, by which France surrendered to Great Britain all its lands in the North and West as far as the Mississippi. In 1787 the Ohio Company was organized in New England by soldiers who had served in the War of the Revolution, among whom Manasseh Cutler and Rufus Putnam were conspicuous, and under their auspices a large tract of land was purchased from the government in the territory including portions of Washington and Athens counties. This was the first public sale of land by the United States government. In connection with its sale, the famous Ordinance of 1787 was passed.

In 1788 Marietta and Cincinnati were founded, and settlements in the southern part of the territory increased rapidly. Late in 1794 a victory was gained by Gen. Anthony Wayne over the Indians, at "Fallen Timbers" on the Maumee River, and the next year a treaty of peace was concluded, the Indians ceding a great portion of the territory, which settlers began at once to fill. Chillicothe was made the seat of government for the territory, and the legislature first met in 1799. Indiana was set off from Ohio in 1800, and in 1802, a constitution was adopted for the latter. On February 19, 1803, Ohio was admitted into the Union.

The state took an active part in the War of 1812. In the Civil War it supplied many times its quota of troops to the Federal army, although there was a strong Southern sentiment in many parts of the state. Because of the many waterways leading to Ohio and its varied natural resources, the course of western immigration set toward the state and built it up rapidly. Between 1800 and 1810 there was an increase in population of over 400 per cent; a century later in the corresponding decade the population increased over 609,000.

Related Articles. Consult the following titles for additional information:

CITIES

Akron	Elyria	Newark
Alliance	Findlay	Norwood
Ashtabula	Fostoria	Piqua
Bellaire	Fremont	Portsmouth
Cambridge	Hamilton	Salem
Canton	Ironton	Sandusky
Chillicothe	Lancaster	Springfield
Cincinnati	Lima	Steubenville
Cleveland	Lorain	Tiffin
Columbus	Mansfield	Toledo
Conneaut	Marietta	Warren
Coshocton	Marion	Xenia
Dayton	Massillon	Youngstown
Delaware	Middletown	Zanesville
East Liverpool	Mount Vernon	

RIVERS

Ohio	Maumee	Scioto

HISTORY

Northwest Territory	Ordinance of 1787
Ohio Company	Wayne, Anthony

UNCLASSIFIED

Mound Builders	Rookwood Pottery

OHIO COMPANY, the name applied to two organizations formed to colonize the Ohio River Valley. The first, in 1749, was an association of London merchants and Virginia colonists; among the latter were two brothers of George Washington. George II granted this company a tract of 500,000 acres south of the river, but beyond the surveying of part of the land nothing came of the enterprise. The second company, known as the Ohio Company of Associates, was organized at Boston in 1786 by Rufus Putnam, Manasseh Cutler and other well-known colonials. This company purchased several thousand acres on the north side of the Ohio, and in 1788 founded Marietta, the first settlement within the present limits of Ohio. See OHIO, subhead *History.*

OHIO RIVER, one of the most important commercial rivers of the United States. It is formed at Pittsburgh, Pa., by union of the Allegheny and Monongahela rivers, and at this point it is a navigable stream 600 yards wide. It flows first northwest, then southwest, separating Ohio from West Virginia; in its further course it separates Kentucky on the south from Ohio, Indiana and Illinois, entering the Mississippi at Cairo, Ill., after a course of almost 1,000 miles. Its drainage basin is estimated at about 210,000 square miles. The river is navigable from

Pittsburgh to Cairo except in the extreme dry season and in the coldest winter weather. The principal tributaries are the Muskingum, the Miami, the Wabash, the Great Kanawha, the Big Sandy, the Licking, the Green, the Cumberland and the Tennessee rivers. Among the towns on its banks below Pittsburgh are Wheeling, W. Va., Marietta, Ohio, Covington, Ky., Cincinnati, Ohio, Madison, Ind., Louisville, Ky., Evansville Ind., and Paducah, Ky. The United States government has expended large sums in constructing locks and dams and otherwise improving the navigability of the stream.

OHIO STATE UNIVERSITY, The, a state institution of higher learning at Columbus, Ohio, founded in 1870 as the Ohio Agricultural and Mechanical College. It was given its present name in 1878. The university comprises departments of arts, philosophy and science, agriculture, engineering, education, medicine, homeopathic medicine, dentistry, law, pharmacy and veterinary medicine and a graduate department. The normal student enrollment is over 5,700, and there is a faculty of about 540.

OHM, *ome.* Every conductor offers a certain degree of resistance to the flow of the electric current, in much the same way as the size and friction of a pipe resist the flow of water through it. The ohm is the unit employed in measuring electrical resistance. It is equivalent to the resistance offered by a column of mercury whose mass is 14.4521 grams, whose cross section is one square millimeter and whose length is 106.3 centimeters, at the temperature of melting ice. In common terms, this means a column of mercury the size of that found in an ordinary thermometer tube 40.84 inches long, at a temperature of 32° F.

OHM, George Simon (1787–1854), a German physicist. He became successively professor of physics at Cologne, director of the Polytechnic at Nuremberg and professor of physics at the University of Munich. He wrote a number of important scientific works and was the discoverer of what in electricity is known as "Ohm's Law" (see below).

OHM'S LAW, an important law in electricity, deduced by Professor Ohm, to the effect that the intensity of the electric current is directly proportional to the whole electromotive force in operation and is inversely proportional to the sum of the resistances in the circuit. See Electro-Motive Force.

OIL CITY, Pa., in Venango County, 132 miles north of Pittsburgh, on the Allegheny River, at the mouth of Oil Creek, and on the New York Central, the Pennsylvania and the Erie railroads. It is the center of the great oil region of western Pennsylvania and has large refineries, barrel works, foundries, machine shops and manufactures of boilers, engines, oil well supplies and other articles. The principal buildings include a Carnegie Library, a Y. M. C. A., a city hospital, a sanitarium and the Oil Exchange. The place was settled about 1825, became prominent with the development of the oil fields after 1859 and was chartered as a city in 1874. On June 5, 1892, burning oil swept down the creek from Titusville and destroyed over 100 lives and more than a million dollars' worth of property. The commission form of government was adopted in 1911. Population, 1910, 15,657; in 1917, 20,162 (Federal estimate).

OIL'CLOTH, a heavy woven waterproof material used chiefly as a covering for floors that require frequent washings. The foundation, a sort of canvas or burlap, is stretched on a frame and treated with a mixture of glue, rye flour, tobacco and varnish. It is then dried, rubbed with pumice and painted. An ornamental design is usually stamped on it. Floor oilcloth has been almost superseded by linoleum, a similar material, which is much heavier and more durable. Lightweight oilcloth is much used as a covering for kitchen tables, pantry shelves and such places. See Linoleum.

OIL PALM, a genus of palms, akin to the cocoanut palm, found chiefly in tropical Africa. One species produces fruit in large clusters, containing about 150 orange-colored drupes having an oily pulp. The oil from this pulp is exported and is much used in making candles and toilet soaps. When chilled, it hardens like butter, for which it is sometimes eaten as a substitute, when fresh.

OILS, sticky or viscid substances formed within living animal or vegetable organisms and having a variety of uses. They are liquid at ordinary temperatures, insoluble in, and lighter than, water, taking fire when heated in air and burning with a more or less luminous flame. The oils are usually divided into the fat, or fixed, oils, and the volatile, or essential, oils. Another division recognizes vegetable oils, by far the most numerous class, animal oils and the mineral oils (petroleum, naphtha).

Fat, or *fixed, oils* are subdivided into the *drying* and the *non-drying oils.* The former class includes all oils which, through the absorption of oxygen, thicken when exposed to the air and are converted thereby into varnish, as, for example, linseed and hemp-seed oil. The most important of the drying oils are linseed, hemp, walnut, poppy, candle nut, sesame, sunflower, madia and safflower. All the drying oils are of vegetable origin. The *non-drying* oils (partly of vegetable, partly of animal origin) when exposed to the air also undergo a change, resulting in the formation of acrid, disagreeably smelling substances. Though these substances thicken, they do not become dry. The fixed vegetable oils are generally prepared by subjecting the seeds of the plant to pressure, with or without heat, but they may also be extracted by means of certain solvents. Of the non-drying oils the chief are olive, cottonseed, colza, rape, ground nut, castor and croton.

Volatile oils are generally obtained by distilling with water the plants which afford them. They are acrid, caustic, aromatic and limpid and are mostly soluble in alcohol, forming essences. They boil at a temperature considerably above that of boiling water, some of them undergoing partial decomposition. A few of them are hydrocarbons; the greater number, however, contain oxygen as one of their elements. They are chiefly used in medicine and in the manufacture of perfumery; and a few of them are extensively employed in the arts, as vehicles for colors, and in the manufacture of varnishes, especially oil of turpentine. They are very numerous, among them being the oils of anise, bergamot, clove, cinnamon, cajeput, lavender, lemon, lime, orange, mint, peppermint, nutmeg, marjoram, rosemary and thyme.

Animal oils are, for the most part, the fluid parts of the fat of the animal and are separated by heat alone. The animal oils comprise neat's foot oil, train oil, seal oil, sperm oil, porpoise oil, cod-liver oil and shark oil. Many are used as articles of food, some are medicines and some are used extensively in the arts. *Vegetable fixed oils* all consist of one or more peculiar principles. Thus, olive oil contains chiefly olein, with a little stearin; linseed oil is composed mainly of linolein. A certain number of the vegetable oils are also known as vegetable fats, from their consistency at ordinary temperatures, such as palm oil, cocoanut oil, shea-butter.

Related Articles. Consult the following titles for additional information:

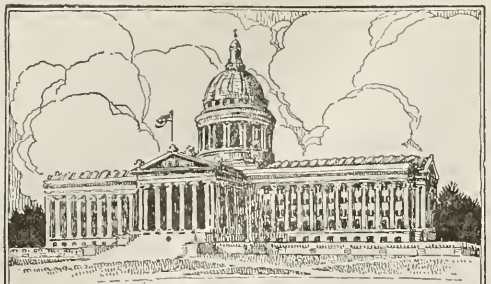
Castor Oil	Linseed	Perfumes
Cocoanut	Olive Oil	Sperm Oil
Cod-liver Oil	Paints	Turpentine
Cottonseed Products	Palm Oil	Varnish

OINT'MENT, a preparation having a fatty substance as a base, used as an external remedy for bruises, sunburn, sprains, etc. Vaseline (which see) is a trade name for one of the most widely used ointments. It is made of petrolatum, the residue from the distillation of petroleum. Cosmoline and petroleum jelly are other ointments made from petrolatum. Lard is also a base of ointments, of which twenty-four are recognized by the United States Pharmacopoeia. Other ingredients used include olive oil, almond oil, spermaceti, wax, benzoin, zinc, sulphur and rose water. Ointments used as beautifiers are usually marketed under the name of cold cream.

OJIBWA, *o jib'wa,* an Indian tribe belonging to the Algonquian family. The former home of the Ojibwas was a great region in the vicinity of Lake Superior. At present there are about 30,000 of these Indians on reservations in Northern United States and Canada. They are tall, active and well built, skilled hunters and fishers, and prone to retain their primitive manners and customs. Originally they possessed a comprehensive mythology and ritual.

OKAPI, *o kah'pe,* an animal of the giraffe family. Its drooping hind quarters, short tail and shape of head are like the giraffe's, but its neck and legs are shorter than those of the latter animal. Except the front and sides of the face, which are yellowish-white, and the legs, which are alternately barred with black and white, the animal is a warm purple, touched with sepia. Protected with this coat, it cannot be distinguished at a distance of twenty paces from the dense, dark foliage in the twilight gloom of the equatorial Congo forests where it makes its home. It feeds on plants, and has the large ears peculiar to forest creatures. The male is equipped with short, dagger-shaped horns.

OKHOTSK, *o'kotsk,* SEA OF, an arm of the Pacific Ocean. It cuts into the eastern coast of Siberia and is nearly enclosed by the peninsula of Kamchatka, northeast of it, Sakhalin Island, southwest, the island of Hokkaido, south, and the long chain of Kurile Islands, which extend from the last named to Kamchatka.



Capitol Building

OKLAHO'MA, one of the young and prosperous states of the American Union, occupying a favored section of the great Middle West. It is composed of two former territories, Oklahoma and Indian Territory, and is the third youngest commonwealth, having joined the sisterhood of states about five years ahead of New Mexico and Arizona. Its popular name, THE BOOMER STATE, was bestowed as a tribute to its remarkable development. When the region was first opened freely to white settlement towns literally sprang up in a day; the industrial growth thereafter was not only rapid, but it was permanent. The name of the state is from the Choctaw language, and means *land of the red men.*

Location and Size. Oklahoma belongs to the south-central group of states, and is located about midway between the Atlantic and Pacific oceans. It touches six other states. In the northwest there is a narrow strip of land extending 169 miles east and west and thirty-five miles north and south. This section, popularly known as the *Panhandle,* lies between the New Mexico boundary on the west and the hundredth meridian on the east. Its southern boundary follows the Texas line and its northern adjoins Colorado and Kansas. The main body of the state is bounded on the north by Kansas, on the east by Missouri and Arkansas, and on the south and west by Texas, the Red River forming a natural boundary between Oklahoma and Texas.

Exclusive of the Panhandle, the state is 310 miles from east to west; it is 213 miles along the eastern boundary. With a total area of 70,057 square miles, in size it is the seventeenth state in the Union. It is a little larger than all New England. Texas, the largest of the states, is nearly four times the size of Oklahoma. North Dakota and Missouri are nearest in area, the former being only 780 square miles larger, and the latter 637 square miles smaller. Of the gross area, 643 square miles are water.

The People and Cities. In 1910 Oklahoma had a population of 1,657,155, an average of 23.9 persons to the square mile. In population it ranks twenty-third among the state. On July 1, 1918, the number of inhabitants was estimated at 2,377,629, representing an increase of nearly 1,000,000 during the preceding decade. Native whites are by far the most numerous element in the population, which includes, however, many Indians and negroes. In 1910 the negroes numbered 137,612. Including admixtures, there are nearly 119,000 Indians in the state, but only about one-fourth of these are full-blood; the others have intermarried both with whites and with negroes. In Oklahoma are found the Five Civilized Tribes—the Cherokee, Chickasaw, Choctaw, Creek and Seminole Indians—who are prosperous and well-educated American citizens. There are remnants of about fifty other Indian tribes. About forty per cent of the native population was born in the state.

Fully three-fifths of the people of Oklahoma belong to no organized church. Of the church members the Methodists are the most numerous, with Baptists a close second. Next in order are Roman Catholics, Disciples of Christ, Presbyterians and Episcopalians.

Cities. In 1917, according to Federal estimates, there were ten cities in Oklahoma having populations in excess of 10,000. These were, in order, Oklahoma City, the capital (97,588); Muskogee (47,173); Tulsa (32,507); Enid (21,356); McAlester (19,358); Shawnee (19,051); Chickasha (16,234); Sapulpa (13,678); Guthrie (12,098); and Ardmore (10,963).

Surface and Drainage. The northeastern section north of the Arkansas and Canadian rivers is a plateau deeply cut by the streams which flow across it. In the central part of this plateau, those portions occupied by the Cherokee and Creek nations, there is considerable open prairie country. The southeastern part, south of the Canadian River, is broken by hills, which enter it from Arkansas. These vary in altitude from 2,500 feet, on the Arkansas border, to about 1,000 feet, in the south-central part of the state. The hills and intervening valleys of this

section are quite heavily wooded. From the central part of Oklahoma westward, the surface consists almost wholly of a rolling plateau, rising from an altitude of 800 feet, in the center, to 2,500 feet, on the northwestern boundary, and 4,500 feet, in the extreme western part of Beaver County. The western part properly belongs to the region of the great plains.

Oklahoma is watered by the Arkansas River, which flows across the northeastern portion, and its leading tributaries. The most important of these is the Canadian, which enters the state near the center of its western boundary and flows easterly, uniting with the Arkansas a few miles west of the eastern boundary. The North Fork of the Beaver River from the Panhandle, and Wolf Creek from Texas, unite to form the Canadian, which flows in an easterly-southeasterly direction until it unites with the main stream a few miles west of its confluence with the Arkansas.

North of the North Fork is the Cimarron, flowing nearly parallel with it, and in the northeastern corner are the Verdigris and Neosho rivers, flowing southerly into the Arkansas. The most important stream in the southern part of the state is the Washita, which unites with the Red a little east of the Midway point of the southern boundary. The Red River and its minor tributaries drain the southern part of the state. There are no lakes of importance.

Climate. The climate is warm temperate. In general it is mild, both in summer and winter, though in the midst of the summer periods of extreme heat occur, during which the thermometer has been known to rise as high as 115°. Severe cold is seldom known. The winters are mild and salubrious. In general the mean temperature for July is about 81°, and for the entire year, about 60°. The rainfall for the state averages a little over thirty-one inches, though in some places it is fifty-seven inches; in the extreme west it averages twenty inches or less. It is quite evenly distributed throughout the year, and except in the extreme western part, is sufficient for agriculture. In the western third and in the Panhandle irrigation is essential to the growing of crops.

Mineral Resources. Oklahoma has attained first rank in the production of petroleum, a recent year's output of which exceeded 107,000,000 barrels. The oil was first produced in quantity in 1904, and in that year the yield was 1,400,000 barrels. Within ten years the production had increased to nearly 107,000,000 barrels, valued at over $56,700,000, and in 1915 the output surpassed that of California for the first time. Near Sapulpa is the famous Glen Pool region, where there is a well with a flow of 1,000 barrels a day. Oklahoma now holds first place among the states in the production of petroleum. There are over one hundred oil and gas fields in the state. It is second in the output of natural gas.

The interest aroused by the oil production has tended to overshadow the interest in coal development, though this mineral ranks second in value. Most of the coal mining is carried on in Pittsburgh, Coal, Okmulgee and Latimer counties, and the coal fields, which are an extension of the Kansas and Arkansas areas, cover about 12,000 square miles. The annual output is between 3,000,000 and 4,000,000 short tons. Natural gas is third in rank, and in its production Oklahoma is surpassed only by West Virginia and Pennsylvania. The yearly output is between 75,000,000 and 80,000,000 cubic feet. In the northeastern part there is a profitable lead and zinc region, a continuation of the mineral field of Southwestern Missouri. Other minerals worked include limestone, asphalt, gypsum, salt, sand and gravel.

Agriculture. Farming is the leading industry, and its development has been very rapid since 1890. Over half the land area is devoted to farms, and about two-thirds of the farm land is improved. About two-fifths of the total number of farms are between 100 acres and 174 acres in area. In Oklahoma are found many white farmers who are leasing their holdings from the original owners—the Indians. Before the era of white settlement large sections of the state, especially in the west, were utilized as cattle ranges, and Oklahoma is still an important livestock state. Horses, mules, cattle (for slaughter) and swine are found in large numbers, and the total value of the stock is over $200,000,000.

Among farm crops corn is first in point of acreage, about 3,900,000 acres being devoted to this cereal. The annual yield is valued at about $56,000,000. Cotton ranks second in value, but is surpassed by wheat in point of acreage. Oklahoma is normally the sixth cotton state in production, and in 1917 it was

fourth in acreage. The annual crop is in the neighborhood of 900,000 bales of 500 pounds each. Wheat, the second cereal in value, is grown on about 3,000,000 acres. Over 1,150,000 acres are devoted to oats, and about 575,000 acres to hay, alfalfa being an important fodder crop. Potatoes are next in rank, and other important products are sweet potatoes, sorghum, tobacco, flowers and nursery products, orchard fruits, grapes and watermelons.

Manufactures. Manufacturing is developing at a normal rate, and is influenced considerably by the natural resources of the state, including fuel in the shape of oil and coal. The manufacture of flour and gristmill products ranks first in importance, followed by oil refining, cotton ginning, the production of cottonseed oil and cake, the manufacture of lumber and timber products and printing and publishing.

Transportation and Commerce. Trunk lines of railway traverse the state from east to west, from north to south and from northeast to southwest. Railways had been constructed through the region before Oklahoma was opened to settlement, and were pioneers in the development of the territory. In all, in 1918, the state had about 6,500 miles of railway, and all important towns were on one or more lines. The important railway centers are Muskogee, McAlester, Tulsa, Oklahoma City, Chickasha, Guthrie and Enid. The railroads having the longest mileage are the Saint Louis & San Francisco, the Chicago, Rock Island & Pacific, the Atchison, Topeka & Santa Fé and the Missouri, Kansas & Texas. The rivers are not navigable, and inland towns rely upon carriage roads for finding an outlet to the railways. The people own an unusually large number of automobiles. The commerce of the state, considering its population and very recent development, is unusually large. The exports consist of corn, cotton, live stock, and lumber together with other agricultural products, while the imports are almost entirely of manufactured goods.

