resent two closely-related sounds. When new letters do appear, sooner or later, they are generally differentiations of others previously in use. The distinction is often made simply either by a diacritical point or by some modification of form (*e.g.* C G, I J, ð ð, ב ב).

2. Changes in form are the result of a continuous process of variation. Fashion necessarily plays a part, and additions are sometimes made for the sake of ornament. Changes of writing material exert a powerful influence at certain periods. The inscribed surface and the instrument used may be changed. When a pen is employed, modifications are caused by the effort to attain speed and convenience. Letters are written as much as possible in one stroke (e from E, *J* from T, ϑ from *θ*). They are also united to one another by ligatures. Considerations of convenience often lead to alteration in the point at which a letter is commenced, with the result that it may be speedily transformed. Changes in the proportion of a letter, influenced by fashion or convenience, soon alter its appearance (*ω* from Ω). The desire to keep letters distinct and legible is a check on development, but when letters approach one another it may actually lead to further change. It is to be observed that liability to variation increases when an alphabet is transmitted to another people, and so is freed from the conservative influences of the past.

3. Change in phonetic values on a great scale takes place when an alphabet is applied to a new language. It is only in a small proportion of cases that the new sounds exactly coincide with the old. Quite new values may be given to the signs which are not required for their original purpose. Other signs may keep their old value, and receive a new one as well. But values also change within the range of national usage; letters are differently pronounced at different dates. This arises (1) through the introduction of new sounds which require representation; (2) through neglect to change the spelling of a word which has changed its sound. In both cases the sign of the old sound comes naturally to represent the new sound.

*The Origin of the Alphabet.*—The earliest alphabetic writing known is Semitic. The oldest monument on which it occurs, to which a date can be assigned, is the stone of Mesha. The language is Moabite, and the date the commencement of the 9th century B.C. A Phœnician inscription on the fragments of a bowl dedicated to Baal of Lebanon belongs perhaps to the same century. There are similar Aramaic inscriptions of the 8th century (from Zenjirli). In the earliest stage of its history the alphabet is therefore common to the Semitic-speaking inhabitants of Syria. It is written from right to left, expresses consonants only, and consists of twenty-two letters.

A mixed system of alphabetic writing existed in Egypt many hundreds of years earlier. (See HIEROGLYPHICS.) Attempts have been made to show that the Semitic alphabet was derived from this. The Egyptian letters are so numerous that accidental resemblances are to be expected. The danger of arbitrary selection has been best avoided, perhaps, by E. de Rougé. He determined the letters that are employed to transliterate each Semitic consonant, selected those most in use, and then compared their hieratic forms in Papyrus Prisse with the early Semitic characters. The resemblances are striking. But the papyrus is dated 1,500 years before the stone of Mesha. Even an interval of a thousand years between the alphabets is more than sufficient to forbid a definite con-

clusion. Besides, there is a close resemblance between certain Semitic letters which express related sounds (*e.g.* tṭ, ṣś, hḥ). It is natural to assume that the forms have been differentiated from one another. But this implies that in these cases De Rougé's resemblances are accidental, and doubt is cast on the other parallels also. The attempts made to show that the cuneiform writing of Babylonia is the true parent of the Semitic alphabet may be regarded as even less successful.

It has been argued, from the resemblance of some of the Semitic signs to the objects denoted by their names, that the letters were once pictures used as ideograms. The intrinsic probability of Egyptian or Babylonian influence forbids the postulate of an unknown ideographic system, which, besides, would surely have left a trace of itself. But the alphabetic signs may have originated in conventional pictures. It is not to be supposed that they were arbitrary inventions. The value of each consonant is the first letter of its name (b = bêth, etc.). The sign may have been devised from the name, although intended to represent its initial consonant only. This hypothesis leaves room for the influence of the older systems. It is unlikely that the inventor followed no precedent, and it is extremely improbable that an alphabet invented in Syria in the second millennium B.C. should be uninfluenced by the writing of Egypt or Babylonia. Both the conception of alphabetic writing and the acrophonic principle of the construction of the letters may have been borrowed from Egypt; both were known there. It is premature to say what influence was exerted by the recently-discovered signs which from an early date were used in Asia Minor, Crete, Egypt, and other countries bordering on the Mediterranean. They resemble alphabetic signs, but their phonetic character is still unknown. (See Flinders Petrie's *Royal Tombs of the First Dynasty* (1900), p. 31, *f.*)

It remains to be said that the great achievement of the inventor of the Semitic alphabet was not, in any case, the creation of new alphabetic signs. It lay in the adoption of a purely alphabetic system, which, moreover, denoted each sound by one sign only. For this achievement he is to be ranked among the greatest of the benefactors of mankind.

The absence of vowels from this early alphabet has not been satisfactorily explained. It has been conjectured that the letters at first had a syllabic value ( = consonant + vowel). The supposition is used in support of the hypothesis of Egyptian origin, and is suggested by it. Does not the fact rather imply that dialects were to be represented which agreed consonantally, but varied in their vowel systems, so that the inventor left the vowels to be supplied according to local practice?

The nationality of the inventor of the alphabet is unknown. It is accidental that the earliest monument on which it is employed is Moabite. The clue given by the significance of the traditional names of the letters is too slight; the Aramaic form of these names in Greek is not decisive evidence.

Cuneiform writing was currently used by the Semites of Syria at the date of the Tell Amarna letters (*c.* 1400 B.C.). This may be evidence that the alphabet was not yet invented, or was still of recent origin. The Aramaic or Hebrew order of the letters is the oldest. There is some appearance of phonetic grouping, but this may be accidental. The meaning of the names seems to affect the arrangement. Some of the letters may be regarded as additions to the first alphabet,

since they appear to be differentiations of letters with related sounds. It is noteworthy that the names of these new letters are the most difficult to interpret.

*The Semitic Alphabets.*—The distinctive forms of the early alphabet were preserved by the Phœnicians. It was the Carthaginian alphabet also. The Hebrews used it before the exile (Siloam inscription), and the Maccabean princes revived it on their coins. The Samaritan alphabet is its most direct descendant.

The Aramean alphabet is of fundamental importance, because of its numerous descendants. It gradually assumes a distinctive character; by the 5th century B.C. the transformation is complete (inscription of Teima). The omission to close the tops or sides of the letters is a marked feature (Greek O is the archaic form of ע, and Δ of ד). The endeavour to reduce the number of separate strokes is noticeable (ט from Θ).

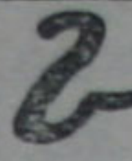
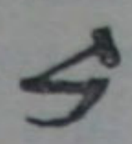
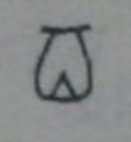
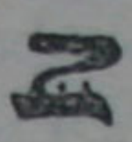
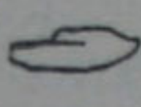
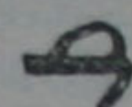
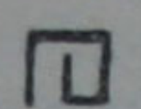
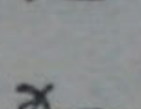
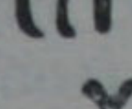
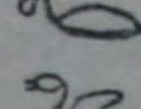
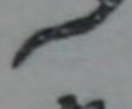
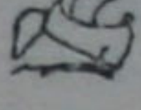
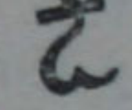
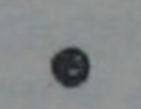
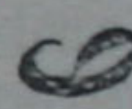
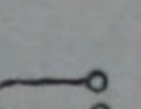
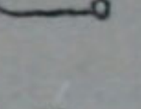
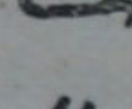
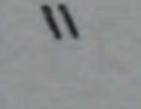
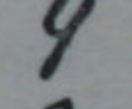
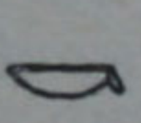
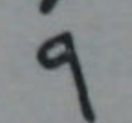
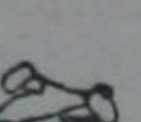
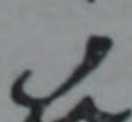
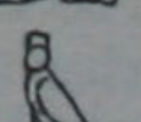
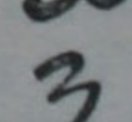
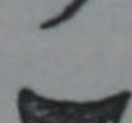
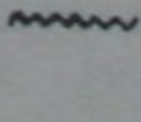
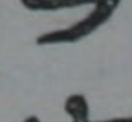
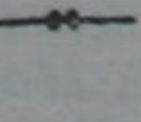
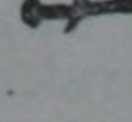
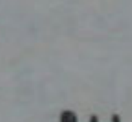
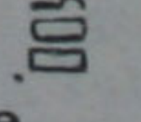
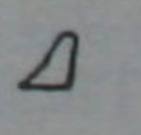
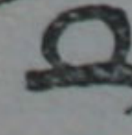
After the exile the Jews adopted the Aramean alphabet. A distinctive Hebrew variety exists from the Christian era onwards. It is marked by a tendency to bend final strokes round to the left (ך is the same letter as L). This was a step towards cursive writing, which at last comes into use, although never in Bible MSS. In printed Bibles the letters imitate ornamental German MSS. of the middle ages. The Syriac is another descendant of the Aramean alphabet. Mutated consonants were indicated by dots, and combinations of points were used to represent vowels. The Hebrew vowels date from the 6th or 7th century A.D., and the innovation may have followed a Syriac model.

From a Nabatean variety of the Aramean alphabet comes the Arabic. It and the Latin alphabet are now the most widely used. It has profoundly altered the characters of the parent alphabet, and so confounded seven that diacritical marks are required to distinguish them. There are now twenty-eight consonants. The numerical order of the alphabet is the old one; the six new consonants are at the end. The grammatical order is a rearrangement according to the present resemblance of the signs. Subsidiary and inadequate vowel representation is now available.

The Himyaritic alphabet of Arabia seems to be a development of the early Semitic alphabet. But the connecting links have not yet been supplied. The Ethiopian syllabary is an offshoot from it. It has been suggested that the Indian alphabets, which are a large family in themselves, may also be derived from this.

*The Genealogy of the English Alphabet.*—The Semitic alphabet was transmitted by the Phœnicians to the Greeks (earliest inscriptions, undated, from the island of Thera; Abu-Simbel inscriptions about 600 B.C.). The most remarkable change was the introduction of vowel representation. Four consonantal signs were employed to denote the vowels *a*, *e*, *i*, *o*; Y was added to express *F*. It appears to be a differentiation of waw *f*, later called digamma, which was required as a consonant. One of the *t* signs was employed for *th*. Some of the local alphabets preferred san, No. 18, and some sigma, No. 21, as the sign for *s*. A third sibilant, No. 15, was dormant until revived to represent ξ. At this stage the Greek alphabet consisted nominally of twenty-three consonants, as follows: Α Β Γ Δ Ε *ϝ* Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ϻ Ϙ Ρ Σ Τ Υ.

Greek colonists took an early form of the alphabet to Italy. But already there were three additional letters at the end, Χ, Φ, Ψ, with the values ξ, φ, χ. Of these twenty-six, the Latin alphabet adopted twenty-one. Θ, Φ, Ψ

| | Egyptian. | | | | | Greek. | | Latin. | |
|---|---|---|---|---|---|---|---|---|---|
| | Hieroglyphic | Hieratic | Hebrew | | Semitic Prototypes | Eastern | Western | Latin | Uncial |
| 1 |  |  | א | α | 4 | AA | AA | A | a |
| 2 |  |  | ב | β | 9 | B | B | B | b |
| 3 |  |  | ג | γ | 7 | Γ | ΓC | CC | c |
| 4 |  |  | ד | δ | Δ | Δ | DD | D | d |
| 5 |  |  | ה | ε | 3 | E | EE | E | e |
| 6 |  |  | ו | F | Y | Y | FV | V | f |
| 7 |  |  | ז | ζ | I | I | I | Z | h |
| 8 |  |  | ח | η θ | ⊟ | H | H | H | ɿ |
| 9 |  |  | ט | ι | ⊕ | ⊗ | ⊙ | I | |
| 10 |  |  | י | κ | ɣ | K | K | K | |
| 11 |  |  | כ ך | λ | ⅃ | ⅃ | ⅃ | L | ⅃ |
| 12 |  |  | ל | μ | ⅄ | M | M | M | m |
| 13 |  |  | מ ם | ν | ⅂ | N | N | NN | N |
| 14 |  |  | נ ן | ξ | ∓ | ≡ | X | X | X |
| 15 |  |  | ס | ο | ○ | ○ | ○ | O | O |
| 16 | |  | ע | π | ⅂ | ⊓ | ⊓ | P | P |
| 17 |  |  | פ ף | | ⅁ | | | | |
| 18 |  |  | צ ץ | | | | | | |
| 19 |  |  | ק | | ⍜ | | ⍜ | Q | ⍜ |
| 20 |  |  | ר | ρ | ⍴ | P | RR | RR | ꝛ |
| 21 |  |  | ש | σ | ⍳ | ξ Σ | ⅀ | S | ſ |
| 22 |  |  | ת | τ | ⍭ | T | T | T | t |

*Alphabets—Comparative View.*

were not required; Ξ was rejected; sigma was preferred to san. The first Latin alphabet was therefore as follows: A B C D E F Z H I K L M N O P Q R S T V X. Before this alphabet passed to Britain the principal changes were: (1.) Z proved unnecessary, was dropped, and then restored for employment in Greek words. Along with Greek Y it was placed at the end of the alphabet. The older Y in the form V had now a different value (*u* as in full). (2.) C, which is Γ rounded, added to the value *g* that of *k*, and practically supplanted *k*. Finally, a variant G took the old value, and C stood for *k* only. The new letter G was set in the alphabet after F. This was the original position of Z, which it still occupies in the Greek and Hebrew alphabets.

This alphabet was transmitted to Britain. The forms in English use may still be called those of the Latin alphabet. (See WRITING.) The number of the letters also has increased only by three: *w* has arisen from *vv; u* and *v*, originally variants, have acquired a distinctive use, and *j* is a modern form of consonantal *i*. Three other letters were employed for a time, until rejected by Norman-French influence (ð and two runic letters þ, ƿ). But, phonetically, the Latin alphabet has been transformed by English usage. The values of the vowels in particular have been entirely changed. (See ORTHOGRAPHY, and the articles on the letters.)

*The Standard Greek Alphabet.*—The principal features in the national development of this alphabet are: (1.) The gradual disuse of *f* and ϙ, because the language did not require them, and of san, which was supplanted by Σ. *f* and ϙ were revived as numerals, 6 and 90. San had lost its alphabetic position, but was set at the end to represent 900 (sampi ϡ). (2.) The addition of certain new consonantal signs. *Ph* (φ) was the earliest in general use. *Ks*, *kh*, and *ps* were not uniformly represented. In one group of alphabets, ξ = *ks*, χ = *kh*, ψ = *ps*. In another, χ was *ks*, and ψ represented *kh*; ξ was retained in the alphabetic list, but unemployed. The Ionian alphabet represents the former group, the Italian alphabets the latter. (3.) The addition of two new vowel signs. H assumed the value η, *h* being left for a period unrepresented; Ω was derived from O. As the last addition to the alphabet, Ω was placed at the end. There were now twenty-four letters.

An alphabet embodying these changes was complete soon after 600 B.C. The Abu-Simbel inscriptions, about this date, show ϙ lingering; H = η, but twice used for *h*; Ω not yet in use. In 403 B.C. the Ionian alphabet was officially adopted at Athens. Since about 500 B.C. the direction of the writing had been from left to right.

*Literature.*—The material for a study of the earliest alphabet, and of Semitic alphabets generally, is given in the *Corpus Inscriptionum Semiticarum*. Selected inscriptions and a full bibliography are given by Lidzbarski in *Handbuch der Nordsemitischen Epigraphik* (1898). In favour of the Egyptian origin of the alphabet, Rougé's *L'Origine Egyptienne de l'Alphabet Phénicien* (1874); of a Babylonian origin, a section (pp. 221–31) of Delitzsch's *Entstehung des ältesten Schriftsystems* (1897). Thompson's *Greek and Latin Palæography* (2nd ed. 1894) is excellent; *cf.* Kenyon's *Palæography of Greek Papyri* (1899). Kirchhoff's *Studien zur Geschichte des Griechischen Alphabets* (4th ed. 1887) is an introduction to the early Greek inscriptions. General introductions, with bibliography on other alphabets:

*The Alps—Eiger and Mönch.*

Taylor's *The Alphabet* (2 vols. 1883); Berger's *Histoire de l'Ecriture dans l'Antiquité* (2nd ed. 1892). Lenormant's *La Propagation de l'Alphabet Phénicien* (1872–3; reprint, 1875) remains incomplete. For phonetic changes in the English alphabet, see Sweet's *History of English Sounds* (1888).

**Alpheus,** in Greek mythology, the chief river of the Peloponnesus, which flows past Olympia to the Ionian Sea. The god Alpheus surprised the nymph Arethusa whilst bathing in the river, and pursued her; but Artemis transformed her into an underground spring, which reappeared as a fountain on the island of Ortygia, close to Syracuse, Sicily. Alpheus came to the surface of the sea as a fresh-water spring near the fountain of Arethusa. (Ovid, *Met.* v. 572.) The legend is the foundation of Shelley's poem *Arethusa*.

**Alphonsine Tables,** improved astronomical tables drawn up by fifty celebrated astronomers at Toledo in 1252, under the patronage of Alfonso X. of Castile, and first printed in 1483.

**Alphonso.** See ALFONSO.

**Alpine Club,** a society formed in London in 1857–8 for the purpose of bringing together those interested in mountaineering and mountain art, science, and literature. Its membership now approaches 600. Its interests extend to all the mountainous regions of the world. By the issue of the *Alpine Journal* (founded in 1863), by holding an equipment exhibition (1899), and by the issue of maps, etc., the club has done much to popularize the sport all over the world. The headquarters, 23 Savile Row, London, contain an excellent reference library. There are numerous similar clubs throughout Europe, the chief of which are the Austrian (1862), Swiss (1863), Italian (1863), French (1874), and German (1869), the first and the last of which were amalgamated in 1874. There are also similar clubs in S. Africa, New Zealand, Canada, and the United States of America. The English Alpine Club has now followed the example of continental clubs in adopting a badge or colours for its members. Its qualification is by far the highest of any Alpine Club in the world, as befits the parent body.

**Alpine Glow,** the tingeing of the summits of certain Alpine peaks with rosy colour just before sunrise and just after sunset.

**Alpine Plants,** which are also, in general, arctic plants, form the flora of regions which, by reason of altitude or latitude, approach the limits of perpetual snow. They are, for the most part, tiny plants with brilliant flowers, and they tend to grow closely, forming carpets of green; thus the many kinds of saxifrages are typical alpine plants. Edelweiss, gentians, azaleas, rhododendrons, primulas, and many minute ferns, belong to the vegetation of mountains, but are successfully grown in European rock gardens. In the secular climatic changes of the earth's surface these forms have been driven from the once frozen valleys of the temperate zone to the mountain slopes of the Alps and Andes, and to the northern plains of Siberia and Canada. See Dawson's *Geol. Hist. of Plants* (1888); Willis's *Flowering Plants and Ferns* (1897); Wooster's *Alpine Plants* (1871–4); and Saboth's *Alpine Plants* (new ed. 1881–4).

**Alpini,** PROSPERO (1553–1617), Italian botanist, studied medicine at Padua, went in 1580 to Cairo to practise as a physician, served (1584) in the same capacity with the fleet of Andrea Doria; and ultimately became professor of botany at Padua. He is remembered chiefly for his work *De Plantis Ægypti* (1592), which included the

first accurate description of the coffee plant. He also published *De Medicina Ægyptiorum* (1591), *De Medicina Methodica* (1611), and other works.

**Alpist,** the seed of canary grass (*Phalaris canariensis*), used for feeding cage birds. The name is derived from the native name of the plant in the Canary Is.

**Alps,** the great mountain range that extends, in the form of a crescent, from Genoa to Trieste. In the Alps themselves the term denotes the high mountain pastures, used only in summer. On the N. the foothills reach to just S. of Munich, Salzburg, Linz, and Vienna. The chain is usually described as divided into three sections: (1) the W. Alps (Col di Tenda to the Simplon), including the Maritime Alps, Cottian Alps, Dauphiné Alps, Graian Alps, chain of Mont Blanc, and Pennine Alps; (2) the Central Alps (Simplon to Reschen Scheideck and Stelvio), with the Bernese Alps, N. Swiss Alps, Lepontine and Adula Alps, Todi group, Rhætian Alps; (3) the E. Alps (Reschen Scheideck and Stelvio to the Semmering), including Ortler, Adamello, and Brenta groups, Limestone Alps of Bavaria, N. Tyrol and Salzburg, Central Tyrolese Alps, S. Tyrolese Alps or Dolomites, and S.E. Alps or the Carnic, Karawanken, and Julian Alps.

Politically, the Alps are situated in five countries—France, Italy, Switzerland, Austria, and Bavaria. Railways have been pierced under several passes—the Semmering, Col de Fréjus (not Mont Cenis, as often stated), St. Gothard, and Arlberg; and tunnels are in progress under the Albula, Simplon (pierced Feb. 25, 1905), Col di Tenda, and Col de Jaman. Railways pass over the Brenner Pass, Col de la Croix Haute, Brünig, Laret, and Little Scheideck. Light railways ascend the Rigi, Uetliberg, Pilatus, Monte Generoso, Monte Salvatore, Brienzer Rothhorn, Rochers de Naye, Grand Revard, Salève, Stanserhorn, Gornergrat, and Gurten. The Jungfrau railway rises from 6,772 ft. to the top at 13,428 ft. The highest carriage roads pass over the Stelvio from Austria to Italy, Col du Galibier, Umbrail from Switzerland to Italy, Great St. Bernard, Furka.

There are many glaciers (1,155, covering 1,200 to 1,500 sq. m. according to Heim), and some of the greatest European rivers rise from these glaciers—the Rhone, Rhine, Po, Adige, and Piave—flowing to the Mediterranean, North Sea, Black Sea, and Adriatic. There are many lakes, of which the largest are Geneva, Constance, Garda, Maggiore, and Chiemsee. The geological history of the Alps is one of successive periods of upheaval, due to pressures from N.W. and S.E., which have folded, broken up, and in some cases even overturned the strata of the earth's crust. In the centre of the range the rocks are chiefly Archæan—gneiss, granite, mica schist, etc.; while the outer belts contain principally fossiliferous sedimentary strata. Minerals are abundant in the Austrian part of the range, where coal, iron, lead, gold, silver, copper, and mercury are worked.

The principal Alpine railways are:—(1.) Geneva to Chamonix. (2.) Geneva to Brigue for the Simplon, *via* St. Maurice (with branch from Visp to Zermatt and Gornergrat). (3.) Berne to Interlaken, *via* Thun; Interlaken by Lauterbrunnen and Mürren for the Jungfrau, with branch for Grindelwald. (4.) Lucerne to Brienz, *via* Meiringen. (5.) Lucerne to Alpnach and Mt. Pilatus. (6.) Lucerne to Zürich, *via* Rothreuz and Zug. (7.) Zug, *via* Arth (for the Rigi), to Vitznau. (8.) Lucerne by Arth-Goldau and the St. Gothard Tunnel to Bellinzona and Lugano. (9.) Zürich, *via* Rapperschwil, to Wee-

sen and Glarus for Linththal. (10.) Zürich, *via* Weesen and Lanquart (*a*) to Davos-Platz, (*b*) Coire and Thusis and the Albula Pass.

