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"Andros, Sir Edmund" to "Anise", by Various**

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# THE ENCYCLOPÆDIA BRITANNICA

A DICTIONARY OF ARTS, SCIENCES, LITERATURE AND GENERAL  
INFORMATION

ELEVENTH EDITION

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ANDROS to AUSTRIA

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article: ROSSETTI, DANTE GABRIEL.

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#### PRINCIPAL UNSIGNED ARTICLES

- *Anglican Communion.*
- *Angola.*

[v.02 p.0001]

**ANDROS, SIR EDMUND** (1637-1714), English colonial governor in America, was born in London on the 6th of December 1637, son of Amice Andros, an adherent of Charles I., and the royal bailiff of the island of Guernsey. He served for a short time in the army of Prince Henry of Nassau, and in 1660-1662 was gentleman in ordinary to the queen of Bohemia (Elizabeth Stuart, daughter of James I. of England). He then served against the Dutch, and in 1672 was commissioned major in what is said to have been the first English regiment armed with the bayonet. In 1674 he became, by the appointment of the duke of York (later James II.), governor of New York and the Jerseys, though his jurisdiction over the Jerseys was disputed, and until his recall in 1681 to meet an unfounded charge of dishonesty and favouritism in the collection of the revenues, he proved himself to be a capable administrator, whose imperious disposition, however, rendered him somewhat unpopular among the colonists. During a visit to England in 1678 he was knighted. In 1686 he became governor, with Boston as his capital, of the "Dominion of New England," into which Massachusetts (including Maine), Plymouth, Rhode Island, Connecticut and New Hampshire were consolidated, and in 1688 his jurisdiction was extended over New York and the Jerseys. But his vexatious interference with colonial rights and customs aroused the keenest resentment, and on the 18th of April 1689, soon after news of the arrival of William, prince of Orange, in England reached Boston, the colonists deposed and arrested him. In New York his deputy, Francis Nicholson, was soon afterwards deposed by Jacob Leisler (q.v.); and the inter-colonial union was dissolved. Andros was sent to England for trial in 1690, but was immediately released without trial, and from 1692 until 1698 he was governor of Virginia, but was recalled through the agency of Commissary James Blair (q.v.), with whom he quarrelled. In 1693-1694 he was also governor of Maryland. From 1704 to 1706 he was governor of Guernsey. He died in London in February 1714 and was buried at St. Anne's, Soho.

See *The Andros Tracts* (3 vols., Boston, 1869-1872).

**ANDROS**, or ANDRO, an island of the Greek archipelago, the most northerly of the Cyclades, 6 m. S.E. of Euboea, and about 2 m. N. of Tenos; it forms an eparchy in the modern kingdom of Greece. It is nearly 25 m. long, and its greatest breadth is 10 m. Its surface is for the most part mountainous, with many fruitful and well-watered valleys. Andros, the capital, on the east coast, contains about 2000 inhabitants. The ruins of Palaeopolis, the ancient capital, are on the west coast; the town possessed a famous temple, dedicated to Bacchus. The island has about 18,000 inhabitants.

The island in ancient times contained an Ionian population, perhaps with an admixture of Thracian blood. Though originally dependent on Eretria, by the 7th century B.C. it had become sufficiently prosperous to send out several colonies to Chalcidice (Acanthus, Stageirus, Argilus, Sane). In 480 it supplied ships to Xerxes and was subsequently harried by the Greek fleet. Though enrolled in the Delian League it remained disaffected towards Athens, and in 447 had to be coerced by the settlement of a cleruchy. In 411 Andros proclaimed its freedom and in 408 withstood an Athenian attack. As a member of the second Delian League it was again controlled by a garrison and an archon. In the Hellenistic period Andros was contended for as a frontier-post by the two naval powers of the Aegean Sea, Macedonia and Egypt. In 333 it received a Macedonian garrison from Antipater; in 308 it was freed by Ptolemy I. In the Chremonidean War (266-263) it passed again to Macedonia after a battle fought off its shores. In 200 it was captured by a combined Roman, Pergamene and Rhodian fleet, and remained a possession of Pergamum until the dissolution of that kingdom in 133 B.C. Before falling under Turkish rule, Andros was from A.D. 1207 till 1566 governed by the families Zeno and Sommariva under Venetian protection.

**ANDROTION** (c. 350 B.C.), Greek orator, and one of the leading politicians of his time, was a pupil of Isocrates and a contemporary of Demosthenes. He is known to us chiefly from the speech of Demosthenes, in which he was accused of illegality in proposing the usual honour of a crown to the Council of Five Hundred at the expiration of its term of office. Androtion filled several important posts, and during the Social War was appointed extraordinary commissioner to recover certain arrears of taxes. Both Demosthenes and Aristotle (*Rhet.* iii. 4) speak favourably of his powers as an orator. He is said to have gone into exile at Megara, and to have composed an *Atthis*, or annalistic account of Attica from the earliest times to his own days (Pausanias vi. 7; x. 8). It is disputed whether the annalist and orator are identical, but an Androtion who wrote on agriculture is certainly a different person. Professor Gaetano de Sanctis (in *L'Attide di Androzione e un papiro di Oxyrhynchos*, Turin, 1908) attributes to Androtion, the atthidographer, a 4th-century historical fragment, discovered by B. P. Grenfell and A. S. Hunt (*Oxyrhynchus Papyri*, vol. v.). Strong arguments against this view are set forth by E. M. Walker in the *Classical Review*, May 1908.