Education. On the organization of the state, Oklahoma established an excellent system of public schools, at the head of which are a superintendent of public instruction and a state board of education. Public education is maintained by a school fund and by taxation. This system includes elementary schools, high schools in cities and large towns and in counties having 6,000 or more inhabitants; and six normal schools, at Edmond, Tahlequah, Ada, Durant, Weatherford and Alva. Separate schools for white and negro children are maintained. The higher institutions of learning include the University of Oklahoma at Norman, an agricultural and mechanical college at Stillwater, Philips University at Enid, Langston University for colored youth at Langston, Kingfisher College at Kingfisher, Henry Kendall College at Tulsa, Oklahoma Woman's College at Chickasha and Methodist University at Guthrie. There is also a school of mines at Wilburton, and in February, 1919, another school of mines was established at Miami, in the lead and zinc region. There are, in addition to these institutions, state preparatory schools at Claremore and Tonkawa, and five secondary agricultural schools, and a number of denominational schools. Indian education is now a part of the general school system.

Institutions. Institutions of charity and correction are administered by a state department. These institutions include a state orphanage at Pryor; hospitals for the insane at Vinita, Supply and Norman; a school for the blind at Muskogee; an institute for the feeble-minded at Enid; a school for the deaf and dumb at Sulphur; a number of industrial schools and reformatories, and a state penitentiary at McAlester.

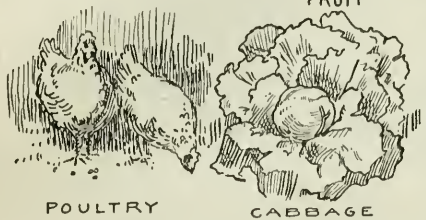
Government. The constitution of 1907 was called by President Taft a code of laws; it is markedly different from the constitutions of most of the states in that many of its original clauses are the kind that are usually adopted through legislative action or by subsequent amendment. It provides for the initiative and referendum. Amendments may originate among the people or in either house of the legislature; to become effective they must have the approval of both houses and of the electorate. The executive department comprises the governor, lieutenant-governor, secretary of state, auditor, attorney-general, treasurer, superintendent of public instruction, commissioners of labor, charities and corrections, and insurance, mine inspector and state examiner, all elected for terms of four years. The governor, secretary of state, auditor and treasurer cannot directly succeed themselves.

The legislature consists of a senate of not more than forty-four members, elected for four years, and a house of representatives of not more than 109 members, elected for

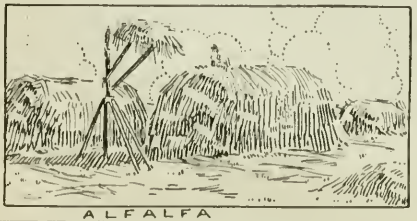
OKLAHOMA
THE BOOMER STATE

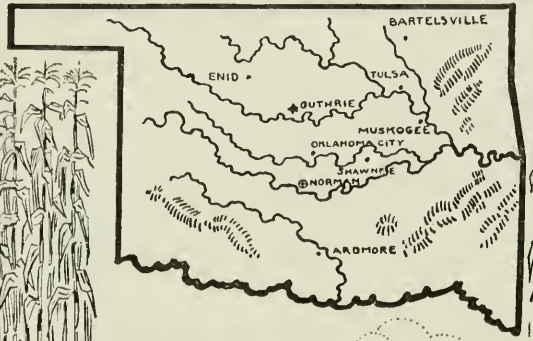

MISTLETOE


FRUIT

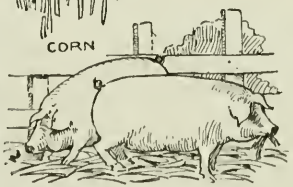

POULTRY CABBAGE

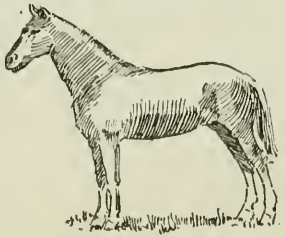

WHEAT


ALFALFA

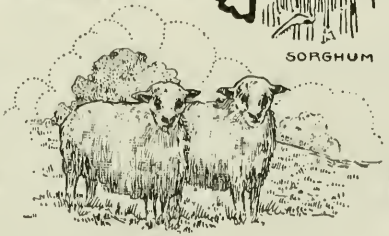


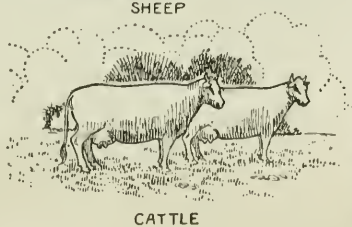

CORN

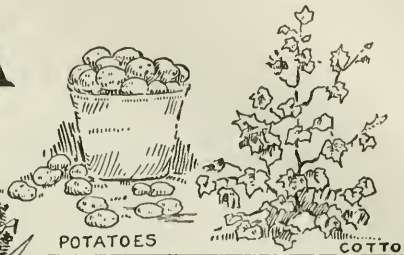


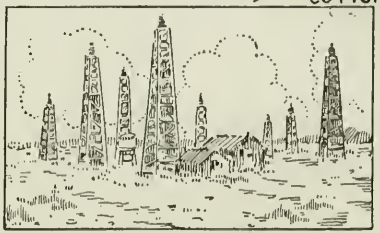


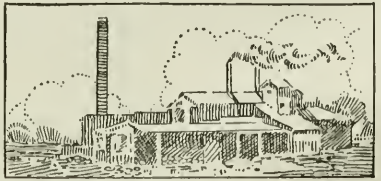

SORGHUM

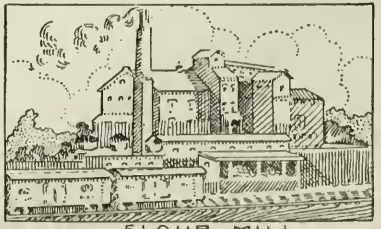

SHEEP


CATTLE


POTATOES COTTON


OIL FIELD


CEMENT MILL


FLOUR MILL

Items of Interest on Oklahoma

The Panhandle, though originally a part of Texas, was disannexed when Texas entered the Union, and for years it belonged to no state or territory. From this circumstance came its former name of *No Man's Land*. In 1890 it was made a part of Oklahoma Territory.

In the northwest are four large salt plains, almost perfectly level, covered with snow-white salt crystals, and containing many salt springs: these are the Big Salt Plain of the Cimarron River, the Little Salt Plain, the Salt Creek Plain, and the Salt Fork Plain.

Characteristic wild animals are the black bear, puma, coyote, timber wolf, fox, antelope, squirrel, rabbit and prairie dog.

Hawks, turkey buzzards, wild turkeys, prairie chickens and quail are common.

The most common trees are oak and cedar of various species; pine is confined to the more mountainous parts in the east and the black walnut is found in the river bottoms; ash, pecan, sycamore, elm, maple and hickory occur but are of little commercial importance.

The prevailing soil is a dark-red loam, made up of decomposed sandstone or limestone; the river valleys often have rich deposits of alluvium.

Before the first opening to settlement in 1899, Oklahoma was largely occupied by great herds of cattle driven in from Texas.

Two crops of potatoes may be grown on the same ground in one year.

Eight per cent of the legal voters have the right to propose any legislative measure, and fifteen per cent to propose amendments to the constitution by petition. The referendum applies both to municipalities and to the state.

Indians who have severed tribal relations may qualify as voters. There are many thousands of these.

Oklahoma is represented in Congress by two Senators and eight members of the House of Representatives.

In 1910 one-fourth of the foreign-born were Germans, who outnumbered the Russians two to one, and the Italians four to one.

The annual expenditure for public education is over $9,500,000.

Oklahoma is a Chocktaw Indian word meaning *land of the red man.*

In the first decade of its career as a state Oklahoma attained rank as the thirty-eighth manufacturing state.

The mistletoe is the state flower.

The Panhandle is a rough table-land lying among the foothills of the Rocky Mountains.

Questions on Oklahoma

Why is Oklahoma called the "Boomer State?"

What and where is the section called the *Panhandle?*

How many states each the size of Rhode Island could be placed in Oklahoma? How many Oklahomas could fit into Texas?

How does the water surface of Oklahoma compare with that of Minnesota? South Carolina? Ohio?

How many persons to the square mile are there in the state? What proportion are negroes? Full-blood Indians?

Who are the Five Civilized Tribes?

What denomination has the most adherents among Protestants?

How many cities of more than 10,000 inhabitants are there in Oklahoma?

Describe the surface and drainage.

What is there unique about the constitution of Oklahoma?

By whom must amendments be approved?

What state officers may not succeed themselves directly?

How did President Taft characterize the Oklahoma constitution? Why?

What name did the Panhandle formerly bear?

How many states entered the Union ahead of Oklahoma?

How does the state rank in size? In population?

In what valuable mineral products does Oklahoma rank first among the states?

two years. The judicial power is vested in a supreme court, district, county and municipal courts and justices of the peace. The chief justice and four judges of the supreme court are elected for six years. There are twenty-one judicial districts, in each of which there is a judge elected for four years. County judges are elected for two-year terms.

Three county commissioners administer affairs in each county, and cities of 2,000 and more inhabitants may frame their own governments. Among progressive laws passed since statehood are those regulating child labor and providing for mother's pensions and workmen's compensation. Women were admitted within recent years to full suffrage privileges.

History. The region included within the bounds of Oklahoma was set apart in 1832 as a residence for the Indian tribes who were removed from the Southern states, with the guarantee that within this domain they should be allowed to exercise their tribal form of government and remain undisturbed. Most of these tribes inaugurated forms of government similar to the government of the states, but the region assigned was much larger than they could occupy with profit, and several attempts were made by white adventurers to settle upon the portion of the territory, that afterwards was erected into Oklahoma Territory. Since this could not be done without gaining the consent of the Indians, this portion of the region was purchased from them by the government and in 1889 was thrown open to settlement.

The opening of Oklahoma Territory witnessed the most remarkable rush for land ever known in America. More than 50,000 people entered the territory and filed claims on the day of the opening. Cities arose in a night. The next year (March 2, 1890) the territory was organized. From the date of opening, Oklahoma continued to prosper, and its increase in wealth and population was beyond precedent. Just before the final adjournment of the Fifty-ninth Congress, in 1906, an enabling act, combining Oklahoma and Indian Territory and providing for their admission into the Union as one state, was passed. This did no violence to the Indian tribes within the state, since, in accordance with a previous arrangement with the government, tribal relations ceased in Indian Territory in 1906. The constitutional convention, composed of 112 delegates, met in Guthrie, November 20, 1906, and drafted a constitution, which was adopted at a general election held September 17, 1907. On this date Oklahoma's history as a state begins. In the same election a prohibition amendment to the constitution was carried. A "grandfather's clause" restricting the right of negroes to vote was adopted in 1910, but this was declared unconstitutional in 1915 by the United States Supreme Court. In 1911 the capital was from Guthrie removed to Oklahoma City.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Ardmore	Enid	Red River
Arkansas (river)	Guthrie	Sapulpa
Canadian River	McAlester	Shawnee
Chickasha	Muskogee	Tulsa
	Oklahoma City	

HISTORY

Cherokee	Five Civilized Tribes
Chickasaw	Grandfather's Clause
Choctaw	Indians, American
Creeks	Seminole

OKLAHO'MA, UNIVERSITY OF, a university established at Norman in 1892 by act of the territorial legislature. It is now the state university of Oklahoma, a coeducational institution. The university comprises a college of arts and sciences, a college of engineering, schools of fine arts, medicine, pharmacy, law, nursing, journalism, education, business and social service, a graduate school and an extension division. The state departments of natural history and geology have their headquarters at the university. The student enrollment is normally about 2,500, and the faculty numbers over 140. The library contains over 22,000 volumes.

OKLAHOMA CITY, OKLA., the capital of Oklahoma, the largest city of the state and the county seat of Oklahoma County, on the North Fork of the Canadian River and on the Atchison & Santa Fe, the Chicago, Rock Island & Pacific, the Saint Louis & San Francisco, the Fort Smith & Western and the Missouri, Kansas & Texas railroad and several interurban lines. Oklahoma County and the surrounding country is a fertile agricultural region, producing wheat, corn, cotton, broom corn, alfalfa, fruits, grapes, cattle and hogs. The city has a large and rapidly growing trade and contains flour mills, ice factories, great packing houses, foundries, grain elevators, cotton gins, oil mills and compresses, brickyards and other factories. Epworth University is located here, and the city has a Federal building, a Carnegie Library and a school for girls. The state uni-

versity and a state normal school are less than twenty miles distant. There are three hospitals and the state university medical school. There are over 1,450 acres in parks, and these are connected by a boulevard system. Oklahoma City showed an increase of 540 per cent in population from 1900 to 1910. The commission form of government was adopted in 1912. Population, 1910, 64,205; in 1917, 97,588 (Federal estimate).

O'KRA, a vegetable extensively cultivated in the southern part of the United States, where it was introduced from the West Indies. The plant can be made to grow readily in all subtropical climates. The mucilaginous pods are served as a vegetable and are used to thicken chicken soup, called chicken-gumbo. In India the stalks are used for making an inferior quality of rope.

OLD AGE PENSIONS, regular allowances paid to old people to prevent their being burdens upon the state or their relatives. In America private employers and corporations frequently retire aged employes on pensions, and teacher pension funds are common, but a government system of old age pensions has not yet been adopted. Civil War veterans receive allowances, but this form of payment cannot be classed as an old age pension system. In 1919 there was considerable agitation for the passage of a law whereby retirement pensions would be granted employes of the civil service.

In Europe and the self-governing British colonies the old age pension system is permanently established. In Germany the *compulsory* system was adopted in 1854. It was at first applicable to miners, but was later extended to all workmen receiving an annual wage of 2,000 marks (about $476) or less. Persons coming under this law were compelled to set aside a certain percentage of their earnings, and employers in each case set aside an equal sum. When the worker reached the age of seventy he received a yearly pension, part of which the government contributed. In 1911 Germany extended the system to teachers, musicians, actors and salaried workers. The systems described prevailed under the empire. France, in 1910, adopted the compulsory system for all workers, and Sweden, in 1913, for the entire population. The voluntary contributing system, by which the government adds to the savings of the workers, is effective in Belgium and Italy.

Free pensions, subject to certain conditions, are paid by the government in Denmark, England, Australia and New Zealand. In Canada there is a *government annuities* system, a form of insurance. The government, however, pays only operating expenses.

OLDENBURG, *ole'den boorK*, according to the composition of the former German Empire, a grand duchy in the northern part of the country, consisting of three distinct territories—the duchy of Oldenburg, the principality of Lübeck and the principality of Birkenfeld. The total area is 2,482 square miles, of which the duchy of Oldenburg constitutes seven-eighths. The country is flat, the soil marshy and sandy, with little of it under cultivation and with large tracts of heath and forest. The chief river is the Weser. The principal crops are cereals, hay, potatoes, beans and rape. Stock breeding is extensively carried on, and there are manufactures of tobacco, corks, knit goods, linoleum and brick. The capital of the grand duchy is Oldenburg.

The first Count of Oldenburg of whom there is any record lived in the thirteenth century. In the fifteenth century a Count of Oldenburg became king of Denmark, and two centuries later Oldenburg came into the possession of the crown of Denmark. In 1777 the state was made a duchy, and in 1815 it was raised to the rank of a grand duchy and given increased territory. It became a part of the German Empire in 1871. The provisional constitution drawn up by the national assembly at Weimar, in February, 1919, provided that all former German states should be a part of the German republic. Population, 1910, 483,042.

OLDHAM, *old'am*, ENGLAND, a town in Lancashire, seven miles northeast of Manchester. The spinning and weaving of cotton are the staple industries, and in the town and vicinity there are about 300 mills. There are also machine shops, foundries, tanneries, silk factories and wool-weaving works. Oldham is one of the industrial centers of England that have been transformed by community movements for beautifying and cleaning streets, homes and public places. Population, 1911, 147,483; in 1914, estimated, 150,055.

OLD IRONSIDES. See CONSTITUTION, THE.

OLD POINT COMFORT, a favorite watering place of Virginia, situated at the mouth

of the James River, near the southern end of Chesapeake Bay, and twelve miles north of Norfolk. It is on the Chesapeake & Ohio and the New York, Philadelphia & Norfolk railways. Because of its equable temperature, being cool in summer and warm in winter, this is one of the most desirable resorts on the Atlantic coast, and it is frequented by large numbers of tourists.

OLD RED SANDSTONE, the popular name of what geologists call the Devonian System, from Devon, England, where the largest beds have been found. This formation includes white, yellow and green beds of shale, conglomerate, clay and limestone and a predominating intermixture of red sandstone. The name "Old Red Sandstone" was first used in popular treatments of geology by Hugh Miller, whose books were at one time widely read. See GEOLOGY; DEVONIAN SYSTEM.

OLD SOUTH MEETING HOUSE, one of the most famous of American historic buildings. It was built in Boston in 1730, on the site of an earlier church erected in 1669 on land owned by John Winthrop. In the stirring times before the Revolutionary War the church was the scene of many notable public gatherings, and it came to be known as the "Sanctuary of Freedom." In it was held the great public meeting which preceded the Boston Tea Party. When the British occupied Boston it was used by them as a riding school. The building now serves as a museum of historical relics and as an auditorium for lectures upon historical and patriotic subjects. It is much visited by tourists.

OLD SOUTH MEETING HOUSE

OLEAN, *o le an'* N. Y., in Cattaraugus County, seventy miles southeast of Buffalo and five miles from Pennsylvania, on the Allegheny River, at the mouth of the Olean Creek, and on the Erie, the Pennsylvania and two more local railroads. It is in a region containing oil fields and hemlock and other forests; and it has oil refineries, tanneries, lumber mills, railroad shops, glassworks, flour mills and other factories. There are oil tanks here with 10,000,000 barrels capacity. The city contains a Carnegie Library, a state armory, a parochial school and three parks. A feature of interest in the vicinity is a massive collection of conglomerate rocks known as Rock City. The place was settled in 1804, and was chartered as a city in 1893. Population, 1910, 14,743; in 1917, 16,927 (Federal estimate).

OLEAN'DER, a plant, known also by the name of *rose* bay, which is a beautiful evergreen shrub, belonging to the dogbane family. It produces large clusters of pink or white, roselike flowers, and has long, narrow glossy leaves. The plant, especially the bark of the root, is poisonous.

OLEOMARGARINE, *o le o mahr'ga reen*, a butter substitute which has as its basic ingredients neutral lard, oleo oil extracted from beef-fat, and vegetable oils, such as cotton-seed and palm oil. Coloring matters, notably annatto and yellow coal-tar dye, are usually added, and the mixture, is also churned in milk and cream. These latter processes are for the purpose of imparting to oleomargarine the flavor and appearance of genuine butter. The product is finally worked, salted and packed for the market.

Oleomargarine of good quality is nutritious and wholesome, and there is no objection to its use if the purchaser knows that he is buying a butter substitute. To protect the consumer the United States government imposes a ten-cent tax on every pound colored to look like butter, and a tax of one-fourth of a cent on every pound uncolored. Foreign importations are taxed at the rate of fifteen cents a pound. In 1917 the domestic tax yielded $1,027,881. Illinois produces about two-thirds of the entire American output. Ohio, Kansas, Missouri and New Jersey are other important producers.

Butterine. This term was formerly applied to oleomargarine of superior grade, but it has fallen into disuse in this sense. In government reports only the term *oleomar-*

garine is used to signify butter substitutes. See BUTTER; ADULTERATION.

OLIGARCHY, *ol'i gahr ky.* See GOVERNMENT.

OLIVE, a fruit tree, of which there are several species. The common olive is a low, branching, evergreen tree, from twenty to thirty feet high, with stiff, narrow, dusky-green or bluish leaves. The flowers, small and white, appear from June to August. The fruit is a plumlike berry of greenish pulp, covered with a thin smooth skin and containing a hard stone. The tree is a native of Syria and it is cultivated in almost every warm, dry climate. The tree grows slowly and lives a long time. As its age increases the trunk becomes gnarled, and twisted into odd shapes, but it continues to produce great quantities of fruit even when it appears to be on the verge of decay.

OLIVE

The wood is yellowish, beautifully streaked with dark lines, and can be brightly polished. It is serviceable in making boxes and small fancy articles. From earliest times the olive tree has been held in veneration throughout the East. Among the Greeks it was sacred to Minerva, and olive wreaths were used by both Greeks and Romans to crown victors. The olive tree is associated with the garden of Gethsemane and with many of the scenes described in both the Old and the New Testaments. To this day it is everywhere recognized as the symbol of peace. California is one of the greatest olive-producing regions of the world.