The chief mountain-climbing centres are Grindelwald (for Eiger and Wetterhorn), Chamonix (for Mt. Blanc), Zermatt (for the Matterhorn), Courmayeur, Macugnaga, and Pontresina (for Piz Languard, etc.).

Among the most frequented health resorts are Davos-Platz (E. Switzerland), St. Moritz, Samaden and Sils Maria (in the Upper Engadine), Pontresina, Tarasp, Bergün, St. Beatenberg, Heiden, Urseren, Engelberg, Seelisberg, Mürren, Grindelwald, Interlaken, Gersau, Lugano, Vevey, Lausanne, Bex, Bormio, Faulen, Rotzlach, Yverdon, etc. (For the chief places here mentioned, see articles under their names.)

The animals of the Alps include the steinbok (ibex), chamois, bear, wolf, lynx, wild cat, marmot; the eagle, lämmergeier (vulture), and several hawks; salmon and trout are abundant in the lakes; butterflies and other insects abound.

The population is racially very mixed, and some have postulated an ancient Alpine race which has modified the people of Teutonic, Slavonic, and Latin origin who have pressed in upon the highlands from the plains.

The Alps have played a great part in the history of the world. Hannibal, Cæsar, Attila, Napoleon, and many other great generals, knew them well. The word 'ultramontane' indicates their significance in ecclesiastical controversy; and the unique international position of the Swiss confederation is only one example of their influence in the politics of Europe.

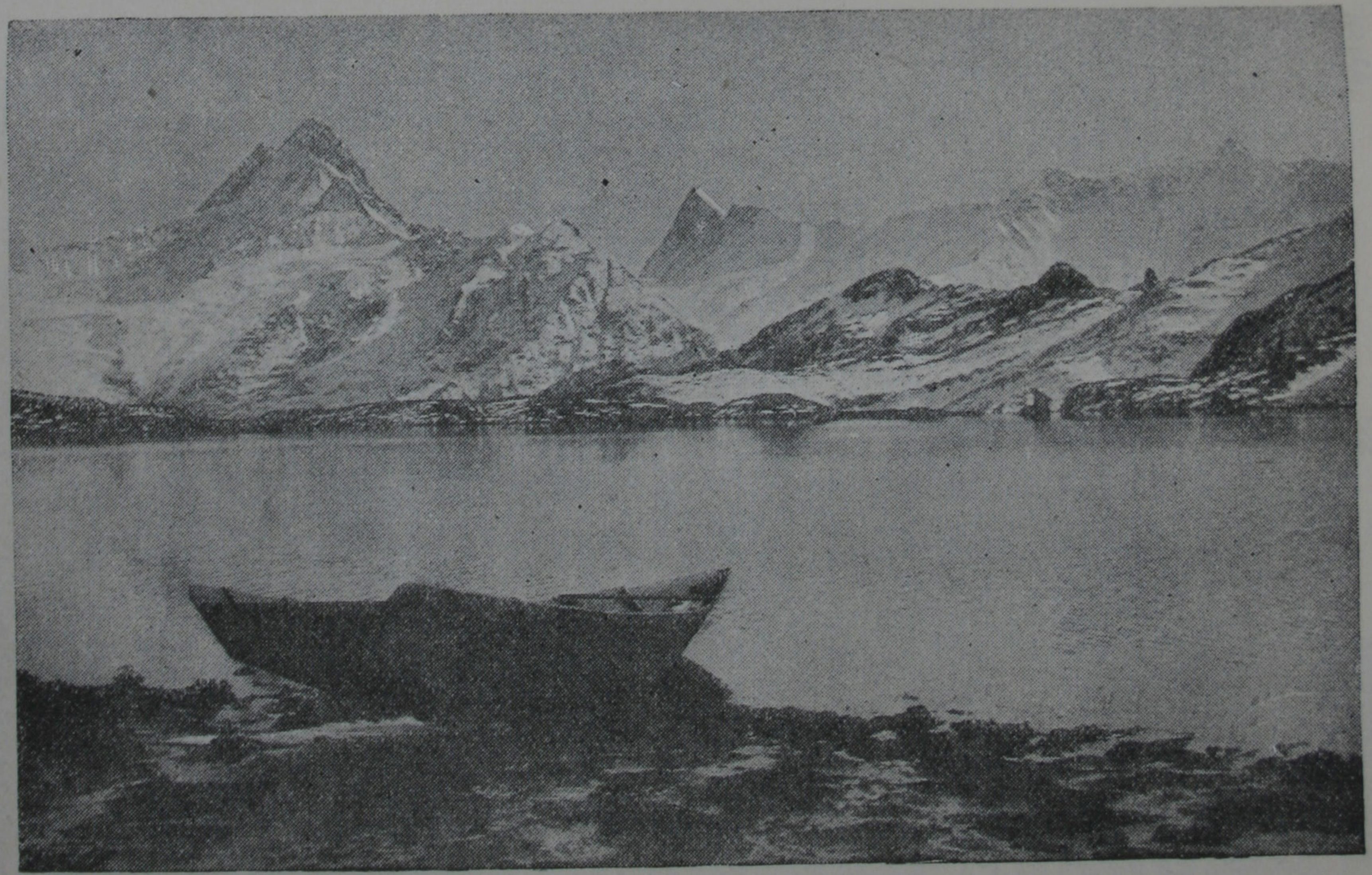
For general bibliography, see Rev. W. A. B. Coolidge's new edition of Ball's *Hints and Notes for Travellers in the Alps.* See also Berlepsch's *Alpen in Natur- u. Lebensbildern* (Eng. trans. 1861); Umlauft's *Die Alpen* (Eng. trans. 1889); Bonney's *Alpine Regions of Switz.* (1868); Coolidge's *Alps in Summer and Winter* (1908); *Anleitung zu Wissensch. Beobachtungen auf Alpenreisen* (1882—pub. by the German and Austrian Alpine Club, and relating to *all* the natural sciences). For history of Alpine exploration, see, for the W. Alps, Ball's *Alpine Guide*; for the Central Alps, Studer's *Ueber Eis u. Schnee* (1896–9); and for the E. Alps, Richter's *Die Erschliessung d. Ostalpen* (1892–4). All the great Alpine countries have now completed the publication of large scale government maps—France (1:80,000 and 1:100,000); Switzerland (the *Dufour Map*, 1:100,000, and the *Siegfried Atlas*, 1:25,000 for the plains and 1:50,000 for the mountains); Italy (1:25,000, 1:50,000, and 1:100,000); Austria (1:75,000); and Bavaria (1:25,000 and 1:50,000). Among the best special maps may be mentioned Duhamel's *Dauphiné* map (4 sheets —Grenoble, 1889; Lond., 1892; scale 1:100,000); Kurz's *Chain of Mont Blanc* (Berne, 1896; scale 1:50,000); and the coloured maps of scale 1:50,000 of the E. Alps issued by the German and Austrian Alpine Club.

**Alps,** MARITIME (mts.). See MARITIME ALPS.

**Alps,** MARITIME (dep., France). See ALPES MARITIMES.

**Alpujarras,** mountain chain in prov. of Granada, Spain, running parallel to and forming a branch of the Sierra Nevada range. The scenery is wild and picturesque, and in these fastnesses the Moriscos of Granada found their last refuge. Their descendants, called 'new Christians,' still linger in separate villages.

**Alruna,** name given to a witch or prophetess by ancient Teutonic tribes; also a small image, carved from mandrakes, used in certain superstitious rites. The word is connected with runes.



*The Alps—Schreckhorn and Finsteraarhorn.*

**Alsace-Lorraine** (Ger. *Elsass-Lothringen*), an imperial territory of the German empire, forming its S.W. border next France. Alsace embraces the W. half of the valley of the Rhine and the E. half of the Vosges Mts. and their valleys. Lorraine, which lies N.W. of Alsace, consists of a low plateau, drained by the Saar in the E. and by the Moselle in the W. The Ill, which enters the Rhine at Strassburg, drains the valleys of Upper Alsace. The climate is exceptionally genial in the Rhine valley. Agriculture is the chief occupation, 50 per cent. of the area being cultivated, and 15½ per cent. meadow and grass land. The chief crops are hay, wheat, oats, potatoes, barley, rye, tobacco, hops, and beetroot; the production of wine is important (over 74,000 ac. being under vine). About 30 per cent. of the area is covered with forest, of which about three-fourths belong to the state and public and corporate bodies. Lorraine possesses considerable mineral wealth, especially in iron, coal, salt, and building stone. Chief industries are iron-founding, the manufacture of glass, porcelain, chemicals, cotton and woollen goods, and paper; also tanning, brewing, and distilling. There is a university at Strassburg. Alsace-Lorraine is administered by a governor-general appointed by the emperor, a ministry of four departments, and a council of state. Legislation is entrusted to a territorial committee of fifty-eight members, all elected indirectly by the people. The Constitution was under revision, considerable changes being made, in 1911. Cap., Strassburg. Area, 5,604 sq. m. Pop. 1,815,000. of whom 200,000 or more are of French origin.

From the 7th century Alsace was governed as a part of the empire by dukes and other dignitaries. Between 1648 and 1697 it was partly transferred to and partly seized by France, which held it until the war of 1870–1, when it was reclaimed by Germany. Lorraine, too, was a county of the empire from the middle of the 9th century, a duchy from 911, and from 953 was divided into two duchies—Upper Lorraine and Lower Lorraine. The former remained constitutionally unchanged until 1736, when it was granted to Stanislaus, ex-King of Poland, and on his death in 1766 was incorporated in France. Lower Lorraine, which stretched to the shores of the North Sea, was united with the duchy of Brabant in the end of the 12th century, and in 1429 with the duchy of Burgundy. See *Beiträge zur Landes- und Volkskunde von Elsass-Lothringen*, by various writers (1887, etc.); H. Witte's *Zur Geschichte des Deutschthums im Elsass und im Vogesengebiet* (1897); and Jacob's *Die Erwerbung des Elsass durch Frankreich in westfälichen Frieden* (1902).

**Alsatia,** a sanctuary for criminals and debtors, called after Alsace (as a debatable country between France and Germany); it included the precincts of the Carmelite House of Whitefriars in London, but lost its privilege in 1697. See Shadwell's *Squire of Alsatia* (1688), and Scott's *Fortunes of Nigel*.

**Al segno** (It. 'to the sign'), in musical score, directs the musician to turn back from the bar thus marked to the sign 𝄋 and begin again at that place, continuing to the first double bar.

**Alsen,** a fertile isl. in the Baltic, Danish up to 1864, but now belonging to the Prussian prov. Schleswig-Holstein, lies near the S. end of the Little Belt. It is separated from the mainland by the Sound of Alsen, 12 m. long and from a few yards to 2½ m. wide. Pop. about 25,000, mostly Danish-speaking. Area, 120 sq. miles.

**Alstaden,** tn., Rhine prov., Germany, on the Rhur, 8 m. w. of Essen. Coal is mined. Pop. 12,000.

**Alster,** riv. in Holstein, Germany; passes through Hamburg, of which it forms the harbour, and joins the Elbe (r. bk.) by several channels.

**Alstrœmeria** (Peruvian lily), plants of the Amaryllidaceæ, from S. America. Several are cultivated as hardy and half-hardy tuberous-rooted perennials. The flowers are brightly and variously coloured.

**Alt,** a term applied to the notes in the octave above the treble stave, beginning with G; the notes in the next octave above are termed *in altissimo.*

**Altai Mountains,** one of the principal mountain ranges of Asia, dividing the Russian province of Semiryechensk from E. Turkestan, and stretching E. along the N. side of the Desert of Gobi. The range is built up principally of argillaceous schists, with granite in the highest parts, and diluvium and alluvium at its base. Gold, silver, copper (and latterly iron) have been mined there since the early part of the 18th century. Mean alt. 2,000 ft.; maximum alt. in the Byelukha, 14,000 ft.

**Altair,** *α* Aquilæ, a white star of 0·74 photometric magnitude. Dr. Elkin's parallax of 0·232″, corresponding to a light journey of fourteen years, indicates for Altair a total luminosity tenfold that of the sun. Its spectrum is of the Sirian type, but the absorption lines are exceptionally wide and diffuse. It is approaching the sun with a velocity of 24 m. a second (Vogel).

**Altamaha,** riv., Georgia, U.S.A., formed by the junction of the Oconee and Ocmulgee. Length, 150 m. It is navigable for small vessels to its source.

**Altamura,** tn., prov. of Bari, Italy, 42 m. N.W. of Taranto, with an old Norman cathedral. Good wine is produced in the vicinity. Pop. 23,000.

**Altar** (Lat. *altare,* 'a high place'), a raised structure on which propitiatory offerings are laid; in the Christian church, the table or stone upon which the instruments of the eucharist are displayed. The altar has often been regarded as a place of refuge for debtors, slaves, and criminals. In the early Christian church the altar was a portable structure of wood, and the Roman Church still allows a table of that material to be used; but a tablet of stone, which alone is consecrated, and must contain an authentic relic, must be placed upon the table, and is regarded as the true altar. This tablet, or *mensa,* may have one or more steps (*gradini*) towards the back, on which are placed the candlesticks, crucifix, tabernacle, etc. The altar early assumed a somewhat monumental form, its rectangular base often enclosing the body of a martyr. Often the most elaborate design was worked in most precious materials; when it was a simple structure, it was covered, during the celebration, with *antependia,* or elaborately ornamented wooden frames. The rubrics require that the *mensa* should be covered with white linen cloths. The 'high' or principal altar is surmounted by a baldachin or canopy. The reredos is not a part of the altar, but usually accompanies it. The expositorium, or throne for the exposition of the monstrance, as well as reliquaries and shrines, are sometimes grouped with the altar, forming one design. There may be numerous secondary altars in side chapels. The Court of Arches has decided that there are no altars in the Church of England, but only holy tables or communion tables. For altar lights, see LINCOLN JUDGMENT.

The altar has been in use by

man from the first dawn of the idea of propitiation in religious worship. The descriptions of the early Jewish altars, often simply built of rough stones when needed, are familiar. Altars of gold and brass constituted a very important part of the furniture of both Moses' tabernacle and Solomon's temple. From early Jewish times the altar provided a protection to fugitives, which it was sacrilege to violate. The altars used in pagan times are of interest. They were of two kinds: some low, and adapted for kneeling on, stood before the images within the temple, so that the worshipper, mounted upon one, could offer up his prayer; the other type was that used for burnt-offerings, which was placed before the temple door. The number of victims offered in many Greek sacrifices required altars of a very large size—one measured 600 ft. in length.

**Altar-piece,** a picture or a framed sculpture in relief of a religious subject or subjects hung over or placed upon an altar. It was one of the earliest forms of Christian art, and some of the most famous works of art in the world are altar-pieces. As a rule, altar-pieces consist of one or more pictures—when of two, they are called diptychs; when of three, triptychs; and when of greater number are usually designated as of so many compartments—and they are frequently provided with shutters, painted on both sides, which may be closed to conceal the principal subject, which, except in a diptych, is the central one. But in some cases, in both Flemish and Italian examples, pictures and sculptures were combined; and in certain Flemish and Spanish specimens, and in many of the Rhenish school, all the subjects were carved in wood, coloured and gilded, and brought together in a carved architectural setting.

**Altazimuth,** or altitude and azimuth instrument, essentially a large theodolite for determining the altitudes and azimuths of the heavenly bodies, and, indirectly, their right ascensions and declinations, these being deducible from the former, provided that the times of observation are known. In this form of instrument, a telescope revolving on a horizontal axis is rigidly attached to a graduated vertical circle read by microscopes; while the whole can be rotated above a fixed horizontal circle, the readings of which give positions in azimuth. The altazimuth (invented by Olaus Römer of Copenhagen in 1690) is available for measurements in all parts of the sky; and it was with a combination of this type, completed by Ramsden in 1789, that Piazzi made the observations for his great star-catalogue. Airy's erection of an altazimuth at the Royal Observatory, Greenwich, in 1847, for the purpose of a more persistent following of the moon, counted, nevertheless, as an innovation; but it was later imitated at Strassburg, Geneva, Bamberg, Washington, and elsewhere. Airy's instrument was replaced by another of the same class, but much larger, in 1897. Although called a 'universal transit,' it is practically fixed in the meridian.

**Altdamm,** tn., Pomerania, Prussia, at the head of the Dammscher See, 5 m. E. of Stettin. Pop. 7,500.

**Altdorf,** or ALTORF, cap. of Swiss canton of Uri, on St. Gothard Ry., 21 m. S.E. of Lucerne, and 2 m. from Flüelen, its port on Lake Lucerne; is associated with the legend of William Tell, of whom it has a fine statue. Pop, 3,200.

**Altdorfer,** ALBRECHT (*c.* 1480-1538), painter, architect, engraver; one of the 'Little Masters' of Germany; known in Paris as '*Petit Albert*;' was probably a pupil of

Dürer. A close student of nature, he has been called the father of landscape painting. The most important of the twenty-five known paintings by him is the *Battle between Alexander and Darius* (Munich). Of his engravings, 111 are on copper (some etched), and 64 are woodcuts. See W. B. Scott's *Little German Masters* (1880).

**Altels,** the second peak in height (11,930 ft.), but the best known summit, of the mountain group that rises just E. of the well-known Gemmi Pass. First ascended (1834) by a Swiss. It is ill-famed for the avalanches it sends down on the Gemmi path.

**Alten,** KARL AUGUST, COUNT VON (1764–1840), Hanoverian general, fought in the Netherlands, and in 1803 went to England. He served under Wellington in the Peninsula, covering Sir John Moore's retreat to Corunna, and commanding Wellington's light-armed troops at Salamanca, Vittoria, Orthez, and other battles, and in the campaign of Waterloo. Returning to his native country, he in 1831 became minister of war, and in 1832 minister of foreign affairs.

**Altena,** tn., prov. Westphalia, Prussia, on the Lenne, 38 m. by rail S.E. of Dortmund; large iron and other metal industries. Here are the ancestral castle of the Counts von der Mark and the Süderländer Museum. Pop. 14.000.

**Altenavia,** the Latin form of Altona; used in bibliography.

**Altenburg,** cap. of the duchy of Saxe-Altenburg, Germany, stands on hilly ground, 24 m. by rail S. of Leipzig. The ducal castle, dating originally from the 14th century, but mostly built in 1865–70, crowns a steep rock above the town. Cigars and woollen yarn are manufactured. It was burnt by the Hussites in 1430, and in 1568–9 was the scene of an important conference of Saxon theologians. The episode of the 'Prinzenraub'—*i.e.* the attempted abduction of two Saxon princes by the knight Kunz von Kaufungen—is associated with the place. Pop. 39,000.

**Altendorf,** suburb of Essen, Rhenish Prussia, with which it was incorporated in 1901.

**Altenessen,** commune, prov. Rhineland, Prussia, 2 m. N. of Essen. Coal mines. Pop. 34,000.

**Altenstein,** a summer castle of the dukes of Saxe-Meiningen, 13 m. S.E. of Eisenach, Thuringia; historically associated with the seizure of Luther in 1521 when returning from Worms.

**Altenstein,** KARL, BARON VON STEIN ZUM (1770–1840), Prussian statesman; was minister of finance from 1808–10. In 1817 he became minister of public instruction, which post he occupied over twenty years. He is the author of the famous education law of 1819, which forms the basis of the actual system of education in Prussia, and has been taken as a model by several European nations.

**Alter Ego,** expressing an intimate friend, was officially employed in the kingdom of the Two Sicilies to designate the administrative plenipotentiary or general vicar of the king.

**Alternating Current.** See DYNAMO.

**Alternating Motion,** a term used in mechanics to indicate motion backwards and forwards, as opposed to rotation. Thus, the reciprocating parts of a steam-engine are in alternating motion, which, as approximately in this case, is frequently a simple harmonic motion.

**Alternation of Generations,** common to plants and animals, is the alternate occurrence in one life-history of two or more forms, differently produced. In some mosses, for instance, there are two generations: one, the plant with which we are familiar, is asexual, producing not male and female elements, but spores, in the little

brown capsules which stand up like spears from the green tufts; the other, a minute, green, leaf-like organism, produced on damp earth by the germination of the fallen spore, is sexual, producing egg-cell and microscopic active male cells or spermatozoids, which fertilize the former to give rise again to the asexual generation. In the ferns and their allies there is a similar alternation of minute sexual and large conspicuous asexual or spore-bearing forms within the same life-cycle; and in the flowering plants, although the sexual generation is microscopic and lies concealed within the spore-bearing plant, yet botanists recognize the same law, which thus extends right through the vegetable kingdom. Among animals it is of common occurrence, especially in the lower forms. It is exemplified in its simplest form in the Cœlentera, or hollow-bodied animals, where a colony of asexual polypes buds off a jelly-fish or medusoid, which gives rise to the sexual elements. From the fertilized egg-cell the asexual polype colony arises, and begins a new cycle. Here a sexual generation, possessed of considerable powers of locomotion, alternates regularly with a sedentary asexual generation. More complicated are the conditions which exist in the liver-fluke, where there are at least three generations. See Geddes and Thompson's *Evolution of Sex* (1901).

**Alternator,** a machine by which an alternating electrical current is produced. It is essentially a form of dynamo. See DYNAMO.

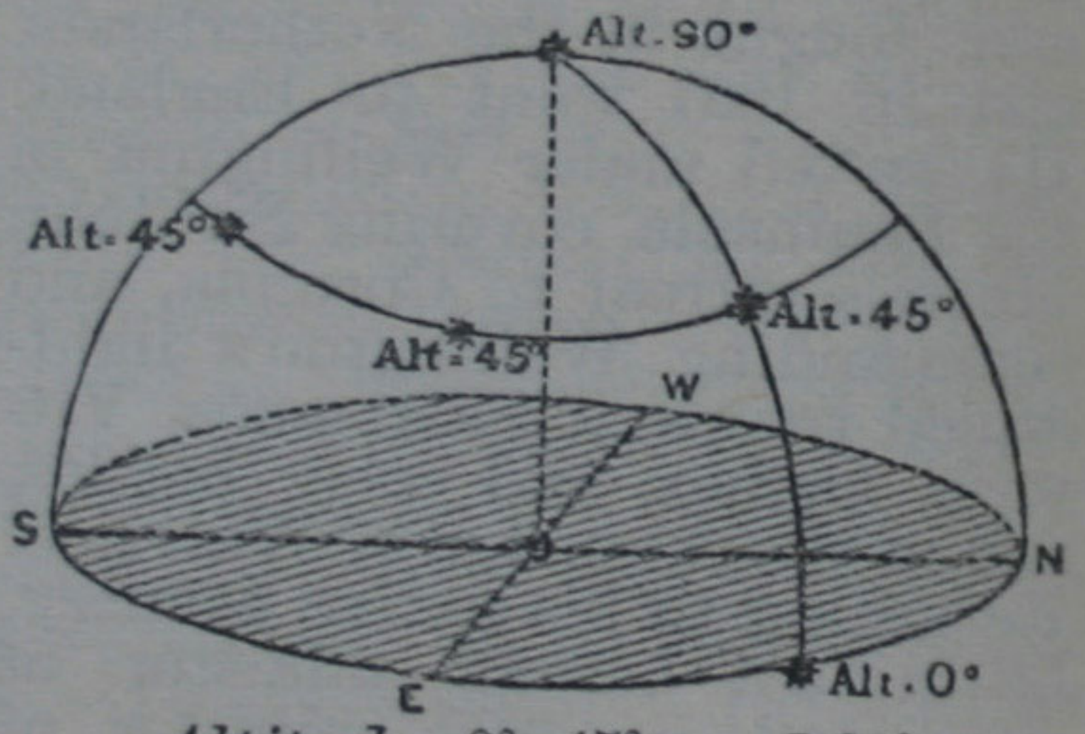
**Althæa,** a genus of the Malvaceæ, including the marsh mallow and hollyhock.