[v.02 p.0002]

**ANDÚJAR** (the anc. *Slilurgi*), a town of southern Spain, in the province of Jaén; on the right bank

of the river Guadalquivir and the Madrid-Cordova railway. Pop. (1900) 16,302. Andújar is widely known for its porous earthenware jars, called *alcarrazas*, which keep water cool in the hottest weather, and are manufactured from a whitish clay found in the neighbourhood.

**ANECDOTE** (from ἀν-, privative, and ἐκδίδωμι, to give out or publish), a word originally meaning something not published. It has now two distinct significations. The primary one is something not published, in which sense it has been used to denote either secret histories—Procopius, *e.g.*, gives this as one of the titles of his secret history of Justinian's court—or portions of ancient writers which have remained long in manuscript and are edited for the first time. Of such *anecdota* there are many collections; the earliest was probably L. A. Muratori's, in 1709. In the more general and popular acceptation of the word, however, anecdotes are short accounts of detached interesting particulars. Of such anecdotes the collections are almost infinite; the best in many respects is that compiled by T. Byerley (d. 1826) and J. Clinton Robertson (d. 1852), known as the *Percy Anecdotes* (1820-1823).

**ANEL, DOMINIQUE** (1679-1730), French surgeon, was born at Toulouse about 1679. After studying at Montpellier and Paris, he served as surgeon-major in the French army in Alsace; then after two years at Vienna he went to Italy and served in the Austrian army. In 1710 he was teaching surgery in Rouen, whence he went to Genoa, and in 1716 he was practising in Paris. He died about 1730. He was celebrated for his successful surgical treatment of *fistula lacrymalis*, and while at Genoa invented for use in connexion with the operation the fine-pointed syringe still known by his name.

**ANEMOMETER** (from Gr. ἄνεμος, wind, and μέτρον, a measure), an instrument for measuring either the velocity or the pressure of the wind. Anemometers may be divided into two classes, (1) those that measure the velocity, (2) those that measure the pressure of the wind, but inasmuch as there is a close connexion between the pressure and the velocity, a suitable anemometer of either class will give information about both these quantities.

Velocity anemometers may again be subdivided into two classes, (1) those which do not require a wind vane or weathercock, (2) those which do. The Robinson anemometer, invented (1846) by Dr. Thomas Romney Robinson, of Armagh Observatory, is the best-known and most generally used instrument, and belongs to the first of these. It consists of four hemispherical cups, mounted one on each end of a pair of horizontal arms, which lie at right angles to each other and form a cross. A vertical axis round which the cups turn passes through the centre of the cross; a train of wheel-work counts up the number of turns which this axis makes, and from the number of turns made in any given time the velocity of the wind during that time is calculated. The cups are placed symmetrically on the end of the arms, and it is easy to see that the wind always has the hollow of one cup presented to it; the back of the cup on the opposite end of the cross also faces the wind, but the pressure on it is naturally less, and hence a continual rotation is produced; each cup in turn as it comes round providing the necessary force. The two great merits of this anemometer are its simplicity and the absence of a wind vane; on the other hand it is not well adapted to leaving a record on paper of the actual velocity at any definite instant, and hence it leaves a short but violent gust unrecorded. Unfortunately, when Dr. Robinson first designed his anemometer, he stated that no matter what the size of the cups or the length of the arms, the cups always moved with one-third of the velocity of the wind. This result was apparently confirmed by some independent experiments, but it is very far from the truth, for it is now known that the actual ratio, or factor as it is commonly called, of the velocity of the wind to that of the cups depends very largely on the dimensions of the cups and arms, and may have almost any value between two and a little over three. The result has been that wind velocities published in many official publications have often been in error by nearly 50%.

The other forms of velocity anemometer may be described as belonging to the windmill type. In the Robinson anemometer the axis of rotation is vertical, but with this subdivision the axis of rotation must be parallel to the direction of the wind and therefore horizontal. Furthermore, since the wind varies in direction and the axis has to follow its changes, a wind vane or some other contrivance to fulfil the same purpose must be employed. This type of instrument is very little used in England, but seems to be more in favour in France. In cases where the direction of the air motion is always the same, as in the ventilating shafts of mines and buildings for instance, these anemometers, known, however, as air meters, are employed, and give most satisfactory results.

Anemometers which measure the pressure may be divided into the plate and tube classes, but the former term must be taken as including a good many miscellaneous forms. The simplest type of this form consists of a flat plate, which is usually square or circular, while a wind vane keeps this exposed normally to the wind, and the pressure of the wind on its face is balanced by a spring. The distortion of the spring determines the actual force which the wind is exerting on the plate, and this is either read off on a suitable gauge, or leaves a record in the ordinary way by means of a pen writing on a sheet of paper moved by clockwork. Instruments of this kind have been in use for a long series of years, and have recorded pressures up to and even exceeding 60 lb per sq. ft., but it is now fairly certain that these high values are erroneous, and due, not to the wind, but to faulty design of the anemometer.

The fact is that the wind is continually varying in force, and while the ordinary pressure plate is admirably adapted for measuring the force of a steady and uniform wind, it is entirely unsuitable for following the rapid fluctuations of the natural wind. To make matters worse, the pen which records the motion of the plate is often connected with it by an extensive system of chains and levers. A violent gust strikes the plate, which is driven back and carried by its own momentum far past the position in which a steady wind of the same force would place it; by the time the motion has reached the pen it has been greatly exaggerated by the springiness of the connexion, and not only is the plate itself driven too far back, but also its position is wrongly recorded by the pen; the combined errors act the same way, and more than double the real maximum pressure may be indicated on the chart.