OLIVE OIL, an oil extracted from the fruits of the olive tree. The olives are taken, as soon as picked, to a press, where they are run through a machine which crushes them into fine pulp. This is packed into short, open-mouthed baskets of rushes, several of which are put together into a press, which squeezes out the oil into tubs half filled with water. The oil remains at the top, and the impurities sink through the water to the bottom. The pulp is gathered together after passing through the press the first time and is usually sent through three times more, each successive pressure producing oil of a different grade. The oil is filtered and clarified until it becomes a beautiful golden-yellow liquid, suitable for the table. Much oil that is sold as olive oil is peanut oil or cottonseed oil or badly adulterated olive oil.

OLIVES, MOUNT OF, or **MOUNT OLIVET,** a hill on the east side of Jerusalem, separated from it by Kedron Valley. The summit, divided into four parts by intervening depressions, is about 200 feet above the city. The hill is mentioned several times in the Old Testament, and was the scene of important events in the life of Jesus. Over the road which winds around its southern end He made his triumphal entry into Jerusalem, and upon the mount He delivered one of His sermons (*Mark* XXX, 3). On the western slope lay the Garden of Gethsemane, whither He often withdrew for prayer. Christian tradition names the mount as the scene of His transfiguration.

OLMSTED, *om'sted* or *um'sted,* FREDERICK LAW (1822–1903), an American landscape architect, was born at Hartford, Conn., educated at Yale University and Amherst College. He first engaged in farming, but, after several trips to Europe and through his own country, he was appointed landscape architect and superintendent of Central Park, in New York City. During the Civil War he was secretary of the United States Sanitary Commission, and by his personal visits to the camps and his tireless efforts in all directions he succeeded in instituting many measures for the relief of the sick and wounded and for the comfort of the soldiers in the field. He assisted in planning many of the largest parks in the county, including several in New York, Brooklyn, Boston, Montreal, Chicago and Milwaukee, as well as the terraces and grounds of the United States Capitol and several important features of the grounds of the World's Columbian Exposition in Chicago. He was the author of many valuable books upon agricultural methods and upon special phases of landscape gardening.

OL'NEY, RICHARD (1835–1917), an American statesman, born in Oxford, Mass. He was graduated from Brown University at the age of twenty-one and studied law at Harvard for three years. Olney was elected to the Massachusetts legislature in 1874 and was a candidate for attorney-general on the Democratic ticket, but he confined himself

chiefly to private practice, where he gained a wide reputation. He was appointed Attorney-General of the United States by President Cleveland in his second term, and in this office he gained fame for his successful effort to break the Pullman strike in Chicago in 1894 by the use of a Federal injunction. Olney became Secretary of State in 1895, on the death of Secretary Gresham. He conducted the negotiations leading to the arbitration of the British-Venezuela controversy and caused wide comment by his firm and vigorous letter of instructions to Ambassador Bayard at London. In 1913 Olney was offered, but declined, the ambassadorship to Great Britain, but in 1915 he became a member of the International Commission under the treaty between France and the United States.

OLYMPIA, *o lim'pi a,* a valley in the district of Elis, Greece, the scene of the famous Olympic games, held in ancient times every four years. There was no town there, but a sanctuary and buildings connected with it. Here were collected thousands of statues of the gods and of victors in the games, treasure houses full of votive offerings, temples, altars, tombs—in short, the most precious treasures of Greek art. Among the buildings were the great temple of Zeus, containing the colossal statue of the god, by Phidias, and considered one of the seven wonders of the ancient world; the temple of Hera, the oldest building at Olympia; the twelve treasure houses, and the building in which the Olympic victors dined after the contests (see Olympian Games). Recent excavations have brought to light numerous valuable fragments of sculpture, bronzes, coins and terra cottas. The most important of the sculptures found there is the *Hermes* of Praxiteles.

OLYMPIA, Wash., the capital of the state and the county seat of Thurston County, is on Puget Sound, about 100 miles north of Portland, Ore., and sixty-five miles from the Pacific coast, and on a branch of the Northern Pacific Railroad. The city has a beautiful location on a peninsula near the head of the Sound, with mountains on each side of the valley. The chief buildings are the capitol, the county courthouse, the Temple of Justice, a Carnegie Library, a Federal building and two hospitals. The leading manufactures include lumber and lumber products, earthenware, shoes, soap and other products. Abundant water power is furnished by the Des Chutes River, which in a series of cascades has a fall of eighty-five feet. The first settlement in Washington was made near Olympia in 1848. The town was incorporated in 1859, the same year that Washington was admitted as a state. Population, 1910, 6,996; in 1917, about 7,500.

OLYMPIAD, *o lim'pi ad,* the period of four years between two successive celebrations of the Olympic Games. The Greek historians and writers began to use Olympiad as a convenient system of chronological reckoning about 300 B. C., when they began to date events from the time of the first recorded games, 776 B. C.


Throwing the discus

OLYM'PIAN GAMES. In the year 1896 there was held in Athens, Greece, a great international athletic festival, which was attended by visitors from all over the world. In the various contests amateur sportsmen of many different countries participated, and the event was heralded as tangible evidence of the ties that unite the members of the family of nations. This international meet was a revival of the most prominent and elaborately observed of all Greek festivals, celebrated in honor of Zeus, on the plain of Olympia. The "Sacred Grove," containing the sanctuaries connected with the games, enclosed a beautiful spot 660 by 580 feet in extent, adorned with temples, monuments, altars and theaters, and was crossed by a road called the Pompic Way, along which all the processions passed. Here was located the Olympium, dedicated to the Olympian Zeus. The place also contained a colossal statue of the god, the masterpiece of the sculptor Phidias. At first, only the Peloponnesus patronized the Olympian games, but gradually the other Greek states joined in them. Originally none but those of pure Hellenic blood were permitted to participate in them, but after the conquest of Greece by the Romans the competition became general, and Roman emperors figured among the lists of victors. The games consisted of running, wrestling and other athletic exercises, and the victor was crowned with garlands.

The revival, in 1896, of the Olympic games, after a cessation of exactly 1,500 years (the edict forbidding them having been issued by the Emperor Theodosius in 396), was an event of historic interest and gave the modern Greeks a coveted opportunity to compete with other nations in the field of athletics. The members of the royal family of Greece participated in the festivities and engaged in the competition for prizes, while the king in person distributed the awards. The stadium erected was an exact reproduction of that of Herodius Atticus, and the arena was capable of seating 70,000 spectators. Among the performances was a long-distance foot-race from Marathon to Athens, for which a special amphora, or cup, was given, in memory of the plucky runner of old, who died in bringing to Athens the news of the rout of the Persians.

It was hoped that similar meetings might become a permanent feature of international life. Games were held at Paris in 1900, at Saint Louis in 1904 and in the Stadium at Shepherd's Bush, London, in 1908. The events included races, bicycling, swimming, rowing, wrestling, tennis, archery and other sports. In 1912 the games were held at Stockholm, Sweden, where Sweden was first with 133 points, the United State being second and Great Britain third. In the field and track events the United States led by a large margin, Great Britain being second, Russia third and Sweden fourth. This order was not disturbed by the subsequent disqualification of James Thorpe, American, who won the all-around championship, but was disqualified because he was found to be not strictly an amateur.

The 1916 series was scheduled to be held at Berlin, but the plan was dropped because of the World War.

OLYM'PUS, the name given by the ancients to several mountains or mountain chains. There was one in Mysia, one in Cyprus and one, the most famous of all, between Thessaly and Macedon. This last, which reached a height of over 9,700 feet above the sea level, was the highest mountain in Greece and was in early times regarded as the home of the gods.

OMAHA, Neb., the thirty-fourth city of the nation in size, and largest city of the state and the county seat of Douglas County, on the Missouri River, 492 miles west of Chicago, and on the Union Pacific, the Chicago & North Western, the Chicago, Milwaukee & Saint Paul, the Chicago, Rock Island & Pacific, the Missouri Pacific, the Chicago Great Western, the Wabash, the Illinois Central and the Chicago, Saint Paul, Minneapolis & Omaha railroads. Interurbans connect the city with the surrounding territory. The river is crossed by three great bridges. There are six public parks, comprising about 1,350 acres. Notable buildings are the Douglas County courthouse, the city hall, the city National Bank, the Omaha National Bank, the Union Pacific Headquarters, Woodmen of the World building, the *Bee* and *World* buildings, and the Fontenelle Hotel.

The public library contains nearly 130,000 volumes. Over fifty graded schools and two-high school buildings comprise the public educational institutions, the city having, besides, the medical school of the University of Nebraska; Creighton University, Creighton Medical, Dental, Pharmaceutical and Law schools; Brownell Hall, under the auspices of the Episcopal Church, parochial schools of the Catholic and German Lutheran churches and the Nebraska State Institute for the Deaf. Omaha is the see city of the North Nebraska diocese of the Catholic Church, and is also the home of the Methodist Episcopal and Episcopalian bishops presiding over the district in the West.

The city is an important railroad center and distributing point, and has an extensive wholesale trade, especially in corn, other agricultural produce and sheep. It has one of the most complete smelters for various ores that has ever been constructed. The leading manufactures include butter, meat products, locomotives, cars and other railroad supplies and numerous other products. The city is also a great grain market.

Omaha is the headquarters of the Union Pacific Railroad, which has large shops here. It is the headquarters of the Department of Missouri, United States Army, and two military posts, Fort Omaha and Fort Crook, are maintained near the city. The first settlement was made in 1854, and for thirteen years Omaha was the capital of the territory and state. It was named after the Omaha Indians. Population, 1910, 124,096; in 1918, 180,264 (Federal estimate).

OMAN, *o mahn'*, a sultanate in the southeastern part of Arabia, partly on the Persian Gulf and partly on the Indian Ocean. Its area is estimated at 82,000 square miles, and

its population at 1,500,000. The chief features of the country are the stretches of barren sand and rock; the mountains near the coast, which rise in places to 10,000 feet, and the fertile valleys and plains, which yield an abundance of sugar, coffee, rice, cotton and fruits. Dates constitute the chief product and the largest export. The country is the richest part of the peninsula, both in agricultural products and in mineral resources. The inhabitants are mostly Arabs, but there is a considerable admixture of Hindus, Persians and negroes. The form of government is a monarchy, the ruler being known as the *imam*. Though independent, Oman is under British protection. The capital is Muscat (which see).

OMAR KHAYYAM, *ki yahm′*, a Persian poet, astronomer and philosopher, born at Nishapur, in the latter half of the eleventh century. He wrote various scientific works which were of high value in their day, but he is now remembered chiefly for his *Rubaiyat*, a collection of epigrams in verse, in praise of wine, love and pleasure. The book, as freely translated into English verse by Edward Fitzgerald, is exquisite poetry but not in line with the best modern ethics.

O'MENS, signs supposed to portend future events. Belief in omens was a part of ancient religion, and rules were made according to which priests interpreted them. Among the ancient Romans the taking of omens was a public institution of great importance. To-day belief in omens is not uncommon among the more thoughtless people. See AUGURS.

OMNIBUS BILL, the name given frequently to single legislative acts which include many slightly related or wholly unrelated measures. In American history it is applied to the compromise measures of 1850, which, though embodied in several bills, were passed in accordance with a single plan. See COMPROMISE OF 1850.

OMSK, *ohmsk*, SIBERIA, the capital of the government of Akmolinsk, and the headquarters of the anti-Bolshevik government of Western Siberia, established after the downfall of the Kerensky régime. Omsk is situated on the Trans-Siberian Railway, 1,624 miles east of Moscow and 280 miles southeast of Tobolsk. It lies on a barren plain just above the point where the Om and the Irtisch rivers unite. Under the empire the city was one of the strongest military stations in Western Siberian, and in its military schools thousands of Cossacks received their training. The place was also a distributing center for its district. Population, 1913, 135,800.

ONEGA, *o nye′ga*, a river in the northern part of Russia. It rises in Lake Latcha, flows in a northerly course for about 250 miles and enters the Gulf of Onega. It is navigable for steamers for about eighty miles.

ONEGA, LAKE, a lake in Russia, near the center of the government of Olonetz, after Lake Ladoga the largest lake in Europe, covering an area of about 3,670 square miles. It is fed by numerous creeks, and is dotted with islands. Fish are plentiful. The lake discharges through the Svir River into Lake Ladoga.

ONEIDA, *o ni′dah*, an Iroquoian tribe who lived originally in New York along the shores of Oneida Lake. They belonged to the confederacy known as the Five (later Six) Nations (see FIVE NATIONS). During the Revolution they sided with the Americans, but the other Iroquoians aided the British, and under the leadership of Joseph Brant attacked the Oneidas. After the war a part of the tribe emigrated to the Thames River district, Ontario, where their descendants number about 800. There are about 3,000 Oneidas in Canada and the United States. Most of those in the latter country are in Wisconsin.

ONEIDA COMMUNITY, an organization founded by John Humphrey Noyes in the middle of the last century. At first the society was a communistic settlement. The members lived as one large family, sharing equally the labors and benefits of the Community, and the support and education of children were made the concern of the whole organization. The ideas of marriage were radical. The communists opposed a legal bond and permanent mating, and believed in what they called "Complex marriage." Their unusual views made them objectionable to the surrounding communities, and they migrated from Putney Vt., to Oneida, N. Y. Then one of the members invented a steel game trap, and the proceeds from this invention brought prosperity to the organization. In 1879 the system of complex marriages was abandoned, and two years later the community was reorganized and a joint stock company, which to-day pays good dividends to the stockholders, was formed. The company has factories at Niagara Falls, Ont., and at Kenwood, Sherrill and Niagara Falls, N. Y.

ONEIDA, *o ni'dah,* **LAKE,** a lake in Central New York which forms the boundary between Onondaga and Oswego counties. Its length is about twenty-five miles, its width, four miles. It is drained by the Oneida and Oswego rivers. It constitutes a natural section of the New York State Barge Canal system.

ONION, *un'yun,* a well-known plant, the bulbous root of which is much used as an article of food. It is a biennial herb, with long, narrow leaves and a swelling, pithy stalk. The peculiar flavor varies much according to the size of the bulb, the small reddish onions having much more pungency than the large ones. The onion may be grown from the tropics to the coldest regions of the temperate zone. There are at least twenty varieties, Strassburg, Bermuda, Spanish and Portuguese onions being among the most esteemed. In Spain, the onion forms a large portion of the food of the poorer classes. Egypt is believed to be the original home of the plant. In the United States it is raised in immense quantities, the leading states being Ohio, New York, Texas, Massachusetts, Illinois and Indiana. See color plate on *Lily Family,* accompanying the article Lily.

ONONDAGA, *on on daw'ga,* a North American Indian tribe of Iroquoian stock who belonged to the confederacy known as the Five Nations (see Five Nations). The Onondagas, who lived in Central New York near the lake that now bears their name, were the official guardians of the council fire of the league. They were not a warlike tribe, and were less prominent than the Mohawks or Senecas. At present there are about 300 on the Onondaga reservation in New York; others are on the Grand River reservation in Ontario.

ONTA'RIO, formerly Upper Canada, or Canada West, is the second largest province of the Dominion of Canada, and the first in wealth, population and industrial importance. The boundaries of this flourishing province are very irregular. The northern boundary line extends from the northeast corner of Manitoba where it touches Hudson Bay, to the southeastern extremity of James Bay. The straight eastern boundary of Ontario follows the Quebec line southward nearly to Lake Nipissing. From that point there is an irregular projection eastward, the northern boundary of this section being separated from Quebec by the Ottawa River. This irregular projection is separated from the United States on the south by the Saint Lawrence River and lakes Ontario and Erie. The rest of the southern boundary is formed by the Detroit River, Lake Huron and Lake Superior, and the Rainy River and the chain of lakes extending between Ontario and Minnesota. Manitoba is on the west and northwest.

Size and Population. Quebec is the only Canadian province larger than Ontario, which has a maximum extent from east to west of about 1,000 miles, slightly more than the distance between New York and Chicago. From north to south its greatest extent is 700 miles. With an area of 407,262 square miles, it covers a territory large enough to contain Texas and nearly all of California. Of the total area, 41,383 square miles are water, exclusive of the Canadian portion of the Great Lakes. The present boundaries enclose what are known as New and Old Ontario. The new portion, which lies north of the Albany River, was added in 1912, when the Keewatin district was divided between Ontario and Manitoba.

In 1911, according to the Dominion census, the province had a population of 2,523,274. The greater number of the people are of English, Scotch and Irish extraction, but in the larger cities there are many immigrants from various countries of continental Europe. There are about 21,000 Indians. Over half the people of Ontario live in towns or cities, a proportion not equaled elsewhere in the Dominion. The southern part, or old Ontario, contains the great proportion of the population. About one-fifth are Roman Catholics; the most important Protestant bodies are, in order, the Methodist, Presbyterian, Baptist and Anglican.

Surface and Drainage. In general, Ontario is a low plateau with a rolling or wavy surface. This regularity is broken by a height of land, which extends northwesterly from the Thousand Islands in the Saint Lawrence to the north shores of lakes Huron and Superior, where it forms the bluffs that characterize this region. The highest point of this elevated section is Tip-Top Hill (2,120 feet) in the Thunder Bay district. Isle Saint Ig-

nace (1,864 feet) is the second highest point. Another height of land, caused by the elevation of the rock over which the cataract of Niagara plunges, extends to the head of Georgian Bay, where it reaches its highest point in the Blue Mountains. It thence extends northwesterly, forming the peninsula between Georgian Bay and Lake Huron and the Manitoulin Islands. The southern part of the province bordering upon Lake Ontario, is lowland. The northern part is a portion of the Laurentian plateau.

The chief rivers are those forming the boundary lines. In addition to these are the Maganetowan and the Muskoka, flowing into Georgian Bay; the Thames, flowing into Lake Erie, the Petawawa, flowing into the Ottawa; and the Albany, draining the western part of the province and flowing into James Bay. The province contains a large number of lakes. The most important of these are Rice Lake, north of the central part of Lake Ontario; Lake Simcoe, directly north of Toronto; the Muskoka lakes, and Lake Nipissing.

Climate. The southern part of the province bordering upon the Great Lakes has a mild and equable climate. In the severest winter weather the thermometer seldom falls lower than 8° below zero, and in the hottest months it seldom reaches 90° above. The influence of the lakes here prevents sudden or great changes, but in the northern part the extremes are greater. Here the winters are severe, and the summers are short and hot. The annual rainfall varies from thirty to forty inches. During the winter there is sufficient snow to protect the crops and to facilitate lumbering.

Minerals and Mining. Coal is the only important mineral in common use which the province does not possess. In the region north of lakes Huron and Superior are rich deposits of a variety of metals. The Sudbury nickel mines, north of Georgian Bay, are the most valuable of their kind in the world, and the Cobalt region, 300 miles north of Toronto, is one of the richest silver districts anywhere exploited. The silver ores contain such quantities of cobalt that they have become the world's most important source of that metal. Ontario is also the chief Canadian province in the production of gold, the most profitable deposits of which are found around Porcupine, 479 miles north of Toronto. Copper occurs along the north shore of Lake Huron, and in the region west of Lake Superior iron ore is found in paying quantities. Salt, which is found extensively in the region bordering on Lake Huron, is obtained by sinking deep wells, pumping out the brine and evaporating it. Natural gas and petroleum are other minerals of value. The total value of mineral products worked has been steadily increasing for years. In 1908 it was $25,637,617; in 1917, $72,093,832.

Agriculture. Agriculture is the chief industry, and it occupies the attention of by far the greater portion of the inhabitants. The southern part of the province, bordering upon the Great Lakes, has a very fertile soil, and the climate is adapted to the growth of all products of a temperate climate. In the region farther north the soil is admirably suited to the raising of hay, potatoes and the hardier grains. Forage crops, grains, vegetables and fruits are raised extensively. Hay is the most valuable field crop, followed by oats. The annual oats yield is about 115,000,000 bushels, and the acreage devoted to this grain is over 2,700,000. Ontario produces more winter wheat than all the rest of the provinces together, the average annual crop being over 13,000,000 bushels. Spring wheat is grown in every county, but not in sufficient quantities for export. Other field crops include barley, grown for feeding; Indian corn, used principally to fatten hogs; rye and flax. Over 1,500,000 bushels of peas were harvested in 1917, Ontario peas being among the best in the world. Potatoes and other garden vegetables, sugar beets, tobacco and buckwheat are also cultivated.

The region along the Great Lakes is a famous fruit section. The province produces three-fifths of the total apple crop of Canada, and exports to Great Britain more of this fruit than any other province or state in North America. Ninety-five per cent of the grapes grown in the Dominion are produced in Lincoln, Wentworth and Welland counties, bordering on Lake Ontario. Pears, peaches, melons, plums, cherries and berries are other profitable fruits.