**Althing,** the Icelandic house of parliament, was originally founded at Thingvellir in A.D. 928, on the lines of the previously-existing Norse *Thing*. In its modern form it was constituted in 1874, and consists of thirty-six members, thirty of whom are elected by popular vote, and six are nominated by the king. It meets at Reykjavik, and sits every second year only. For a detailed account of the ancient Althing, see Sir George Dasent's introduction to the *Story of Burnt Njal* (1861).

**Althorn,** or TENOR SAXHORN, a valve bugle in E♭ or F, used in military bands, often instead of the French horn.

**Althorp,** LORD. See SPENCER FAMILY.

**Altin-** or ALTYN-TAGH, range of mts. Central Asia, stretching W.S.W. to E.N.E. and forming part of the N. boundary of Tibet. Highest known altitude, 14,000 ft.




*Altitudes* 0°, 45°, *and* 90°.

**Altitude,** a term applied astronomically to the angular distance of a celestial object from the horizon, measured on a vertical circle, which is a circle at right angles to the horizon, and passing through the zenith or pole of the horizon. AZIMUTH is the distance, measured along the horizon, from the s. point to the intersection with the horizon of the vertical circle passing through the object. By its altitude and azimuth the momentary position of an object on the celestial concave, with reference to the horizon, is fixed. Observations of altitude are made at sea with the sextant, and from them many problems essential to navigation can be worked out, such as finding the latitude and rating the chronometers.

**Altmühl,** a riv. of Bavaria, l. bk. trib. of the Danube, rising on the w. border of the country. It has a length of 103 m., and enters the Danube between Ratisbon and Ingolstadt.

**Alto,** a musical term, strictly applicable to the male voice of the highest pitch, counter tenor, but also used to denote the lowest range of the female voice, contralto. In ordinary four-part music the alto part is an essential constituent with the soprano, tenor, and bass. Alto is also the Italian term for the tenor violin.

**Alt-Ofen.** See BUDAPEST.

**Alton.** (1.) City, Madison co., Illinois, U.S.A., on the Mississippi, 21 m. above St. Louis. Has flour-mills and glass factories, and makes machinery and carriages. Pop. 18,000. (2.) Anc. *Auleton*, mrkt. tn. and par., Hampshire, England, at the source of the Wey, 17 m. N.E. of Winchester. It has an ancient church, with portraits of Henry VI., its founder, and of several bishops. Brewing and paper-making are the chief industries. There are extensive hop-fields in the neighbourhood. Pop. 5,500.

**Alton,** EDUARD JOSEF D' (1772–1840), anatomist, archæologist, and naturalist; born at Aquileia, near Trieste; was the author of *Die Naturgeschichte des Pferdes* (2 vols. 1810–17), and, in conjunction with Pander, of *Vergleichende Osteologie* (1821–8).—His son, EDUARD D'ALTON (1803–54), was for many years (from 1834) professor of anatomy at Halle. He was the author of *Handbuch der vergleichenden Anatomie des Menschen* (1850), and other works.

**Altona,** tn., Prussian prov. of Schleswig-Holstein, stands above the r. bk. of the Elbe, immediately w. of Hamburg, with which it forms commercially, though not municipally, one community. It has extensive docks, and is the seat of various industries—shipbuilding, brewing, iron foundries, flour-mills, cotton, woollen, glass, and soap factories. The imports amount to over £3,500,000, and the exports to over £2,000,000 annually. In 1901 a free harbour was opened. In the 16th century Altona was a mere fishing hamlet; but since 1835, when its population was 26,393, it has grown very rapidly. Pop. 170,000. Ottensen, immediately to the w., was incorporated with Altona in 1889.

**Altoona,** city, Blair co., Pennsylvania, U.S.A., situated at the foot of the Alleghany Mts.; is 85 m. E. of Pittsburg, and manufactures cars and locomotives. Pop. 52,000.

**Alto-relievo** (sometimes spelt, as in Italian, *alto-rilievo*), high-relief, a term applied to sculptured forms which stand out by at least half their true proportionate thickness from the background from which they project or are relieved. Of this style of sculpture the metopes of the Parthenon and the Pergamon frieze in the Berlin Museum may be taken as typical examples. See SCULPTURE.

**Altötting,** tn., Bavaria, Germany, near the Inn, 60 m. by rail N.E. of Munich; possesses an image of the Virgin which attracts numerous pilgrims. From 1838 to 1873 it was the headquarters of the Redemptorist Fathers. There are iron works. Pop. 5,000.

**Altranstädt,** vil., prov. Saxony, Prussia, near Lützen; here was concluded the treaty between Charles XII. of Sweden and Augustus II., king of Poland and elector of Saxony (Sept. 24, 1706). Pop. 700.

**Altrincham,** mrkt. tn. and par. in Cheshire, 9 m. S.W. of Manchester and on the Watling Street. The Bridgewater Canal affords communication with the Manchester Ship Canal. There are large linotype works and

engineering and cabinetmaking industries, and market-gardening is extensively carried on in the district. Pop. 17,000.

**Altruism,** a term brought into use by Comte (*l'altruisme*), and introduced into English by his positivist followers, denotes (1) the other-regarding or social, as opposed to the egoistic, instinct or impulse in human nature; (2) this instinct or impulse raised to the rank of a conscious principle, the ethical principle which makes the good of others the paramount end of human action. It is evident that altruism cannot be an exclusive principle in ethics, since the individual, if he knows what is good for others, can hardly be ignorant of his own good, and it would be paradoxical to maintain that he can never promote his own good directly. Herbert Spencer (*Data of Ethics*, ch. 11–14) discusses the antagonism of egoism and altruism, and their ultimate 'conciliation' in the course of social evolution. But it is necessary to observe that he applies the term 'altruistic,' not merely to actions prompted by conscious regard for others, but to all other-benefiting actions, whether motived by regard for others or not. And this ambiguity is important from an ethical point of view, since actions which benefit others may be performed from merely egoistic motives. So that no direct inference can be drawn from the necessity of altruistic actions, in the wider biological sense, to the authority of altruism as an ethical principle. See ETHICS.

**Altsohl,** tn., Sohl co., Hungary, 80 m. N. of Budapest; has mineral springs. Pop. 7,000.

**Altstätten,** tn., canton St. Gall, Switzerland, station on the Rorschach-Chur Ry., 9 m. E.S.E. of St. Gall, at an alt. of 1,700 ft., with sulphur springs. Pop. 2,000.

**Altwasser,** vil., Prussian prov. Silesia, 43 m. by rail S.W. of Breslau; has coal mines and important manufactures of porcelain, machinery, and mirrors. Pop. 17,000.

**Alt-Zabrze,** vil., Prussian prov. Silesia, 5 m. by rail E. of Gleiwitz; the seat of iron works, iron foundries, engineering works, and coal mines. Pop. 20,000.

**Aludel Furnace,** a furnace used in the reduction of mercurial ores. The vapour given off is condensed in tubes or vessels of glass or earthenware, called aludels.

**Alum** is the double sulphate of aluminium and potassium, which crystallizes with water, and has the formula $Al_2(SO_4)_3K_2SO_424H_2O$. The term is also used generically for salts of similar composition, in which the potassium may be replaced by other alkali metals, ammonium, etc., and the aluminium by chromium, ferric iron, manganese, and many other trivalent metals. The alums are isomorphous—*i.e.* form similar crystals. Common alum is prepared by roasting alum shales, by which aluminium sulphate is formed, and, after extraction by lixiviation, is crystallized with a potassium or ammonium salt. Alum is a white solid, very soluble in hot water, but much less so in cold, from which it crystallizes in octahedra. It has a sweetish, astringent taste and acid reaction, and is mainly used as a mordant in dyeing and in the manufacture of paper and leather. It is employed in medicine chiefly on account of its astringent properties, serving as a hæmostatic, and in dilute solution as a mouth wash or gargle. It is sometimes used as an emetic.

**Aluminium** (Al, 27·1), though not found free, is one of the most abundant elements in nature. It occurs as silicate in clays, felspar, etc.; but is chiefly extracted from bauxite, an impure hydrated oxide; corundum, the oxide $Al_2O_3$;

and cryolite, the double fluoride with sodium, $Na_3AlF_6$. It was originally prepared by displacement by sodium from its double chloride with sodium, but is now almost exclusively obtained by the electrolysis of a solution of the purified oxide in molten cryolite. The mixture is melted by the heat produced by the current, the aluminium being set free at an iron cathode immersed in molten aluminium, while the oxygen also obtained oxidizes the carbon anode at which it is liberated. This process has greatly increased the output, for while in 1890 the world's annual production was about 40 tons, in 1900 it had reached 5,000 to 6,000 tons. At the former date the price was 9s. 6d. per lb., while in 1904 it averaged 1s. 4d. Aluminium is a white but somewhat soft metal; takes a fine polish; without odour or taste; highly malleable at 100° to 150° C.; highly sonorous; a fair conductor of electricity; has a high specific heat and a low specific gravity (2·7). It does not oxidize in air, or combine with sulphur at ordinary temperatures, and is soluble in hydrochloric acid and solutions of caustic potash and soda. Its chief impurities are silicon and iron. The great want in working aluminium into articles has been a good solder and flux. It oxidizes so readily at a soldering temperature, and the oxide formed is so insoluble in ordinary fluxes, that the film of oxide prevents the pieces of metal from coming into contact, so that a good joint cannot be formed. Aluminium is also used for electric conductors, and has proved valuable for the preparation of alloys, and in rendering castings of iron, etc., sound. An application in another direction has been the utilization of the intense heat given out on its reaction with iron oxide for welding *in situ*, preparation of small steel castings, etc.

The compounds of aluminium of greatest importance are its oxide and its sulphate. The oxide, alumina, $Al_2O_3$, occurs native as corundum, sapphire, and emery, and is an intensely hard solid. As prepared artificially, it is a white solid, which when hydrated is gelatinous. Aluminium oxide acts both as a basic oxide, giving rise to the aluminium salts, and as an acidic oxide, forming the somewhat indefinite aluminates. Aluminium sulphate is the chief of the aluminium salts, and is prepared both by itself and along with potassium or ammonium-sulphate as alum. Aluminium was discovered by Wöhler in 1827, and again in 1854 by St. Claire Deville, who received great encouragement and assistance in its manufacture near Paris both from Napoleon III. and from the French Academy. The first really practical electrical method of extraction was patented by Messrs. Cowles in 1885 in England and the United States of America; but that was finally supplanted by the Héroult-Hall method. Owing to its lightness, toughness, and strength, aluminium is extensively used for boat-building, for torpedo boats, for engines, for instruments, balloon fittings, bicycles, cooking utensils, and in chemical works, but does not make a really satisfactory structural material, owing to its being somewhat lacking in tenacity and hardness. A copper-aluminium alloy of about 87 copper to 13 aluminium has almost exactly the same physical and mechanical properties as mild steel. It can even take a temper. It is used as a substitute for lithographic stone. Aluminium conductors are used in telegraphy and telephony. Large works for its manufacture have been erected at Niagara Falls, the Falls of Schaffhausen, Kinlochleven, Argyllshire, and the Falls of Foyers in Inver-

ness-shire. See Borchers' *Electric Smelting* (1897); Blount's *Electro-Chemistry* (1901); Richards's *Aluminium* (3rd ed. 1896).

**Alumography.** See ALGRAPHY.

**Alum Root,** a name applied to *Geranium maculatum* and *Heuchera americana* (a saxifrage), both found in the United States. An extract from the roots is used in America as a powerful astringent, to stop bleeding.

**Alunogen,** a fibrous aluminium sulphate found in volcanic débris, clays, feldspathic rocks which contain pyrites, and often as an inflorescence on walls of mines, caves, etc.

**Aluta.** See OLT.

**Alva,** par. and tn. in Clackmannanshire, Scotland, 6½ m. N.E. of Stirling. Plaids, serges, shawls, tartans, and other woollen fabrics are manufactured, and the neighbouring hills yield cobalt, copper, iron, and lead ores. Pop. 6,000.

**Alva,** or ALBA, FERDINAND ALVAREZ DE TOLEDO, DUKE OF (1508–83), Spanish statesman and soldier; first gained military distinction in the battle of Pavia (1525), and in campaigns under Charles V. in Hungary and N. Africa; became general (1534), commander-in-chief (1538), and received the dukedom for his services in the defence of the northern provinces of Spain. Alva led the Spanish forces in Italy against Pope Paul IV. (1555–6), but was recalled on the succession of Philip II. His most famous military exploits, in which his ferocity and his avarice made him the object of undying execration, are associated with his six years' attempt to subdue the insurgent Netherlands to the Spanish rule and the Roman faith. Leading a large force to the Low Countries in 1567, he established the 'Council of Tumults,' known also as the 'Bloody Council,' an arbitrary and cruel instrument of inquisition and rapine, by which many thousands were put to death, reduced to indigence, or expatriated; he was guilty of the execution of Count Egmont and Count Horn; and subjugated the whole country except the intrepid provinces of Holland and Zeeland. Their resistance, supported by the Gueux, or 'Beggars of the Sea,' was successful; Alva's fleet was destroyed, and in 1573 he relinquished the command. His last campaign (1581) was against Don Antonio, pretender to the throne of Portugal, whose forces he routed, and whose adherents he treated with the greatest cruelty, abandoning the country to his licentious soldiery. See Motley's *Dutch Republic*.

**Alvarado,** JUAN BAUTISTA, a Californian, who raised a revolt against Mexican authority in 1836, and routed the Mexicans in a single battle at San Buenaventura. He was president of California from 1836 until 1842, when he was deposed.

**Alvarado,** PEDRO DE (1495–1541), Spanish adventurer, and lieutenant of Cortes in the conquest of Mexico, was born at Badajoz. After an exploring expedition to Yucatan (1513), he left Havana with the conqueror. Entrusted with the command in Mexico, while Cortes went to meet Narvaez, Alvarado made the mistake of massacring many of the native nobility, and thus caused the terrible troubles which the Europeans had to endure. He fought with great intrepidity in the nocturnal evacuation of the city. Alvarado invaded Guatemala (1523) with a large force; founded Santiago de los Caballeros, now Guatemala Antigua (1524). Accused of defrauding the royal treasury, he was recalled and tried; on acquittal he returned to Guatemala as governor, and later took part in the conquest of Honduras. See CORTES; Prescott's *Conquest of Mexico*.

**Alvares,** FERNAM (1540–99), Portuguese poet, born at Goa in India; commanded two expeditions to the Coromandel coast. His chief work is *Lusitania Transformada* (pub. 1607 and 1781), in the style of Camoens' *Lusiad.*

**Alvarez,** LUIS (1841–1901), Spanish painter, born and died in Madrid; first attracted notice by his picture of *Cæsar's Wife, Calpurnia,* which, as well as its successor, *Isabella the Catholic,* is now in the royal palace at Madrid. In addition to these he painted (1863–73) the large historical canvases of *Philip II. in the Escorial, The Cardinal in San Giovanni,* and *The Embarkation of King Amadeus at Spezia.* Subsequently he devoted himself to genre painting—his productions in this line (*e.g. A Funeral, The Marriage of Pauline Borghese, The Charity Bazaar, The Heir's Picture,* etc.) being distinguished for dramatic force, richness of colouring, and accuracy of costume.

**Alvarez de Cienfuegos Nicasio** (1764–1809), dramatist and philological writer, born at Madrid. His most popular tragedies were *Zoraida, Condesa de Castilla,* and *Pitaco,* the latter of which secured for him election in the Spanish Academy. As a poet he was somewhat affected and extravagant.

**Alvensleben,** KONSTANTIN VON (1809–92), Prussian general, served through the Danish war and the war with Austria, and in 1860 was appointed to a post at the war office. He commanded at Königgrätz, and afterwards, as commander of the 3rd Army Corps, played a distinguished part in the Franco-Prussian war, especially before Orleans and at Le Mans. He retired in 1873. One of the forts at Metz was named after him.

**Alverstone,** par., Hants, England, containing Gosport; has brick-making. Pop. 30,000.

**Alverstone,** LORD (1842), formerly SIR RICHARD EVERARD WEBSTER, Lord Chief-Justice of England (since 1900), one of the most brilliant and successful lawyers of modern times, chiefly in commercial, railway, and patent cases, was born in 1842; called to the bar (Lincoln's Inn) in 1868; represented Launceston (1885) and the Isle of Wight (1885–1900) in the House of Commons; was attorney-general three times under Lord Salisbury (June 1885–Jan. 1886, Aug. 1886–1892, June 1895–Aug. 1900); represented the British government in the arbitrations relating to the Bering Sea with Sir Charles Russell (1893), and Venezuela (1898–9); member of Royal Commission on Historical MSS. (1910); was for a few months Master of the Rolls (1900), and in 1903 presided over the tribunal which was constituted under a treaty between Great Britain and the United States to define the Canadian and American boundaries of Alaska. As attorney-general he conducted what was practically the prosecution in the Parnell Commission (1888–9). He was created Lord Alverstone in 1900.

**Alverthorpe,** par. and vil., s. div. of West Riding, Yorkshire, England, 2 m. N.W. of Wakefield. The industries include market gardening, brick making, coal mining, dyeing, and yarn and cotton manufactures. Pop. 13,000.

**Alvin,** LOUIS JOSEPH (1806–87), Belgian poet and librarian, born at Cambrai. His publications include the tragedy, *Sardanapale* (1834); the comedy, *Le Folliculaire Anonyme* (1835); *Souvenirs de ma Vie Littéraire* (1843); *Les Recontemplations,* a satire on Victor Hugo (1856); *Le Commencement de la Gravure aux Pays-Bas* (1857–9); *André von Hasselt, sa Vie et ses Travaux* (1877).

**Alvinczy,** JOSEPH, BARON VON (1735–1810), Austrian field-mar-

shal, distinguished himself in the Seven Years' war; fought against the Turks in 1789. In the wars between Austria and France, he defeated the French at Neerwinden, Landrécy, Charleroi, etc., in 1792, but was defeated at Hondschoote (Sept. 6, 1793). Was afterwards appointed commander-in-chief of the forces in Italy; repulsed Napoleon at Caldiero (1796), but was defeated at Arcole (Nov. 15–17, 1796) and at Rivoli (Jan. 14, 1797), this last involving also the fall of Mantua. He was later appointed governor in Hungary, and field-marshal in 1808.

**Alwar,** or ALWUR, native state in Rajputana, India; area, 3,144 sq. m.; pop. 830,000. Its cap. is Alwar, about 85 m. S.W. of Delhi; pop. 57,000. See Fagan's *The Alwar State* (1902); and Hendley's *Alwar and its Art Treasures* (1888).

**Alxinger,** JOHANN BAPTIST EDLER VON (1755–97), Austrian poet, was born in Vienna, and studied law there. He wrote the 'Rittergedichte' *Doolin von Mainz* (1787) and *Bliomberis* (1791), in imitation of Wieland; he was also intimate with Gleim, Ramler, Gessner, and Uz. His complete works were published in 10 vols. (1812).

**Alyattes,** King of Lydia (reg. *c.* 617–523 B.C.), made war against Cyaxares of Media; expelled the Kimmerians from Asia; took Smyrna, and thus provided his kingdom with a port. Before his death all Asia Minor west of the Halys—*i.e.* the old Hittite empire—was included in his kingdom. He was succeeded by his son Crœsus. His tomb, situated north of Sardis, near Lake Gygæa, was one of the wonders of antiquity. See Hugo Winckler's *Babylonia and Assyria* (1907; trans.).

**Alypius,** a Greek writer on music, who flourished at Alexandria in the middle of the 4th century A.D. His works, under the title *Introductio Musica*, were collected and published, with a commentary and notes, by Meibom (*Antiquæ Musicæ Auctores Septem*) in 1652, and again by Jans (*Musici Script. Græcæ*) in 1895, and contain the key to the scales and modes of Greek music.

**Alyssum,** a genus of cruciferous plants, mostly yellow-flowered, of Europe. *A. Cyssum saxatile* (rock madwort) is one of the most conspicuous hardy plants of British rock gardens in April and May.

**Alyth,** par. and mrkt. tn., 5½ m. N.E. of Blairgowrie, in E. Perthshire, Scotland; manufactures jute, linen, wool, and shoes. Here the Committee of Estates, including Leslie, Earl of Leven, and James Sharp of Magus Moor fame, were surprised and captured (1651). Pop. 3,000.

**Alzey,** tn., 20 m. S.W. of Mainz, Germany, carries on brewing and tanning. The place is mentioned in the *Nibelungenlied*. It was a free imperial city, and in 1689 was burned by the French. Pop. 7,500.

**Alzog,** JOHANN BAPTIST (1808–78), R.C. historian, born at Ohlau in Silesia; was professor of church history at Posen (1836), Hildesheim (1845), and Freiburg (1853). His chief works are *Lehrbuch der Universalgeschichte der Christlichen Kirche* (1840; 10th ed. by F. X. Kraus in 1882), which was translated into most European languages, and *Grundriss der Patrologie* (4th ed. 1886).

**A.M.,** abbreviation of (1) *anno mundi*, 'in the year of the world;' (2) *ante meridiem*, 'before noon;' and (3) *artium magister*, 'master of arts.'

**Amadeo,** GIOVANNI ANTONIO (1447–1522), Italian sculptor and architect, born at Pavia. Helped in the decoration of the Certosa at Pavia, and executed some sculptures for the tomb of Gallas Visconti in the church of the same; but his principal works are statues in the chapel Colleoni at Bergamo, regarded as among the best speci-

mens of Renaissance sculpture in Lombardy. He also took part in the construction of the cathedral at Milan, and died there.

**Amadeus,** the name borne by several princes of the house of Savoy, of whom the most notable are: AMADEUS V. (1249–1323), 'The Great,' Count of Savoy; succeeded his uncle, Philip (1285); engaged in continual warfare, and among his last actions forced the Turks to raise the siege of Rhodes. AMADEUS VIII. (1383–1451), succeeded his father, Amadeus VII. (1391). He was created (1416) Duke of Savoy, and his dominions were greatly increased; but he retired to a monastery at Ripaille (1419). He was elected Pope (1439) under the name of Felix V., but resigned in favour of Nicholas V. (1449).

**Amadeus I.** of Spain (1845–90), second son of Victor Emmanuel of Italy, was chosen king of Spain (1870), but in vain tried to act as constitutional king in a country unfitted for constitutional government. He abdicated in 1873, and retired to Italy as Duke of Aosta.

**Amadeus, Lake,** shallow depression filled with salt (probably over 200 m. long), just N. of 25° S., in S. and W. Australia; discovered (1872) by Ernest Giles.