A modification of the ordinary pressure-plate has recently been designed. In this arrangement a catch is provided so that the plate being once driven back by the wind cannot return until released by hand; but the catch does not prevent the plate being driven back farther by a gust stronger than the last one that moved it. Examples of these plates are erected on the west coast of England, where in the winter fierce gales often occur; a pressure of 30 lb per sq. ft. has not been shown by them, and instances exceeding 20 lb are extremely rare.

Many other modifications have been used and suggested. Probably a sphere would prove most useful for a pressure anemometer, since owing to its symmetrical shape it would not require a weathercock. A small light sphere hanging from the end of 30 or 40 ft. of fine sewing cotton has been employed to measure the wind velocity passing over a kite, the tension of the cotton being recorded, and this plan has given satisfactory results.

Lind's anemometer, which consists simply of a U tube containing liquid with one end bent into a horizontal direction to face the wind, is perhaps the original form from which the tube class of instrument has sprung. If the wind blows into the mouth of a tube it causes an increase of pressure inside and also of course an equal increase in all closed vessels with which the mouth is in airtight communication. If it blows horizontally over the open end of a vertical tube it causes a decrease of pressure, but this fact is not of any practical use in anemometry, because the magnitude of the decrease depends on the wind striking the tube exactly at right angles to its axis, the most trifling departure from the true direction causing great variations in the magnitude. The pressure tube anemometer (fig. 1) utilizes the increased pressure in the open mouth of a straight tube facing the wind, and the decrease of pressure caused inside when the wind blows over a ring of small holes drilled through the metal of a vertical tube which is closed at the upper end. The pressure differences on which the action depends are very small, and special means are required to register them, but in the ordinary form of recording anemometer (fig. 2), any wind capable of turning the vane which keeps the mouth of the tube facing the wind is capable of registration.

[v.02 p.0003]

The great advantage of the tube anemometer lies in the fact that the exposed part can be mounted on a high pole, and requires no oiling or attention for years; and the registering part can be placed in any convenient position, no matter how far from the external part. Two connecting tubes are required. It might appear at first sight as though one connexion would serve, but the differences in pressure on which these instruments depend are so minute, that the pressure of the air in the room where the recording part is placed has to be considered. Thus if the instrument depends on the pressure or suction effect alone, and this pressure or suction is measured against the air pressure in an ordinary room, in which the doors and windows are carefully closed and a newspaper is then burnt up the chimney, an effect may be produced equal to a wind of 10 m. an hour; and the opening of a window in rough weather, or the opening of a door, may entirely alter the registration.

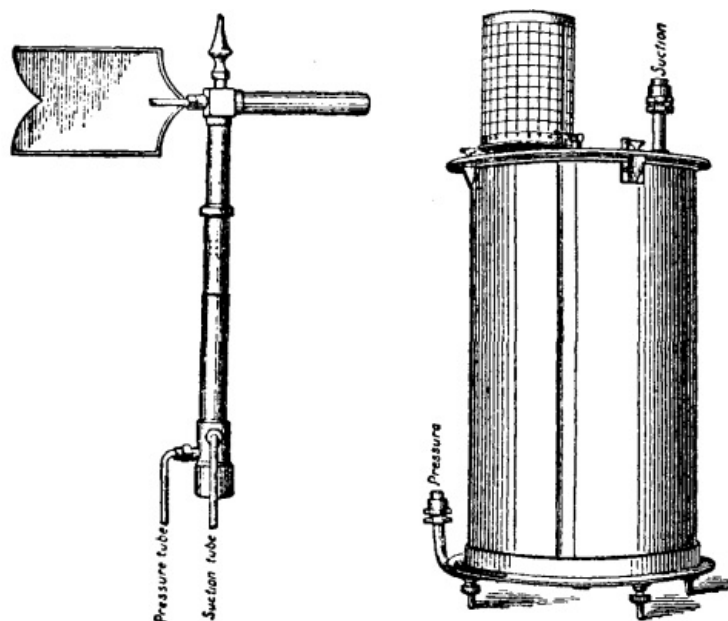


FIG. 1 & FIG. 2 Anemometers.

The connexion between the velocity and the pressure of the wind is one that is not yet known

with absolute certainty. Many text-books on engineering give the relation  $P = .005 v^2$  when  $P$  is the pressure in lb per sq. ft. and  $v$  the velocity in miles per hour. The history of this untrue relation is curious. It was given about the end of the 18th century as based on some experiments, but with a footnote stating that little reliance could be placed on it. The statement without the qualifying note was copied from book to book, and at last received general acceptance. There is no doubt that under average conditions of atmospheric density, the .005 should be replaced by .003, for many independent authorities using different methods have found values very close to this last figure. It is probable that the wind pressure is not strictly proportional to the extent of the surface exposed. Pressure plates are generally of moderate size, from a half or quarter of a sq. ft. up to two or three sq. ft., are round or square, and for these sizes, and shapes, and of course for a flat surface, the relation  $P = .003 v^2$  is fairly correct.

In the tube anemometer also it is really the pressure that is measured, although the scale is usually graduated as a velocity scale. In cases where the density of the air is not of average value, as on a high mountain, or with an exceptionally low barometer for example, an allowance must be made. Approximately 1½% should be added to the velocity recorded by a tube anemometer for each 1000 ft. that it stands above sea-level.