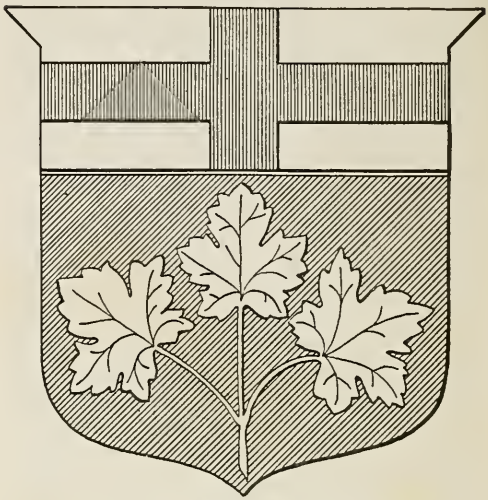
Bee keeping, dairying and rearing of live stock are important branches of agriculture. It is estimated that there are about 300,000 bee colonies in the province; at the provincial agricultural college courses in bee keeping are given. The annual production of cheese, butter, milk, cream, condensed milk and

powdered milk is valued at about $65,000,000. The dairy products are of high quality, and the province maintains two dairy schools. Ontario produces over half the cheese made in Canada, and exports large amounts to Great Britain. The province is noted for its excellent breeds of cattle, horses and sheep, and special pains are taken to keep the standards high. The same policy prevails in regard to poultry. In all lines of agriculture the government extends encouragement and aid to the producer.

Manufactures. With its splendid water-power facilities, good transportation and abundance of raw material, Ontario easily leads as a manufacturing center. Lumber products are the most important line of manufacture, and raw material is secured from the splendid stand of hard woods, spruce, pine and tamarack. About one-fourth of the province is still forest-covered, and there are about 60,000,000 acres of standing timber in the north. The iron and steel industry is also a flourishing and developing activity, the chief centers of the industry being Collingwood, Deseronto, Sault Sainte Marie, Midland and Hamilton. Flour mills, machine shops, carriage and wagon works, furniture establishments and manufactories of paper, cotton and woolen goods, pianos and organs are also numerous. At Niagara Falls there is an immense government power plant, and other valuable sites are also owned by the government, which created a hydroelectric commission in 1906 to supervise the development and distribution of power.

Fisheries. The annual value of the commercial fisheries of the province is in the neighborhood of $3,000,000. Whitefish, trout, herring, sturgeon, pike, pickerel and other lake fish are caught in the Great Lakes waters. In connection with the fishing industry the preparation of sturgeon caviare is a flourishing enterprise.

Transportation and Commerce. The frontage of the Great Lakes furnishes ample opportunity for water transportation through the Saint Lawrence to the ocean. The southern part of the province is traversed by the Grand Trunk and Canadian Pacific railways and other lines which cross from Detroit to Buffalo. Each of these roads has cross lines and branches extending to the most important agricultural and commercial centers within its territory. The Canadian Pacific also has a line extending across the northern part of the province and westward to the coast. The Grand Trunk Pacific is another northern road. In all there are over 10,000



COAT OF ARMS OF ONTARIO

The sprig of golden maple leaves, on a green background, has no special significance, except as the maple leaf is the national emblem. The red cross of St. George, on a silver ground, is the emblem of British sovereignty.

miles of steam railway, and a constantly increasing electric mileage.

The commerce is extensive. Lumber and lumber products, agricultural produce, butter and cheese, nickel, copper, silver and gold are exported. The principal imports are manufactured products. The United States and Great Britain have the largest share of the foreign trade.

Government and Religion. The executive department consists of a lieutenant-governor, appointed by the Governor-General of the Dominion for five years, and an executive council of eight members, each of whom is at the head of a department. The legislature is an assembly of one house of 111 members, chosen by popular vote. The courts consist of a supreme court of judicature, consisting of one high court of justice with divisions of the King's Bench, common pleas and court of chancery. The province is divided into counties, townships, towns and cities for purposes of local government, and in each of these units the administrative body is an elective council. In New Ontario in sections with few inhabitants the local unit is the district, in which there is no governing council.

Items of Interest on Ontario

The first white man known to have set foot on what is now Ontario was Champlain; in 1613 he explored the Ottawa River as far as Allumette Island, and in 1615 he reached Georgian Bay by way of the Ottawa.

In 1763, when Canada was ceded to Great Britain, there was a great revolt led by Pontiac in a vain attempt to drive out the white men.

The Ontario Agricultural and Experimental Union, started in 1886, now embraces over 5,000 farmers in the province who conduct experiments on their farms. The Union holds annual meetings for discussion of the experiments.

Alfalfa is grown in nearly every county, and in some sections much attention is given to the production of alfalfa seed. In 1917–1918 the Trades and Labor Branch of National Service Workers organized camps for instructing girls in fruit picking, canning and truck gardening. Contracts were made with farmers and fruit associations for marketing the products.

Ontario has about three dozen jam and jelly factories, more than 115 fruit and vegetable canning factories, and about 100 fruit evaporators.

In 1917 Ontario possessed 1,082,119 milch cows and 865,847 other cattle; 732,977 horses; about 20,000 pure bred sheep, and about 972,000 of all kinds; and about 1,656,000 swine.

Ontario produces about one-fourth of the annual maple sugar output of Canada. The average yield of the province is 5,000,000 pounds.

In Ontario there are two Dominion National Parks; they comprise twelve islands in the Saint Lawrence River and Point Pelee Bird Sanctuary.

The provincial government has an Experimental Forest Station of 1,800 acres in Norfolk County, where forest planting and nursery work are demonstrated. Since 1905 about 2,000,000 forest seedlings have been distributed from the government nurseries.

Amber mica, used especially as an insulator in electrical apparatus, is found extensively in Eastern Ontario, and the Lacey mine, near Sydenham, is the largest of its kind in North America. Canada is the only country in the world outside of Ceylon in which there are deposits of amber mica.

Questions on Ontario

What is the population? The area?

In what part of the province do most of the inhabitants live?

Describe briefly the surface of this district.

What is the average density of population?

What is the highest point in the Lake Superior region?

What is the Niagara escarpment?

What is the character of the north shore of Lake Superior?

What are the three principal rivers?

For what minerals is the province noted?

Where is most of the silver mined?

What part of the world's supply of nickel does Ontario produce?

What can you say of the gold output?

For what is the Porcupine district famous?

What is the total annual value of Ontario's mineral product?

What are the principal crops?

What fruits are raised extensively?

What can you say of the importance of Ontario's dairying? Fisheries?

What is the extent of the forest area?

What proportion of the grape yield of Canada is produced in Ontario?

How does the total value of manufactures compare with that of other provinces?

What manufacturing industries depend upon natural resources?

How many miles of railway are in the province?

Why may Ontario be justly called the "premier province" of Canada?

Name five large cities of the province.

Education. Ontario maintains an excellent system of schools, which are under the immediate control of a minister of education. Uniformity as to courses of study, methods of instruction and text-books is maintained, and in addition to the elementary schools, several normal schools and one normal college are maintained, also various technical and industrial schools with day and evening classes. At Toronto are located a technical school with 7,000 students and a high school of commerce with an enrollment of about 3,000. Toronto University is at the head of the educational system, and all of the high schools, common schools and kindergartens are affiliated with it, as are most of the colleges and secondary schools maintained by the various religious denominations. Among the latter are the University of Trinity College, Saint Michael's College, Victoria University, Wycliffe College and Knox College, all at Toronto. Other institutions of higher learning include Queen's University, at Kingston; Western University at London; University of Ottawa, at Ottawa; Royal Military College, at Kingston, besides numerous professional schools and kindergartens and schools of art and music.

Cities. Toronto, the capital, is the largest city in Ontario and the second largest in the Dominion, ranking next to Montreal. The next five (in order of size,) are Ottawa, Hamilton, London, Brantford and Kingston. Ottawa is the capital of the Dominion.

History. Canada was organized as a British possession in 1763, and in that year Ontario became a part of the old Quebec province. In 1791 this was divided into Upper Canada (or Canada West) and Lower Canada. The former division comprised Ontario, and the latter, Quebec. In 1837 a rebellion of French malcontents broke out, which was led by William Mackenzie in Upper Canada and by Louis Papineau in Lower Canada. This rebellion was suppressed, and in 1841 the two sections were united. The union continued until 1867, when the Dominion of Canada was organized. Since that time Ontario has enjoyed prosperity and progress. The province was loyal and generous in its efforts to aid Great Britain in the World War, and gave freely of its man power and its treasure. In 1916 the provincial legislature adopted a war-time prohibition measure, and in 1917 gave women municipal and provincial suffrage.

Related Articles. Consult the following titles for additional information:

Barrie	Kenora	Port Hope
Belleville	Kingston	Preston
Brantford	Kitchener	Revelstoke
Brockville	Lindsay	St. Catharine's
Chatham	London	Saint Thomas
Cobalt	Niagara Falls	Sarnia
Cobourg	North Bay	Sault Ste. Marie
Collingwood	Orillia	Smith's Falls
Cornwall	Oshawa	Stratford
Dundas	Ottawa	Toronto
Fort William	Owen Sound	Trenton
Galt	Parry Sound	Walkerville
Goderich	Pembroke	Waterloo
Guelph	Peterborough	Welland
Hamilton	Porcupine	Windsor
Ingersoll	Port Arthur	Woodstock

LAKES

Great Lakes, The — Nipigon
Lake of the Woods — Nipissing
Muskoka Lakes — Rainy

RIVERS

Ottawa — Saint Mary's
Saint Lawrence

HISTORY

Canada, subhead History — Quebec, subhead History
Mackenzie, William L.

ONTARIO, Lake, the smallest of the Great Lakes of North America (Lake Saint Clair not being considered) and the most easterly. It is situated between Northwestern New York and the province of Ontario, its greatest length, 185 miles, lying in a general east and west direction. It is oval in shape and about sixty miles wide, is 326 feet below Lake Erie, and between the two is Niagara Falls. It receives the waters of the latter through the Niagara River and the Welland Canal. Its waters pass out at the eastern end through the Lake of a Thousand Islands, thence to the Saint Lawrence River and into the Atlantic Ocean. The coasts are broken by numerous bays and small inlets and dotted with harbors. Toronto, Hamilton, Kingston and Oswego are the principal ports. The most important rivers discharging into the lake are Genesee, Oswego, Black, Humber and Trent. The lake is navigable throughout the year and carries a heavy commerce. By canal it is connected with the Hudson and Ottawa rivers. See Great Lakes.

ONYX, *on'iks,* a variety of agate with colors which are ususally shades of brown, green or red, alternating with white, arranged in parallel bands. When the red is of a deep brownish hue, and the white pure and transparent, the variety is known as *sardonyx.* Onyx was formerly highly prized for making cameos, the figures being formed of one layer and the background of another, and it is still used to some extent for this purpose. *Mexican onyx* is not a true onyx, but is a translucent limestone, with iron and manganese irregularly scattered through it, producing the beau-

ONTARIO

1, Bridge at Niagara Falls.
2, Canadian Lock at Sault Ste. Marie.
3, Dairy Products.
4, Fruits.
5, Grain Elevator at Fort William.
6, University College, Toronto.
7, Smelter in the Cobalt District.

tiful variegated appearance for which this stone is noted. It is found in layers in caves, where it was deposited by water. This stone was used by the Aztecs, who carved it into idols, masks and a variety of other objects. It is very soft and easily worked. See AGATE; CHALCEDONY; PRECIOUS STONES.

O'PAL, a precious stone, frequently showing a brilliant play of colors—yellow, red, green, blue. It is composed of silica and water, and is easily broken. The general appearance of the *precious opal* is whitish or milky, and the tints displayed are red, yellow, green, and blue or violet. The most brilliant variety known is the *fire opal*. Opals are found in Australia and in the western part of the United States. The best are mined at Dunkirk, Hungary. The finest opal known is an Austrian crown jewel weighing seventeen ounces. This gem is the birthstone for October. See BIRTHSTONES.

OPEN-AIR SCHOOLS, schools designed especially for tubercular children or others who are physically below normal and need building up. These schools are held on roofs of buildings or other out-of-door places, or in rooms open to the air, without artificial heat. The children are dressed in clothing specially designed for them, that they may enjoy the benefit of pure air and still not suffer from exposure. Nourishing food is provided, and the health is cared for in every way possible. The first American schools of this character were opened in 1904 in New York City and in Providence, R. I. So excellent were the results of the innovation that the fresh-air school is now found in nearly all large cities and in many of moderate size.

OPEN SHOP, an industrial establishment where employes may work whether they belong to labor unions or not. It is the opposite of the closed shop (where only union labor is employed). This classification represents a phase of the conflict between capital and labor. Capital insists on its right to manage its business as it sees fit, hence to employ whom it will; labor points to the benefits of unionism and insists that the closed shop is virtually a necessity to its cause. See LABOR ORGANIZATIONS.

OP'ERA, a dramatic composition set to music and sung on the stage, accompanied with musical instruments and enriched by the accessories of costumes, scenery and dancing. The component parts of an opera are recitatives, solos, duets, trios, quartettes and choruses, and they are usually preceded by an instrumental overture. The chief classes of opera are *opéra seria*, or *grand opera*, constructed upon serious themes and generally a tragic outcome, such as Verdi's *Aïda; opéra comique*, which may be serious or humorous, but contains spoken dialogue as well as musical numbers, such as Beethoven's *Fidelio; romantic opera*, an Italian form, representing a combination of the serious and comic; and *light*, or *comic opera*, best represented by the Gilbert and Sullivan series. Among these may be mentioned *The Mikado, Pinafore* and *The Pirates of Penzance*.

Development of the Opera. Though the Greek dramas were operatic in character, as the chorus was an important feature in them, the opera proper is of modern date and of Italian origin. The first operas date from the sixteenth century. About the close of this century the poet Rinuccini wrote a drama on the classical story of Daphne, which was set to music by Peri, the most celebrated musician of the age. The orchestra of this first opera consisted of four instruments, namely, a harpsichord, a harp, a viol di gamba and a lute. There was no attempt at melodies, and the recitative was merely a kind of measured speech. Monteverde, a Milanese musician, improved the recitative by giving it more flow and expression. In the middle of the seventeenth century, melodies, or airs, connected in sentiment and spirit with the dialogue were first introduced. The first regular serious opera was performed at Naples in 1615. The first light opera is said to have been presented at Venice in 1624, where also the first stage for operas was erected in 1637. In 1646 the opera was transplanted to France by Cardinal Mazarin; about the same time it was introduced into Germany, and somewhat later it was taken to England. Lavish expenditures attended the presentation of these early operas. In 1680 an opera was performed in Padua which required a chorus of 100 girls, 100 soldiers and an equal number of iron-clad horsemen.

At the beginning of the eighteenth century a revival and reform occurred, the German-Frenchman Gluck being its chief exponent, his purpose being to restore to opera the dramatic element which it had long lacked. Then began a separate national development in each of the great countries of Europe. The chief Italian composers include, besides those

mentioned, Piccini, Cherubini, Rossini, Bellini, Donizetti, Mascagni, Puccini, and Verdi. Among the French composers are Meyerbeer, Grétry, Auber, Halévy, Gounod, Offenbach, Bizet, Saint Saëns, Massenet, Debussy and Charpentier.

Among American composers of operas may be mentioned Reginald de Koven, Victor Herbert, Damrosch and Sousa; and among English composers, Balfe, Macfarren, Sullivan, Mackenzie and Thomas. It is the German composers, however, who have raised opera to the highest point of perfection, the list including such names as Handel, Mozart, Beethoven, Weber, Flotow and, finally, Richard Wagner, the most celebrated of modern composers. In his work, the vocal music of the piece is deprived of the prominent place formerly assigned to it and is made subordinate to text, instrumentation and scenic decoration. He preferred the name *musical drama* for his works.

The following are among the best-known operas:

Aïda, Verdi
Barber of Seville, Rossini
Bohemian Girl, Balfe
Carmen, Bizet
Cavalleria Rusticana, Mascagni
Don Giovanni, Mozart
Faust, Gounod
Fliegende Hollander, Der, Wagner
Fra Diavolo, Auber
Freischütz, Der, Weber
Les Huguenots, Meyerbeer
Lohengrin, Wagner
Lucia di Lammermoor, Donizetti
Madame Butterfly, Puccini
Magic Flute, Mozart
Marth, Flotow
Meistersinger von Nürnberg, Wagner
Mikado, Sullivan
Nora, Bellin
Oberon, Weber
Pagliacci, Leoncavallo
Rienzi, Wagner
Ring des Nibelungen, Wagner
Robin Hood, De Koven
Robert le Diable, Meyerbeer
Salome. Strauss
Tannhäuser, Wagner
Tristan und Isolde, Wagner
Troyens, Les, Berlioz
Trovatore, Il, Verdi
William Tell, Rossini

Related Articles. Consult the following titles for additional information:
Aïda
Carmen
Cavalleria Rusticana
Comic Opera
Faust, John
Lohengrin
Parsifal
Tannhauser
COMPOSERS AND SINGERS
See Music

OP'ERA GLASS, a small, double telescope, used chiefly in the theater to obtain a clearer and more distinct view of the actors; it is also much used in outdoor nature study. The instrument has a double-convex lens for its object glass and a concave lens for the eyepiece. The eyepiece is attached to a rack and pinion, by means of which it can be properly focused. See FIELD GLASS; LENS; TELESCOPE.

OPHIR, *o'feer*, the region to which the Hebrews made voyages in the time of Solomon, bringing home gold, precious stones and fine wood (*I Kings* IX, 26–28; X, 11; *II Chron.* VIII, 18). Some authorities believe that it was situated in the Arabia; others think it was in India or Africa.

OPHTHALMIA, *of thal'me a.* See CONJUNCTIVITIS.

OPTHAL'MOSCOPE, an instrument for observing the internal structure of the eye. It consists of a mirror, by which light from an artificial source is directed into the eye of the patient, and a double convex lens, by which the illumined parts of the structure of the eye are magnified, in order that they may be more easly examined, the observer looking through a hole in the center of the mirror. The light is usually placed to the side of and slightly behind the patient's head.

O'PIUM, the dried juice of a species of poppy, used in medicine, by the dissolute as an opiate, and well known in many places as an ornamental garden plant. Commercially it is of more importance than any other drug. It is a powerful narcotic, and is used in medicine chiefly to procure sleep and to bring relief from pain. It is often used in the form of *laudanum*, and is an ingredient of many patent medicines (see MORPHINE).

OPIUM POPPY
a, whole plant; b, flower and leaf; c, ripe capsule; d, seed and its section, enlarged.

The juice, which is procured by making an incision in the green head or seed capsule of the flower, flows out in the form of a milky liquid; soon it hardens and turns black. It is then scraped off and dried thoroughly, and next goes through a kneading process and is molded into cakes or balls for the market.

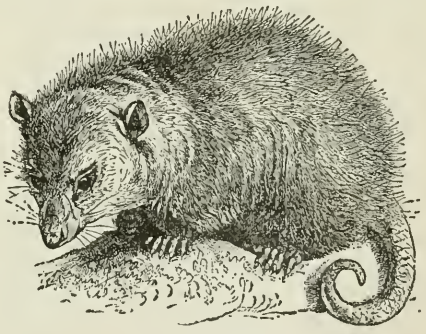
The agreeable effects produced on the system by opium have tempted many persons to form the opium habit. Evil effects as serious as those of excessive alcoholic drinking follow over-indulgence in opium. The habitual use of opium is most common in China and the Malay Archipelago, though it has decreased considerably in recent years owing to the influence of missionaries and to an agreement between China and Great Britain, whereby the latter country has promised to curb the production and exportation of opium from India, the chief source of China's supply. The western market is supplied with opium from Asia Minor.

Opium War, a war between China and Great Britain which began in 1840 as a result of China's attempts to stop the importation of opium from India. In 1729 an edict had been passed forbidding the importation of opium into China from India. Notwithstanding all precautions, it continued to be smuggled in, and in 1839 the Chinese government took stringent measures. A shipload of opium bound for China and valued at ten million dollars was destroyed in Canton harbor. Serious complications followed. It was shown that the sudden stoppage of opium traffic would result in widespread famine in India, where in many places it had been the chief crop. In the end China was forced to pay a large indemnity, but great Britain agreed to stop the Indian production gradually. In 1906 the use of opium was prohibited in the schools and in the army, and people were forbidden to grow it. In 1916 further steps were taken by the government to banish the evil.

OPOR'TO, Portugal, the second city in size in the kingdom (ranking next to Lisbon), and capital of the district of its own name, is situated on a steep declivity on the right bank of the River Douro, three miles from its mouth and about 175 miles north-northeast of Lisbon. The river is crossed by two bridges of recent constuction, one of which is the largest and most beautiful bridge of its kind in Europe. Among the chief buildings of the city are the "Tower of the Clergy," a granite structure 246 feet high; the Gothic cathedral, the episcopal palace, the exchange, the crystal palace, the mint and the opera house. There are also museums, a large library, a medical college, schools of commerce and navigation and other schools of high rank, together with hospitals, art galleries and fine gardens. Oporto is the chief industrial city of Portugal. The principal trade is in wine, chiefly port wine, which is named from the town. There are manufactures of hats, silks, cotton, woolen and linen stuffs, paper, wax, tobacco, soap and other articles.