**Amadis of Gaul,** the hero of a cycle of mediæval romances, similar to the Arthurian cycle in England and the Charlemagne cycle in France. Although the Amadis story was known in the 14th century, and the oldest existing version is in Portuguese, written by Vasco de Lobeira (d. 1403), its popularity was established by Garcia Ordonez de Montalvo (*c.* 1465; first printed 1508). The best English version is Southey's. The story—one of the leading characters of which is Galaor, brother of Amadis—had several continuators. Chief among these have been Montalvo's *Sergas del Esplandiano* (1485); *Los Grandes Hechos de Florisando*, by, probably, Paez de Ribera; *Coronica de Don Florisel de Niquea*, attributed to Feliciano de Silva; and so on down to the *Flores de Grèce* (1552). See Baret's *De l'Amadis de Gaule* (2nd ed. 1873); Pagès' *Amadis de Gaule* (1868); Braunfels's *Amadis von Gallien* (1876); Braga's *Formaçao do Amadis* (1878).

**Amador de los Rios,** JOSÉ (1818–78), Spanish historian, born at Baena; became professor of literature at the Madrid University and member of the Academy. His principal works are *Historia Critica de la Literatura Española* (7 vols. 1861), and *Historia Social, Politica, y Religiosa de los Judios de España y Portugal* (3 vols. 1875). He also wrote historical works on Toledo, Seville, and Madrid.

**Amadou,** or GERMAN TINDER, a fungus, *Polyporus fomentarius*, growing on trees, is cut into slices and beaten into a felt; it has been used to plug wounds and stop bleeding. The felt steeped in saltpetre forms German tinder.

**Amagasaki,** tn., Honshu, Japan, 20 m. E. of Kobe. Pop. 12,000.

**Amager,** or AMAK, a flat, low, fruitful island, off the E. coast of Zealand, 10 m. long and 5 m. broad; most densely populated part of Denmark, and is the kitchen garden of Copenhagen. Pop. (exclusive of Christianshavn and the two Sundbys) 8,500.

**Amakosa,** or AMA-XOSA, an important branch of the Bantu nation, inhabiting the Transkei, Tembuland, and Pondoland; complexion, dark brown; hair, nose, and lips of negro type; good height and well-proportioned; in character intelligent and brave; weapons, assegai and club or knobkerry; religion, animistic.

**Amaldar,** the governor of a province under the Mohammedan rule in India.

**Amalekites,** a nomadic Arab people of great antiquity inhabiting the desert region south-west of

Palestine. In Gen. 36 : 12 they are traced to Amalek, grandson of Esau; but there are evidences that they were in existence even before Abraham. The Amalekites opposed the Israelites' march from Egypt to Canaan; they harassed them after their settlement; and only after the victories of Saul and David over them did they sink into insignificance, to be finally exterminated in the reign of Hezekiah. Arabian annalists give many details regarding the tribe; outside the O.T. we have little reliable information concerning them. See Ewald's *Hist. of Israel*, i. 109 *f.*

**Amalfi,** (1.) tn. and archiepisc. see of Italy, prov. Salerno, on the N. shore of Gulf of Salerno, and 10 m. W.S.W. of Salerno, with which it is connected by a road hewn like a shelf out of the rock. The cathedral dates from the 11th century. First a Byzantine station, Amalfi developed into an independent republic, which was overcome by Roger of Sicily (1131). At this period it was a powerful rival of Pisa and Genoa, with 50,000 inhabitants, and the sea laws bearing its name (*Tabula Amalphitana*) were observed by nearly all the seafaring nations of the Mediterranean. In the 12th century the sea began to wash away the lower parts of the town, and in 1343 it was devastated by an inundation of the sea. Manufactures of macaroni and soap. Pop. 7,500. (2.) tn., Colombia, 60 m. N.E. of Medellin. Pop. 8,000.

**Amalgam,** an alloy of mercury. All metals except iron and platinum form amalgams—some, like sodium and potassium, combining with great energy; while others, like lead, bismuth, and tin, require the application of heat. When the mercury is in excess the amalgam is usually liquid, otherwise it is pasty or solid. Amalgamation is used in extracting gold and silver from the ore; for frictional electrical machines (1 part zinc, 1 tin, and 3 mercury, or 2 parts zinc and 5 mercury); and for 'silvering' metals and glass.

**Amalia,** ANNA, Duchess of Saxe-Weimar-Eisenach (1739–1807), daughter of the Archduke of Brunswick-Wolfenbüttel, married Duke Ernst August Constantine of Weimar (1756), after whose death (1758) she became regent for her son Karl August. She encouraged commerce and industry, but is specially remembered as a generous patron of art and letters; her court was frequented by the most distinguished writers of the day, including Herder, Goethe, Wieland, and Schiller.

**Amalia,** ELIZABETH, Landgravine of Hesse-Kassel (1602–51), daughter of Count Philip Louis II. of Hanau-Münzenberg, married William V., 'The Constant' (1619), of Hesse-Kassel, after whose death (1637) she was appointed regent. At the peace of Westphalia (1648) she received a large compensation for the devastation caused by the Thirty Years' war. See K. W. Justi's *Amalie Elisabeth Landgräfin von Hessen* (1872).

**Amalthæa,** the nurse of Zeus, most frequently represented as a goat, and from whom came the horn of plenty which had the power of becoming filled with whatever its possessor desired.

**Aman-Jean,** EDMOND FRANÇOIS (1856), French portrait painter, born at Chevry-Cossigny (dep. Seine-et-Marne). His very individual art is refined, subtle, full of thought and charm. His aim is to reveal the soul, therefore he usually depicts his subject in repose and absorbed in thought, as in his portrait of the sculptor Dampt. He places his figures in a special atmosphere, in surroundings removed from everyday convention. He is essentially a decorative designer. Among his chief paintings are the portraits of Jules Case and of Paul Verlaine, and the *Jeune Fille au Paon.* In the

Luxembourg there are two cartoons for tapestries—*La Beauté* and *Le Regret du Passé*. See the *Studio*, vol. viii. (1896), and Brownell's *French Art* (1902).

**Amara,** tn., Busra prov., Turkey in Asia, 180 m. S.E. of Bagdad, on the Tigris and on line of proposed railway. Pop. about 10,000.

**Amaranth** (*Amarantus*), a genus of the order Amarantaceæ, chiefly tropical plants. Species are grown in British greenhouses under the names of 'prince's feathers,' 'cockscomb,' and 'love-lies-bleeding.'

**Amarapura** ('city of the gods'), a former capital of Upper Burma, on the E. bank of the Irawadi. The greater part of the city was destroyed by a fire in 1810 and an earthquake in 1839. A colossal bronze statue of Buddha is its chief feature. Pop. (1810) 170,000; now about 7,000.

**Amara-Sinha** (probably flourished 1st century B.C., though later dates have been suggested), Buddhist grammarian, and compiler of *Amara-Kosha* ('Treasury of Amara'), a Sanskrit vocabulary.

**Amargosa,** riv. of Nevada and S. California, U.S.A., which flows into a desolate region, depressed below sea level, known as Death Valley or Amargosa Desert, lying between 36° and 37° N. lat.

**Amari,** MICHELE (1806–89), Italian historian, Orientalist, and statesman, was born in Palermo. In 1834 he published *Fondazione della Monarchia dei Normanni in Sicilia*, and in 1841 *Un Periodo delle Istorie Siciliane del Secolo XIII.*, a study of the Sicilian Vespers. The latter work having been suppressed on account of its politics, Amari brought it out in Paris under another title—*La Guerra del Vespro Siciliano* (new ed. 1886, 2 vols.). After the Sicilian insurrection of 1848 Amari went to Paris, where he devoted himself to literary pursuits. In 1859 he returned to Italy to join Garibaldi. He was made senator (1861), and was minister of public instruction (1862-4). He was professor of Arabic at Pisa, and afterwards at Florence till his retirement in 1878. His other works include *La Sicile et les Bourbons* (1849), *Storia dei Musulmanni di Sicilia* (1853–73), and *Altre Narrazioni del Vespro Siciliano* (1886).

**Amarna.** See TELL-EL-AMARNA.

**Amaru,** TUPAC. See TUPAC.

**Amaryllidaceæ,** an order of lily-like plants, having most of the characters of the true lilies, except that the ovary in the former is below the origin of the flower leaves. Familiar species are the snowdrop, snowflake, daffodil, the Cape belladonna lily (*A. belladonna*), the Guernsey lily (*A. sarniensis*), and the American aloe (agave). The so-called roots are either underground stems (rhizomes) or bulbs.

**Amasia,** tn., vilayet of Sivas, 100 m. S.E. of Sinope, Asia Minor; has steam flour-mill, and a trade in silk, wine, fruit, salt. Pop. about 30,000.

**Amasis,** or AAHMES, king of Egypt (570–526 B.C.), under whose reign Egypt prospered greatly, opened the country to commercial relations with Greece, married a Greek wife, and in legendary lore was said to have been visited by Solon, Thales, and Pythagoras; and to have advised Polycrates to fling his ring into the sea.

**Amateur,** in sport, is the man who practises a sport or pastime for the mere pleasure of it, as opposed to the professional, who makes it a means of livelihood. From a lexicological standpoint, a sufficiently satisfactory definition is to be found in the first rule of the Amateur Athletic Association, which lays it down that 'an amateur is one who has never competed for a money prize or staked bet, or with or against a professional for any prize, or who has never taught, pursued, or as-

sisted in the practice of athletic exercises as a means of obtaining a livelihood.' Other definitions preclude the amateur from any share in gate-money, or from competing in any match under a false name. Theoretically these restrictions are all that could be desired, but in practice nearly every form of sport has its own precise conception of what constitutes an amateur, and in most cases that conception is a rather elastic one. In a few instances, notably rowing, the amateur is such in the strictest sense of the word, not only as regards the nature of the contests into which he enters, but also by reason of the fact that he 'pays his own way.' In cricket, football, cycling, and other sports, on the contrary, there are many so-called amateurs who, if they do not make those sports a means of livelihood, may be said to derive some emolument from them under the head of 'expenses.' It is a matter of common knowledge that these 'expenses' are sometimes on a very liberal scale, and such as to leave a considerable margin over the bare outlay for food and lodging. The status of the amateur is constantly being discussed in the sporting press, and a lucid article is devoted to the subject in the *Encyclopædia of Sport* (1910).

**Amati,** a famous family of violin-makers, who all resided in Cremona. ANDREA (*c.* 1530–1611), founder of the Cremona school of violin-making, built violins, tenors and basses, now very rare; the violins mostly small, of high model; the sound-holes Brescian in character; the tone small, but very sweet.—NICOLA, brother of the above, with whom he is believed to have worked.—ANTONIO (1550–1635) and GIROLAMO (1556–1630), sons of Andrea, worked together for many years, and produced a large number of most beautiful instruments. Though signing their instruments conjointly, it was seldom that each did not make his own entirely. Antonio retained his father's Brescian type of sound-hole, but lowered the arching considerably; his workmanship is fine in every respect. Girolamo discarded the wide and pointed form of the Brescian sound-hole and substituted a much more graceful form, which was reproduced and improved by his son Nicola. The instruments of the brothers Amati have long been highly prized. The tone, though not seeming very powerful, carries remarkably well, and is rich, sweet, and flexible. Fine specimens by these makers at present command from £200 to £300.—NICOLA (1596–1684), the great man of the family, son of Girolamo, followed his father's model until about 1625, when he designed a model—since known as the 'grand Amati'—which has never been excelled in grace and elegance of form, exquisite workmanship, and a sweet and responsive tone. Violins of his best period, in fine condition, realize from £300 to £500. Nicola Amati had many pupils, of whom Antonius Stradivarius was the most famous.—GIROLAMO (1649–1740), son of Nicola, and the last of the family. Instruments by this maker are rare, but the few known are said to be excellent. See Piccolelli's *Genealogia degli Amati* (1886).

**Amatitlan,** dep., Guatemala, Central America (area, 463 sq. m.), contains Lake Amatitlan, on which the cap., Amatitlan, 15 m. s.w. of the city of Guatemala, is situated. The chief industry is the production of cochineal. Pop. dep. 40,000; tn. 9,000.

**Amatongaland,** or TONGA LAND, an undulating strip of territory on the E. coast of S. Africa, in the extreme N. of Natal, extending along the coast for about 60 m. and from the Swaziland border to the sea. The Kosi

R. forms the boundary between Zululand and Amatongaland. The Tongas are a branch of the great Bantu race, not so warlike as their neighbours, but good workers in the S. African labour market. Amatongaland was annexed to Natal in 1897.

**Amatrice,** tn., Italy, in prov. of and 25 m. N.N.W. of Aquila. Pop. comm. 10,000.

**Amaurosis** (Gr. 'a darkening') is partial or total loss of vision. The term has now become nearly obsolete, and amblyopia is in common use.

**Amazonas.** (1.) A state of Brazil, occupying a large part of the basin of the Amazon R. The greater part of the state, particularly south of the river, is covered with forests (*selvas*) containing a variety of timber and other natural products, chief among which is india-rubber, extracted from the *Hevea*. Along the Rio Negro and Rio Branco are vast plains where cattle are fed. India-rubber, Brazil-nuts, salted fish, and turtle oil are exported. The immigration is very large, especially from Ceara. Cap. Manaos. Area, 732,250 sq. m. Pop. 260,000. See Temple's *The State of Amazonas* (1900). (2.) Dep. Peru, bounded by Ecuador on the N., and the deps. of Loreto, Libertad, and Cajamarca on the E., S., and W. Area about 14,130 sq. m., mainly virgin forest. Pop. 32,000. (3.) Terr. of Venezuela, in the S., having Brazil on the S. and E., and Colombia on the W. Area about 20,000 sq. m. Pop. 50,000.

**Amazons,** the largest river in the world, its basin, including that of the Tocantins, covering 2,700,000 sq. m., or two-fifths of the S. American continent. While flowing on an average three miles an hour, it discharges into the Atlantic 2,452,000 cub. ft. of water per second, besides an immense quantity of solid matter. After emerging from the Andes its fall is slight—only about 1 ft. in 8 m. from the Brazilian frontier to the sea, a distance of about 2,000 m.; it forms innumerable lakes, *paranamirins* (branches re-entering the main stream), and *furos* (channels joining two streams), and during high water, when the level rises 26 to 60 ft., floods large areas of the adjacent country. The islands formed by the silt carried down by the Amazons are very numerous, especially near the mouth (which has a breadth of 200 m.), where the largest is the Marajo, 2,060 sq. m., in which are many lakes. Another island, Tupinambararas, formed by the Amazons, Madeira, and *furos*, has an area of 950 sq. m. The Solimoes (*i.e.* the part of the river between Tabatinga and Manaos) has a breadth of 2½ to 4 m., and at Macapa the river expands to 25 m. In spite, however, of its width and slight fall, the current is 1¾ m. an hour, and sometimes as much as 4 m. in the Lower Amazons; and the fresh water of the river is perceptible 180 m. out into the Atlantic. The tide affects the river 400 m. up stream, and near spring-tides forms a formidable bore (*pororoca*) rising near Maraca I. from 5 to 12 feet. The water of the Amazons swarms with fish of a great many species, the most remarkable being the *pirarucu* (*Sudis gigas*), which attains a length of 7 ft. Turtles of several kinds are abundant, and the manatee is frequently caught.

The Alto Marañon, which is generally regarded as the upper course of the Amazons, rises in the Andes of Peru, in lat. 10° 30′ S., and long. 76° 30′ W., issuing from the Lauricocha lake at an altitude of 11,980 ft. Obstructed here and there by rapids in its upper course, it becomes navigable below the Pongo de Manseriche, only 250 m. from the Pacific coast, at Payta, and thence to the sea affords a

clear waterway of 2,700 m. It is soon joined by the Huallaga and Ucayali on the r. bk., and the Napo, entering on the l. bk. below the town of Iquitos. From this point the lengths navigable by steamers at all seasons are: on the Huallaga, 500 m. (to Yurimaguas); on the Ucayali, 770 m.; on the Napo, 350 m.; and on the Marañon, to Barja, 450 m. From Tabatinga (on the Brazilian frontier) to Manaos the river is known as the Solimoes, and here receives the tributaries Javary, Judahy, Jurua, and Purus on the r. bk., and the Içа or Putumayo and Japura on the l. bk., all navigable for considerable distances. At Manaos the Rio Negro (which is connected by the Casiquiare with the Orinoco, and has a large navigable tributary, the Rio Branco) enters on the l. bk.; and 100 m. farther down is the confluence with the Madeira, the greatest of all the tributaries. From the source of the Guapay, near Cochabamba, at a height of 13,000 ft., the Mamore, as it is called, traverses Bolivia, and receives the Guapore from Matto Grosso, and the Beni, swollen by the waters of the Madre de Dios, after which it takes the name of Madeira, and enters the Amazons after a course of more than 3,000 m. Above and below the mouth of the Beni the bed is obstructed by rapids for 230 m., and a concession for a railway past these obstacles has been granted. From Manaos steamers ply regularly up the Solimoes to Iquitos, 1,150 m.; up the Jurua to Marary, 1,090 m.; along the Purus to Anajaz, 1,400 m., with change of steamers at Hyutanaham; on the Madeira to Santo Antonio, 700 m.; and on the Negro to Santa Izabel, 420 m. Steamers direct from Liverpool and other European ports ascend to Manaos, more than 1,000 m. from Belem (Para), and some to Iquitos. Of the lower tributaries, the Tapajoz (1,100 m.) and Xingu are navigable only for short distances—the former to Itaituba, 200 m., and the latter to Souzel. Indeed, the Xingu has been visited by only three or four explorers. The Araguaya (1,700 m. long) is navigable in its upper course from Itacaiu to the rapids of Santa Maria, a distance of 740 m. Thence to Praia Grande only light-draught vessels can pass with great difficulty and danger. In the section of rapids it is joined by the Tocantins, which, though smaller, gives its name to the united stream. The Tocantins is navigable below Porto Nacional. Smaller affluents besides those mentioned, and many of the secondary tributaries, are utilized by boats and by steamers at high water. The waterways of the whole system are estimated at more than 31,000 m. See BRAZIL; also Agassiz' *A Journey in Brazil* (1868), Keller-Leuzinger's *The Amazon and Madeira Rivers* (1874), Brown and Lidstone's *Fifteen Thousand Miles on the Amazon* (1878), Bates's *A Naturalist on the River Amazon* (1892), Wallace's *Travels on the Amazon and Rio Negro*, and for the whole subject, *Archiv für Anthropologie*, vol. v. (1872).

**Amazons,** according to Greek legend a warlike race of women, who lived in the neighbourhood of the Caucasus, and invaded Asia Minor, Thrace, Greece, Egypt, and other countries. They were governed by a queen, and once every year met a neighbouring race of men, the Gargareans, to propagate their race; they retained only female children, the males being killed, or handed over to the Gargareans. They are said to have cut off their right breasts to give them freedom in using weapons; hence their name, from Greek *a*, 'without,' and *mazos*, 'breast.' Probably the legend is a reminiscence of the

conquests of the Hittites, who descended from the Caucasian direction and overran all Asia Minor, founding Ephesus and other cities, and whose great nature-goddess, the Artemis or Diana of the Ephesians, was attended by multitudes of armed priestesses. In ancient art the Amazons are represented in the Hittite tunic, and wielding the Hittite double-headed axe. See Corey's *De Amazonum Antiquissimis Figuris* (1891); Sayce's *Hittites* (1889); Stricker's *Die Amazonen* (1868). There are tales of Amazons also in S. America, whence the name of the great river (see above); and women were until recently armed and drilled in Dahomey, W. Africa. See *Archiv für Anthropologie*, vol. v. (1872), p. 220 *ff.*

**Ambaca,** chief vil. of Loanda, Angola, and the centre of a coffee-growing district. It is connected by a narrow-gauge railway, 220 m. long, with Loanda.

**Amballa.** See UMBALLA.

**Ambassadors.** The status and sanctity of ambassadors have been recognized among all civilized nations. The representatives of countries at foreign courts are divided into three classes—ambassadors, ministers or envoys extraordinary, and *chargés d'affaires.* Their functions are regulated by the terms of their commission, but they are seldom granted general powers to treat on all subjects, and for the negotiation of treaties and the like British ambassadors often receive special commissions under the Great Seal. As representatives of sovereign states, ambassadors take precedence after the blood-royal, while ministers rank after dukes. A state is entitled to object to an ambassador accredited to it. An ambassador must not plot against, or take part in the politics of, the country to which he is accredited. His house should not shelter political refugees, except perhaps in certain American states where revolution is endemic. He is not subject to the civil or criminal laws of the foreign state. This doctrine is put in an exaggerated form when it is said that an ambassador's house is extra-territorial. Ambassadors are entitled to audience of the sovereign, but in Britain only in presence of a minister of the crown. Britain sends out nine ambassadors—to Paris, Berlin, St. Petersburg, Rome, Vienna, Constantinople, Washington, Tokio, and Madrid. The recall or dismissal of an ambassador is often the signal for an outbreak of war. British ambassadors and their attendants are protected from legal process by an act of 1709; but this right, which if pressed might become absurd, is sometimes waived. They do not lose their domicile by foreign residence. The Pope's ambassador is a 'nuncio.' See EXTRA-TERRITORIALITY.

**Ambato,** tn., Ecuador, about 80 m. S. of Quito, at an elevation of 8,500 ft. It was destroyed by an eruption of Cotopaxi (1698), but was rebuilt. Trade in sugar, cochineal, and grain. Pop. 10,000.

**Amber,** a fossil resin, arises from the exudation of coniferous trees, as is shown by its composition and physical properties, by its occurring in drops and globular masses which resemble the resin seen exuding from the bark of pine trees, and by its common association with fossil wood. Amber is of a clear brownish-yellow colour, varying in shade, and is often clouded with irregular streaks. It is usually transparent, brittle, with a hardness of only 2 to 2½, and a low sp. gr. (1 to 1·1). It burns readily, giving off dense fumes. When rubbed it is negatively electrified, and from this property, which was well known to the ancients, the word 'electricity' has been derived (Gr. *elektron*, 'amber'). It is used

chiefly in the manufacture of mouth-pieces for pipes and cigar-holders, beads, necklaces, etc. It is soluble in alcohol, and forms the basis of certain varnishes. When distilled it yields succinic acid and a fine lamp-black. Amber ornaments which have been worn for a considerable time gradually assume a rich, dark, ruddy colour, which is much prized. Much of the amber of commerce is artificial, being made from copal, camphor, and turpentine, or is prepared from chips of natural amber fused under pressure. Amber is found in small quantities in Catania, Galicia, and other parts of the world; but the principal source has always been the shores of the Baltic, between the Frisches Haff and the Kurisches Haff in E. Prussia, also on the shores of Pomerania, W. Prussia, Schleswig-Holstein, and Denmark. It occurs in certain dark sands and clays, from which it is washed out by the action of the sea. Natural amber usually contains flaws and impurities. Fragments of bark, leaves, ants, flies, etc., which adhered to the sticky surface and were enveloped by the exudation, are the most frequent enclosures; these are the subject of a monograph—Conwentz's *Monographie der Baltischen Bernsteinbäume* (1890). Amber beads have been found in the royal tombs of Mycenæ in Greece, in Scandinavian relics of the Stone Age, in the ancient pile dwellings of Switzerland, and in Etruscan ruins. Amber was brought from the Baltic by Assyrian caravans in 900 B.C., and by Arab caravans in the 8th–11th centuries A.D. It was well known to the Romans, and is described by Pliny. Between 1837 and 1899 it was partly mined, partly gathered after storms by private monopolists. See Tesdorpf, *Gewinnung . . . . des Bernsteins* (1887); Landsberg, 'Geschichte des Bernsteins,' in *Preuss. Jahrbücher* (1899).