(W. H. Di.)

**ANEMONE**, or WIND-FLOWER (from the Gr. άνεμος, wind), a genus of the buttercup order (Ranunculaceae), containing about ninety species in the north and south temperate zones. *Anemone nemorosa*, wood anemone, and *A. Pulsatilla*, Pasque-flower, occur in Britain; the latter is found on chalk downs and limestone pastures in some of the more southern and eastern counties. The plants are perennial herbs with an underground rootstock, and radical, more or less deeply cut, leaves. The elongated flower stem bears one or several, white, red, blue or rarely yellow, flowers; there is an involucre of three leaflets below each flower. The fruits often bear long hairy styles which aid their distribution by the wind. Many of the species are favourite garden plants; among the best known is *Anemone coronaria*, often called the poppy anemone, a tuberous-rooted plant, with parsley-like divided leaves, and large showy poppy-like blossoms on stalks of from 6 to 9-in. high; the flowers are of various colours, but the principal are scarlet, crimson, blue, purple and white. There are also double-flowered varieties, in which the stamens in the centre are replaced by a tuft of narrow petals. It is an old garden favourite, and of the double forms there are named varieties. They grow best in a loamy soil, enriched with well-rotted manure, which should be dug in below the tubers. These may be planted in October, and for succession in January, the autumn-planted ones being protected by a covering of leaves or short stable litter. They will flower in May and June, and when the leaves have ripened should be taken up into a dry room till planting time. They are easily raised from the seed, and a bed of the single varieties is a valuable addition to a flower-garden, as it affords, in a warm situation, an abundance of handsome and often brilliant spring flowers, almost as early as the snowdrop or crocus. The genus contains many other lively spring-blooming plants, of which *A. hortensis* and *A. fulgens* have less divided leaves and splendid rosy-purple or scarlet flowers; they require similar treatment. Another set is represented by *A. Pulsatilla*, the Pasque-flower, whose violet blossoms have the outer surface hairy; these prefer a calcareous soil. The splendid *A. japonica*, and its white variety called Honorine Joubert, the latter especially, are amongst the finest of autumn-blooming hardy perennials; they grow well in light soil, and reach 2½ to 3 ft. in height, blooming continually for several weeks. A group of dwarf species, represented by the native British *A. nemorosa* and *A. apennina*, are amongst the most beautiful of spring flowers for planting in woods and shady places.

The genus *Hepatica* is now generally included in anemone as a subgenus. The plants are known in gardens as hepaticas, and are varieties of the common South European *A. Hepatica*; they are charming spring-flowering plants with usually blue flowers.

**ANENCLETUS**, or ANACLETUS, second bishop of Rome. About the 4th century he is treated in the catalogues as two persons—Anacletus and Cletus. According to the catalogues he occupied the papal chair for twelve years (c. 77-88).

**ANERIO**, the name of two brothers, musical composers, very great Roman masters of 16th-century polyphony. Felice, the elder, was born about 1560, studied under G. M. Nanino and succeeded Palestrina in 1594 as composer to the papal chapel. Several masses and motets of his are printed in Proske's *Musica Divina* and other modern anthologies, and it is hardly too much to say that they are for the most part worthy of Palestrina himself. The date of his death is conjecturally given as 1630. His brother, Giovanni Francesco, was born about 1567, and seems to have died about 1620. The occasional attribution of some of his numerous compositions to his elder brother is a pardonable mistake, if we may judge by the works that have been reprinted. But the statement, which continues to be repeated in standard works of reference, that "he was one of the first of Italians to use the quaver and its subdivisions" is incomprehensible. Quavers were common property in all musical countries quite early in the 16th century, and semiquavers appear in a madrigal of Palestrina published in 1574. The two brothers are probably the latest composers who handled 16th-century music as their mother-language; suffering neither from the

temptation to indulge even in such mild neologisms as they might have learnt from the elder brother's master, Nanino, nor from the necessity of preserving their purity of style by a mortified negative asceticism. They wrote pure polyphony because they understood it and loved it, and hence their work lives, as neither the progressive work of their own day nor the reactionary work of their imitators could live. The 12-part *Stabat Mater* in the seventh volume of Palestrina's complete works has been by some authorities ascribed to Felice Anerio.

**ANET**, a town of northern France, in the department of Eure-et-Loir, situated between the rivers Eure and Vègre, 10 m. N.E. of Dreux by rail. Pop. (1906) 1324. It possesses the remains of a magnificent castle, built in the middle of the 16th century by Henry II. for Diana of Poitiers. Near it is the plain of Ivry, where Henry IV. defeated the armies of the League in 1590.

**ANEURIN**, or ANEIRIN, the name of an early 7th-century British (Welsh) bard, who has been taken by Thomas Stephens (1821-1875), the editor and translator of Aneurin's principal epic poem *Gododin*, for a son of Gildas, the historian. *Gododin* is an account of the British defeat (603) by the Saxons at Catteraeth (identified by Stephens with Dawstane in Liddesdale), where Aneurin is said to have been taken prisoner; but the poem is very obscure and is differently interpreted. It was translated and edited by W. F. Skene in his *Four Ancient Books of Wales* (1866), and Stephens' version was published by the Cymmrodorion Society in 1888. See CELT: *Literature* (Welsh).