Oporto was an important town during the Middle Ages. In 1808 it was captured by the French, and in the following year Wellington drove the French out of it, after the remarkable passage of the Douro. Early in 1919 it was seized by revolutionary forces seeking to restore the monarchy, and was made their stronghold. In February the royalists were suppressed and Oporto restored to republican control (see Portugal). Population, 1911, 194,009.

OPOS'SUM, a mammal found in America as far north as Hudson Bay. It is nocturnal in its habits and lives mostly in trees, swinging from branch to branch with the aid of its tail and feeding on small reptiles, birds' eggs



OPOSSUM

and young and almost anything else which comes its way. There are about twenty species; some are as small as a rat, and others are the size of a large cat. The largest, the common opossum, is the only animal in America which has a pouch for carrying the young. It is whitish-gray in color, and the hair is soft and wool-like. It is common in the southern part of the United States, where it is regarded by negroes as a choice meat for the table. When captured or threatened with danger, the opossum feigns death, and

the phrase "playing 'possum" is on this account often used to indicate any deceitful proceeding.

OP'PER, Frederick Burr (1857-), an American illustrator, born in Madison, Ohio. For several years he was connected with Frank Leslie's magazines, *Puck* and *Hearst's* New York *Journal.* He made a reputation with his cartoons against political leaders and the "trusts" in political campaigns. His drawings, while lacking artistic merit, forcefully express a situation or an idea and often reveal a keen sense of humor. He illustrated the writings of "Bill" Nye and Mark Twain, and Peter Dunne's *Mr. Dooley.* He also ranks as an author of some note, having written *Folks in Funnyville, John Bull, Happy Hooligan, Alphonse and Gaston* and *Our Antediluvian Ancestors.*

OPTIC NERVE. See Eye.

OPTICS. See Light.

OPTIMISM, *op'ti miz'm* (from the Latin word *optimus,* meaning *best*), is the belief that there is more good than evil in the world and that mankind is growing better; a disposition to take a hopeful attitude toward life and to look on the bright side of things. One who habitually takes this view is called an *optimist;* one who holds a contrary view is called a *pessimist.* The word *optimism* was first employed by the German philosopher Leibnitz, whose optimism was based on logic. Most of the optimism in the world is due not to logical reasons but to a joyous and happy temperament.

ORACLES, *or'a k'lz.* Nearly all of the peoples of antiquity believed that the gods controlled their destinies, and, moreover, that if the deities were consulted they would give advice concerning the proper course to be pursued for the attainment of success. The places of consultation, often the temple of the god approached, and also the replies to inquiries, were alike called oracles. The belief in oracles was so firm that vast numbers flocked to them for advice, and scarcely any war was waged, or peace concluded, or new form of government instituted, or new laws enacted, without the approbation of some oracle. The Greek oracles were the most celebrated, and among these the earliest, and one of the most famous, was that of Jupiter at Dodona. Apollo had many oracles, but that at Delphi held the first place, and it was often applied to for explanation of obscure answers obtained at Dodona. Another famous oracle of Apollo was in the island of Delos. The Romans had no important oracles of their own, but often consulted those of Greece and Egypt. Under the reign of Theodosius, the temples of the prophetic deities were closed or demolished. See Delphi.

ORAN, *o'rahn,* Algeria, a seaport and the capital of the department of Oran. It is 260 miles southwest of Algiers, on the Bay of Oran, an inlet of the Mediterranean Sea. The town is fortified, has a good harbor and considerable European architecture. It was founded by Arabs in the tenth century and became in time an important center. When the Moors were driven from Spain they took possession of Oran, and it became a port for pirates. In the sixteenth century Spain, to stop marauding, captured the port, but lost it to Turks a hundred years later. It regained possession in 1708, but abandoned the town after an earthquake had practically destroyed it in 1791. The French have occupied it since 1831. The city has a considerable trade, the principal exports being cereals, wine, olives, brandy, flour, esparto grass, sheep and cattle. The imports are coal and manufactured goods. Population, about 123,000.

ORANGE, *or'enj,* the most important of the citrus fruits, the group which includes the lemon, citron, lime and grapefruit. It is the fruit of a long-lived evergreen tree. The orange was brought from Southern Asia to Spain and Portugal during the sixteenth century. Taken to South America by the early explorers, it ran wild in the tropical forests of the Amazon; about the same time the sour orange was brought into Florida by the Spaniards. Here, until 1880, large wild groves were to be found, usually on mounds marking the former homes of the natives. In more recent years the stock of this class of oranges has been utilized to graft the sweet orange and the tangerine (see accompanying colored plate), which have since been extensively cultivated.

Description. The orange tree is small and has broad, green leaves. Under the most favorable circumstances it seldom exceeds thirty feet in height, and in cultivation it is kept much lower. The branches are low, and the flowers are white and waxlike; because of their beauty and fragrance orange blossoms have long been worn in almost all parts of the world by the bride on her wedding day.

The fruit is nearly spherical, bright yellow in color, and contains a pulp which con-

ORANGES

1, Branch with Fruit and Flower.
2, Flower and Bud.
3, Pistil and Ovary.
4, Section through the Flower.
5, Plan of the Flower.
6, Blood Orange.
7, Navel Orange.
8, Tangerine.

The Orange

I. Description
- (1) Tree
  - (a) Height
  - (b) Branches
  - (c) Leaves
    - (1) Shape
  - (d) Blossom
    - (1) Color
    - (2) Shape
    - (3) Fragrance
- (2) Fruit
  - (a) Shape
  - (b) Color
  - (c) Kinds
    - (1) Navels
    - (2) Blood Orange
    - (3) Russets
    - (4) Mandarins

II. Production
- (1) Mediterranean countries
- (2) India and the East Indies
- (3) North and South America
  - (a) United States
  - (b) Brazil
  - (c) Other countries

III. Harvest
- (1) Picking
- (2) Sorting
- (3) Packing
- (4) Shipping

Questions on the Orange

Of what continent is the orange a native?

What countries are the chief producers of oranges?

On what kinds of soil does the orange thrive?

Name three common varieties. Describe each as well as you can.

What is the average height of an orange tree?

What are the chief orange-producing states of the United States?

How are oranges prepared for shipment?

What conditions cause a variation in the average crop in the United States?

Why are orange blossoms popular with brides?

What can you say about the longevity of the orange tree?

sists of a collection of oblong segments, filled with a sugary and refreshing juice and in most varieties containing several seeds. There are many varieties under cultivation, but those in greatest demand in the United States are the *navels*, which are seedless. This orange was introduced from Brazil and is now grown in large quantities in California. *Blood oranges* are so called from the color of their juice, which is dark red. The oranges grown in Florida are generally known as *russets*. They are of a lighter yellow than the others, and the peel has a bronze coat which gives the orange its name. The *mandarin* orange, introduced from China, is small and somewhat flattened.

Cultivation. The orange is a warm-climate plant. It flourishes in any moderately fertile soil, if it is well drained and sufficiently moist, but a rather stiff loam, mixed with some vegetable matter, is best suited for the purpose. Grafting or budding on stocks raised from the seed is the usual method of cultivation. Carefully selected seeds are sown in well-prepared ground, and the seedlings removed to a nursery bed in the fourth or fifth year. About the seventh or eighth year they are grafted with the desired variety. After the grafts are sufficiently strong, the trees are planted in rows in a permanent orangery. The distance left between the trees varies. In France, when the trunks have reached a height of five to six feet, an average space of twenty feet is left; in the West Indies and the Azores a space of twenty-four or even thirty feet is not uncommon. The ground is kept well broken between the trees and the roots manured. In dry climates water must be supplied in abundance; nearly all the California orchards are irrigated. The tre require careful pruning, the heads being trained to a spherical form.

Marketing. In good seasons the orange tree produces great quantities of fruit; a single tree will produce from 400 to 1,000 oranges. A healthy tree will bear abundantly for fifty to eighty years; some of the bitter variety produce a fair crop for several centuries. Blossoms and green and ripe fruit are sometimes seen on the trees at the same time, but the bulk of the crop ripens at about the same time. When picked, the oranges are carefully wrapped in tissue paper and packed in boxes holding from 100 to 250 oranges, according to the size of the fruit. Average fruit runs from 176 to 200 in a box.

Production in America. In the United States Florida and California are the chief orange states. In favorable years the total annual output of the country is about 25,000,000 boxes, but this yield is sometimes reduced fifty per cent by frosts or other unfavorable weather conditions. The average California crop is 16,500,000 boxes, and that of Florida, 7,500,000. Louisiana, with 150,000, and Arizona, with 32,000, are next in order.

ORANGE, N. J., the parent settlement, in 1666, which has become, by growth and division, four cities, all of them attractive suburban towns, tributary to New York City. They are Orange, East Orange, West Orange and South Orange.

Orange, on the Erie and Lackawanna railroads, was originally a part of Newark, and existed first as Newark Mountain and then as the Mountain Society until 1806, when its present name was adopted. The surrounding scenery is most attractive; the elevation, twelve miles from the ocean, is about 200 feet, although hills in the vicinity reach 600 feet. The principal industry is the manufacture of hats. Population, 1910, 29,630; in 1917, 33,636 (Federal estimate).

East Orange, on the Erie and the Lackawanna railroads, is chiefly a residential suburb, though there are manufactories of electrical and pharmaceutical supplies. The town was a part of Orange until 1863; it became a city in 1899. Population, 1910, 34,371; in 1917, 43,761 (Federal estimate).

West Orange, until 1862 a part of Orange, is on the Erie Railroad, five miles northwest of Newark and twelve miles west of New York City. Here are the great Edison electrical works, and there are also carriage and hat factories. Population, 1910, 10,980; in 1917, 13,964 (Federal estimate).

South Orange, a town south of the parent city, from which it was separated in 1861. It is four miles west of Newark, on the Lackawanna Railroad, and has a fine location facing Orange Mountain. The Roman Catholic Church has here Seton Hall College, established in 1856. Population, 1910, 6,014.

ORANGE FREE STATE, Province of the, one of the states of the British Union of South Africa. It is separated from the Transvaal, on the north, by the Vaal River, and from the Cape of Good Hope province, on the south, by the Orange River. Its area is estimated at 50,389 square miles, or about the same as that of New York. Lying at a height of about 4,000 feet above the sea, the country, which is composed chiefly of vast undulating plains, is cold in winter, with violent thunder storms and long droughts in summer. The seasons are the reverse of those in countries in the northern hemisphere having a corresponding latitude. Because of the altitude, the climate is very healthful.

Pasturing is the chief occupation, and wool, hides and ostrich feathers are among the principal exports. Agriculture is increasing in importance, and corn is exported in considerable quantities. Diamonds and other precious stones have been found in paying quantities. Rich coal mines exist, and the country is said to abound in other mineral wealth. There are over 1,340 miles of railway in operation, the chief line being the one which connects Bloemfontein, the capital of the province, with the Transvaal railway systems.

The province is governed by the Administrator, appointed by the Governor-General for a term of five years, and by the provincial council, of twenty-five members, elected for four years. Education, while under the control of the government, is neither free nor compulsory. In 1836 a colony of Boers from Cape Colony, dissatisfied with the British rule there, entered the territory which is now the Orange Free State. The British annexed the territory in 1848, but in 1854 it was declared a free state. When war broke out between the South African Republic and Great Britain, the Orange Free State joined the former, and as a result of British successes was declared a possession of the British crown in 1900. It was then given the title Orange River Colony. On the formation of the Union of South Africa, in 1910, it became a state of the Union, with its present name. Population, 1911, 528,174 (about 175,000 whites). See Bloemfontein; Union of South Africa.

OR'ANGEMEN, the popular name for the members of a society of Irish Protestants. It was formally organized in Ulster in 1795, the official name being Loyal Orange Institution. Because of disorders connected with its growth and activities, it was suspended in Ireland from 1813 to 1838, and at present is of small influence in the island. There are, however, a number of branch lodges in the United States. July 12, the anniversary of the Battle of the Boyne, is observed as Orange Day.

ORANGE RIVER, the longest river in South Africa. It rises on the western slopes of the high mountains in Basutoland, less than 200 miles from the Indian Ocean, and, flowing in a general westerly direction, travels 1,300 miles across the continent and enters the Atlantic, draining a region embracing 400,000 square miles. The largest of its tributaries is the Vaal. Numerous cataracts and cascades occur in its course. At Hundred Falls the water rushes over a series of ledges and falls 400 feet in sixteen miles. A large sand bar at the mouth of the river closes it to ocean vessels; above the bar it is navigable a short distance for small vessels. In parts of its course the waters can be used for irrigation. The native Hottentots call the river the *Garib*, meaning *great water.*

ORANG'-UTAN', or **ORANG'-OUTANG',** one of the anthropoid, or manlike, apes, or monkeys, found in Borneo and Sumatra. It

ORANG-UTAN

reaches a height of four or five feet and is second in size only to the gorilla. It is one of those animals which approach most nearly to man, being in this respect only inferior to the chimpanzee and gorilla. It is utterly incapable of walking in a perfectly erect posture. Its body, except the face, is covered with coarse hair, of a brownish-red color. The arms reach to the ankle joint, the hind legs are short and stunted and the nails of the fingers and toes are flattened. The orang-utans swing themselves quickly along from tree to tree, by the aid of their long arms, but their gait on the ground is awkward and unsteady. They are remarkable for strength and intelligence, and are capable of being tamed and taught, if captured when young. They feed chiefly on fruits and sleep in trees. See MAN; APE; MONKEY.

ORA'TION, a formal public speech in dignified style, delivered on some special occasion. Orations may be of several classes: *demonstrative,* in which the purpose of the speaker is less to persuade than to please his audience; *deliberative,* or *exhortative,* in which the speaker aims to secure a certain decision, to arouse people to action or to convince them of a truth; *judiciary,* used chiefly by advocates in court, characterized by clearness, close logic and earnestness. Some of the greatest addresses have been pleas in court.

The oration was the form of literature first to be developed to comparative perfection. It advanced through all the stages from the exhortation of armies by their commanders to the addresses in behalf of great causes in modern free deliberative assemblies. Among the Greeks were many famous orators, of whom Isocrates, Demosthenes, Aeschines and Pericles are especially famous. The names of Cicero, Mark Antony and Cato represent Roman oratory at its best. From the downfall of the Roman Empire until the late modern period, oratory suffered a decline; but at the time of the American and French Revolutions there was an awakening, signified by such names as Pitt, Mansfield, Sheridan, Burke, Fox, Patrick Henry, James Otis, Alexander Hamilton and Richard Henry Lee.

Probably in no equal period in the history of any nation have so many remarkable orators arisen as during the slavery controversy in the United States: notable among these are Calhoun, the spokesman of the South; Webster, the representative of the North; Clay, the compromiser and defender of the Union; Sumner, the advocate of universal liberty; Douglas, the expounder of state sovereignty; Everett, one of the greatest scholars and rhetoricians of his time; Choate, unsurpassed as a forensic orator; Phillips, the agitator; James G. Blaine, the political orator and George William Curtis, the supporter of independence and honesty in politics. Among single orations Abraham Lincoln's *Gettysburg Address* holds first place in American literary annals. America has also produced many eloquent pulpit orators, such as Phillips Brooks, Henry Ward Beecher and Newell Dwight Hillis. Among recent political orators William Jennings Bryan is perhaps the most effective. Sir Wilfrid Laurier, former Premier, was unsurpassed among modern Canadian orators.

Related Articles. The following are representative of the notable orators whose biographies are found in these volumes:

Aeschines	Douglas Stephen A.
Beecher, Henry Ward	Everett, Edward
Blaine, James G.	Fox, Charles J.
Hayne, Robert Y.	Isocrates
Henry, Patrick	Laurier, Wilfrid, Sir
Hillis, Newell D.	Otis, James
Brooks, Phillips	Pericles
Bryan, William J.	Phillips, Wendell
Calhoun, John C.	Pitt, William
Cicero, Marcus Tullius	Webster, Daniel
Clay, Henry	Yancey, William L.
Demosthenes	

ORATO'RIO, a sacred musical composition performed with full orchestra, singers, and sometimes organ accompaniment. The subjects, usually taken from Scripture, are lofty in tone and are impressively treated. The oratorio originated about the year 1540. Its chief object at that time was to render religious services attractive. Its increasing popularity induced poets of eminence to supply texts for these works. Among the most notable oratorios are *The Messiah*, by Handel; *The Creation* and *The Seasons*, by Haydn; *Saint Paul* and *Elijah*, by Mendelssohn, and *Passion According to Saint Matthew*, by Bach.

ORCHESTRA, *or'kes tra*, in ancient times that part of the Greek theater between the spectators and the stage reserved for the chorus. In the Roman theater the seat reservation for senators was called the orchestra. In modern times the word is applied to the pit, or space reserved in theaters for the musicians, also to the musicians themselves, collectively considered, and to the musical instruments on which they play. A modern orchestra, in the last sense, consists of stringed, wind and percussion instruments, in varied proportions, according to the number of performers, this number varying from eight to more than a hundred. As many as twenty different instruments are represented.

ORCHIDS, *or'kidz*, the common name of a family of curious plants, found plentifully in the tropics, but also represented by many species in the temperate regions. There are, in all, several thousand species, some growing naturally in the ground; others upon tree trunks or rocks, seeming to obtain all their nourishment from the air, and a third class growing as parasites upon trees and other plants. Orchids are favorites with gardeners and plant lovers, because of the extraordinary forms of the flowers, the brilliancy of their colors and their fragrance. There are probably 3,000 species now under cultivation. So far, Mexico, Central America and South America have been the most productive of fine specimens.

The flowers are of extremely irregular shape and are either solitary or grouped in spikes or in long, loose clusters. Normally the flowers have three petals, one of which, called the *lip* or *labellum*, is developed in a remarkable manner. In some species this is a long, narrow strip; in others, a broad surface variously cut and fringed, and in still others, a pouch or sack, as in the common lady's slipper. The purpose of all, however, seems to be to invite insects for the purpose of fertilization, for most species would soon become extinct were it not for the aid of the insects. In the lady's slipper, for instance, the insect is tempted to enter the sack, which it may do from any side, but when it tries to leave, the curled edge of the petal and the stiff, slanting hairs prevent it from going out except by the very narrow path which leads by the pollen mass and the pistil. But this is not all. Each species of orchid must be fertilized by an insect which is especially adapted in size and shape to carry the pollen. In fact, nothing in the vegetable kingdom is more wonderful than the strange and characteristic shapes into which orchids have grown, to adapt themselves to their insect friends. The lady's slipper, the begonia, the calopogon and several fringed orchids are beautiful specimens found in damp soils in the United States. In the tropics there are many species of air plants which have peculiar foliage, and brilliant and beautiful flowers.

ORCHID

OR'DEAL. Among peoples in a primitive stage of culture there has long been a widespread belief that a supernatural power will protect the innocent and punish the guilty. When, therefore, in such societies men and women have been accused of committing wrongs, they have been subjected to certain tests which afforded opportunity for divine intervention. These tests or ordeals were of

two kinds, *fire ordeal* and *water ordeal.* The former was confined to persons of high rank; the latter, to the common people.

The person who underwent fire ordeal either took in his hand a piece of red-hot iron or walked with bare feet and blindfolded over glowing coals or over nine red-hot plowshares, laid lengthwise at unequal distances. If he escaped unhurt, he was adjudged innocent, otherwise he was condemned as guilty. One who underwent ordeal by water was either forced to plunge his bare arm to the elbow in boiling water, or was tied and thrown into a pond or river. If he sank he was adjudged innocent. Trials by ordeal were suppressed in the thirteenth century in Europe; certain forms of trial by ordeal are still found in India and among some African tribes.

ORDER, a term used in botany and zoölogy with respect to classification. An order is a group of families having a common resemblance, while the family is a group of genera (plural of *genus*). A distinction between order and family is not always observed, as in some systems of classification the terms have the same meaning. See GENUS; FAMILY.

ORDER OF THE BATH, an order of knighthood in England, the oldest on record in that country. Its date of establishment is unknown, but there is an account of its bestowal by Henry I on Geoffrey of Anjou in 1127. At that time anyone who received the honor was expected to bathe, in token of the purity of life demanded of knights; hence the name. The organization declined in the course of time, but after a century of obscurity it was revived by King George I in 1725. The order was a military one until 1847, since when it has been conferred on writers, scientists and artists, as well as on warriors. There are three classes of knights: Knights Grand Cross of the Bath (G. C. B.), Knights Commanders (K. C. B.) and Companions (C. B.). Recipients of the last named bear no title; the others use the prefix "Sir."