**Amberg,** tn., Bavaria, 35 m. E. of Nuremberg, still surrounded with walls and moats; has iron mines and iron works, and manufactures of earthenware and fire-arms (state factory). Pop. 24,000.

**Ambergris,** a gray fatty substance with ruddy marble-like veins running through it, found floating in the sea or thrown up on shore. It has a pleasant odour, and is used in perfumery. It is derived from the intestine of the spermaceti whale, and is probably a biliary secretion.

**Ambert,** tn., Puy de Dome dep., France, 55 m. W. by S. of Lyons. Manufactures paper and ribbons, and produces much fine cheese. Pop. 7,600.

**Ambianum,** the Latin form of Amiens; used in bibliography.

**Ambidexterity.** See RIGHT-HANDEDNESS.

**Ambleside,** mrkt. tn., Westmorland, England, 13 m. by rail N.W. of Kendal, is beautifully situated near the N. end of Lake Windermere. Close by resided, at different times, Mrs. Hemans, Dr. Arnold, and Miss Martineau. Wordsworth's house at Rydal Mount is about 1 m. to the N.W. Pop. 2,500.

**Amblyopia** (Gr. 'dim-sightedness'), defective, weak, or blunted vision. Scientifically, the term is supposed to apply only to those cases which cannot be more strictly classified after ophthalmoscopic examination. It is therefore more seldom used as our knowledge extends. The probable causes of amblyopia may be arranged as follows: (1) toxic; (2) functional; (3) changes in the optic nerve; (4) cerebral changes; (5) defective development. The first includes *tobacco amblyopia*, which is very common; heavy smokers are often affected. The defect is at first limited to the central field of vision, and occurs in both eyes,

there being often a blind spot for red and green. Sometimes a misty sensation is complained of. It sometimes leads to total blindness, unless tobacco is discontinued. In functional amblyopia there is transient loss of sight, complete or partial, which comes on suddenly and lasts from a few minutes to an hour; one form of this is hysterical. Amblyopia is most frequently seen with congenital squint; it usually occurs with long-sightedness.

**Amblyopsis,** the blind fish, 1 to 6 in. long, of the Mammoth Cave of Kentucky, U.S.A. The eyes are rudimentary and functionless, but not absent.

**Amblypoda,** a group of extinct mammals which flourished in the Eocene period; mostly of large size. Many were as large as an elephant, and in their general appearance they must have somewhat resembled the hippopotamus. Remains are found in the London clay, but it is from the Eocene beds of N. America that the most perfect specimens have been obtained.

**Amblystoma,** the name given to one form of the interesting amphibian known as the axolotl, before the relation of the two was understood. Now used as a generic name for the axolotl.

**Ambo,** in early Christian churches a reading-desk or pulpit from which the lessons were read or the sermon preached.

**Amboise** (anc. *Ambatia*), tn., France, dep. Indre-et-Loire, on the l. bk. of the Loire, 16 m. E. of Tours. Industries of cotton and machinery; wine trade. Pop. 4,700. It has an ancient castle, in which Charles VIII. was born and died, and Abd-el-Kader, the Algerian Arab chief, was imprisoned (1848–52). In the castle of Clos-Lucé, near Amboise, Leonardo da Vinci died (1519). The town is noted for the conspiracy of Amboise, formed by the Huguenots against Francis II. in 1560, and the treaty of Amboise (1563), between Catherine de' Medici and the Prince of Condé, by which the Protestants of France were granted the free exercise of their worship in the feudal dominions of the king, and received an indemnification for the losses they had suffered. Amboise acquired ill fame through its *oubliettes*, or subterranean cells, constructed for political prisoners by Louis XI. See L. Boileau's *Le Château d' Amboise et ses Environs* (1860).

**Amboise,** GEORGES D' (1460–1510), cardinal, and minister of Louis XII. of France; became bishop of Montauban (1474), prime minister (1498), and was made cardinal by Pope Alexander VI., after whose death he aimed at the popedom, and, failing to secure it, became strongly opposed to the Popes. See *Lives* by Montagnes (1631) and Legendre (1726), and Baudier's *Histoire de l' Administration du Cardinal d' Amboise* (1634).

**Amboyna,** or AMBOINA, an isl. in the Dutch E. Indies, one of the smallest, but one of the most important and, though hot, the most healthy of the Moluccas group. It consists of two peninsulas, connected by a narrow isthmus, and is a hilly island (4,020 ft.). Until 1873 the cultivation of cloves was jealously restricted to this island. The soil is abundantly fertile, and the island is clothed with vegetation. Including the adjacent Uliasser group, the area is 300 sq. m., and the pop. about 30,000. The island was in British occupation from 1796 to 1802, and again from 1810 to 1814. The town of Amboyna—pop. 8,000—has a good harbour; it is the principal fortified post of the Dutch in this part of the E. Indies. The residency of Amboyna — pop. 300,000—embraces the islands of Amboyna, Buru, Ceram, and the island groups of Aru, Banda, Kei,

Tenimber, and the S.W. Islands. Their chief products are sago, rice, maize, sweet potatoes, timber, cloves and other spices, cocoa-nuts, cajeput oil, trepang, cocoa, and nutmegs.

**Ambracia,** anc. tn. of Greece, on the N. of the Ambracian Gulf (Gulf of Arta), in Epirus, colonized from Corinth about 630 B.C. Pyrrhus made it his capital; later it joined the Ætolian League, and was taken by the Romans in 189 B.C. After the battle of Actium, Augustus transferred its inhabitants to his newly-founded city, Nicopolis, near the modern Arta.

**Ambree,** MARY, who fought at the siege of Ghent (1584) to avenge her lover; referred to in Fletcher's *Scornful Lady*, and in a ballad included in Percy's *Reliques* (1765).

**Ambriz,** one of the chief harbours in the Portuguese colony of Angola, W. Africa, on a bay into which the Loje R. flows. Exports are principally coffee, india-rubber, and copal. Pop. 2,500.

**Ambrose,** ST. (*c.* 340–397), patron saint of Milan, and one of the most famous of the church fathers. He was born in Gaul, but went when young to Rome. Having devoted himself chiefly to the study of law, Ambrose was appointed prefect of Liguria and Æmilia, with Milan as his centre. On the death of the bishop (Auxentius) in 374, Ambrose, though a layman, was elected to the vacant see. In the theological conflicts that raged over the question of Christ's divinity, Ambrose took up a resolute position against Arianism. When the Emperor Valentinian and his mother Justina sought the use of two churches in the diocese of Milan for the Arians, the bishop stoutly resisted their requests (384), declaring that though ready to suffer death he would never betray the church of Christ. Six years later he administered a severe reproof to the Eastern emperor Theodosius for having permitted the massacre of 7,000 inhabitants of Thessalonica; and the emperor underwent eight months of penance. On the assassination of Valentinian and the usurpation of Eugenius in 392, Ambrose fled; but when Theodosius defeated the usurper he returned to Milan, and continued there till his death, in 397. The life of Ambrose, written by Paulinus and dedicated to Augustine, is incorporated with the best edition of his works—the Benedictine (1686 and 1690). Though ambitious, Ambrose was amiable and generous. As a statesman he was vigorous and indomitable; as a theologian he was both a scholar and a philosopher, his knowledge of Greek making him a link between the East and the West. The hymnology of the church was enriched by him, and he is the author of the proverb, 'When in Rome do as Rome does.'

**Ambrose,** an Edinburgh tavern-keeper of the early years of the 19th century. His rooms were a favourite resort of the literary men of that day, notably of the *Blackwood* coterie, whose famous *Noctes Ambrosianæ* record their real and imaginary conversations during these symposia.

**Ambrosia,** in Greek mythology the food of the gods, which bestowed immortal youth and beauty upon all who partook of it. The Sanskrit *amrita*, the elixir of the gods, corresponds to ambrosia.

**Ambrosian Chant,** a generic name for the choral music of the Christian church in use antecedent to the 6th century. It was introduced into Italy from the East by St. Ambrose, but was superseded, except in Milan, by the Gregorian music of Pope Gregory the Great in the 6th century.

**Ambrosian Library,** a famous library in Milan, founded in 1602–9 by Carlo Borromeo, and named in

honour of St. Ambrose, the patron saint of the city. It contains upwards of 8,000 manuscripts, many of them of very great value.

**Ambrosius,** AURELIANUS, the Welsh EMRYS (*c.* 440 A.D.), emperor of Britain, reputed to have driven the Saxon invaders under Hengist to the Isle of Thanet. Early legend calls him son of Constantine; Geoffrey of Monmouth makes him son of Arthur.

**Ambrosius,** JOHANNA, pen-name of JOHANNA VOIGT (1854), German peasant poetess, wife of a farmer at Gross-Wersmeninken. Her poems reflect the hardness and narrowness of life on the soil, but are noble and valorous in tone. A collection was published with introduction—*Johanna Ambrosius, eine deutsche Volksdichterin* (1894); trans. by Mary Safford (1896), and a second in 1897. See Franke's *Glimpses of Modern German Culture.*

**Ambry,** AUMBRY, or ALMERY (O. Fr. *almarie, armarie;* Low Lat. *armarium,* 'a place for implements'), in churches a niche or press in the wall near the altar for vestments and sacred utensils. (See Pugin's *Eccl. Ornament and Costume,* 1868). In domestic life, the word is applied to a chest for keeping plate and household utensils, or to a pantry or cupboard, and is still current in Scotland and the north of England.

**Ambulance,** a wagon, litter, or other means of transport used for the conveyance of the sick and disabled. In a wider sense it means the work of the hospital establishments that follow an army in time of war, for the purpose of providing surgical aid to the wounded and medical assistance to the sick. The organization and general procedure are much the same in all armies. A soldier who is wounded or falls sick is useless as a fighting man, and a serious encumbrance to his unit. Moreover, in campaigns against uncivilized races, to whom the Geneva Convention and the courtesies of modern war are unknown, a disabled man must not only be medically treated, but also be protected from falling into the hands of the enemy. In war a medical officer is attached to each unit of the size of an infantry battalion. These officers, with a small *personnel,* are responsible for sanitary duties on the march and in camp; while, during a fight, they supply 'first aid.' The actual medical unit is known as a field ambulance. It can accommodate 150 patients, and is divided into 3 sections. Each section is further subdivided into a 'bearer subdivision,' corresponding to the old bearer company, and a 'tent subdivision,' corresponding to the old field hospital. Such a field ambulance has a *personnel* of 251, including 10 officers. Its transport consists of 22 vehicles, including 10 ambulances, and 98 horses.

When a soldier falls wounded in the fighting line he is attended to as quickly as possible by the medical officer of his unit. He is then carried to the nearest collecting station, as a rule by his regimental stretcher-bearers. Hence he passes to the hands of the bearer subdivisions, which push forward to gain touch with the regimental medical service. He is then forwarded to the dressing station, which is established farther to the rear by one of the tent subdivisions. If his injury be very slight, he remains in the field ambulance; but more serious cases are sent to the clearing hospital without delay. The clearing hospital, which can accommodate 200 patients, is merely a temporary resting place. Hence the more serious cases are sent to stationary or general hospitals, accommodating 200 and 520 patients respectively, on the lines of communication; while men who are likely to

be fit for duty within a short period are retained in a stationary hospital at or near railhead. Men are sent down the lines of communication in ambulance trains accommodating 100 cases lying down. Cases which are unlikely to recover within a reasonable period may be sent home in hospital ships of 220 beds. One train and one ship are mobilized for each division of the field army.

**Ambulance Classes.** See First Aid.

**Ambur,** tn., Madras, India, on the Palar R., 100 m. w.s.w. of Madras, with fort commanding an important pass into the Carnatic. Pop. 16,000.

**Ambuscade,** the disposition of troops who conceal themselves in a suitable locality with the object of lying in wait for an enemy and falling upon him unawares. A force on the march is generally protected from surprise by cavalry and scouts. In many cases, however, especially in guerilla and savage warfare, the difficult nature of a country or the paucity of troops available makes it impossible to obtain absolute security. A convoy of wagons or a long column of troops may be committed to a defile, or confined to a single track through country that it would be difficult to search effectively in a reasonable time. In such cases an ambuscade may be successfully laid, and, owing to the range of modern firearms, may result in their destruction or capture. The formation of ambuscades by the Boers in the broken ground of the veld was a prominent feature in the South African campaign, as at Sannah's Post in March 1900.

**Ameer.** See Emir.

**Amelia** (anc. *Ameria*), tn., prov. Perugia, Italy, 12 m. w. of Terni, with remains of Cyclopean walls. It has been a bishop's see since the 5th century. Important trade in raisins. Pop. 10,000.

**Amélie-les-Bains,** wat.-pl., France, dep. of Pyrénées-Orientales, 7 m. s.w. of Céret; has hot mineral springs; until 1840 it was called Bains d'Arles. Pop. 1,400.

**Amen,** a Hebrew word signifying 'firmly' or 'surely,' from *aman*, 'to prop or support.' It is used in Scripture—(1) to indorse the assertion of another—*i.e.* 'so is it' (1 Kings 1:36); (2) to confirm one's own statement, either at the close (Rev. 1:7), or initially (the 'verily' of Jesus, often double—Mark 10:15, John 1:51); (3) as a confirmation of prayer (Rom. 11:36, Neh. 5:13); and (4) as a name of God or Christ (Isa. 65:16, Rev. 3:14). The use of the word, especially in the sense of (3) above, has become a characteristic of Christian worship, and it has also passed into the liturgical diction of Mohammedanism. See an article by Hogg in the *Jewish Quarterly Rev.*, Oct. 1896.

**Amen.** See Ammon.

**Amendment.** See Parliamentary Procedure.

**Amenhotep,** the name of four Pharaohs of Egypt of the 18th dynasty. (**1.**) Son of Amasis I., reigned for about ten years (*c.* 1570 B.C.). His mummy is in the Ghizeh museum. (**2.**) Son of Thothmes III., reigned twenty-five years, from about 1450 B.C. (**3.**) Son of Thothmes IV., reigned thirty-six years from about 1410 B.C., and is noted for his buildings. He erected the great temples at Thebes, of which only the ruins of the temple of Luxor, and the two colossi, one of which was known in classical times as 'the Vocal Memnon,' now remain. (**4.**) Son of the preceding, reigned eighteen years, from about 1375 B.C. He was the son of a foreign mother, and married a foreign princess, probably of Indian (Aryan) race. He endeavoured to introduce the worship of the sun, calling him *Aten*, not by the Egyptian word *Ra*.

**Amenorrhœa.** See MENSTRUATION, DISORDERS OF.

**Amentaceæ,** or AMENTALOS, a collection of orders of dicotyledonous plants whose flowers, devoid of corolla, and often of calyx, are grouped into unisexual inflorescences, called amenta or catkins. Sometimes both kinds of inflorescence are on one plant, as in birch; sometimes on different plants, as in willow. Other examples are bog myrtle, poplar, alder, beech, oak, hazel, and hornbeam.

**Amenthes,** the lower world of the ancient Egyptians, to which souls descended after death to await the judgment of Osiris.

**Amercement.** In England, during the 13th century, if an offender was found guilty, the court declared that he was 'at the mercy' (*in misericordia*) of the king in a royal court, of the sheriff in a county court, or of the lord in a seignorial court. The offender gave security. At the end of the session his peers were sworn to 'affeer' or assess the amercement or fine payable. In theory the declaration of amercement forfeited all the offender's goods, but in practice amercements often did not exceed two or three pence. By Magna Charta and other enactments amercements were graduated according to the offender's rank. Formerly the unsuccessful party in a civil suit was liable to be amerced. See Pollock and Maitland's *Eng. Law*, ii. 513–15 (1898).

**America,** or the NEW WORLD, is the second largest continent on the globe. It has an area of 15,000,000 sq. m. If all adjacent islands are added, the area of the New World is 16,700,000 sq. m.—half that of the Old World. The New World and Old World are separated by Bering Str., 35 m. wide. The mainland lies between 71° N. and 54° S. lat., and between 35° and 168° W. long. The meridian of 80° W. divides it approximately into a W. and N. and an E. and S. mass, which are connected by the narrow isthmus of Panama. These two masses of N. and S. America have several common characteristics. They are broad at the N. and taper to the S.; the W. part consists of a belt of lofty mountain chains enclosing extensive plateaus; the centre is a great lowland, continuous from N. to S., and drained by great rivers, the Mackenzie and the Orinoco, the Mississippi and the Plate Rivers; and the E. is a highland broken by the St. Lawrence in the N. and the Amazons in the S. The coast-lines, however, present a striking contrast. N. America, with its irregular coast-line and great peninsulas, may be compared with Europe and Asia; while S. America, with its regular, unbroken coast, is the counterpart of Africa. The two main masses are attached to each other by the long, narrow isthmus of Central America and the chain of W. India Islands, which extend between the Tropic of Cancer and 10° N. These are usually reckoned with N. America, notwithstanding that both their physical and biological conditions resemble rather those of S. America. The population of the New World is about 150,000,000 or about one-tenth that of the Old World. See NORTH AMERICA and SOUTH AMERICA.

**America Cup.** This international yachting competition is of British origin, and arose out of a Royal Yacht Squadron contest, for which a prize, called the Queen's Cup, was offered, the course being round the Isle of Wight. The cup having been carried off by the U.S. schooner *America*, the winners conveyed it by deed of gift in 1857 to the New York Yacht Club, to be held by that club against all challengers as an international trophy. In 1870 and 1871 Britain challenged with the *Cambria* and

*Livonia*, both of which were defeated. A similar fate befell Canadian challengers in 1875 and 1881, and further British challengers in 1885, 1887, 1893, and 1895. In the two last cases Lord Dunraven challenged with *Valkyrie II.* and *Valkyrie III.* respectively, attributing his second defeat largely to the crowded state of the course. In the deciding race, Lord Dunraven, not being able to come to terms with the committee as to the complete clearance of the course, merely crossed the line with *Valkyrie*, in order to give the American *Defender* a start, and withdrew from the contest. A heated controversy ensued, and no further challenge from Britain was forthcoming till 1898, when a challenge was sent over by Sir Thomas Lipton, and met with a particularly cordial response. The result was the building of the British *Shamrock* and the American *Columbia*—the former designed by Mr. W. Fife, jun., of the Clyde; the latter by Mr. A. G. Herreshoff, for the owners, Mr. J. Pierpont Morgan and Mr. C. Oliver Iselin. The contest took place in October 1899, outside Sandy Hook, a series of five races being arranged. Only three, however, became necessary —*Columbia* winning the first by 11 minutes; *Shamrock* losing her topmast, and *Columbia* finishing alone, in the second; and *Columbia* winning the third by 6 minutes 34 seconds. In 1900 Sir Thomas Lipton again challenged, and in 1901 a new boat, *Shamrock II.*, was designed for him by Mr. G. L. Watson, and built by Messrs. Denny of Dumbarton. In the races of that autumn *Columbia* won three races consecutively—the first by about 200 yds., and the second by somewhat more than a minute. Sir Thomas Lipton took *Shamrock III.* (designed by Messrs. Fife and Watson, and built by Messrs. Denny) across the Atlantic, to contest the cup with the American boat *Reliance* in the autumn of 1903. In this year, again, he failed to win a single race, though the Clyde boat showed wonderful qualities in the light and fluky airs characteristic of those waters at the season in which the races take place. Sir Thomas Lipton offered, before leaving New York, a cup for an ocean race from Sandy Hook to the Needles, without handicap or restriction of measurements or of sail area; but when he learned that the Emperor of Germany had proposed to found a prize for a similar contest, Sir Thomas courteously withdrew. In August 1904 Sir Thomas announced his intention of making a fourth attempt, and offered a commission to Mr. Watson (d. Nov. 1904), who refused it on the ground that he could not build a 'freak' boat which would safely carry 60 men across the Atlantic. See YACHT.

**American Aloe.** See AGAVE.

**American Blight,** a disease which attacks apple trees, and was formerly very prevalent in the United States east of the Rocky Mts.; it has been known in Great Britain for upwards of a century. It affects the bark, and eventually causes the death of the tree. The disease is due to a minute insect (*Eriosoma mali*), a kind of plant-louse, known as the 'woolly aphis,' from the white protective material, like cotton-wool, with which it covers itself. Eggs are laid in minute crevices of the bark by the oviparous females in autumn, thus spreading the pest. The bark splits open, canker begins, and the tree, if not killed, becomes of little value. No part of the tree is safe from attack. Washing, spraying, or painting with paraffin and soft soap or an insecticide two or three times in the spring and early summer, is one of the most effective reme-

dies. This is best applied after the sun has gone down, in order not to injure the foliage. Spraying in winter with a solution of caustic soda and pearl ash is also recommended. Firs and larches are also subject to the blight.

**American Cloth,** or LEATHER CLOTH, is a textile fabric coated or enamelled to resemble leather. Unbleached calico is generally the foundation; this is coated with a mixture of boiled oil, dark pigments, and driers. Another common method of preparation is to coat the fabric with gelatin which has been rendered insoluble by chemical means.

**American Colonization Society,** founded for the purpose of establishing in Africa a colony of the free blacks of America. The first movement started in 1773, in Massachusetts and Connecticut. The Rev. Samuel Hopkins in 1787 made an attempt to establish a colony in Sierra Leone, but it was unsuccessful. In 1815 a company from New Bedford emigrated there; in December 1816 a constitution was adopted; and in January 1817 the American Colonization Society elected its first president. In 1820 thirty-eight emigrants established themselves at Liberia; and in 1824 a civil government was planned. Certain difficulties with the British government, however, led Liberia to declare her independence in 1847.

**American Indians** (*Amerinds*), the aborigines of the New World, so called from the original delusion of Columbus, who supposed that the land discovered by him was the India, and its inhabitants the Indians, of the eastern hemisphere. Hence these came later to be distinguished as East Indians, and the others as West or American Indians, for which the contracted form *Amerinds* has lately been proposed and adopted by some writers. The great divisions — Eskimos, Athabascans, Algonquians, Siouans, Aztecs, etc.—are treated elsewhere, and this notice must be confined to the natives in general.

1. *Origin.* — No ethnological question has been more warmly discussed than that of the peopling of the New World. The polygenist view that its inhabitants were really *autochthonous* — *i.e.* sprung from the soil—must be dismissed as absolutely untenable. All, in fact, agree that they came from the Old World, and the differences of opinion turn after all merely on the questions of the *whence* and *when.* Africa is at once excluded, because between Negro and Amerind there is nothing in common. Asia, and more particularly the north-eastern region separated from Alaska only by the sixty miles of Bering Strait, has always been, and continues to be, generally regarded as the most likely source. Indeed, it may be taken as established that a great part, perhaps the great bulk, of the natives did arrive by the Bering route. But all conditions are not met by any single hypothesis, and it will presently appear that Europe also must be included as an important factor of the problem. So far the *whence.* Many considerations require the *when* to be set back to remote post-glacial, if not interglacial, or even preglacial, times, when Europe was still connected by almost continuous land through the Faroes and Iceland with Greenland and N. America. The question of Paleolithic man, in the strict sense of the term, is still undecided, though opinions are more and more converging in that direction. But nobody denies the presence of Neolithic man everywhere in the New World, and it has been shown (by Sir William Turner amongst others) that the Neolithic (New Stone)

Age had a vast duration of some tens of thousands of years. This is sufficient for all purposes, and it will be seen that every condition of the problem is satisfied on the simple assumption that America was peopled, partly from Asia, partly from Europe, during the Stone Ages, and after that received no further contributions of any moment from the eastern hemisphere till Norse and Columbian days.