**ANEURYSM**, or ANEURISM (from Gr. ἀνεύρισμα, a dilatation), a cavity or sac which communicates with the interior of an artery and contains blood. The walls of the cavity are formed either of the dilated artery or of the tissues around that vessel. The dilatation of the artery is due to a local weakness, the result of disease or injury. The commonest cause is chronic inflammation of the inner coats of the artery. The breaking of a bottle or glass in the hand is apt to cut through the outermost coat of the artery at the wrist (radial) and thus to cause a local weakening of the tube which is gradually followed by dilatation. Also when an artery is wounded and the wound in the skin and superficial structures heals, the blood may escape in to the tissues, displacing them, and by its pressure causing them to condense and form the sac-wall. The coats of an artery, when diseased, may be torn by a severe strain, the blood escaping into the condensed tissues which thus form the aneurysmal sac.

The division, of aneurysms into two classes, *true* and *false*, is unsatisfactory. On the face of it, an aneurysm which is false is not an aneurysm, any more than a false bank-note is legal tender. A better classification is into *spontaneous* and *traumatic*. The man who has chronic inflammation of a large artery, the result, for instance, of gout, arduous, straining work, or kidney-disease, and whose artery yields under cardiac pressure, has a *spontaneous* aneurysm; the barman or window-cleaner who has cut his radial artery, the soldier whose brachial or femoral artery has been bruised by a rifle bullet or grazed by a bayonet, and the boy whose naked foot is pierced by a sharp nail, are apt to be the subjects of *traumatic* aneurysm. In those aneurysms which are a *saccular* bulging on one side of the artery the blood may be induced to coagulate, or may of itself deposit layer upon layer of pale clot, until the sac is obliterated. This laminar coagulation by constant additions gradually fills the aneurysmal cavity and the pulsation in the sac then ceases; contraction of the sac and its contents gradually takes place and the aneurysm is cured. But in those aneurysms which are *fusiform* dilatations of the vessel there is but slight chance of such cure, for the blood sweeps evenly through it without staying to deposit clot or laminated fibrine.

In the treatment of aneurysm the aim is generally to lower the blood pressure by absolute rest and moderated diet, but a cure is rarely effected except by operation, which, fortunately, is now resorted to more promptly and securely than was previously the case. Without trying the speculative and dangerous method of treatment by compression, or the application of an india rubber bandage, the surgeon now without loss of time cuts down upon the artery, and applies an aseptic ligature close above the dilatation. Experience has shown that this method possesses great advantages, and that it has none of the disadvantages which were formerly supposed to attend it. Saccular dilatations of arteries which are the result of cuts or other injuries are treated by tying the vessel above and below, and by dissecting out the aneurysm. Popliteal, carotid and other aneurysms, which are not of traumatic origin, are sometimes dealt with on this plan, which is the old "Method of Antyllus" with modern aseptic conditions. Speaking generally, if an aneurysm can be dealt with surgically the sooner the artery is tied the better. Less heroic measures are too apt to prove painful, dangerous, ineffectual and disappointing. For aneurysm in the chest or abdomen (which cannot be dealt with by operation) the treatment may be tried of injecting a pure solution of gelatine into the loose tissues of the armpit, so that the gelatine may find its way into the blood stream and increase the chance of curative coagulation in the distant aneurysmal sac.

(E. O.)

**ANFRACTUOSITY** (from Lat. *anfractuosus*, winding), twisting and turning, circuitousness; a word usually employed in the plural to denote winding channels such as occur in the depths of

the sea, mountains, or the fissures (*sulci*) separating the convolutions of the brain, or, by analogy, in the mind.

**ANGARIA** (from ἄγγαρος, the Greek form of a Babylonian word adopted in Persian for "mounted courier"), a sort of postal system adopted by the Roman imperial government from the ancient Persians, among whom, according to Xenophon (*Cyrop.* viii. 6; cf. Herodotus viii. 98) it was established by Cyrus the Great. Couriers on horseback were posted at certain stages along the chief roads of the empire, for the transmission of royal despatches by night and day in all weathers. In the Roman system the supply of horses and their maintenance was a compulsory duty from which the emperor alone could grant exemption. The word, which in the 4th century was used for the heavy transport vehicles of the *cursus publicus*, and also for the animals by which they were drawn, came to mean generally "compulsory service." So *angaria*, *angariare*, in medieval Latin, and the rare English derivatives "angariate," "angariation," came to mean any service which was forcibly or unjustly demanded, and oppression in general.

**ANGARY** (Lat. *jus angariae*; Fr. *droit d'angarie*; Ger. *Angarie*; from the Gr. ἀγγαρεία, the office of an ἄγγαρος, courier or messenger), the name given to the right of a belligerent to seize and apply for the purposes of war (or to prevent the enemy from doing so) any kind of property on, belligerent territory, including that which may belong to subjects or citizens of a neutral state. Art. 53 of the Regulations respecting the Laws and Customs of War on Land, annexed to the Hague Convention of 1899 on the same subject, provides that railway plant, land telegraphs, telephones, steamers and other ships (other than such as are governed by maritime law), though belonging to companies or private persons, *may be used* for military operations, but "must be restored at the conclusion of peace *and* indemnities paid for them." And Art. 54 adds that "the plant of railways coming from neutral states, whether the property of those states or of companies or private persons, shall be sent back to them as soon as possible." These articles seem to sanction the right of angary against neutral property, while limiting it as against both belligerent and neutral property. It may be considered, however, that the right to use implies as wide a range of contingencies as the "necessity of war" can be made to cover.