ORDER OF THE GARTER, or **ORDER OF SAINT GEORGE**, the highest order of chivalry in Great Britain, was established by King Edward III in 1349. The membership is very select and was originally restricted to the sovereign and twenty-five knights. In 1831 the order was reorganized and the membership extended to include the Prince of Wales and such descendants of George I and foreign sovereigns as might be chosen. It now includes about sixty members. The emblem is a dark blue ribbon, edged with gold and bearing the motto *Honi soit qui mal y pense* (Shame to him who evil thinks) in gold letters. It is worn on the left leg just below the knee. The monarch of England is the Grand Master.

ORDERS, RELIGIOUS. See MONACHISM; BENEDICTINES; DOMINICANS; FRANCIS OF ASSISI.

ORDERS IN COUNCIL, a term applied to decrees issued by the British sovereign, with the advice of the Privy Council. During the Napoleonic wars England used the Order in Council as a commercial weapon against Napoleon, to offset his decree blockading the British Isles. In 1914, after the outbreak of the World War, a British Order in Council was issued proclaiming the North Sea a war zone. Subsequently the British blockade was greatly extended, and Germany retaliated with unrestricted submarine warfare.

Related Articles. Consult the following titles for additional information:

Blockade	Milan Decree
Continental System	War of 1812
Embargo	World War

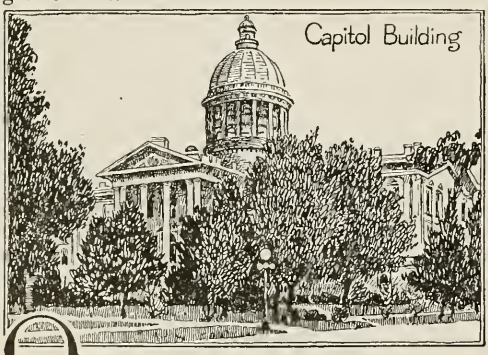
ORDINANCE OF 1787, a statute adopted by Congress, July 13, 1787, providing a plan of government for the territory northwest of the Ohio River, known as Northwest Territory. The government was placed temporarily in the hands of a governor, a secretary and three judges, who might apply to the territory any law then in force in any of the thirteen states. The legislature was to be organized as soon as there were 5,000 free males of "full age" in the district. The ordinance also included six other articles, which constituted its distinctive feature. They granted religious freedom, guaranteed the benefit of the writ of *habaes corpus,* trial by jury and proportionate representation in the legislature, emphasized the necessity for education, forbade slavery and declared that the territory should always remain a part of the United States. The ordinance has been called the "greatest and most important legislative act in American history." See NORTHWEST TERRITORY.

ORDNANCE. See CANNON; ARTILLERY.

ORDOVICIAN, *or do vish'an*, **PERIOD**, a period of geologic time, the second oldest of the Paleozoic Era (which see). The rocks of the period include the formations just below

the Silurian. In North America the rocks are especially prominent in New York, where local names have been given a number of the formations, such as the Niagara, the Hudson, the Trenton and the Chazy. Ordovician rocks also occur westward from the Appalachians as far as Minnesota. In general, they follow the V-shaped Laurentian continent of that period. Most of the rocks are marbles and sandstones, and some of them are of considerable economic value. The petroleum in Indiana and Ohio and some of the natural gas found in these regions occur in the Ordovician formations, as do the deposits of zinc and lead ore found in Wisconsin, Illinois and Missouri.

ORE, a mineral from which metals can be extracted with profit. Most gold and platinum and some other metals occur in ores in a native state; others, such as copper, lead, zinc and iron, are chemically combined with other substances. Ores frequently occur in *veins*, or *lodes*, which are metalliferous deposits in fissures or cracks in rock. Metals are commonly separated from the ore mass by crushing the ore and smelting, either in a blast furnace or an electric furnace. Often the ore is first roasted, then smelted and subjected to chemical processes, as in the case of the extraction of gold and silver from low-grade ores.



OREGON, one of the Western states of the American Union, lying south of Washington and west of Idaho. California and Nevada touch it on the south, and on its western border is the Pacific Ocean. Rich in natural resources and possessing great tracts of fertile land, Oregon can look forward with confidence to a prosperous future. Though it is not thickly populated, its people are alert, progressive and unafraid of innovations, and it has made a record for progress in democratic ideals surpassed by no state and equaled by few. Oregon is popularly known as THE BEAVER STATE, because it was originally inhabited by the Beaver tribe of Athapascan Indians. Its floral emblem is the graceful Oregon grape vine.

Area and Population. The ninth state in size, it has an area of 96,699 square miles, of which 1,092 square miles are water. The states nearest it in size are Utah and Wyoming, the latter but 1,215 square miles larger. Texas is about three times as large. In 1910, with 672,765 inhabitants, Oregon was the thirty-fifth state in population. It then had only seven persons to the square mile, but by July, 1917, the population had increased to 861,992, according to a Federal estimate. Among the foreign population, Germans and Canadians are found in greatest number. There are more than 10,000 Chinese and Japanese, and over 6,500 Indians. The latter live upon the Klamath, Umatilla and Warm Springs reservations.

Religion. The Roman Catholics constitute the strongest religious body, and Methodist are the most numerous of the Protestants. Others, in order of rank, are the Baptist, Presbyterian, Disciples of Christ and Congregational denominations.

Cities. In 1917 there were five cities with populations exceeding 10,000, according to Federal estimates. These were, in order of size, Portland (308,399), Salem, the capital (21,274), Medford (14,932), Eugene (14,257) and Astoria (10,487).

Surface and Drainage. Oregon is crossed from north to south by three ranges of mountains; the Coast Range, from ten to thirty miles from the coast; the Cascades, nearly parallel with the Coast Range and from 120 to 150 miles inland, and the Blue Mountains, in the eastern part. The Coast Range varies from 1,000 to 4,000 feet in altitude. The range is irregular, with numerous transverse valleys, but it is broken in only a few places. The Cascades have an average height of nearly 6,000 feet, but there are a number of peaks that exceed 10,000 feet. The most prominent of these is Mount Hood, near the northern border, with an altitude of 11,225 feet. Other peaks worthy of mention are Mount Jefferson, Mount Pitt, Diamond Mountain and the Three Sisters. Both ranges are heavily timbered to the tree line, making Oregon a leading state in extent and value of forest area. Between the Coast Range and the Cascades is a broad, fertile

valley, which in the northern part is rolling prairie, watered by the Willamette. The southern part is broken and uneven. This valley is crossed by four spurs of the Cascades, which extend to the Coast Range.

The region east of the Cascades, comprising about two-thirds of the state, consists of a high plateau, with a rolling, uneven surface in the south, and in the north merging into the Blue Mountains. This plateau is separated into northern and southern slopes by a height of land which extends across the state in an irregular line from the eastern boundary, about midway between the northern and southern borders, and having a somewhat southwesterly trend. The region north of this divide is more undulating than that to the south. In the northeast it is crossed by the Blue Mountains, an irregular range having an altitude of about 7,000 feet. Several rivers have cut their way through this range, forming canyons remarkable for their scenery. That of the Snake River on the northeastern boundary is considered by some a rival of the Grand Canyon of the Colorado. The canyons of the Columbia are also noted for their scenery. In places, cliffs of basalt rise abruptly from the river to the height of several hundred feet. In other places there are beautiful cascades.

The Columbia River, which forms most of the northern boundary, and its largest tributary, the Snake, forming the greater part of the eastern boundary, drain the northern half of the state. The chief tributaries of the Columbia from west eastward are the Willamette, the Deschutes and the John Day. The southeastern part of the state is drained by the Owyhee, which rises in Nevada and flows northward into the Snake. West of the Cascades and south of the Willamette are found the Umpqua, the Rogue and the Coquille, flowing directly into the Pacific. In the southern part there are a number of lakes.

Climate. Like other Pacific states, Oregon has an east and west, rather than a north and south variation in climate. Owing to the warm winds of the Pacific, that portion of the state west of the Cascades has a mild and equable climate; in winter the average temperature is 42°, and in summer, about 63°. But east of the Cascades, greater extremes are found. Here the thermometer falls as low as 30° below zero in the severest weather and rises to 110°, or more, in the summer months. The rainfall is more uneven than the temperature. Along the coast it varies from 89 to 114 inches, and in the Willamette valley it is about 51 inches, while east of the Cascades it varies from about 13 inches, in the northern part of the state, to 6½, in the southern; hence, the eastern two-thirds of Oregon has an arid climate, and in most of this region irrigation is necessary for the growing of crops. The reason of this unequal distribution of rain is the position of the Cascades and the prevailing westerly winds. These winds come moisture-laden from the ocean, strike the cold mountain tops, and have their vapor condensed into rain, which falls on the west side of the ranges.

Agriculture. The finest farm land is in the valley of the Willamette, between the Coast Range and the Cascade Mountains. Here there is abundant rainfall and a soil capable of producing every crop of the middle latitudes. In the Willamette Valley and in the valleys of the Hood and Rogue rivers bountiful harvests of apples and other orchard fruits are produced, including pears and peaches of superior quality. Small fruits, especially strawberries, and grapes are also important.

Of field crops, hops, cereals, hay and potatoes are most important. Oregon has 10,000 acres devoted to hops, an acreage exceeded only in California. Winter and spring wheat, barley and oats are the chief cereals. The annual hay crop is nearly 2,000,000 tons, and over 8,000,000 bushels of potatoes are raised a year. Oregon received the grand prize for forage crops at the Panama-Pacific Exposition.

In the dry regions east of the Cascades irrigation is necessary. Because of the cost of irrigating, the land is usually held by large companies and rented in small sections. In 1915 about 686,000 acres were under irrigation, but many contracts had been let for extension of the system. The Umatilla and Oregon Klamath projects, representing over $5,000,000 investment, are under Federal control. There are large grazing areas in the eastern part of the state, and horses, cattle, swine and sheep are reared in large numbers.

Forests. The national forest areas cover about 13,150,000 acres, and the amount of lumber cut from these forests is exceeded only by the cut in Idaho and Montana. Oregon has about one-sixth of the standing tim-

ber for the entire United States. Of first importance as a timber tree is the Douglas fir, or Oregon pine, which grows to a height of 300 feet. This splendid tree is surpassed in the United States only by the yellow pine in extent of commercial use. Other important woods are the Sitka spruce, yellow and white pines, hemlock, cedar, juniper, laurel, oak and maple.

Mineral Resources. Although mining is not the leading industry, Oregon has profitable deposits of a variety of minerals. The value of the annual output of all minerals is between $3,000,000 and $4,000,000. Gold, found in Baker County, in the Blue Mountains, and in the west, in Josephine and Lane counties, is the most valuable product of the mines. The annual yield for several years past has averaged about $1,500,000 in value. The yearly output is about 90,000 fine ounces. The silver output has increased notably since 1915, a year's output having exceeded $177,000. Coal, copper, granite and other building stones, clay products, gypsum and platinum are also mined.

Fisheries. In the value of all fishery products Oregon ranks sixteenth among the states, but its Columbia River salmon fisheries are among the most valuable in the world. Astoria is not only the chief center in Oregon for the catching and canning of this fish, but the most important in the world (see SALMON). Along the coast white sturgeon, halibut, oysters and Oregon trout are taken in profitable quantities.

Manufactures. The extensive forests have made lumbering the chief manufacturing industry of the state. The centers of industry are in the basin of the Columbia River. The largest mills are located at Portland and Astoria, and in the southern end of the Willamette Valley, at Eugene and Springfield. The canning and preserving of fish and fruits constitutes another leading industry. Other important manufacturing industries are flour and grist milling, slaughtering and meat packing, the manufacture of woolen goods, car construction and repairs and shipbuilding. The total value of manufactured goods is in the neighborhood of $110,000,000.

Transportation and Commerce. The northern and western parts of the state are well supplied with railroad lines, but the section east of the Cascades is not so well served. The Oregon and Washington Railroad and Navigation Company, with nearly 1,000 miles of tracks, is the most important road. It extends the whole length of the Columbia River west of Portland. The Spokane, Portland & Seattle line runs along the river east of Portland. The main line of the Southern Pacific runs west of the Cascades and into California. In the Deschutes valley railway construction has been undertaken, and in this section there is also a branch of the Oregon-Washington system. In all, the state has about 3,000 miles of steam railway. There are over 700 miles of electric road, and many splendid highways. Of these the finest is the automobile drive called the Columbia Highway, which traverses the Cascades at the base of Mount Hood.

There are over 2,100 miles of navigable waterway in the state. The Columbia is navigated by ocean steamers to Portland, and by river vessels to Lewiston, Idaho. The recently opened Dalles and Celilo Canal permits navigation above the rapids that once blocked river travel. The Willamette is navigable between Portland and Eugene, a distance of 150 miles, and the Deschutes is also used for local transportation.

The state carries on an extensive commerce, Portland being the most important shipping center. This city enjoys a flourishing export trade in grain, flour, lumber, canned goods and salmon, and it has regular steamship connection with American Pacific ports and the Orient. The broad estuary of the Columbia affords an excellent land-locked harbor.

Education. Oregon is one of the leading states in per capita expenditure for public education, and its percentage of illiteracy is very low. The state enjoys the use of a rapidly increasing fund from the sale of public lands, a liberal grant of which was made to the state by the national government. The state university at Eugene is the head of the school system. A state agricultural college is located at Corvallis, and a state normal is at Monmouth. There are within the state a number of important secondary schools and colleges, maintained by religious denominations. Among these are the Willamette University at Salem; Pacific University at Forest Grove; Mount Angel College at Mount Angel; Albany College at Albany; McMinnville College at McMinnville; Pacific College at Newberg; Dallas College at Dallas, Saint Helen's Hall at Portland; Columbia University and Reed College, at Portland.

Items of Interest on Oregon

The coast consists of long stretches of sandy beach broken occasionally by spurs of the Coast Range, which project into the sea and form rocky headlands.

The state as a whole has an average elevation of 3,300 feet; the summit of Mount Hood, 11,225 feet, is the highest point in the state.

Southern Oregon has many lakes, of which the largest are Harney, Malheur, Albert, Warner, Upper and Lower Klamath.

Crater Lake, 6,239 feet above the sea, lies in the great pit of a former volcano; the lake has never been known to freeze and its waters are fresh, though it has no visible outlet.

The Douglas fir produces more available lumber to the acre than any other American tree.

For the school year ending June 30, 1917, there were 2,550 public elementary schools with 6,282 teachers and 141,120 enrolled pupils. The total expenditure on public school education was $7,287,308.

The number of dairy cows is about 227,000; of other cattle 683,000, and of horses 309,000.

In September, 1917, there were 260 banks in the state, with a total deposit of $162,046,426. Of this amount about one-fifth was in saving deposits.

The initiative and referendum were first exercised by the people in 1904, when a local option liquor law and a direct primary law were passed.

Oregon was the first state to grant complete home rule to the cities by passing a law in 1906 giving cities and towns the exclusive right to enact or amend their own charters and providing for the initiative on special or local legislation.

In 1909 the recall was adopted, a system by which the voters at a special election may remove from office any local official after six months' service.

The state constitution forbids any bank or banking company in the state to issue bills, certificates, promissory notes or other paper to circulate as money.

Questions on Oregon

What is the character of the coast line?

What differences in climate exist between the western and the eastern parts of the state? What mountains are the dividing line?

Compare Western Oregon's winter climate with that in states a thousand miles east.

What is peculiar about Crater Lake?

Name five important crops.

How does Oregon rank in the production of hops? Salmon?

Name six mineral products.

What manufacturing industry takes first rank?

How many miles of railway are there in the state?

What are some of the innovations in government adopted by Oregon in recent years?

Why is Portland noteworthy?

When was Astoria founded? For what purpose? For what industry is it now a great center?

Why is Oregon called the "beaver state"?

What is the state's rank in population and area?

Where is there a canyon of remarkable beauty?

Account for the aridity of Eastern Oregon.

How was Oregon honored at the Panama-Pacific Exposition?

How does the state rank in amount of lumber cut from national forest areas?

What railway companies have trunk lines or branches in Oregon?

What is the state's record in regard to expenditures for public education?

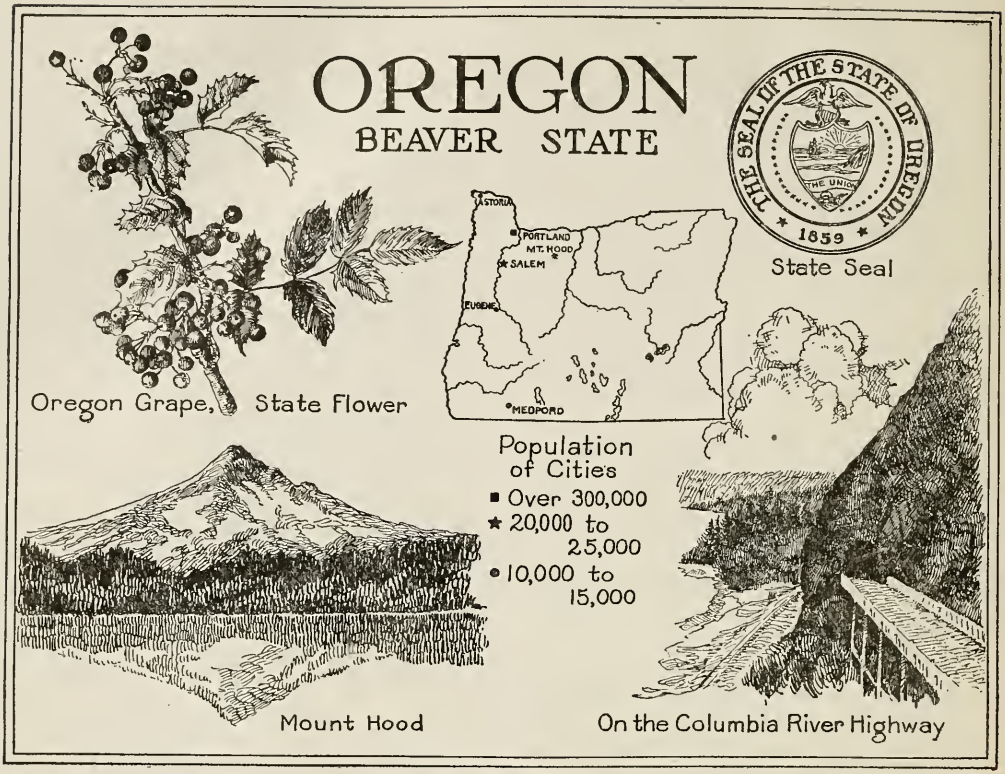
What early explorers visited the Oregon country?

What was meant by the slogan "Fifty-four forty or fight"?

When did the people first exercise the power of the initiative and referendum?

What is meant by the recall?

When was it adopted in Oregon?



Institutions. The charitable and penal institutions include a state hospital at Salem, an eastern state hospital at Pendleton, a penitentiary at Salem, an institute for the feeble-minded, a state training school, a tuberculosis hospital, schools for the deaf and blind, and an industrial for girls, all at Salem, and a soldiers' home at Roseburg.

Government. Oregon is governed under its first constitution, effective in 1859. The political history of the state is a story of steady progress in extension of popular rights. Oregon began nominating its Senators by primary elections in 1901; in 1903 the initiative and referendum went into effect, being applicable to acts of the legislature and to amendments to the constitution. All elective officers may be recalled by the voters. Women vote on equal terms with men, capital punishment has been abolished, and statewide prohibition went into effect in 1916, in advance of national prohibition. The legislature consists of a senate, which cannot exceed thirty members, and a house of representatives, which cannot exceed sixty members. The Senators are elected for four years, and the representatives for two. The legislature meets every two years.

The executive department consists of a governor, auditor and secretary of state, treasurer and superintendent of public instruction. The governor may not serve more than two terms in twelve years, and the secretary of state and treasurer are not eligible for immediate reëlection.

The judiciary is composed of a supreme court of one chief justice and six associate justices, elected for six years; circuit courts, each having one judge, who holds court in each county twice a year; county or probate courts, and justices of the peace.

History. Drake discovered the coast of Oregon in 1579, and two centuries later, in 1778, Captain Cook visited Nootka Sound. In 1792, Vancouver surveyed the entire coast and ascended the Columbia River. Spain claimed the region by exploration dating as far back as 1603, and the United States claimed it by reason of Robert Gray's voyage of 1791-1792, when he also discovered and named the Columbia River.

Astoria was established in 1811 by John Jacob Astor; two years later it was captured by the British, but was restored to the

United States in 1818 by a convention establishing a system of joint control. By a treaty in 1828 this arrangement was continued, neither party forfeiting its claim. Americans were clamoring for "fifty-four forty or fight;" the British demanded the region as far south as the Columbia River. The boundary was finally fixed at 49°, by a treaty in 1846. In 1832, settlement by New Englanders began, and in 1848 Oregon became a territory. Eleven years later admission into the Union was granted, with a constitution which forbade slavery but prohibited negroes from entering or living in the state.