2. *Physical and Mental Characters.*—That the Amerinds are stamped by a certain bodily and mental *cachet*, which lends them a distinct ethnic unity, and enables them to be at once recognized as a separate division of mankind, is admitted by all the best observers. The terms of this unity are essentially four—the disproportionately large, massive head; the almost universal coarse, black, very long and lank hair of the horse-tail type, round in transverse section; the absolutely universal polysynthetic structure of their speech (see below); and their generally wary, impassive, reserved, taciturn, or almost sullen temperament. There are many local and even general differences noticeable, especially in the colour of the skin, varying from all shades of brown (Iroquois, Dakotas, Aztecs, Peruvians, Araucanians) to blackish in one direction (Charruas of Uruguay, Lower Californians), and yellowish or whitish in another (Guarani, Botocudos, Haidas of Queen Charlotte Is.); in the stature, ranging from the undersized Calchaquis, Peruvians, Fuegians (5 ft. or under) to the gigantic Brazilian Bororos and Patagonians (6 ft. to 6 ft. 4 in.); but above all in the shape of the skull, which shows all the transitions between that of the Greenland Eskimo, almost the longest, and that of the Argentine Calchaquis, absolutely the shortest yet recorded. From all this it follows that the ethnic unity is not primordial, but a growth, a gradual fusion during long isolation of two originally distinct elements—the short-headed, yellowish-brown Mongol from Asia, and the long-headed, presumably fair men of the Stone Ages from Europe. Hence it is that intelligent observers are often so greatly puzzled, and declare, with Mr. E. im Thurn, for instance, that it is impossible to classify the Amerinds except on a linguistic basis; or, with Dr. Paul Ehrenreich, that many differ no more from Europeans than from Asiatics. 'The constituent elements of our aborigines would therefore appear to be proto-Europeans of the First Stone Age, a somewhat generalized primitive Caucasic type; and proto-Asiatics, a somewhat generalized primitive Mongolo-American type—both Europeans and Asiatics still preserving many common features of the common Pleistocene precursors' (A. H. Keane, *Man Past and Present*, p. 353).

3. *Speech and Culture.*—In a general survey of the American aborigines, what perhaps most arrests attention is the unique character of their languages, which, despite their endless diversity, present only a single morphological type, and that type fundamentally different from all other known forms of speech. To the three orders recognized in the Old World—the Isolating, Agglutinating, and Inflecting—a fourth, the Polysynthetic, has to be added to make room for the American languages in any general linguistic scheme. No doubt some philologists, Hovelacque amongst others, have endeavoured to show that polysynthesis does not differ essentially from agglutination, and that the Amerind tongues belong substantially to the same order as, for

instance, the Basque, the Finnic, the Turki, and some other highly agglutinating Eurasian tongues. But it is not so; and if these freely incorporate both direct and indirect *pronominal* object—as when we say even in Italian, *Datemelo*, 'give-to-me-it'—the American incorporate the *nominal* as well, and much more besides, saying, for instance, 'Give-it-to-me-the-stick-quickly,' all in one 'bunch-word,' often of prodigious length. And as the *pronominal* elements are limited and the *nominal* unlimited, it follows that the difference is one, not of degree only, but of kind. Furthermore, not a single example of nominal incorporation has ever been found in the eastern hemisphere, while nothing else can be found in the western from Alaska to Fuegia, all the Amerind tongues being cast in this extraordinary polysynthetic mould. As, for instance, the Tarascan of Mexico cannot say *hoponi*, 'to wash,' but only *hopocuni*, 'to-wash-the-hands,' *hopodini*, 'to-wash-the-ears,' etc., so the Ipurina of Amazonia says all in a breath, *Nicuçacatçaurumumatinii*, 'I draw-the-cord-tight-round-your-waist.' It is the same in Eskimo, Algonquin, Aztec, Peruvian, Araucanian (Chile); and if there are any apparent exceptions, as in the so-called 'monosyllabic' Otomi of Mexico, it is due to later disintegration and phonetic decay, as clearly shown by Charancey. It follows that the Pleistocene Amerinds can have brought nothing with them from the Old World except the elements, the first articulate germs, of speech, which in their new homes they developed on polysynthetic lines, and diffused throughout the continent from a single centre of dispersion. Thus are explained both the unity of American speech and its radical difference from Eurasian and Eurafrican speech.

It was the same with American culture, of which the germs alone—stone, wood, and bone implements, possibly the fire-drill, basketry, and the like—came from the eastern hemisphere during the Stone Ages, and were afterwards elaborated in the New World independently of all extraneous influences. This is, of course, a fiercely debated point, and there is an 'Asiatic school' which still denies to the Amerinds the light of reason, refuses them the right to invent anything, and brings all their belongings ready-made from the Old World. But its voice grows daily fainter, and has recently been all but stilled by such writers as Powell, Payne, Dellenbaugh, and others. The pyramid argument, for instance, is seen to be baseless when it is pointed out that the Egyptian pyramids were royal tombs terminating in a point, and made as inaccessible as possible; while the Central American and Mexican were all truncated with platforms for temples and sacrificial rites, and were approached by broad flights of steps; and further, that an interval of at least two millenniums lay between the Egyptian and the Mexican pyramid-building epochs. So also Humboldt's astronomic argument, the mainstay of the Asiatics, collapsed when it was shown that the Maya and Mexican calendar was locally evolved, and had next to nothing in common with the Chinese, the Indian, or any other Old World systems. It was based on a year of eighteen months of twenty days each with five epacts, hence was unlike anything in use out of America. On the other hand, the absence of such cultural accessories as wheat, rice, tea, silk, the ox, the horse, the pig, poultry, the lamp (except amongst the Eskimos), seaworthy ships propelled with sail and rudder, and needed in order to cross the Paci-

fic and Atlantic Oceans, is inexplicable, and, in fact, never has been explained on the assumption of Eastern civilizations introduced bodily into the New World. Hence it may be confidently affirmed that all the native arts and industries, social, religious, and political institutions, may be traced on the spot from rude beginnings in Pleistocene times through all the transitions up to a certain standard of excellence. Dellenbaugh justly stigmatizes as 'ridiculous' the assumption that a fully specialized cultural people came over from Asia 'and passed down to Mexico and Yucatan, and even S. America, carrying with them their arts, but not exercising them on this interminable journey' (*The North Americans of Yesterday*, 1901). And elsewhere this great authority concludes that 'there is nothing in any of the remains that indicates foreign influence. Every architectural work on the continent is purely Amerindian, or modified by contact with other races subsequent to 1492.'

This indigenous culture was by no means of a homogeneous nature. On the contrary, it presented, perhaps, as many different aspects as did that of the Old World, ranging from the sheer savagery of the Fuegians and Amazonians, through the hunting and fishing stages of the Eskimos, Athapascans, and Missourians, and the agricultural condition of the Muskhogeans, Natchez, Moundbuilders, Puebloans, and Cliff-dwellers, to the relatively civilized Aztecs, Mayas, Quiches, Chibchas, Quichuas (Peruvians), and Aymaras.

4. *Classification.*—Owing to the generally homogeneous nature of their physical and mental characters, no classification of the aborigines is possible except on a linguistic basis. The languages themselves are no doubt also homogeneous, in so far as they all belong to the same polysynthetic order of speech, and would therefore afford no ground for separate groupings but for the fact that they have often so widely diverged within the limits of that order as to be no longer reducible to a common origin. Such 'stock' languages, as they are called, are, however, very numerous, perhaps outnumbering those of all the rest of the world. Their distribution is also remarkable. In N. America the vast majority of these stocks are crowded together along the Pacific seaboard between Alaska and California, at some points, as about Puget Sound and the Lower Columbia, in indescribable confusion. Thus the rest of the continent east of the Rocky Mountains is occupied by very few stocks, and here the great families—*Athapascan*, *Algonquian*, *Siouan*, *Shoshonean*, *Muskhogean*, *Iroquoian*—range or have ranged over immense areas. But these, again, are divided into numerous branches, which often constitute separate 'nations,' and are of great historic importance, hence cannot be overlooked in any comprehensive grouping. In Central America (including Mexico) the stocks are more uniformly distributed, although here also two great families—the *Nahuan* and *Maya-Quichean* — occupy very wide domains. Lastly, in S. America the distribution again differs, inasmuch as most of the western seaboard from Ecuador to Chile is held by two large stocks — the *Quichua-Aymaran* and the *Araucan;* and the central and eastern parts (Amazonia with Brazil proper and the Guianas) by three—*Tupi-Guaranian*, *Cariban*, and *Arawakan*—around or intermingled with whom are a multiplicity of smaller groups whose claims to be regarded as true stocks cannot always be verified.

In the extreme south there are at least four—the *Pampeans* (*Puelcheans*) of Argentina, the Patagonian *Tehuelcheans*, and the *Yahgans* and *Alacalufans* of Fuegia. It should be stated that Powell's convenient plan of distinguishing the N. American stocks from their branches by the final syllable *an* or *ian*, which has been extended by Léon to Mexico and Central America, is here adopted for the whole continent. Thus *Iroquoian*, the stock name, comprises the Iroquois proper, the Hurons, the Tuscaroras, and Cherokees as branches of the family. So the Shawnees, Delawares, Micmacs, Cheyennes, and many others, are all branches or members of the *Algonquian* family, and so on. Subjoined are all the stocks, as far as known, with the more important branches of the great families:—*North America.*—ESKIMAUAN: Alaska, Baffin, Labrador, Greenland, Yuit, Aleut sub-branch. ATHAPASCAN: Kutchin, Ahtena, Taculli, Chippewaya, Slave, Hupa, Apache, Navajo. ALGONQUIAN: Abnaki, Arapaho, Cheyenne, Cree, Delaware, Fox, Micmac, Mohegan, Ojibwa, Ottawa, Powhatan, Sac, Shawnee, Stockbridge. IROQUOIAN: Iroquois (Mohawk, Cayuga, Oneida, Onondaga, Seneca), Huron (Wyandot), Cherokee, Tuscarora. SIOUAN: Dakota, Assinaboin, Omaha, Ponca, Kansa, Osage, Quapaw, Iowa, Otoe, Missouri, Winnebago, Mandan, Hidatsa, Tutelo, Biloxi, Catawba. THLINKITAN, HAIDAN, TSIMSHIAN, CHINOOKAN, SHOSHONEAN: Snake, Bannock, Comanche, Utah, Hopi. CADDOAN: Pawnee, Arikara, Wichita. SALISHAN: Flathead, Atnah, Bellacoola, Chehalis, Spokan. CHIMAKUAN, KALAPOOIAN, KIOWAN, MARIPOSAN, PUEBLOAN: Zuñi, Tegua, Tao, Picuri, Tusaya. MUSKHOGEAN: Creek, Choktaw, Chickasaw, Alibamu, Seminole, Natchez. SHAHAPTIAN, WAKASHAN, YUMAN. *Mexico and Central America.*—PIMAN: Pima, Papago, Cahita, Yaki, Mayo, Opata, Tarahumara, Tepehua, Sinaloa. SERIAN, NAHUATLAN: Aztec, Huichol, Pipil, Zacateca, Acaje, Cora, Nayarit, Colotla. COAHUILTECAN, OTOMIAN, MATLALTZINCAN, ZOQUE-MIXEAN: Zoque, Popoloco, Mixe, Tlapaneca. TOTONACAN, CHAPANECAN, TARASCAN, MIXTECAN, ZAPOTECAN, MAYA-QUICHEAN: Huaxtec, Maya, Lacandon, Quiché, Mame, Tzeltal, Chontal, Tzotzil, Chaneabal, Chol, Chorti, Poconchi, Pocoman, Cakchi. CHOROTEGAN, LENCAN: Tuca, Wulwa, Rama, Paya, Melchora, Guatusa. COSTA RICAN: Bribri, Talamanca, Terreba, Guaymi, Cuna, Durasco. DARIEN: Choco, Tule. *South America.*—CHIBCHAN, PAESEAN, COCONUCAN, CHINCHASUYAN, YUNCAN, QUICHUA-AYMARAN: Inca, Huanca, Chanca, Cana, Colla, Lupaca, Pacasa. CALCHAQUIAN, ANTISUYAN, JIVARAN, ZAPARAN, BETOYAN, PANOAN, TICUNAN, JURIAN, PARUAN, MOJOAN, BARREAN, CURETUAN, CARIPUNAN, CATAUXIAN, CHARRUAN, CARAPUYANAN, CHUNCHOAN, CONIBAN, CARIBAN: Macusi, Akawai, Calina, Galibi, Rucuyenne, Bakairi, Apiaca, Arecuna. ARAWAKAN: Wapitiana, Atorai, Maypure, Parexi, Arawa. WARRAUAN, CHIQUITAN, BORORAN, BOTOCUDAN, CARIJAN, HUAMBISAN, HIPURINAN, TUPI-GUARANIAN: Guarayi, Caribuna, Siriono, Mundrucu, Mauhé, Chiriguano, Tupinamba, Omagua, Goajire, Ovampi, Guaycuru. ARAUCAN, MOCOBILULEAN, MATACOAN, TOBAN, PUELCHEAN (Pampas), TEHUELCHEAN (Patagonian), YAHGAN, ALACALUFAN. See E. J. Payne's *History of the New World called America: The Aborigines* (vol. ii. 1899); Zelia Nuttall's *The Fundamental Principles of Old and New World Civilizations* (1901); F. S. Dellenhaugh's *The North Ameri-*

*cans of Yesterday* (1901); D. G. Brinton's *On Various Supposed Relations between the American and Asian Races* (1893), and *The American Race, a Linguistic Classification of the Native Tribes of North and South America* (1891); A. D'Orbigny's *L'Homme Americain considéré sous ses Rapports Physiologiques et Moraux*, 2 vols. (1839); J. W. Powell's *Linguistic Families of America north of Mexico* (1891); N. Léon's *Familias Linguisticas de Mexico* (1902); A. Gallatin's *A Synopsis of the Indian Tribes within the United States, etc.*, 2 vols. (1836); R. G. Latham's 'Ethnography of North America,' in *Proceedings of Philological Society, London* (1846); A. Hrdlicka's *Skeleton Remains of Early Man in N. America* (1907); A. S. Gatschet's *Indian Languages of the Pacific States, etc.* (1877); A. H. Keane's 'Ethnography and Philology of America,' in Stanford's *Compendium*, 1st series (1878), and *Man Past and Present* (1900); F. Boas's *Anthropology of the North American Indians*, and *Social Organization, etc.* (1897); P. Ehrenreich's *Anthropologische Studien, etc.* (1897); De Nadaillac's *L'Amérique Prehistorique* (English ed. 1885); H. H. Bancroft's *The Native Races of the Pacific States of North America*, 5 vols. (1875–76); A. Bastian's *Die Culturländer des Alten America*, 2 vols. (1878); J. D. Baldwin's *Ancient America* (1872); G. Catlin's *Illustrations of the Manners, Customs, and Conditions of the North American Indians*, 2 vols. (1866); A. von Humboldt's *Researches concerning the Institutions and Monuments of the Ancient Inhabitants of America* (English ed. 1814); S. G. Morton's *Crania Americana* (1839); H. R. Schoolcraft's *Ethnological Researches respecting the Red Men of America*, 5 vols., and *Historical and Statistical Information respecting the History, etc., of the Indian Tribes, etc.*, 3 vols. (1851–53); *Smithsonian Institution, Annual Reports of the Bureau of Ethnology*, and *Contributions to North American Ethnology*.

**Americanisms.** By this term are understood, by all English-speaking people, certain words, locutions, phases of meaning, and methods of spelling peculiar to the United States, and in a less degree to Canada. Many so-called Americanisms are disowned by the cultivated class in the United States; and it was maintained by Richard Grant White that the differences between the speech of educated people in New England and Old England are so slight as to be almost, if not altogether, imperceptible. The following expressions may be noted, however, as peculiar to N. America. Timber is known as *lumber*, biscuits are *crackers*, rolls are *biscuits*, confections are *candy*, running streams are *creeks*, all climbing plants and tendrils are *vines*, and the vine itself is distinguished as the *grape-vine*, while, to the ordinary American, *corn* only means maize or Indian corn. During the past thirty years—as far back, at any rate, as the Philadelphia Exhibition of 1876—the English word 'exhibition' has been yielding place to *exposition*. This form appears to have been brought over from Paris, in the first instance, by unlettered 'drummers' (*Anglice*, 'bagmen'). In the United States one hears of goods being *shipped* by rail; and the railway terminology presents several differences. Thus, *track* is used instead of line, the engine-driver is called the *engineer*, the train is often spoken of as *the cars* and the station as the *depôt* (with the hybrid pronunciation *dee-po*), while *railroad* is more commonly used than railway. But the last three instances are by no means invariable, though their occurrence is worth recording. '*On*

time,' moreover, is used to signify punctual, or (as with us) 'up to time;' and a railway time-table is a *schedule*. Instead of our antiquated booking office—meaningless since the era of *booking* seats—*ticket office* is properly substituted. Other Americanisms are: *back of* for 'behind;' *right away* for 'immediately;' and an expansion of the Scotticism '*on* the street' into such applications as, 'he lives *on* Fifth Avenue,' 'he crossed *on* the *Campania*,' 'he came *on* the afternoon train.' Instead of adopting the French *galoche*, as we have done ('golosh'), the Americans call their overshoes *rubbers* and *gums*. The latter, however, is more local than the former, and the Philadelphia lady who 'wiped her gums on the door-mat' before entering the house of her New York friend aroused as much merriment by that expression as she could have done in London. Mention may further be made of such variations as *side-walk* instead of 'pavement' (a term less frequently applicable in American towns), *hack* for 'hackney-carriage,' *hackman* for 'cabman,' *side-whiskers* and *chin-whiskers* for 'whiskers' and 'beard,' *bureau* for a bedroom chest of drawers, *Cologne* instead of eau de Cologne, the use of *cream-pitcher* instead of the British 'cream-jug,' and the restriction of *boots* to top-boots—*shoes* being held to indicate ankle-boots, as well as what we understand as shoes. This last, however, is more distinctly a usage of the Western States.

It would be a great mistake to assume that Americanisms are necessarily novelties, or aberrations from good English. Some of those cited above are of this class—*e.g.* the misuse of *lumber*, *creek*, and *exposition*. But many are Americanisms merely in the sense that they are English words which are nowadays peculiar to N. America in their use or in their application. It is quite good English to call railway carriages 'cars;' and, indeed, we have borrowed back that very application in our dining, sleeping, and tramway car. Other expressions—*e.g.* *I reckon*, *I guess*, *I allow* (in the sense of 'I think or suppose'), or *to home* (meaning 'at home'), or the nouns *hub* and *chores*—have all been used in England, and some are even yet in use in rural districts. Certain Old English words, indeed, still survive in the United States which seem to have vanished from England. Conversely, some English words are obsolete or obsolescent in the United States—*e.g.* sledge (supplanted by *sleigh*), fortnight, ironmonger, and luggage. As regards the so-called American spelling of such words as *favor*, *honor*, *plow*, *center*, *theater*, *miter*, all these forms have been used in England. Thus, a large number of the divergences between American-English and British-English are due to the fact that the two great English-speaking communities have lived separate lives for many generations. The term 'Briticism' has been employed in the United States to denote certain novelties in the English speech of the British Islands which have arisen since 1776. But to recognize such expressions as 'Briticism' and 'British-English' (used above for the sake of antithesis) is to assume that the speech of a mother country stands on precisely the same level as that of its offshoots—a premise not likely to be granted by any of the older civilizations. See Farmer's *Americanisms, Old and New* (1889); R. G. White, in *Atlantic Monthly*, vols. xli.-xlv.; T. R. Lounsbury, in *Internat. Rev.*, vol. viii.; G. M. Tucker, *N. Amer. Rev.*, vol. cxxxvi.; W. W. Crane, in *Putnam's Mag.*, vol. xvi.; Brander Matthews, in *Harper's Mag.*,

1891; and Lowell's Introd. to *Biglow Papers; A New Dictionary of Americanisms*, by Sylva Clapin (1903).

**Americanists,** those who make a special study of American ethnology, archæology, etc. Several international congresses of such students have already been held in Europe. See the *Report* (in French) of the Copenhagen Congress of 1883 (Copenhagen, 1884).

**American Line** (steamship) is a descendant of the International Navigation Co., a Pennsylvania undertaking, formed in 1871, which gradually enlarged its operations until it embraced the Red Star Line, running from 1873 between Antwerp and Philadelphia, and the Inman Line (acquired in 1886), running between Liverpool and New York. In 1893 all the undertakings were merged in the American Line, running weekly between Southampton, *via* Cherbourg, and New York, and between Liverpool and Philadelphia. The company has a fleet of 8 steamers, which aggregate 80,887 tons. It owns the *St. Louis*, *St. Paul* (which has a record of 21·08 knots on the westward run), *New York*, and *Philadelphia*. It now forms part of the International Mercantile Marine Co. London offices: 38 Leadenhall Street, E.C. See ATLANTIC SHIPPING TRUST.

**American Literature.** See UNITED STATES—*Literature*.

**American Organ.** See HARMONIUM.

**American Protective Association,** a league formed at Clinton, in Iowa, U.S.A., in 1887, by a lawyer, Mr. Bowers, for restricting immigration into the country, and for checking the privileges of Roman Catholics.

**American Rails,** the name given to the group of stock-exchange securities consisting of the common stock and bonds of the railways (or rail*roads*, as they are called in America) of the United States and Canada. For history see RAILWAYS.

The total mileage of American and Canadian railways was, in 1908, 274,000. The capital invested amounted to about £3,000,000,000. Of this sum, about £1,600,000,000 was represented by common stock (corresponding to our 'ordinary'), and about £1,400,000,000 by bonds. The common stock is generally of a speculative character. A great deal of it is 'water,' issued to arrange for control of a line, or to carry through some financial arrangement.

Bonds are not so speculative nor so fluctuating in price as common stock. They are secured by a mortgage on the railway, or on some part of its property. Though now regarded as securities for investment rather than for speculation, they have as a class passed through many vicissitudes before reaching their present position. Between 1870 and 1875 over a hundred companies were insolvent, and no less than £100,000,000 of bonds were in default with their interest. The position is now entirely altered. The growth and prosperity of America have enormously increased the traffic and earnings of American railways. The costs of working have been greatly reduced by careful management, and confidence has been restored by reorganizations, proper accounting, and, above all, by the publicity given to accurate reports and statistics. The best American bonds command as high prices as corresponding British securities.

American railway securities were placed on the London market as early as 1838. They have long been dealt in to such an extent that they are treated as a distinct class in stock-exchange quotations.

Transactions in rails form the

largest part of stock-exchange business in America. On the New York Stock Exchange, of the 1,500 'listed' securities (*i.e.* those which occupy the highest position owing to their fulfilling the conditions of the Stock Exchange as to publication of reports, etc.) nearly 200 are railroad stocks, and over 600 are railroad bonds.