(T. Ba.)

**ANGEL**, a general term denoting a subordinate superhuman being in monotheistic religions, *e.g.* Islam, Judaism, Christianity, and in allied religions, such as Zoroastrianism. In polytheism the grades of superhuman beings are continuous; but in monotheism there is a sharp distinction of kind, as well as degree, between God on the one hand, and all other superhuman beings on the other; the latter are the "angels."

[v.02 p.0005] "Angel" is a transcription of the Gr. ἄγγελος, messenger. ἄγγελος in the New Testament, and the corresponding *mal'akh* in the Old Testament, sometimes mean "messenger," and sometimes "angel," and this double sense is duly represented in the English Versions. "Angel" is also used in the English Version for אביר *'Abbir*, Ps. lxxviii. 25. (lit. "mighty"), for אלהים *'Elohim*, Ps. viii. 5, and for the obscure שַׁנְאִין *shin'an*, in Ps. lxxviii. 17.

In the later development of the religion of Israel, *'Elohim* is almost entirely reserved for the one true God; but in earlier times *'Elohim* (gods), *bnē 'Elohim*, *bnē Elim* (sons of gods, *i.e.* members of the class of divine beings) were general terms for superhuman beings. Hence they came to be used collectively of superhuman beings, distinct from Yahweh, and therefore inferior, and ultimately subordinate.<sup>[1]</sup> So, too, the angels are styled "holy ones,"<sup>[2]</sup> and "watchers,"<sup>[3]</sup> and are spoken of as the "host of heaven"<sup>[4]</sup> or of "Yahweh."<sup>[5]</sup> The "hosts," צבאות *Sebaoth* in the title *Yahweh Sebaoth*, Lord of Hosts, were probably at one time identified with the angels.<sup>[6]</sup> The New Testament often speaks of "spirits," πνεύματα. <sup>[7]</sup> In the earlier periods of the religion of Israel, the doctrine of monotheism had not been formally stated, so that the idea of "angel" in the modern sense does not occur, but we find the *Mal'akh Yahweh*, Angel of the Lord, or *Mal'akh Elohim*, Angel of God. The *Mal'akh Yahweh* is an appearance or manifestation of *Yahweh* in the form of a man, and the term *Mal'akh Yahweh* is used interchangeably with *Yahweh* (cf. Exod. iii. 2, with iii. 4; xiii. 21 with xiv. 19). Those who see the *Mal'akh Yahweh* say they have seen God.<sup>[8]</sup> The *Mal'akh Yahweh* (or *Elohim*) appears to Abraham, Hagar, Moses, Gideon, &c., and leads the Israelites in the Pillar of Cloud.<sup>[9]</sup> The phrase *Mal'akh Yahweh* may have been originally a courtly circumlocution for the Divine King; but it readily became a means of avoiding crude anthropomorphism, and later on, when the angels were classified, the *Mal'akh Yahweh* came to mean an angel of distinguished rank.<sup>[10]</sup> The identification of the *Mal'akh Yahweh* with the *Logos*, or Second Person of the Trinity, is not indicated by the references in the Old Testament; but the idea of a Being partly identified with God, and yet in some sense distinct from Him, illustrates the tendency of religious thought to distinguish persons within the unity of the Godhead, and foreshadows the doctrine of the Trinity, at any rate in some slight degree.

In the earlier literature the *Mal'akh Yahweh* or *Elohim* is almost the only *mal'akh* ("angel") mentioned. There are, however, a few passages which speak of subordinate superhuman beings other than the *Mal'akh Yahweh* or *Elohim*. There are the cherubim who guard Eden. In Gen. xviii., xix. (J) the appearance of *Yahweh* to Abraham and Lot is connected with three, afterwards



two, men or messengers; but possibly in the original form of the story Yahweh appeared alone.<sup>[11]</sup> At Bethel, Jacob sees the angels of God on the ladder,<sup>[12]</sup> and later on they appear to him at Mahanaim.<sup>[13]</sup> In all these cases the angels, like the *Mal'akh Yahweh*, are connected with or represent a theophany. Similarly the "man" who wrestles with Jacob at Peniel is identified with God.<sup>[14]</sup> In Isaiah vi. the seraphim, superhuman beings with six wings, appear as the attendants of Yahweh. Thus the pre-exilic literature, as we now have it, has little to say about angels or about superhuman beings other than Yahweh and manifestations of Yahweh; the pre-exilic prophets hardly mention angels.<sup>[15]</sup> Nevertheless we may well suppose that the popular religion of ancient Israel had much to say of superhuman beings other than Yahweh, but that the inspired writers have mostly suppressed references to them as unedifying. Moreover such beings were not strictly angels.

The doctrine of monotheism was formally expressed in the period immediately before and during the Exile, in Deuteronomy<sup>[16]</sup> and Isaiah,<sup>[17]</sup> and at the same time we find angels prominent in Ezekiel who, as a prophet of the Exile, may have been influenced by the hierarchy of supernatural beings in the Babylonian religion, and perhaps even by the angelology of Zoroastrianism.<sup>[18]</sup> Ezekiel gives elaborate descriptions of cherubim;<sup>[19]</sup> and in one of his visions he sees seven angels execute the judgment of God upon Jerusalem.<sup>[20]</sup> As in Genesis they are styled "men," *mal'akh* for "angel" does not occur in Ezekiel. Somewhat later, in the visions of Zechariah, angels play a great part; they are sometimes spoken of as "men," sometimes as *mal'akh*, and the *Mal'akh Yahweh* seems to hold a certain primacy among them.<sup>[21]</sup> Satan also appears to prosecute (so to speak) the High Priest before the divine tribunal.<sup>[22]</sup> Similarly in Job the *bne Elohim*, sons of God, appear as attendants of God, and amongst them Satan, still in his rôle of public prosecutor, the defendant being Job.<sup>[23]</sup> Occasional references to "angels" occur in the Psalter;<sup>[24]</sup> they appear as ministers of God.