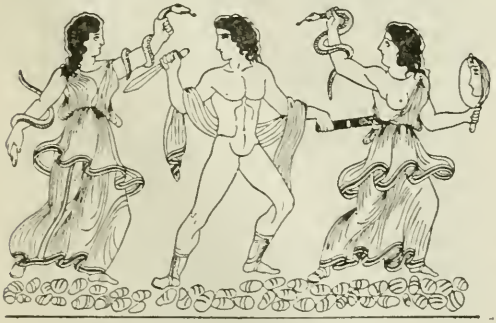
Recent legislation includes the enactment of laws safe-guarding the rights of the poor in courts, of discharged convicts and of women workers. The state has enjoyed long-continued peace and prosperity, though the Japanese question has been a subject of controversy.

Related Articles. Consult the following titles for additional information:

Astoria	Medford
Cascade Range	Portland
Coast Range	Salem
Columbia River	Snake River
Dalles, The	Whitman, Marcus
Eugene	Willamette
Hood, Mount	Northwest Boundary

OREGON, UNIVERSITY OF, a state institution at Eugene, the head of the public school system of Oregon. It was founded in 1872, and is organized into departments of literature, science and arts, law, commerce, journalism, education, music, architecture and fine arts, medicine and the graduate school. The law and medical schools are located at Portland. The student enrollment is over 1,800, and there are about 140 instructors. The library contains 75,000 volumes.

ORESTES, *o res'teez,* in Greek mythology, the son of Agamemnon and Clytemnestra.



PURSUED BY THE FURIES
From an ancient vase.

When Agamemnon was killed by Clytemnestra and her lover Aegisthus, Orestes was saved by his sister Electra and sent to the court of his uncle, where he was brought up. On becoming a young man he returned to Mycenae and avenged his father's death by killing both his mother and her lover. For this crime he was relentlessly pursued by the Furies, who drove him in madness from land to land. At last he was informed by the oracle at Delphi that he would be forgiven if he brought back from Tauris to Greece a certain statue of Diana. When he arrived in Tauris, he found, as priestess in the temple of Diana there, his sister Iphigenia. The story of Orestes was the subject of some of the greatest dramas of ancient Greece.

ORGAN, from the Greek *organon,* meaning an instrument, is one of the greatest of musical instruments. The pipe organ is probably the offspring of the water organ of the Greeks, and from the fourth century A. D. it has been steadily developed and improved. The three essentials of an organ are (1) a chest of compressed air; (2) a set of pipes, producing musical sounds, in communication with this chest; (3) a keyboard, by means of which this communication may be opened or closed at pleasure. The air is forced into the wind chest by means of bellows, which are operated by water power, by electricity or by hand. To the upper part of each wind chest is attached a *sound board,* a contrivance divided into as many grooves as there are keys, for the passage of wind. Air is admitted into these grooves by means of valves, or pallets, connected with the keys; the transmission of air, and consequently the quality of the tone produced, is regulated by the *register,* or *slide.* The series of pipes above each slide is called a stop. The principal stops of an organ are the *open, stopped* and *double diapasons;* the *principal, dulciana, melodia, salicional, flute, trumpet, clarion, bassoon, oboe* and *vox humana.*

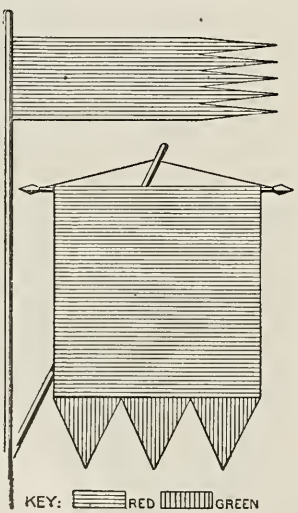
An organ may have several wind chests, filled by the same bellows, and several keyboards, each keyboard and wind chest representing a distinct organ and connected with a separate group of pipes. In the largest

instruments these organs are five in number, namely, the *great organ*, the *choir organ*, the *swell organ*, the *solo organ* and the *pedal organ*. The keys for the hand are termed *manuals*, the parts operated by the feet, *pedals*. The most common compass of the manuals is from CC to F, four octaves and a half; that of the pedals from CCC to E or F, two and a quarter to two and a half octaves. There are two kinds of organ pipes—*flute* pipes, or *mouth* pipes, and *reed* pipes. There are several kinds of each, the character and quality of their sound depending mainly on the material employed in their manufacture (wood or metal), their shape and their dimensions.

In 1863 a contrivance was patented for transferring some of the work from mechanism to electro-mechanism. An organ built on this principle is termed an *electric organ*. It facilitates the playing and enables the organist to sit at a keyboard at a distance from the instrument. Among the largest organs are those in Saint Peter's in Rome; in the Seville Cathedral; in Haarlem, Holland; in Notre Dame, Paris; in the Auditorium, Chicago; and in the Mormon Tabernacle, Salt Lake City.

The instrument known as *harmonium, melodeon,* or *reed organ,* is only an organ with reed pipes and a bellows operated by the feet of the performer. It has foot pedals.

ORIFLAMME, *or'i flam,* a red silk banner, having across the bottom three green points, which was borne on the tip of a spear. Originally it belonged to the abbey of Saint-Denis, but in Charles VII's reign it became the royal standard of France. As late as 1415 a red streamer with five points used by the French army also was called an oriflame.



ORIFLAMME

ORILLIA, *o ril'e ah,* ONT., in Simcoe County, on the Grand Trunk and the Canadian Pacific Railways. Though especially noted for the fine scenery in its vicinity, Orillia is also an industrial center. The important manufactures are cheese, clothing, flour, boats and canoes, cement, woolen goods, carriages and wagons, furniture and wood pulp. There is a collegiate institute, an opera house, an asylum for the feeble-minded, a Y. M. C. A. and a Carnegie Library. Population, 1916, 8,000.

ORINOCO, *o ri no'ko,* a great river of South America, in volume ranking next to the Amazon and Paraná, and with its tributaries, the Guaviare, the Meta and the Apure, draining most of the northern part of the continent. From the Parima highlands of Venezuela, where it rises, it flows northwest as far as the Colombia boundary, turns northeast for about 300 miles, then takes an eastward course and finally pours into the Atlantic through a great delta formed by fifty branches and covering an area of 7,000 square miles. Throughout its entire length of 1,500 miles it flows through an exceedingly fertile region, much of the way through virgin tropical forests of growth so dense as to be inaccessible to man. About 700 miles from its mouth are the wonderfully picturesque Altures rapids. Below and above these the river is navigable, though there is little trade, owing to the fact that much of the country on its banks is sparsely inhabited. Ciudad Bolivar, 260 miles from the Atlantic, is the chief trading point.

O'RIOLE, a beautiful bird of brilliant color, belonging to the family of the same name. The best known species, the golden oriole, a native of America, the European continent and the British Isles, is a bright yellow bird with black feathers on back, wings and tail. Its nest is a deep pocket lined with wool, suspended from forked branches. The eggs are white or salmon colored, with purplish spots. A similar oriole is native to India.

ORI'ON, a hero of Greek mythology, about whom various myths are told. The most common of these tells how, for his attempt to carry off Merope, whom he loved, he was blinded by her husband Oenopion. Vulcan, took pity on him and gave him one of his servants as a guide to conduct him to the sun god, by whom he was restored to sight. Diana, coming upon him while hunting in the forest, fell in love with him, but her brother, Apollo, became very angry with her for lov-

ing a mortal. One day Apollo taunted Diana about her skill with the bow and arrow, and declared that she was not able to strike a certain dark object on the surface of the ocean, which he pointed out to her. Diana shot and struck the object, totally unaware that it was the head of her favorite, Orion, who was bathing in the sea. Inconsolable for his death, she placed him with his dog Sirius in the sky, as the constellation which still bears his name. See Orion.

ORION, the most brilliant of the constellations. It is on the celestial equator, southeast of Taurus. By the ancients this constellation was represented by the figure of a man with a sword at his side. The belt is formed by three stars of the second magnitude, and below them are three other stars, in the midst of which occurs a hazy spot. This is not a star, but a great nebula, which through the telescope is a magnificent object. The red star which marks the right shoulder of Orion is Betelgeux and the blue star at his left foot is Rigel. Both are of first magnitude. Other stars mark the right shoulder and head.

ORION

ORKNEY, *awrk'ni*, **ISLANDS**, a group of islands off the north coast of Scotland, from which they are separated by Pentland Firth, a channel four miles wide. Thirty of the sixty-seven islands of the group are inhabited. Pomona, or Mainland, is the largest; others are South Ronaldshay, Hoy, Westray, Rousay, Stronsay, Sanday and Shapinshay. Excepting Hoy, none of the islands has hills of any great height. There are no large streams, but there are many lakes and springs. The air is moist, but the climate is remarkably mild in winter. The chief crops are oats, turnips, potatoes and barley. Cattle, sheep and poultry are raised, and fishing is an important industry.

It is probable that the Picts originally possessed the Orkney Islands, but in the eighth century, and subsequently, they were occupied by the Northmen. In the ninth century Harold Haarfagr attached them to Norway, and for several centuries they were governed by rulers called jarls, who sometimes owed allegiance to Norway, sometimes to Scotland. About the middle of the thirteenth century they were transferred to Alexander, king of Scotland, but the Norwegians continued to assert their sovereignty. James III of Scotland received the islands as a dowry with Margaret of Norway in 1468, and from that time they have belonged to Scotland. They constitute a Scottish county, of which Kirkwall is the capital and largest town. Population, about 26,000.

ORLEANS, *ohr la ahN'*, a French royal family, two houses of which have occupied the throne of France. On the death of Charles VIII without issue, in 1498, Louis, duke of Orleans, great grandson of their common ancestor Charles V, and grandson of the first duke of Orleans, ascended the throne under the title of Louis XII. Henry III, who died in 1589, was the last sovereign of this house, or the Valois-Orleans branch. For the House of Bourbon-Orleans, see Bourbon.

ORLEANS, France, about seventy-five miles southwest of Paris, on the Loire. It is intimately associated with the life of Joan of Arc (Maid of Orleans), who as leader of the French army in 1428 compelled the English to raise the siege of the city. An equestrian statue of the heroine stands in the middle of the principal square. The house she occupied is still standing, and has been converted into a museum of her relics. Among the interesting features of the city are the Gothic Cathedral of Sainte Croix, a Palace of Justice and two town halls.

Orleans is the capital of the Department of Loiret. Less important as a manufacturing center than formerly, it still has woolen, pottery and candy factories. It was built on the site of an ancient Gallic town which was destroyed by Caesar. It was a place of importance under the Merovingian kings and under the early kings of France. It was taken and retaken more than once in 1870 during the Franco-German War. Population, 73,000.

ORLEANS, Louis Philippe Joseph, Duke of (1747–1793), called Philippe Egalité. In 1769 he married a rich woman, and bought popularity which rendered him obnoxious to the court. He was exiled in 1771 for his opposition to Maupeou, but returned in 1774. In the Assembly of Notables he showed himself hostile to the king and was sent to England, ostensibly on a diplomatic

mission. On returning he joined Danton's party, renounced his titles, assumed the name Philip Egalité (equality), and in the troubles which followed voted for the death of the king. Suspected of duplicity, he was tried before the revolutionary tribunal, condemned and executed.

ORLEANS, MAID OF. See JOAN OF ARC.

ORLEANS, PHILIPPE, Duke of (1640–1701), only brother of Louis XIV of France. He was created Duke of Orleans in 1661 and shortly afterwards married Henrietta Maria of England (sister of Charles II), whose sudden death later was attributed to poisoning. Subsequently he married Charlotte Elizabeth, daughter of Charles Louis, Elector Palatine. This second marriage was arranged by Louis to secure the neutrality of the Elector in the approaching war against Holland. Monsieur, as the duke was usually called, distinguished himself in this and in later wars and thus incurred the king's jealousy, which kept him thereafter in the background.

ORLEANS, PHILIPPE, Duke of (1674–1723), regent of France during the minority of Louis XV. In 1692 he married Mademoiselle de Blois, the legitimatized daughter of Louis XIV. He distinguished himself in the war of the Spanish Succession, but was recalled because he was suspected of intriguing for the crown of Spain. On the death of Louis XIV, in 1715, he was appointed regent. On acceding to power he found the finances in extreme disorder and endeavored to improve matters by retrenchment and peace; but his reckless introduction of a vast paper currency brought the nation to the verge of bankruptcy (see LAW, JOHN). As regent he displayed brilliance and (usually) judgment, but he set an example of dissolute manners which made his regency one of the most corrupt periods in French history. He resigned the government to Louis XV in 1723.

ORNITHOL'OGY, that branch of zoölogy which treats of birds, their description, habits and relationship to man. See BIRDS.

ORPHEUS, *or'fe us,* a legendary musician of the ancient Greeks, according to some the son of Apollo. The invention of the lyre, or cithara, was attributed to him, and upon it he played so wonderfully that wild beasts, birds and even fishes were enraptured, the storms were stilled and the sea becalmed with the music. Having lost his wife Eurydice, he descended into Hades in an attempt to bring her back to life, and his music so moved the deities of the lower world, Pluto and Proserpina, that they consented to her return to earth, if her husband, whom she was to follow, would not once look back until they had reached the upper world. This condition the impatient Orpheus violated, and thus lost his wife forever. He is said to have met his death at the hands of a band of Thracian women engaged in the mystic rites of Bacchus. Another version says that he was slain by Jupiter because his power of bringing back the dead violated the laws of nature. His rescue of Eurydice and his death were favorite subjects for artists.

ORRIS ROOT, the root of several species of iris, especially of the European iris, which, on account of its voiletlike odor, is employed in perfumery and in the manufacture of tooth powder. It was formerly used quite freely as a medicine.

ORSINI, *or se'ne,* one of the most illustrious and powerful families of Italy. It became prominent about the eleventh century, having acquired high rank and extensive possessions in the Papal States. The feud between the Orsini and Colonna families is celebrated in history; it commenced toward the close of the thirteenth century and was distinguished for bitterness, unscrupulousness and violence. Many of the Orsini became military chiefs; two of them were Popes—Giovanni Gaetano, who was raised to the pontificate in 1277, with the title Nicholas III, and Vincenzo Marco Orsini, who succeeded Innocent XIII in 1724 as Benedict XIII.

ORTHOCERAS, *or thos'e ras,* a genus of fossil mollusks distinguished by straight, cone-shaped shells. These fossils are abundant in the formations extending from the lower Silurian to the Triassic. In structure they resembled the nautilus, except that their shells were straight, instead of curved. The shell was divided into numerous chambers by cross partitions, each of which had a small opening in the center. Some species were small, while others were very large. The shells of some species found in the Trenton limestone are as large around as a barrel, and the sections found indicate that the animal must have been from twelve to fifteen feet long. In all, remains of about 200 species have been discovered. See GEOLOGY.

ORTHOCLASE, *or'tho klase.* See FELDSPAR.

ORTHOGRAPHY, *or thog'ra fi,* a word derived from two Greek words, *orthos,* which means *straight* or *correct,* and *graphein,* which is the Greek for *to write.* Orthography, then, may be understood as a branch of the art of speaking and writing correctly; however, the subject is confined to *words,* not to sentences or paragraphs, and relates to *spelling* alone. We are studying orthography when we seek to learn the sounds a word contains, to know how to divide it into syllables, and to pronounce it correctly, every letter given its proper sound, and accent placed on the proper syllable.

The mastery of this subject, in most particular detail, is the work of the expert in the department of language, but the general principles—entirely sufficient for the average man or woman—may be easily understood, and such a grasp of orthography is plainly necessary if one would speak and write correctly those words we ordinarily use. Unless one knows how the various letters in the written alphabet stand for the sounds in the spoken language, and is acquainted with the general rules for combining letters in the formation of words, he will always be liable to embarrassing errors in pronunciation and spelling and must be decidedly at a disadvantage in both his social and his business life. To meet the needs of the general reader who wishes to make an elementary study of orthography, the essentials of the subject are carefully set forth in the following paragraphs.

Diacritical Marks. In the English language there are many more spoken sounds than letters to represent them. The letters are twenty-six in number, and one of these is not really needed; there are forty-three sounds, most of them very important and not difficult to utter, while a few express tones seldom sounded correctly in our speech. The letter with which we could dispense is *c,* for its soft sound, as in the word *ice,* and its hard sound. as in *call,* might well be represented by the letters *s* and *k.*

As there are forty-three sounds in the English language and only twenty-six letters to represent them, it is evident that a single letter must serve to represent more than one sound. The various sounds of a letter as used in different words are represented by means of symbols, or signs, placed either above or below the letter, as a guide to pronunciation. When once the exact tone demanded by a symbol is learned, the ability to pronounce correctly has been acquired.

Classification of Sounds. According to the kinds of sounds that they represent, the letters of the language are divided into two classes, known as vowels and consonants. Vowels are open sounds made by an unobstructed passage of the breath through the vocal organs. The letters that indicate these sounds are *a, e, i, o, u* and sometimes *w* and *y.* Consonants are sounds formed by a stoppage of the breath in the mouth or the throat.

Sounds are said to be *vocal* when they have a tone or voice quality, and *aspirate* when they are merely breath sounds. The vowels are pure vocal sounds since they have tone qualities that are expressed without any obstruction. In the case of several of the consonants, however, the tone quality is suppressed or obstructed by the organs of speech, and the sounds are therefore known as subvocals. When two vocal sounds are combined, as in *oi* in *voice,* the resulting sound is known as a diphthong.

In the paragraphs which follow all the sounds of the vowels are classified and explained by proper diacritical marking; in each instance, the sound of the letter as marked is indicated by examples of words in common use.

Vowels

A vowel sound is a free and uninterrupted sound of the voice. The various vowel sounds are modified by changed positions of the tongue and lips. A study of the following paragraphs will enable you always to pronounce any word found in the course of your reading.

The Vowel A. There are eight sounds of the vowel *a;* each is explained below.

(1) The long sound of the letter is called its name letter. In the words—

āge māy plāte

the long sound of the vowel is represented, and the sound is denoted by a straight line above the letter, called a *macron.*

(2) The short sound of *a* is heard in the words—

măt hăm plăid

and is represented by a curved mark directly above the vowel called a *breve.*

(3) There is a broad sound of *a* heard in—

all call stalk

and it is always represented by two dots, called a *dieresis,* placed below the vowel. The former spelling of this name is *diaeresis.*

(4) One of the common sounds in *a* is heard in—

ärm fär pälms

and is called the "Italian" sound of the letter, because characteristic of that language. It is heard as well in the Spanish and German. The mark is the dieresis above the *a*.

(5) The soft Italian sound is heard in—

ȧsk pȧss bȧth

and the single dot above the vowel is its mark. The sound is about midway between the short sound, as in *pat,* and the Italian sound, as in *barn.*

(6) A sound of *a* which is like the short sound of *o* appears in—

wąs whąt swąn

and demands a single dot below the vowel.

(7) A sound of *a* very similar to the short sound of *e* (see below) is noted in—

senąte villąge

and the mark is called the suspended bar and is placed under the vowel.

(8) A somewhat difficult sound of *a* appears in—

câre pârent

About the easiest way to explain this sound is to say that it is nearly equivalent to the sounds of *a* and *e* short, run together. The inverted *v*-shaped mark above the letter is called a *circumflex.*

The Vowel E. The three sounds of the letter *e* are graphically illustrated below:

(1) The long, or natural, sound is heard in—

ēve ēra stēam

The mark is the macron, above the letter.

(2) The short sound of the letter *e* is found in the words—

mĕt ĕnd friĕnd

and the distinguishing mark is the breve.

(3) In a fairly large list of words such as—

ẽrr hẽr fẽrn

the vowel has the same sound as *u* in *urge* and *i* in *sir* (see below). The diacritical mark denoting this sound is called a *tilde,* or *wave. Tilde* is pronounced in two syllables, til'de. The name comes from a foreign language, the Spanish, where it is used over the letter *n* to denote a following sound similar to *y,* as in *cañon.*

The Vowel I. (1) The long sound, or name sound, of *i* is heard in—

īce tīe ītem

The distinguishing mark is the macron, a straight line above the vowel.

(2) The short sound of *i* is heard in such words as—

bĭt tĭn skĭm

and, as in all other short sounds, the distinguishing mark is the breve.

(3) In a considerable number of words *i* takes the sound of other letters; in—

machĭne quarantĭne

the sound is that of long *e,* and the mark is the two dots above the letter. In

fĩr sĩr stĩr

the tilde denotes the same sound as uttered in *u* in *urn* and *burn.*

The Vowel O. The sounds of *o* are marked with the same devices as the preceding vowels.

(1) The long, or natural, sound of *o* is heard in—

ōar fōe tōne

and the macron is used above the letter.

(2) The short sound of *o* is used in such words as—

nŏt lŏt spŏt

and its distinguishing mark is the breve.