At least one-fifth of American capital is invested in railroads. The extent to which speculation takes place on the chief Stock Exchange (New York) may be gathered from the fact that in a single year some of the railroad stocks have been sold ten or twenty times over. In a single day two-thirds of all the shares of the Union Pacific and three-fourths of the Southern Railway have changed hands.

These enormous sales are due to the frequent struggles between groups of financiers for the control of some particular line. The result of these constant struggles has been the combination of a large number of railroads under a single financial control, and such groups or systems are generally named after the chief financier among the controlling parties. The interests controlling the main lines represent about 7,000 million dollars of railroad stocks and bonds, or considerably more than one-third of all American stock-exchange securities.

Besides the groupings above referred to, American rails are generally classified according to the nature of their business. Thus, the *Trunk Line* group includes the main through lines between the eastern seaboard and the middle states. The *Coalers* and the *Grainers* are the great coal-carrying and wheat-carrying lines respectively. The so-called '*Transcontinental' Roads* connect the middle and the Pacific states:—Union Pacific (1869), Southern Pacific (1881), Northern Pacific (1883), Great Northern (1893), and the Atchison, Topeka, and Santa Fé. The Canadian Pacific Railway is really transcontinental; as are also the Grand Trunk Pacific and the Canadian Northern, now being built.

Many of the chief American railroads are known by recognized nicknames or contractions—the 'Big Four' is the Cleveland, Cincinnati, Chicago, and St. Louis; the 'Nickel-plate' is the New York, Chicago, and St. Louis.

For full information on American railroad securities, see *Poor's Manual* (annual).

**Americus,** a city, Georgia, U.S.A., co. seat of Sumter co., 53 m. S.E. of Columbus. It is situated in the centre of a cotton and sugar-cane district, and has large iron, machinery, and chemical industries. Pop. 8,000.

**Amerigo.** See VESPUCCI.

**Amerind,** and AMERINDIAN or AMERINDIC (adj.), terms invented by members of the Anthropological Society of Washington (U.S.) to denote, in scientific treatises, the aboriginal tribes of the American continent and adjacent islands, including the Eskimos.

**Amerling,** FRIEDRICH (1803-1887), painter, born in Vienna, whose portrait of the Emperor Francis I. (1832) made him the favourite portrait painter of the court and the aristocracy. He painted about a thousand portraits; among his historical pictures is *Moses in the Desert* (1829). See *Life* by Frankl (1889).

**Amersfoort,** tn., prov. Utrecht, Netherlands, 14 m. by rail N.E. of Utrecht. Theological seminary of the Jansenists. Manufactures of tobacco, cottons, glass, hats, and beer. Pop. 20,000.

**Amersham,** or AGMONDESHAM, tn. and par., Buckinghamshire, England, 26 m. W.N.W. of London. Straw-plaiting and chair-making are the principal industries. Pop. 3,200.

**Ames,** JOSEPH (1689–1759), antiquary and bibliographer, born at Yarmouth. His chief publications are: *An Index to the Pembrokian Coins and Medals* (?1746); *A Catalogue of English Heads* (1748), the first general description of English engraved portraits; *Typographical Antiquities* (1749), a history of printing in England, and a register (copied from the books themselves and not from catalogues) of printers and their books from 1471 to 1600. He also wrote *Parentalia, or Memoirs of the Family of the Wrens* (1750). See Gough's *Memoir of Ames*, in editions of *Typog. Antiq.* by Herbert and Dibdin; Nichols's *Literary Anecdotes and Illust.* (8 vols. 1817–58); Bigmore and Wyman's *Bibliog. of Printing* (3 vols. 1880–6).

**Ames,** JOSEPH (1816–72), American painter, born at Rosebury, New Hampshire. His portraits include Ristori, Prescott, Emerson, Rachel, and Pope Pius IX.

**Ames,** WILLIAM (1576–1633), known also as Amesius, English Puritan divine, born at Ipswich. Persecuted for nonconformity, he sought refuge in Holland, where he engaged in controversy with Grevinchovius and Episcopius. He was appointed professor of theology at Franeker (1622), and at Rotterdam (1632). His works include *Medulla Theologiæ*, a student's handbook; the famous *Coronis ad Collationem Hagiensem; De Conscientia, ejus Jure et Casibus;* and *Bellarminus enervatus.* See *Life* by Nethenus.

**Amesbury.** (1.) Tn. and par., Wilts., Eng., on the Avon, 8 m. N. of Salisbury. About a mile to the W. is a large entrenchment, covering an area of 39 ac., called Vespasian's Camp, but supposed to be of British origin; and a little farther W. Stonehenge. Elfrida, widow of Edgar, founded here, in 980, a Benedictine nunnery. At Milston, near Amesbury, Joseph Addison was born in 1672. Pop. 1,100. (2.) Town, Essex co., Mass., U.S.A., 35 m. E.N.E. of Boston. Manufactures woollen goods, boots and shoes, and carriages. Pop. 9,000. See Merrill's *History of Amesbury* (1880).

**Amesha Spenta** (mod. *Amshaspends*), the 'immortal holy ones' of the later Avesta, are the principal spirits who assist Ormuzd in his works of creation. They are seven, including Ormuzd. The affinities between the Zoroastrian and Jewish theogonies, manifest in Ormuzd (the Creator) and Ahriman (Satan), are further illustrated by the Amesha Spenta, who have been compared to 'the seven Spirits which are before His throne' (Rev. 1:4). See ZEND-AVESTA; ZOROASTER.

**Amethyst,** a kind of quartz distinguished by its purple colour. The presence of a small amount of manganese has been regarded as the origin of the peculiar colour, which may vary considerably in the same specimen, and is readily destroyed by heating. Amethyst is most often found lining fissures and cavities, or in the interior of agates. Fine specimens come from Oberstein (in the Nahe valley, Prussian Rhineland), Hungary, Brazil, and Ceylon. The ancients supposed that this stone was a charm against intoxication. See Church's *Precious Stones* (1882), Streeter's *Precious Stones* (1884), and Bauer's *Precious Stones* (1904).

**Amfortas,** or ANFORTAS, king of the Holy Grail, in Wolfram von Eschenbach's *Parzival* and Wagner's opera of *Parsifal.* See Filson Young's *Wagner Stories* (1908).

**Amga,** l. bk. trib. of Aldan riv., Yakutsk gov., E. Siberia; rises in Aldan Mts. and flows N.N.E. Length, 500 m.

**Amhara** ('highlands'), the central division of Abyssinia,

and formerly one of its most powerful states. See ABYSSINIA.

**Amharic,** a language spoken since the 13th century throughout a large part of Ethiopia or Abyssinia, succeeded Geez or Ethiopic (still the literary language), and, like it, is Semitic in origin; written from right to left.

**Amherst,** or FORT LAWRENCE. Seapt., cap. of Cumberland co., Nova Scotia, Canada, 95 m. N.N.W. of Halifax; has lumber trade, shipbuilding, tanneries, iron foundries, etc. Pop. 5,000.

**Amherst.** (1.) Tn., Hampshire co., Mass., U.S.A., 72 m. W. of Boston. It is the seat of Amherst College, with which the Lawrence Observatory is associated, and the state agricultural college. Manufactures straw hats. Pop. 5,000. See Carpenter and Morehouse's *History of Amherst* (1896). (2.) Tn., sanatorium, and important pilot station at the mouth of the Wakaru River, Burma, 32 m. S. of Moulmein. Pop. about 3,500.

**Amherst,** JEFFREY (1717–97), created BARON AMHERST (1776); British field-marshal; chosen (1758) by Pitt to command the army for the conquest of French N. America. Montreal having fallen, Amherst was appointed governor-general of British North America (1760).

**Amherst,** WILLIAM PITT (1773–1857), created EARL AMHERST OF ARAKAN (1826), British diplomatist and statesman, nephew of the above, was sent in 1816 as envoy to the emperor of China; and, after a brilliant diplomatic career, became governor-general of India (1823–8). See Ellis's *Journal of the Proceedings of the late Embassy to China* (1817); Taylor's *Manual of the History of India* (1870).

**Amice,** a long cloak worn by priests in the 9th century and subsequently. The term is still applied to the hood of French canons, and also to a linen band worn on the shoulders by Roman Catholic priests while saying mass.

**Amicis,** EDMONDO DE (1846–1908), Italian writer, born at Oneglia. He became editor of the Florentine paper *L'Italia Militare* in 1867. For this he wrote a series of bright and natural tales, *Bozzetti della Vita Militare* (1868; subsequently recast), which became very popular. In 1871 De Amicis devoted himself entirely to literature, though two works which appeared at this time—*Ricordi 1870–1* (1872) and *Roma Libera* (1872)—have political rather than literary interest. These were followed by a series of books of travel, remarkable for great charm of style and power of description—*La Spagna* (1873), *Ricordi di Londra* (1874), *L'Olanda* (1874), *Marocco* (1876), *Constantinopoli* (1877), *Ricordi di Parigi* (1879), *Sull' Oceano* (1889). In fiction De Amicis's greatest success is the sentimental *Il Cuore*, primarily intended for young people. In his later efforts—*Il Romanzo d'un Maestro* (1895), and *Il Primo Maggio*—he essays social themes, bordering even on social democracy. (See, too, the pamphlet, *Ai Nemici del Socialismo*, 1896.) Less good are the early *Novelle* (1872), and the collection of historical tales, *Alle Porte d'Italia* (1884). Opinion is divided as to the value of the *Poesie* (1880); while admiring the descriptive passages, most critics are agreed that De Amicis is a master of prose rather than a poet. His latest books were, *La Carozza di Tutti* (1899), *Memorie* (1899), *Speranza e Gloria* (1900), *Ricordi d'Infanzia et di Scuola* (1901), *Una Tempesta in Famiglia* (1904), *Nel Regno del Cervino* (1905), *Ultime Pagine*, 3 vols. (1908).

**Amicus Curiæ,** any person present at the hearing of a lawsuit, who, though not concerned in it, informs or corrects the court as to some fact or decision

**Amides,** a group of organic compounds derived from ammonia by the replacement of a portion of the hydrogen by an acid radical. They are usually solid substances, are neutral to litmus, but act as bases to acids, with which they form salts. Treated with phosphoric anhydride, they are dehydrated, and become nitriles; while if they are boiled with aqueous caustic potash they give off ammonia, and leave the potassium in combination with the acid.

**Amidogen** is the group $NH_2$. It is known only in combination, forming amides with acid radicals, and amines with alkyls.

**Amiel,** HENRI FRÉDÉRIC (1821–1881), French author, born at Geneva. He published many poetical and literary works, but *Fragments d'un Journal Intime* (1883–4; English trans. by Mrs. Humphry Ward) is the book by which he is best known. It is a diary of 1,700 pages, the revelation of an almost morbidly introspective mind.

**Amiens,** tn. on l. bk. of Somme, cap. of dep. Somme, formerly cap. of Picardy, 81 m. N. of Paris, France. It is the seat of a bishop, and is the headquarters of the 2nd Army Corps. The cathedral (1220–88) is supposed to exhibit the highest point in the history of Gothic architecture. (See Ruskin's *Bible of Amiens.*) Amiens is one of the principal manufacturing centres of France: flax, wool, silk, cashmeres, velvet, lace, dyeing, and iron factories; trade in wines, spirits, soaps, and timber. Previous to the Roman occupation it was an important place under the name of *Samarobriva.* Christianity was introduced in 304. Peter the Hermit was born at Amiens. Pop. 91,000.

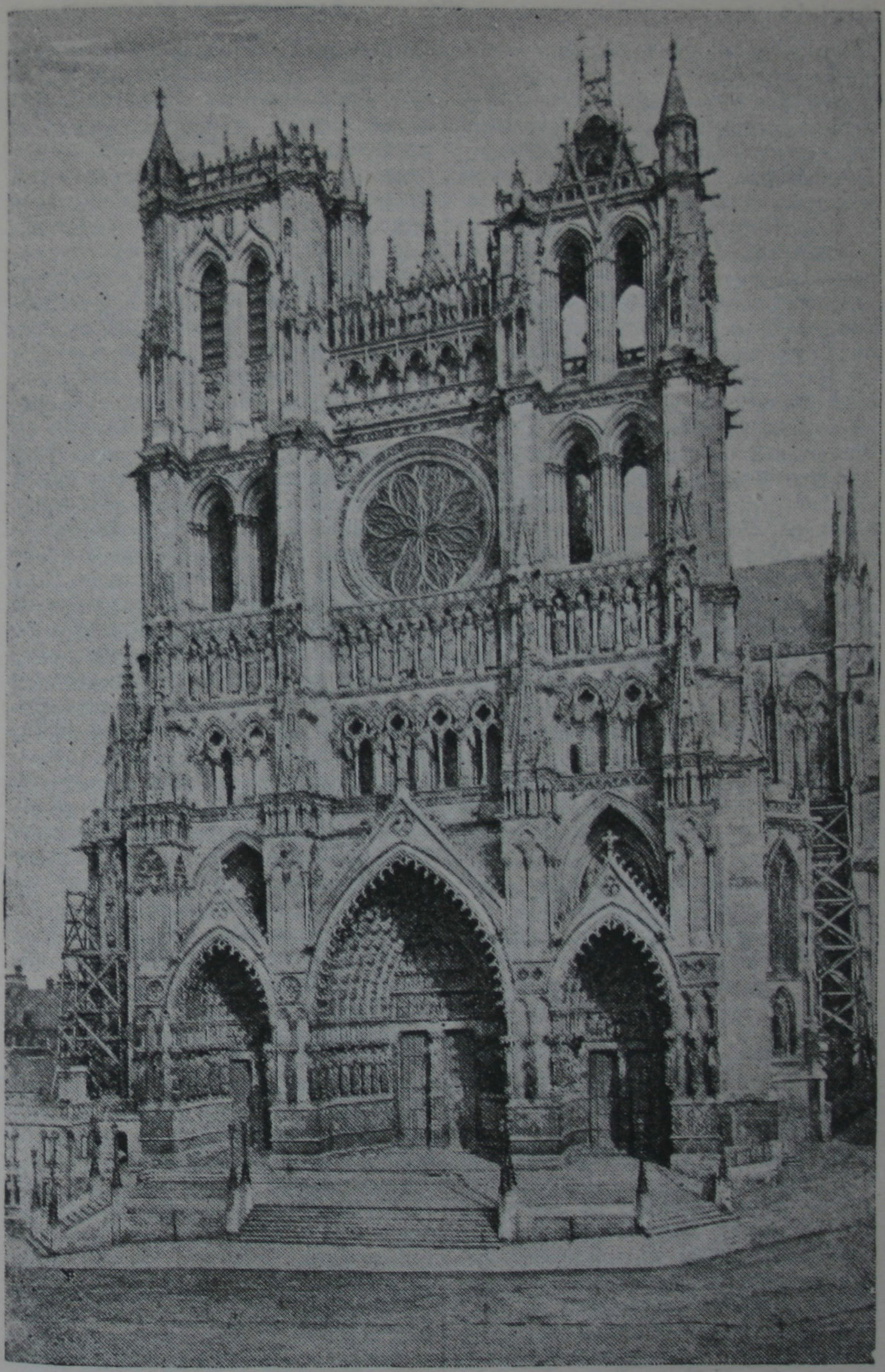
The MISE OF AMIENS, or 'Award of St. Louis' at the Council of Amiens, Jan. 23, 1264, marks an epoch in the Barons' war under De Montfort against Henry III. of England. The questions in dispute between king and barons were referred to Louis IX. of France as arbiter. The decision was in Henry's favour, but he was to observe established liberties. De Montfort rejected the Mise, and fighting began. The quarrel was at last adjusted at the 'Mise of Lewes' in the same year.

The TREATY OF AMIENS, Mar. 27, 1802, between Britain and France (with Spain and the Batavian Republic), brought a truce in the great revolution and the Napoleonic struggle. Chief terms: Britain to restore conquests except Trinidad (Spanish) and Ceylon (Dutch); Malta (taken by Britain in 1800) to be restored to the Knights of St. John, under guarantee of a European power; France to evacuate the Two Sicilies and Papal States; Egypt to revert to the Porte; integrity of Portugal recognized by France; republic of Ionian Islands recognized. From fear of Napoleon's designs, Malta was not surrendered by Britain, and war was renewed in May 1803.

**Amines** are compounds derived from ammonia by replacing the hydrogen with one or more alkyls or alcohol radicals; they are primary, secondary, or tertiary according to the number of hydrogen atoms replaced. The amines are mostly volatile, and act as bases, forming salts with acids in a similar manner to ammonia. Trimethylamine, one of the members of the group, occurs in herring brine, and as a by-product in beet-sugar manufacture.

**Amir.** See EMIR.

**Amirante** or ADMIRAL ISLANDS (called after Vasco da Gama), a group of small coral isls. in the Indian Ocean, dependencies of, and lying to the S.W. of the Seychelles; produce cocoa-nut oil, and are visited for turtle fishing. Pop. about 100.



*Amiens Cathedral, the finest example of Gothic architecture.*

**Amisia,** or AMISIUS, anc. name of Ems (*q.v.*).

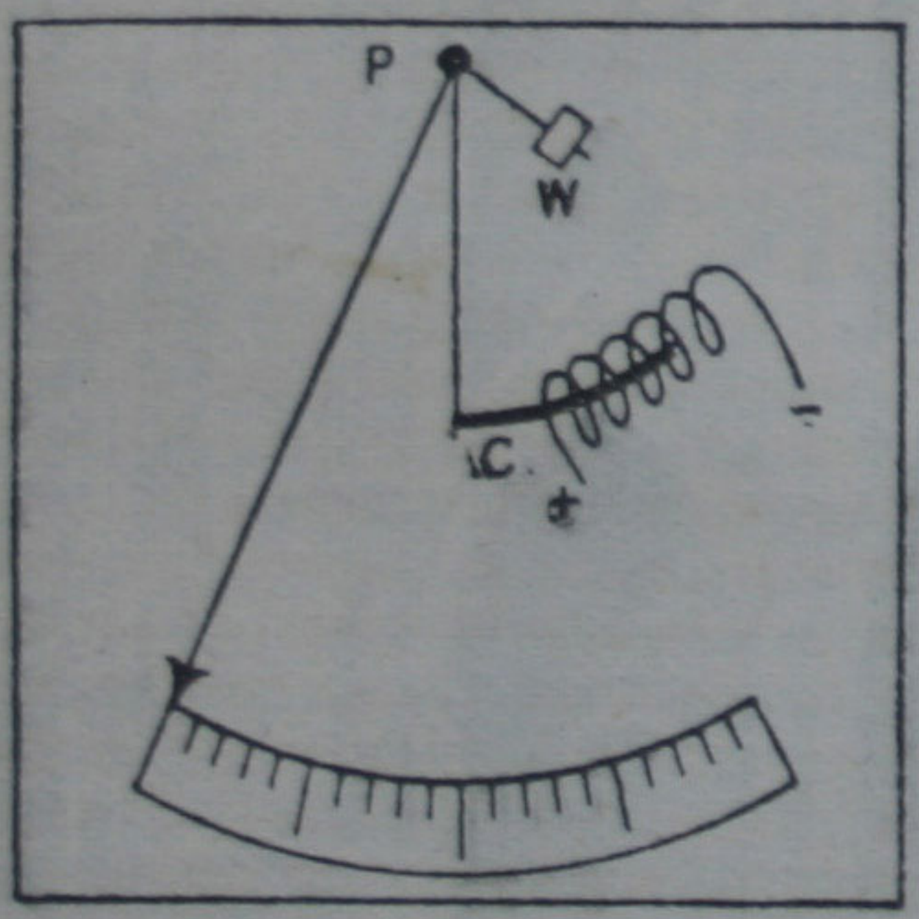
**Amjhera,** tn. Malwa, Central Indian Agency, 45 m. S.W. of Indore. Opium-growing. Pop. 96,000.

**Amlwch,** par., seapt., and wat.-pl., Anglesey, Wales, 15 m. N.W. of Beaumaris. Pop. 3,000.

**Amman,** JOST (1539–91), Swiss wood engraver and painter, born at Zürich; lived chiefly at Nuremberg, where he executed a series of portraits of the kings of France. G. Hirth edited Amman's *Stände und Handwerker* (1896), *Wappenbuch und Stammbuch* (1881), *Frauenentrachtbuch* (1880), etc.

**Ammanati,** BARTOLOMEO (1511–92), architect and sculptor, born at Settignano, near Florence. His most noted works are the *Ponte della Trinita* and the *Leda* at Florence, a *Neptune* in St. Mark's Place, Venice, and a gigantic *Hercules* at Padua.

**Ammersee,** lake, Bavaria, 20 m. S.W. of Munich, is 10 m. long and 1,750 ft. above sea-level.




**Ammeter,** an instrument for measuring electric current in terms of ampères. A piece of soft iron, if free to move in a magnetic field, is attracted towards the strongest part of the field. Thus, if a current be sent round the coil of wire C (Fig.), the iron rod will move towards the centre of the coil, against the action of the weight W. This movement, which may be measured by a pointer P, gives a measure of the current. In some forms of ammeters a spiral spring is used as a control. Various arrangements of soft iron cores are in use, and for general switchboard work these are very useful; but errors are caused by the residual magnetism of the iron cores when they are used with continuous currents. For alternating currents, if specially made for the purpose, they are very suitable. Other types, the moving coil and hot-wire ammeters, are similar to the voltmeters of these forms; but for measuring anything more than very small currents, a thick strip of special metal alloy is joined as a by-pass or shunt across the terminals of the instrument, so that only a definite small fraction of the current traverses the coil or hot wire. These instruments may likewise be regarded as measuring the fall of pressure between the two ends of the resistance strip, and by Ohm's law the fall of pressure is proportional to the current, and is therefore a measure of it. The scale is marked in ampères. The hot-wire instrument can be used for alternating currents, but the moving coil type only for continuous currents. For accurate measurement, an instrument is used in which the force of attraction or repulsion between two coils carrying an electric current is measured. By balancing this against a weight on a sliding arm (Kelvin's current balance), the current is measured in terms of a length and a weight which can be accurately read, and are not liable to change; and such instruments are used to calibrate the commercial types. See Ayrton and Perry's *Practical Electricity;* Aspinall Parr's *Electrical Engineering Measuring Instruments.*

**Ammianus Marcellinus** (330–400 A.D.), by birth a Greek, was a member of the Roman imperial

bodyguard; served (350–354) in Gaul. He attended the Emperor Julian, 'the Apostate,' on his Persian campaign (363). After 371 he lived in Rome, and wrote his continuation of Tacitus's history in thirty-one books, of which the first thirteen, covering the period 96–353 A.D., are lost. The remaining eighteen contain the events from 353–378 A.D., and are the most important source for the history of that period. As a historian he is accurate and impartial. See edition of his works in the Teubner Series, ed. by Gardthausen (1874–5).

**Ammir,** a canoe formerly used in the Scottish Highlands.

**Ammirato,** SCIPIONE (1531–1601), Italian historian, was born at Lecce, and went to Naples to study law, where he published *Famiglie Napolitane* (1580). His chief work is *Istorie Fiorentine* (1600 and 1641), which carries the account from the foundation of Florence to the year 1574 (ed. Scarabelli, 1859), valued for its accuracy. A second archæological work is the *Famiglie Fiorentine* (1615). The *Discorsi sopra Cornelio Tacito* (1591), an imitation of Machiavelli's *Discourses on Livy*, were intended as a counter-blast to that writer's attacks on the papacy.