In Ps. lxxviii. 49 the "evil angels" of A. V. conveys a false impression; it should be "angels of evil," as R. V., *i.e.* angels who inflict chastisement as ministers of God.

The seven angels of Ezekiel may be compared with the seven eyes of Yahweh in Zech. iii. 9, iv. 10. The latter have been connected by Ewald and others with the later doctrine of seven chief angels,<sup>[25]</sup> parallel to and influenced by the Ameshaspentas (Amesha Spenta), or seven great spirits of the Persian mythology, but the connexion is doubtful.

In the Priestly Code, *c.* 400 B.C., there is no reference to angels apart from the possible suggestion in the ambiguous plural in Genesis i. 26.

During the Persian and Greek periods the doctrine of angels underwent a great development, partly, at any rate, under foreign influences. In Daniel, *c.* 160 B.C., angels, usually spoken of as "men" or "princes," appear as guardians or champions of the nations; grades are implied, there are "princes" and "chief" or "great princes"; and the names of some angels are known, Gabriel, Michael; the latter is pre-eminent,<sup>[26]</sup> he is the guardian of Judah. Again in Tobit a leading part is played by Raphael, "one of the seven holy angels."<sup>[27]</sup>

In Tobit, too, we find the idea of the demon or evil angel. In the canonical Old Testament angels may inflict suffering as ministers of God, and Satan may act as accuser or tempter; but they appear as subordinate to God, fulfilling His will; and not as morally evil. The statement<sup>[28]</sup> that God "charged His angels with folly" applies to all angels. In Daniel the princes or guardian angels of the heathen nations oppose Michael the guardian angel of Judah. But in Tobit we find Asmodeus the evil demon, τὸ πονηρὸν δαιμόνιον, who strangles Sarah's husbands, and also a general reference to "a devil or evil spirit," πνεῦμα.<sup>[29]</sup> The Fall of the Angels is not properly a scriptural doctrine, though it is based on Gen. vi. 2, as interpreted by the Book of Enoch. It is true that the *bnē Elohim* of that chapter are subordinate superhuman beings (cf. above), but they belong to a different order of thought from the angels of Judaism and of Christian doctrine; and the passage in no way suggests that the *bne Elohim* suffered any loss of status through their act.

The guardian angels of the nations in Daniel probably represent the gods of the heathen, and we have there the first step of the process by which these gods became evil angels, an idea expanded by Milton in *Paradise Lost*. The development of the doctrine of an organized hierarchy of angels belongs to the Jewish literature of the period 200 B.C. to A.D. 100. In Jewish apocalypses especially, the imagination ran riot on the rank, classes and names of angels; and such works as the various books of Enoch and the *Ascension of Isaiah* supply much information on this subject.

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In the New Testament angels appear frequently as the ministers of God and the agents of revelation;<sup>[30]</sup> and Our Lord speaks of angels as fulfilling such functions,<sup>[31]</sup> implying in one saying that they neither marry nor are given in marriage.<sup>[32]</sup> Naturally angels are most prominent in the Apocalypse. The New Testament takes little interest in the idea of the angelic hierarchy, but there are traces of the doctrine. The distinction of good and bad angels is recognized; we have names, Gabriel,<sup>[33]</sup> and the evil angels Abaddon or Apollyon,<sup>[34]</sup> Beelzebub.<sup>[35]</sup> and Satan,<sup>[36]</sup> ranks are implied, archangels,<sup>[37]</sup> principalities and powers,<sup>[38]</sup> thrones and dominions.<sup>[39]</sup> Angels occur in groups of four or seven.<sup>[40]</sup> In Rev. i.-iii. we meet with the "Angels" of the Seven Churches of Asia Minor. These are probably guardian angels, standing to the

churches in the same relation that the "princes" in Daniel stand to the nations; practically the "angels" are personifications of the churches. A less likely view is that the "angels" are the human representatives of the churches, the bishops or chief presbyters. There seems, however, no parallel to such a use of "angel," and it is doubtful whether the monarchical government of churches was fully developed when the Apocalypse was written.

Later Jewish and Christian speculation followed on the lines of the angelology of the earlier apocalypses; and angels play an important part in Gnostic systems and in the Jewish Midrashim and the Kabbala. Religious thought about the angels during the middle ages was much influenced by the theory of the angelic hierarchy set forth in the *De Hierarchia Celesti*, written in the 5th century in the name of Dionysius the Areopagite and passing for his. The creeds and confessions do not formulate any authoritative doctrine of angels; and modern rationalism has tended to deny the existence of such beings, or to regard the subject as one on which we can have no certain knowledge. The principle of continuity, however, seems to require the existence of beings intermediate between man and God.

The Old Testament says nothing about the origin of angels; but the *Book of Jubilees* and the Slavonic *Enoch* describe their creation; and, according to Col. i. 16, the angels were created in, unto and through Christ.