(3) In a large number of words such as—

mọve prọve

the sound is the same as though *oo* were present; as, *proof.* When this sound is to be uttered and there is but one *o,* the dieresis is used below the vowel. In such words as—

mo͞on so͞on

if it is desired to use a mark of pronunciation the double macron is used above the letters.

The Vowel U. (1) The long sound of *u* is heard in—

ūse dūty cūbe

and is distinguished by the macron above the letter.

(2) The short sound of *u* appears in—

bŭt sŭn stŭmp

and its mark is the breve.

(3) A common use of *u* is found in such words as—

ûrn ûrge

and the vowel is marked with the circumflex, as in (8), in the preceding column.

Diphthongs. A diphthong is a sound produced by running together two vowel sounds in the same syllable. It is called a *proper diphthong* if both vowels are sounded. Examples are *oi* in the word *oil, oy* in *boy, ou* in *out,* and *ow* in *cow.* An *improper diphthong, or digraph,* is merely a union of two vowels in the same syllable, only one of which is sounded. An example is found in the words *rain, teach, audible.*

Triphthongs. A triphthong is a sound produced by running together three vowels in the same syllable. Technically, a proper triphthong would be one in which all three of these vowels are sounded, but there is no such instance in the English language. The only triphthong is the improper, or *trigraph,* in which three vowels appear in the same syllable but only one of them is sounded. Examples of the improper triphthong, or trigraph, are found in the words *adieu* and *beauty.*

Vocal Equivalents. The teacher, parent or student will find much help in learning correct pronunciations of words if the following table of vowels and their equivalent sounds is studied until it is thoroughly understood.

Consonants. The consonant sounds of the alphabet are best learned by observing how the letters they represent are sounded in spoken words. The following table of aspirates and subvocals will materially assist one to master these sounds:

Table of Aspirates

f	as in far
h	as in hand
k	as in kind
p	as in pen
s	as in sin
t	as in tip
th	as in through
sh	as in shore
ch	as in chick
wh	as in whirl

Table of Subvocals

b	as in band
d	as in dead
g	as in gun
j	as in joy
l	as in lip
m	as in men
n	as in none
ng	as in sung
r	as in tar
th	as in then
v	as in vain
w	as in went
y	as in yacht
z	as in zinc
s	as in treasurer
si	as in version

In the spelling of English words we occasionally use a letter whose sound in the word is that of another letter or other letters. As an illustration, in the word *onion,* the first *n* is sounded as though it were *ny.* Other equivalents will be noted in the following table:

Table of Vocal Equivalents

a̤	as in what	ŏ
ã	as in liār	ẽ
ê	as in thêre	â
e̤	as in they	ā
ĭ	as in polĭce	ē
ī	as in fīrm	ẽ
ô	as in ôught	a̤
o̤	as in sǒme	ŭ
ō	as in tailōr	ẽ
o̤	as in to̤	o͞o
o̤	as in wo̤rld	o͝o
ṳ	as in mṳle	o͞o
ṳ	as in fṳr	o͝o
ȳ	as in cry̆	ī
y̆	as in badly̆	ĭ
ȳ	as in mȳrtle	ẽ

Subvocal and Aspirate Equivalents

c̦	as in mic̦e	s
c	as in catch	k
g̈	as in g̈in	j
n̈	as in pin̈k	ng
ñ	as in oñion	ny
s̱	as in phas̱e	z
x	as in box	ks
x̱	as in ex̱act	gz
ph	as in sylph	f
qu	as in quick	kw
qu	as in croquet	k

Syllabication and Accent

Consonant and vowel sounds are combined in groups known as syllables, and these groups are in turn united to form words. Sometimes a single vowel may form a syllable, but a consonant cannot be thus used alone; it must always be combined with a vowel. The syllables of which a word is formed must be carefully noted, for in pronunciation one of the syllables of the word is distinguished by special emphasis or accent, and the others must be clearly enunciated; and in writing it frequently happens that the parts of a word must be separated at the close of a line, thus requiring a proper division into syllables. A general rule for the division of a word into syllables is that if two consonants occur between two vowels, one goes with each vowel, and that when but one consonant comes between two vowels the consonant usually goes with the second vowel.

When a word consists of but one syllable, pronunciation depends wholly upon correct utterance of the sounds of which the word is composed; but when there are two or more syllables, proper placing of the accent becomes one of the essentials of pronunciation. See SPELLING.

ORTHOPEDICS, *awr tho pe'diks,* a modern branch of medical science, relating to the prevention and cure of natural deformities. Preventive treatments are given to infants and delicate children by hygienic care, such as pure air, careful nursing and suitable food, clothing and exercise. Cures are attempted by means of special mechanical apparatus and methodical muscular exercises, but the course of treatment is likely to prove ineffective unless work is begun soon after the deviation from the natural shape begins. The manufacture of orthopedic apparatus has become highly developed and forms an important branch of trade.

ORTHOP'TERA, a large group of insects, including katydids, grasshoppers, locusts, crickets, cockroaches and the odd-looking walking sticks. While not so prolific as some other kinds of insects, most species are represented by large numbers, owing to skilful self-preservation. Some of the orthoptera are among the oldest insects, as indicated by fossil remains. They have four wings, the upper tough and somewhat hardened, lying straight along the body, and covering the hinder ones, except when in flight. Some species, though having wings, cannot fly. There are about 10,000 species. See INSECTS, and special articles on the insects mentioned above.

ORTO'LAN, a species of bunting found on both coasts of the Mediterranean Sea. Its head and back are brown, touched with white; about its eyes and covering its throat the plumage is yellow. The birds are regarded as among the choicest table delicacies, and hundreds of them are caught in nets annually in the south of France, in Italy and in Cyprus, and are fattened for the table.

ORTOLAN

OSAGE, *o'saje,* a once important Siouan tribe of Indians, now living on a reservation in Oklahoma and enjoying the distinction of being the richest tribe in the United States. Originally they occupied extensive territory in what are now the states of Missouri, Arkansas and Kansas. These holdings they sold to the United States government, which paid them a good price. They have also prospered through the collection of royalties for the working of oil wells on their reservation. They number about 1,300, and are gradually dying out.

OSAGE, a river which rises in Lyon County, Kansas, flows eastward and after a course of about 500 miles enters the Missouri River nine miles below Jefferson City. It is navigable for small vessels for about 200 miles from its mouth.

OSAGE ORANGE, a tree native to North America, especially to the southwestern part of the United States, where it is frequently used as a hedge plant. The wood is yellow, tough and satiny, and was formerly much used for bows by the Indians. The tree grows to a height of from thirty to sixty feet. The fruit is large and round and has a pale yellow skin the texture of orange peel. It is not edible.

OSAGE ORANGE

OSAKA, *o sah'ka,* or **OZAKA**, *o zah'ka,* JAPAN, on the island of Hondo, one of the three imperial cities of the empire. It is situated on the shore of Osaka Bay, at the mouth of the Yodo River, twenty miles from Kobe. Osaka has a thriving inland trade, but the harbor is inadequate for the accommodation of large vessels, and the foreign commerce is not large. As a manufacturing center, however, the place is one of the leading Japanese cities, maintaining prosperous manufactories of cotton, glass, iron and steel products, boots and shoes and other commodities. Shipbuilding is also an important industry. The city is the seat of a government mint and contains the headquarters of Osaka military district. Because of its

numerous canals and bridges Osaka is known as the "Venice of the East." Among its notable buildings are several temples and a famous castle. Population, 1916, 1,460,218.

OS'CAR I (1799–1859), king of Sweden and Norway, son of Charles XIV John. During the reign of his father he was three times viceroy of Norway, where he made himself popular by his just administration. He acceded to the throne in 1844, reformed the civil and military administration of the state, abolished primogeniture, established complete liberty of conscience, encouraged education and agriculture and removed the political disabilities of the Jews. He took little part in foreign politics.

OSCAR II (1829-1907), king of Sweden and Norway from 1872 to 1905; from the latter date, king of Sweden only. Although he showed himself from the first willing to grant concessions to the Norwegians, he steadily opposed their efforts for independence. Despite his opposition, however, matters came to a crisis in 1905, and Norway was lost to him. Oscar was a writer of some merit; he translated Goethe's *Tasso* into Swedish, and published several volumes of lyric poetry.

OSCEOLA, *os e o'lah*, (1804–1838), a celebrated Indian chief. His father was an English trader, William Powell, and his mother was the daughter of a Creek chief. Osceola grew up among the Seminoles of Florida and became their leader. His wife, the half-breed daughter of a negro slave, was seized and carried away by the former owner of her mother. This so embittered Osceola that he became one of the most terrible enemies the whites ever had. Imprisonment and punishment did not subdue him, and he took murderous revenge at every opportunity. In October, 1837, while carrying a flag of truce to General Jessup, he was treacherously seized and kept a prisoner in Fort Moultrie until his death.

OSCEOLA

OSEL, or **OESEL**, *o'zel*, an island in the Baltic Sea, geographically a part of Livonia (which see). The island is situated at the entrance to the Gulf of Riga. Its area is about 1,000 square miles. The surface is undulating; the climate is mild, and grains, including wheat, can be produced. Agriculture, the rearing of horses and fishing are the principal occupations of the inhabitants. Population, estimated, 42,000.

OSH'AWA, Ont., on Lake Ontario, thirty-four miles northeast of Toronto, on the Canadian Northern, the Canadian Pacific and the Grand Trunk railroads and on an electric line. There is a Carnegie Library, an armory and a hospital, and manufactories of automobiles, steam fittings, woolens, pianos, and numerous other articles. Population, 1918, about 11,000.

OSH'KOSH, Wis., the county seat of Winnebago County, eighty miles northwest of Milwaukee, on Lake Winnebago, at the mouth of the Upper Fox River, and on the Minneapolis, Saint Paul & Sault Ste. Marie, the Chicago & North Western and the Chicago, Milwaukee & Saint Paul railroads. A state normal school is located here, and the city has a public library, Saint Mary's Hospital and several parks. Other important buildings are the city hall, the county courthouse and the Federal building. The lake affords fine fishing, yachting and ice boating, and there is good hunting in the vicinity. State and county hospitals for the insane, a tuberculosis sanitarium and the county poor farm are near the city. Oshkosh has an important trade in lumber and extensive manufactures of lumber products, such as sash, doors, blinds, matches and furniture. There are also manufactures of machinery, boilers, twine, matting, flour, tobacco, liquors and other articles. Statues of the Indian chief Oshkosh and Carl Schurz and a monument to the soldiers of the Civil War adorn the city. The place was settled in 1836 and was chartered in 1853. Four different times during its history it has been damaged by fires. Population, 1910, 33,062; in 1917, 36,549 (Federal estimate).

OSIRIS, *o si'ris*. In Egyptian mythology, the husband of Isis and father of Horus. He was styled the manifestor of good, lord of lords and king of the gods, and was regarded as the source of good, whereas Set, his brother, stood for evil. Osiris, after having established good laws and institutions throughout Egypt, was murdered by Set and became afterward the judge of the dead. There are a multitude of traditions, both Greek and

Egyptian, about Osiris. He is represented under many different forms and is compared sometimes to the sun and sometimes to the Nile. His soul was supposed to animate the sacred bull, Apis, and thus to be continually present among men. His worship extended to Rome, where in time it was superseded by Christianity.

OSKALOO'SA, Iowa, the county seat of Mahaska County, sixty-five miles southeast of Des Moines, on the Chicago, Rock Island & Pacific, the Chicago, Burlington & Quincy and the Minneapolis & Saint Louis railroads. The city is in a rich agricultural district. There are extensive deposits of coal, limestone and clay in the vicinity. The principal industrial establishments make cement, stave, silos, hydrants, furnaces, brick, tile and building blocks. There is also a packing house. The city contains Penn College, Oskaloosa College, Central Holiness University, a Carnegie Library and three hospitals. After a destructive fire, Penn College was recently rebuilt at a cost of $400,000. The annual state meeting of the Society of Friends is held here. The place was settled in 1843, and the city was incorporated in 1853. Population, 1910, 9,466; in 1917, 9,650 (Federal estimate).

OSLER, William, Sir (1849–), a physician and surgeon, born at Bondhead, Ont., and educated at Trinity College School, Port Hope, at Trinity University, Toronto, and McGill University. Later he studied at the University College of London and at Berlin and Vienna. He returned to Canada in 1874, and was elected to the chair of physiology and pathology in McGill University. From 1884 to 1889 he was professor of clinical medicine in the University of Pennsylvania, when he was called to a professorship at Johns Hopkins University at Baltimore. In 1905 he became regius professor of medicine at Oxford. Sir William won remarkable distinction as a lecturer and also as a physician. He is the author of numerous monographs and articles in medical journals and also has published *Cerebral Palsies of Children, The Principles and Practice of Medicine, The Teacher and Student,* and *Oliver Wendell Holmes: an Address.* While at Johns Hopkins he attracted wide attention by his theory that when men reached the age beyond usefulness, an end should be put to their years. For this pronouncement he was very widely criticised.

OSMIUM, *oz'mium*, a metallic element found in platinum ore. It is bluish-white and has a bright luster. It is the heaviest of all substances, being twenty-two and one-half times heavier than water. Osmium is the most infusible of all the metals. It combines with chlorine in different proportions, also with sulphur, and forms alloys with some other metals. Osmic acid acts as a powerful oxidizer, removing the carbon from indigo, separating iodine from potassium iodide and converting alcohol into acetic acid.

OSMO'SIS, the transfusion or mixture of two liquids when they are separated by a membrane, such as parchment. For instance, if a bladder containing a strong solution of sugar be placed in a receptacle containing water, it will be found after a time that a considerable quantity of water has passed through the membrane into the bladder, making it noticeably fuller. At the same time there has been a passage of the sugar solution into the water. The flow from the vessel into the bladder, or the inward flow, is called *endosmosis,* and the flow from the bladder into the passage, or the outward flow, *exosmosis.* The flow is usually unequal, the greater flow being from the light to the denser liquid. When the fluids become of the same density, osmosis ceases.

Osmosis is one of the most essential processes in the growth of plants. The protoplasm is confined within the cells, the walls of which are a thin membrane. Water and any substances it may hold in solution can pass through this membrane, but the protoplasm has the power of selecting those substances which are needed for its own growth; thus, it absorbs from the circulating cell the necessary nutriment.

OSPREY, *os'pray.* See Fish Hawk.

OS'SINING, N. Y., until 1901 known as Sing Sing and incorporated under that name in 1813, is in Westchester County, thirty miles north of New York City, on the east bank of the Hudson River and on the New York Central Railroad. There is freight and passenger traffic on the river. It is a beautiful residence town, located on an elevated site, at the widest point of the Hudson River, known as Tappan Sea. The famous Sing Sing State Prison is located just outside the village. Other features of interest are the arch of the Croton Aqueduct and the arched highway bridge. There are two military schools, a school for girls, a Carnegie Li-

brary and a hospital. Population, 1910, 11,480; in 1917, 14,064 (Federal estimate).

OS'SOLI, Sarah Margaret Fuller, Marchioness (1810–1850), an American writer, born at Cambridge, Mass., known commonly as Margaret Fuller. She was even at an early age noted for her brilliancy, eccentricity and high temper. Her father gave her a superior education, and after his death she supported the family by teaching languages in Bronson Alcott's school in Boston, and by managing a private school in Providence, R. I. Her brilliancy, and especially her conversational powers, attracted the attention of the most eminent men of New England, and she became closely associated with the Transcendentalists, for a time editing their journal, *The Dial.* She published some translations from German in 1840 and soon afterwards her first original volume, *Summer on the Lakes,* appeared. From 1844 to 1846, the most productive period of her life, she contributed essays on art and literature to the New York *Tribune.*

In the latter year she went to Europe, and in the following year married Marquis d'Ossoli, in Rome. During the revolution of 1848 she served in Roman hospitals, and when the city fell, fled with her husband and their son to Florence and later sailed for America. Their vessel was wrecked off Fire Island Beach, near New York, and all on board were lost. Madame Ossoli, though she wrote little, is regarded as one of the most brilliant women America has produced, her fame resting chiefly on her conversational powers and personal magnetism. Possibly her most important book was *Woman in the Nineteenth Century.*

OSTEND', Belgium, a seaport in the province of West Flanders, on the North Sea, fourteen miles from Bruges. Before the World War the city was a famous summer resort, sometimes entertaining 50,000 visitors in a single season. The Kursaal, a magnificent building, is the center of social life in normal times. Cod and herring fishing and the cultivation of oysters are important industries. The city was built in the ninth century. It sustained a memorable siege by the Spaniards from 1601 to 1604, when it surrendered to Spinola. In 1914 it was for a short time the capital of Belgium, but was later taken by the Germans, who held it until October, 1918. The population in 1911 was 42,638; when the city was evacuated by the Germans there remained only 27,000 of the inhabitants.

OS'TEND MANIFES'TO, a dispatch signed at Ostend, Belgium, October 9, 1854, by James Buchanan, John Y. Mason and Pierre Soulé, at that time United States ministers to Great Britain, France and Spain, respectively. It declared that if Spain refused to sell Cuba to the United States the latter country should forcibly acquire the island. The manifesto, while drawn up at the direction of President Pierce, turned out to be a document of the pro-slavery party. It was not approved in the United States, and nothing ever came of it.

OSTEOPATHY, *os te op'a thi,* a method of treating certain diseases without drugs. The system was formulated by Dr. Andrew Taylor Sill, of Baldwin, Kansas, who, dissatisfied with old-school practice and believing that the body contains within itself the remedy for all disease, founded the first college of osteopathy at Kirksville, Mo., in 1892, after experimenting according to his theory for eighteen years.

Osteopathy is based on the theory that the chief cause of disease is obstruction of the free circulation of the blood and lymph by bone displacement, and that through proper manipulation of the dislocated part it can be restored to its normal position and the body fluids to their normal functions. The treatments are concerned chiefly with the nerve centers of the spine. There are more than 3,000 practitioners, and about 1,000 students in the various colleges in the United States. Twenty-three states have legally recognized the profession and regulate its practice. The objection made to osteopathy is not so much to the method of curing as to the attempt to adapt it to all kinds of diseases. Many medical schools teach the principles of osteopathy, and a large number of regular physicians use it with some classes of patients.

OSTRACISM, *os'tra siz'm,* a political measure practiced among the ancient Athenians, by which persons considered dangerous to the state were banished by public vote for a term of years (usually ten), with leave to return to the enjoyment of their estates at the end of the period. Among the distinguished persons ostracized were Themistocles, Aristides and Cimon, son of Miltiades. To-day in English-speaking countries ostracism means social exclusion.

OS'TRICH, the largest of the existing birds. It is a native of Africa and Asia, and was formerly found in great numbers in the wild state. After the ostrich plume became a fashionable adornment for women's hats and dress trimming, the bird was hunted and exported in such numbers to stock ostrich farms that it is now extant only in the more inaccessible regions of its native haunts.

Physical Characteristics. The full-grown male stands seven or eight feet high and weighs 200 pounds or more. It has a flat head, a stout beak, large eyes, and small, useless wings. The neck and thighs are nearly bare, but the body is covered with feathers.

OSTRICH AND YOUNG

To the ancients it was known as the *camel bird,* a name suggested not only by its appearance but by its peculiar humping gait. Its voice is similar to that of a lion, but has a peculiar hissing intonation. The males are shiny black, with white wings and tails. The females and young birds are of dull brown color, and when hatched the chicks are striped.

The ostrich is a timid bird and has great speed, often outstripping the fleetest Arabian horse. When hunted it usually runs in a circle, and while, because of its speed, it is impossible for a single horseman to overtake it, a number of hunters can capture it by surrounding and closing in their prey. The bird is either lassoed or killed with a spear, rifle, or arrow.

The food of the ostrich in the wild state consists of almost anything in can find in the way of herbs, seeds and fruits. In captivity, the birds are usually fed upon alfalfa or some other form of grass or clover, with occasional variations of fruit.

Family Life. In the wild state several females accompany one male, and all lay their eggs in the same nest, which is a mere hollow in the sand. The eggs weigh about three pounds each, with shells so thick and strong that they serve the African natives as bowls and cups. In warm countries the eggs are left to be warmed by the sun during the day and the male bird sits upon them at night. In captivity, however, when the birds attain their full growth, at about four years, they pair, and each pair is kept in a separate enclosure. Here the nest is made, and about eighteen eggs are laid, upon which the female sits during the day and the male at night.

Ostrich Stock Farms. Large ostrich farms have been established in the southern parts of California and in Arizona, as well as in British South Africa and in other countries where the climate is suitable for raising the birds. They are so voracious that their upkeep proves quite expensive when fashion's vagaries or when interference with commerce, as in the World War, affects the plume market. But if the demand for plumes is great, the industry is lucrative, as an ostrich may attain the age of eighty. The black and white plumes are obtained from the male bird, and the brown ones from the female.

OSTROGOTHS. See GOTHS.