**Ammon,** AMUN, or AMEN ('the Unrevealed'), a deity of the ancient Egyptians, corresponding in part to the Greek Zeus and the Roman Jupiter. Represented variously as a ram, or as a throned human figure holding in one hand the sceptre of power, in the other the cross of love, Ammon was worshipped principally at Thebes, or, as it was then called, No-Ammon—the Diospolis of the Greeks. The colossal ruins of his temple still stand at Karnak. See EGYPT.

**Ammon,** OTTO (1842), German anthropologist, born at Karlsruhe; author of 'Ammon's law,' that the immigrants from country to town tend to group themselves in two divisions—a 'round-headed' division pursuing commercial and industrial pursuits, and a 'long-headed' division recruiting the ranks of the learned and official classes. The law rests upon anthropometric measurements, and is expounded in *Die natürliche Auslese beim Menschen* (1893), *Die Gesellschaftsordnung und ihre natürlichen Grundlagen* (1896) and *Zur Anthropologie der Badener* (1899).

**Ammonia** (SPIRITS OF HARTSHORN), $NH_3$, occurs in nature in minute quantities in the atmosphere, and in natural waters, being derived from the decomposition of nitrogenous organic substances. It appears to have been known to the ancients, and in modern times was obtained by Priestley (1774), though its composition was first demonstrated by Berthollet in 1785. Ammonia may be produced by several methods, but is usually prepared by heating a salt of ammonium, such as ammonium chloride (sal ammoniac), with slaked lime. When organic substances containing nitrogen, such as bones, horn, leather, and flesh, are decomposed, much of the nitrogen is evolved as ammonia gas. This is also the case with coal, which contains from one to two per cent. of nitrogen. The total annual production of ammonia in Britain does not exceed 200,000 tons of sulphate, about half of which is obtained in the manufacture of coal gas, the remainder being produced in the distillation of shale, and from the coal used in blast furnaces and coke ovens. The gas liquor is heated with steam in stills, when the ammonia gas distils over, and is passed into sulphuric acid, with which it forms ammonium sulphate, the crystals of which are fished out from time to time. Liquor ammonia is obtained by passing the purified gas into water. In some works

lime is added to the stills; this decomposes the sulphide and some other compounds of ammonia in the liquor, and gives a larger yield of gas. Ammonia is a colourless gas with a well-known pungent odour. It is poisonous when inhaled in quantity, and will not burn under ordinary conditions, but when mixed with oxygen or heated in air it burns with a yellow flame. It is about half the weight of air, and is very soluble in water: 1 volume of water at 0° c. absorbs 1,150 volumes of the gas. The strongest solution of commerce has the sp. gr. ·880 (water = 1), and contains 35 per cent. of ammonia. It is readily detected by its odour, and by its alkaline reaction on red litmus, which it turns blue. Minute quantities of ammonia in solution are estimated by Nessler's solution (see WATER), and stronger solutions by titration with a standard acid. Ammonium salts are decomposed when heated with an alkali, the ammonia being evolved as gas. Ammonium sulphate, by far the most important of these, is largely used as a manure, and also in the preparation of ammonia alum and other ammonium compounds. Ammonium chloride—muriate or sal ammoniac—is prepared by allowing a stream of ammonia liquor to meet and combine with a stream of hydrochloric acid. The liquor is boiled down and crystallized. It is also made by subliming a mixture of ammonium sulphate and common salt in large iron pots covered with an iron dome. It is used in pharmacy, in soldering metals, in the manufacture of galvanized iron, and for many less important purposes. Ammonium carbonate—sal volatile—is prepared by heating ammonium sulphate (one part) with chalk (two parts) in cast-iron vessels. The vapours are condensed in lead vessels, and purified by resublimation. It is used in scouring wool, and as a baking powder, and in medicine as a stimulant, antacid, diaphoretic, and expectorant. Ammonia is also used in pharmacy, in dyeing, in the ammonia soda process, and for the absorption of heat in ice-making machines or refrigerators. The preparation of ammonia from the nitrogen of the air is a chemical problem which has not yet been successfully effected on a commercial scale; nor has the extraction of it from sewage and animal excreta, which contain much of it, been carried out by economical methods. See Lunge's *Coal-tar and Ammonia*; Mond's and Beilby's *Presidential Addresses to Soc. of Chem. Industry*, 1899 and 1900 (*Journal*, vols. viii. and xviii.).

**Ammoniacum,** a gum resin obtained from an umbelliferous plant found in Persia. It has a nauseous smell, and is used medicinally as an expectorant and disinfectant in cases of chronic bronchitis, and externally to reduce tumours, chronic swellings of the joints, and chronic inflammation of glands.

**Ammonite,** an explosive composed of pure ammonium nitrate and nitro-naphthalene; used in coal mines.

**Ammonites,** a group of animals belonging to the Cephalopoda, now extinct. The name *Cornua Ammonis* is derived from their resemblance to the coiled rams' horns which decorated the statues of Jupiter Ammon. The shells vary from a fraction of an inch to nine or ten feet in diameter. In certain formations they are very common and important fossils. The earliest ammonites are found in the Permian of Sicily; they became extinct at the close of Cretaceous times. In Jurassic and Cretaceous seas they abounded; and their shells are among the most characteristic ingredients

of the calcareous rocks of those periods. They were not only individually numerous, but developed also a great variety of genera and species, which were, as a rule, short-lived, one species appearing and flourishing for a time, soon to become extinct and to be replaced by another. Their spirally-coiled shells, like the shell of the living nautilus, were divided into a series of separate chambers by transverse partitions. The outermost chamber was open in front, and was inhabited by the animal; the posterior chambers contained only gases. The mouth of the 'living chamber' was often ornamented with projecting processes or horns. By an aperture in its posterior wall this chamber communicated with a tube, the 'siphuncle,' which ran backwards through all the empty chambers, and ended in the centre of the coil. Lying in the living chamber a calcareous plate is sometimes found, the 'aptychus,' which is believed to have served as an operculum, with which the mouth of the shell could be closed. The external surface was sometimes smooth, but more usually ornamented with projections, ribs, and furrows. See Zittel's *Palæontology* (1900); Nicholson and Lydekker's *Palæontology* (2 vols. 1889); J. G. Taylor's *Common Brit. Fossils* (1885).

**Ammonium** is the name given to the group $NH_4$ present in the salts formed by the union of ammonia with acids. This group has not been isolated, but behaves very like the element potassium in its compounds, and so is often classed along with it.

**Ammonius.** (1.) Of Alexandria (b. 458), presbyter and œconomus of the church in that city, was an Egyptian. His extant works are, *An Exposition on the Book of Acts*, *A Commentary on the Psalms*, *On St. John's Gospel*. See Angelo Maio's *Nova Collect. Script. Vet.*, vol. i. p. 166 (1825). (2.) Son of Hermias (5th century), studied at Athens under Proclus, and was afterwards the master of Simplicius, Asclepius Trallianus, John Philoponus, and Damascius. His extant commentaries are, *On the Isagoge of Porphyry* (pub. Venice, 1500), *On the Categories of Aristotle* (1503), and *De Interpretatione* (Venice, 1503). See Fabricius's *Bibliotheca Græca*, vol. v.; Brandis's *Memoirs* of the Berlin Acad. (1833). (3.) Saccas, a Greek philosopher (d. 243 A.D.), founded the Neo-Platonic school of philosophy. He was brought up as a Christian, but discarded Christianity for heathenism, and lectured at Alexandria; his greatest pupils were Origen, Plotinus, Longinus, and Herennius. He left no written doctrines. See Fabricius's *Bibliotheca Græca*, vol. v.; Dehaut's *Essai Hist. sur la Vie et la Doctrine d'A. Saccas* (1836).

**Ammunition** formerly included all the stores carried with an army in the field, but is now confined to projectiles and their propellants (see Cordite and Cartridge). The history of the shell is practically identical with that of the rifle bullet (see Rifle). With rifled muzzle-loading ordnance rotation was secured by two or three rows of soft-metal studs. With the first rifled breech-loading guns (Armstrong system) the shell was coated with lead, which was forced into the grooves on the shock of discharge. These systems proved unsatisfactory, mainly because of the excessive windage and stripping, and were replaced by the gas-check, a grooved and indented plate which attached itself automatically to the base of the shell on the shock of discharge. In all modern guns the gas-check has been replaced by the driving-band, a ring of copper embedded in grooves cut round the shell near its base. This is compressed into the

grooves of the bore, and not only prevents erosion by the escape of gas, but results in perfect centring. All shell consist of a cylindrical body with an ogival head, the latter being, as a rule, bushed to receive the fuze.

ARMOUR-PIERCING SHELL are supplied for most guns of 4-inch calibre and upwards. They are naturally intended for the attack of armour, and are made of forged or cast steel. The walls are very thick, only a small cavity being left for the bursting charge. The head is struck with a radius of two diameters, and is of extremely hard metal. The body is made somewhat softer, to provide tenacity sufficient to hold the shell together when impinging on armour. The fuse is in the base. A recent innovation is the adoption of mild steel caps to fit over the points. This has been found to result in greater penetration. Armour-piercing shot are of similar construction, but without bursting charges. They are now used only for testing plates.

COMMON SHELL are intended mainly for the attack of materiel, and are therefore designed to hold as large a bursting charge as possible. They are of cast steel for guns of 6-inch calibre and upwards, and of forged steel for the smaller natures. High-explosive, segment, ring, and star, are merely other forms of common shell. High-explosive shell are supplied for most heavy guns and howitzers. They are filled with lyddite, a central space being left for the exploder of picric powder, which takes the place of the fuze. In segment shell, the ordinary shrapnel bullets are replaced by layers of iron segments. The ring shell consists of a thin cast-iron envelope with a core of iron rings, which are weakened to break up into segments on the explosion. Star shell are intended only to light up a given area. They are filled with layers of stars, which are ignited by a time fuze.

SHRAPNEL are for the attack of personnel, and are designed to hold as many bullets as possible; but the walls must be sufficiently thick to hold the projectile together on discharge and during flight. The shell acts merely as an envelope, and is opened by a small bursting charge of powder contained in a chamber at the base. A metal tube down the centre conveys the flash from the fuze to the bursting charge. This shell is supplied for all guns except the 12-inch B.L.

CASE SHOT is merely a sheet-iron envelope containing sand shot or mixed metal balls. It is intended for use at point-blank range. Its effect was found to be infinitesimal in South Africa, and it has since been discarded for field artillery. However it is still supplied for certain heavy coast-defence guns, as a means of repelling boat and close torpedo attacks.

FUZE. Shell are exploded by means of time or percussion fuzes, which, as a rule, are screwed into the nose; but, as in armour-piercing shell, they may be in the base. A time fuze has a ring of composition, which is ignited in the shock of discharge by a detonating pellet. The flash is conveyed to the primer of the bursting charge after a certain number of seconds, the time being regulated by setting the fuze at the desired graduation. In percussion fuzes, the shock of discharge sets free a detonator to rush forward and ignite at the moment of impact. Time and percussion fuzes, which are used mainly by field artillery, combine both the above arrangements.

TUBES. Where the cartridge does not contain its own means of ignition it is fired by a friction, percussion, or electric tube. The ordinary friction tube is of copper, and filled with pistol powder. It

is fired by the ignition of detonating composition on a roughened bar, which is pulled out by a lanyard. Vent-sealing tubes of stronger and more complicated construction are used for axially-vented guns. See *Treatise on Ammunition* (1905); and books quoted at GUNPOWDER.

AMMUNITION SUPPLY is, by reason of the adoption of magazine rifles and quick-firing guns, one of the most difficult problems which confront an army in the field. A battery can expend all the ammunition carried with it in under an hour; but it is obviously impossible to provide sufficient transport to enable such a rate of fire to be maintained. The general principles on which the present system is worked are that 1,000 rounds will be available for each quick-firing gun, 500 rounds for each howitzer and heavy gun, and 500 rounds of small-arm ammunition for every man in the force, including even non-combatants. About one half of this is held ready on the lines of communication, and the remainder is divided between the units and the brigade and divisional columns. Thus, an infantryman carries 150 rounds, and there are 100 more for him in each of the regimental reserve and brigade and divisional columns. On going into action each man is given as much as he can conveniently carry from the regimental reserve. Two carts are taken from each battalion to form a brigade reserve. This latter opens up communication with the artillery brigade ammunition column, which is about 1 mile in rear. Behind this again is the divisional ammunition column. Supply is always by sending full wagons from rear to front, and then taking back the empty ones to refill. No empty wagons may be sent to the rear until full ones arrive to take their places. The wagons and carts reach as far forward as the battalion reserves or supports, whence the supply is continued by the company pack-animals, and by all men moving up into the firing-line. Artillery supply is very similar. Where it is impossible to drive wagons up to the battery, men are sent forward with 4 rounds carried in the pockets of a sleeveless canvas coat.

A field artillery brigade ammunition column consists of 5 officers, 315 men, 389 horses, and 60 vehicles. It carries 202 rounds for each field gun, 100 rounds for each rifle, and 10,000 rounds for each machine gun.

A divisional ammunition column consists of 20 officers, 809 men, 1,048 horses, and 157 vehicles. It carries 120 rounds for each field gun, 100 rounds for each rifle, and 10,000 rounds for each machine gun.

**Amnesia** (Gr. 'forgetfulness'), loss or defect of memory; now restricted to the loss of memory of spoken words. Show an amnesic patient common objects—a match-box, pencil, penknife, etc.—and ask him to name them; if he cannot do this, he has word-forgetfulness (amnesia verbalis). Sometimes the patient has a vague idea of the word he wants, but cannot pronounce it properly, although he may be able to write it. This has been called articulative amnesia. Amnesia is due to cerebral conditions which may be temporary or permanent. Most people experience a certain degree of amnesia when exhausted or out of health.

**Amnesty** (Gr. *amnestos*, 'not remembered'), a general act of pardon and oblivion of past offences. The term is applied to a pardon extended to classes or communities rather than to individuals. Though it may be granted by the sovereign, it is usually granted by Act of Parliament. Amnesties have been allowed:—(1.) After rebellions—*e.g.*

in 1660. (The last general act of amnesty in Britain was in 1747, after the Jacobite rebellion of 1745–6.) (2.) On auspicious occasions—*e.g.* coronations, etc. (3.) After wars, in which persons may have violated the law. (4.) For unconstitutional acts—*e.g.* the Act of 1767, protecting the king's ministers. Perhaps the term is only strictly applicable to (1) and (2), whereas (3) and (4) are more properly acts of indemnity; (2) is probably obsolete.

**Amnion,** a protective investment which surrounds the embryo in mammals, birds, and reptiles, but not in amphibia, fishes, or lower vertebrates—*i.e.* in those cases only where the embryo does not develop in the relatively dense medium water. The amnion originates as a double fold of membrane, which rises up on all sides of the embryo, and unites above it to form a domelike structure. As the embryo becomes more and more folded off from its yolk-sac, the amnion spreads beneath and around it, forming a double sheath. Between the inner of its two membranes and the embryo a fluid appears, which forms a water-bath about the embryo and protects it from shock. Between this inner membrane, or true amnion, and the outer, or false amnion, a space is left which is continuous with the body-cavity of the embryo, and into which the allantois later spreads. At birth, or hatching, the amnion becomes functionless, and is ruptured and cast off. Amniota is a general term applied to those vertebrates in which the amnion is present. See ALLANTOIS.

**Amœba** (Gr. 'changing'), a genus of Protozoa, or simple unicellular animals; but the term is also used in a more general sense, to designate any protozoön which structurally resembles a true amœba. Thus many Protozoa are said to pass through an amœba stage; and the term amœboid is also applied to cells, such as the white blood corpuscles of man, which have the power of protruding and retracting blunt processes (*pseudopodia*). A typical amœba consists of a naked mass of protoplasm, is without definite shape, and moves by pushing out pseudopodia in the anterior region and contracting the cell-mass in the posterior region. As to size, a diameter of a hundredth of an inch is not uncommon, but some amœbæ are much larger than this. There is no permanent distinction between outer and inner layers in the protoplasm, but the marginal layer contains fewer granules than the central. Within the central protoplasm a denser patch forms the usually single nucleus. The central protoplasm contains also one or more pulsating bubbles of fluid—the so-called contractile vacuoles, whose function is apparently excretory. Also included in the protoplasm are the food vacuoles, consisting of a food particle—*e.g.* a diatom—surrounded by a film of water ingested with it. According to some authorities, a ferment is poured by the surrounding protoplasm into the food vacuole, and the food substance is digested and absorbed, while the indigestible residue is got rid of at the surface. Although, for various reasons, the amœba has become the most familiar member of the Protozoa to the general public, it has not been the object of so many experiments as some other members of the group, and many points in regard to its physiology are conjectural only. The life history of amœba is very simple. It grows until the limit of advantageous size is reached, and then divides to form two amœbæ. Under unfavourable conditions it is capable of rounding itself off and forming a protective investment or cyst, within which it may

lie passive until the environment again becomes favourable to the resumption of active existence. The formation of spores is also stated to occur. The general interest of amœba, as indicated above, is that it retains throughout life a type of cell structure which tends to recur, permanently or temporarily, among the cells of many higher animals, and in the life-cycle of many other Protozoa. See Huxley and Martin's *Course of Elementary Instruction in Practical Biology* (rev. by Howes and Scott, 1888); J. A. Thomson's *Outlines of Zoology* (1899); and for amœboid cells in higher animals, Metchnikoff's *Lectures on the Comparative Pathology of Inflammation* (trans. 1893).

**Amœbean Verses,** verses which exhibit persons answering each other alternately.

**Amok** (colloquially 'A-muck'), also called *mataglap*, is a Malay term denoting a sudden frenzy which seizes an individual, sometimes as a result of intoxicants, but often unaccountably. Only the Malay peoples appear to be thus affected. It has been compared to the 'madness' of the ancient Norse Berserker, but the latter was essentially a frenzy of rage or valour in war. (See Metzger, in *Globus*, 1887.) In Malaysia, as soon as a man is known to be 'running amok,' alarm gongs are sounded, and every effort is made to check his career.

**Amol,** tn., prov. Mazanderan, Persia, 20 m. s.w. of Barfrush, s. of Caspian Sea. Pop. varies with the season—10,000 to 20,000.

**Amomum.** See CARDAMOM and GRAINS OF PARADISE.

**Amontillado,** a favourite variety of Spanish sherry, light in body and in colour.

**Amor,** among the Romans the god of love and harmony, equivalent to the Greek Eros; had no place in their national religion. The cult was derived from the Greeks.

**Amorites,** a name applied generally to the primitive inhabitants of Canaan, practically equivalent to Canaanites, but very loosely used. The Amorites seem originally to have been a tribe or group of tribes occupying the district of Anti-Lebanon, who, overrunning most of Canaan, were in turn conquered by the Hittites. They were still strong enough, however, to make some resistance to the Israelites in the time of the Exodus, at which period they had settlements in the south and east of Palestine; but their chief kings, Sihon and Og, were overthrown by Moses, while Joshua utterly discomfited five Amorite kings at Gibeon. See Sayce's *Races of the O.T.* (1891).

**Amoroso,** in musical score, indicates a tender, delicate style.

**Amorphous,** a term applied to substances devoid of characteristic shape, or of different properties in different directions, in contradistinction to crystalline bodies. Glass, glue, opal, obsidian may be cited as examples. The faculty of solidifying in the amorphous form is well marked in the borates, phosphates, and silicates, which readily cool from fusion in the glassy form. Very often, however, the amorphous state is unstable, and tends to pass into the cryptocrystalline, or minutely crystalline; this change is known as devitrification.

**Amortization,** the provision for the extinction of a loan, or replacement of capital expenditure, by setting aside certain sums out of income towards the redemption of the loan when due, or by writing down the value of the assets representing the expenditure. See NATIONAL DEBT.

**Amory,** THOMAS (?1691–1788), an eccentric writer of disordered intellect, Irish by descent; lived a secluded life in Dublin, Westminster, and Hounslow. His books, of which the chief were *Memoirs*

*containing the Lives of Several Ladies of Great Britain* (1755), and its sequel, *The Life of John Buncle, Esq.* (1756-66), are a medley of rhapsodies, descriptions of scenery, theological disquisitions, and autobiography. See Hazlitt's *Round Table*, Essay 18; *Saturday Review*, May 12, 1877.

**Amos,** one of the twelve 'minor prophets,' and the earliest of the prophets whose writings are extant. He prophesied in the reign of Uzziah of Judah, the contemporary of Jeroboam II. of Israel (ch. 1:1; 7:10 *ff.*), *c.* 765-745 B.C. He impeaches the nations of Syria and Palestine (ch. 1, 2); denounces the luxury and cruelty of Israel, but specially the insincere though elaborate and punctilious worship maintained at Beth-el and elsewhere; and predicts disaster (3–6). Ch. 7–9 contain a series of five visions intended to reinforce the foregoing indictments, but close with a promise of ultimate restoration. Though a rustic, Amos wields a style of remarkable refinement; his writings are singularly vivid and orderly, illuminated by many apt images borrowed from rural life. His book is of importance as affording contemporary evidence of religious belief and practice in Israel during the 8th century B.C. He traverses the popular notion of the 'day of Jehovah,' showing that it will be a day not of national triumph but of catastrophe; inveighs against the false trust in sacrifice and ritual as substitutes for righteousness; proclaims that Jehovah is no mere national Deity, but the God of the whole earth; and declares that His special covenant with Israel, far from justifying national pride and frowardness, will count as a reason for the more exemplary punishment of an unfaithful people. See Driver's *Joel and Amos* (Camb. Bible), and G. A. Smith's *Bk. of Twelve Prophets* (Expos. Bible).

**Amoy,** port, prov. Fu-kien, China, on two islands at the mouth of the Lung-kiang ('Dragon river'); is in almost daily communication with Hong-kong by steamer, and a bi-weekly service exists between Hong-kong, Amoy, and Foochow. Tea, sugar, rice, turmeric, and ginger are among its chief articles of produce. Pummel, oranges, hing, and other sub-tropical fruits abound. It is also noted for its delicately-flavoured oysters. In 1909 the value of the exports was £344,224; of imports, £1,293,866. European trade with Amoy dates from early in the 16th century. The East India Company had a station there at different times between 1661 and 1730. The port was opened to foreign trade by the treaty of Nanking (1842). Pop. est. 115,000.

**Ampelopsis.** See Virginia Creeper.

**Ampère,** the practical electric unit of current, is theoretically defined as equal to $10^{-1}$ C.G.S. electro-magnetic units of current. It is practically defined as current which deposits 1·118 milligrams of silver per second out of a specific solution of silver nitrate. For measuring currents, various types of ammeters, galvanometers, and current meters are used. The milliampère is one-thousandth of an ampère. See Ammeter.

**Ampère,** André Marie (1775-1836), physicist and mathematician, born at Lyons, was professor successively at Bourg and Lyons from 1801–5. He then removed to the Polytechnic School at Paris, where he was appointed professor of analysis in 1809, and professor of physics at the Collège de France in 1824. His fame rests on his physical researches, especially on his development of electro-dynamics and demonstration of the relations between magnetism and electricity. His chief works are: *Recueil d'Observations électro-dynamiques* (1822);