Nor does the Bible give any formal account of the nature of angels. It is doubtful how far Ezekiel's account of the cherubim and Isaiah's account of the seraphim are to be taken as descriptions of actual beings; they are probably figurative, or else subjective visions. Angels are constantly spoken of as "men," and, including even the Angel of Yahweh, are spoken of as discharging the various functions of human life; they eat and drink,<sup>[41]</sup> walk<sup>[42]</sup> and speak.<sup>[43]</sup> Putting aside the cherubim and seraphim, they are not spoken of as having wings. On the other hand they appear and vanish,<sup>[44]</sup> exercise miraculous powers,<sup>[45]</sup> and fly.<sup>[46]</sup> Seeing that the anthropomorphic language used of the angels is similar to that used of God, the Scriptures would hardly seem to require a literal interpretation in either case. A special association is found, both in the Bible and elsewhere, between the angels and the heavenly bodies,<sup>[47]</sup> and the elements or elemental forces, fire, water, &c.<sup>[48]</sup> The angels are infinitely numerous.<sup>[49]</sup>

The *function* of the angels is that of the supernatural servants of God. His agents and representatives; the Angel of Yahweh, as we have seen, is a manifestation of God. In old times, the *bne Elohim* and the seraphim are His court, and the angels are alike the court and the army of God; the cherubim are his throne-bearers. In his dealings with men, the angels, as their name implies, are specially His messengers, declaring His will and executing His commissions. Through them he controls nature and man. They are the guardian angels of the nations; and we also find the idea that individuals have guardian angels.<sup>[50]</sup> Later Jewish tradition held that the Law was given by angels.<sup>[51]</sup> According to the Gnostic Basilides, the world was created by angels. Mahomedanism has taken over and further elaborated the Jewish and Christian ideas as to angels.

While the scriptural statements imply a belief in the existence of spiritual beings intermediate between God and men, it is probable that many of the details may be regarded merely as symbolic imagery. In Scripture the function of the angel overshadows his personality; the stress is on their ministry; they appear in order to perform specific acts.

BIBLIOGRAPHY.—See the sections on "Angels" in the handbooks of O. T. Theology by Ewald, Schultz, Smend, Kayser-Marti, &c.; and of N. T. Theology by Weiss, and in van Oosterzee's *Dogmatics*. Also commentaries on special passages, especially Driver and Bevan on *Daniel*, and G. A. Smith, *Minor Prophets*, ii. 310 ff.; and articles *s.v.* "Angel" in Hastings' *Bible Dictionary*, and the *Encyclopaedia Biblica*.

(W. H. Be.)

[1] *E.g.* Gen. vi. 2; Job i. 6; Ps. viii. 5, xxix. 1.

[2] Zech. xiv. 5.

[3] Dan. iv. 13.

[4] Deut. xvii. 3 (?).

[5] Josh. v. 14 (?).

[6] The identification of the "hosts" with the stars comes to the same thing; the stars were thought of as closely connected with angels. It is probable that the "hosts" were also identified with the armies of Israel.

[7] Rev. i. 4.

[8] Gen. xxxii. 30; Judges xiii. 22.

[9] Exod. iii. 2, xiv.

- [10] Zech. i. 11f.
- [11] Cf. xviii. I with xviii. 2, and note change of number in xix. 17.
- [12] Gen. xxviii. 12, E.
- [13] Gen. xxxii. I, E.
- [14] Gen. xxxii. 24, 30, J.
- [15] "An angel" of I Kings xiii. 18 might be the *Mal'akh Yahweh*, as in xix. 5, cf. 7, or the passage, at any rate in its present form, may be exilic or post-exilic.
- [16] Deut. vi. 4. 5.
- [17] Isaiah xliii. 10 &c.
- [18] It is not however certain that these doctrines of Zoroastrianism were developed at so early a date.
- [19] Ezek. i.x.
- [20] Ezek. ix.
- [21] Zech. i. 11f.
- [22] Zech. iii. 1.
- [23] Job i., ii. Cf. I Chron. xxi. 1.
- [24] Pss. xci. 11, ciii. 20 &c.
- [25] Tobit xii. 15; Rev. viii. 2.
- [26] Dan. viii. 16, x. 13, 20, 21.
- [27] Tob. xii. 15.
- [28] Job iv. 18.
- [29] Tobit iii. 8, 17, vi. 7.
- [30] *E.g.* Matt. i. 20 (to Joseph), iv. 11. (to Jesus), Luke i. 26 (to Mary), Acts xii. 7 (to Peter).
- [31] *E.g.* Mark viii. 38, xiii. 27.
- [32] Mark xii. 25.
- [33] Luke i. 19.
- [34] Rev. ix. 11.
- [35] Mark iii. 22.
- [36] Mark i. 13.
- [37] Michael, Jude 9.
- [38] Rom. viii. 38; Col, ii. 10.
- [39] Col. i. 16.
- [40] Rev. vii. 1.
- [41] Gen. xviii. 8.
- [42] Gen. xix. 16.
- [43] Zech. iv. 1.
- [44] Judges vi. 12, 21.
- [45] Rev. vii. 1. viii.
- [46] Rev. viii. 13, xiv. 6.
- [47] Job xxxviii. 7; *Asc. of Isaiah*, iv. 18; Slav. *Enoch*, iv. 1.
- [48] Rev. xiv. 18, xvi. 5; possibly Gal. iv. 3; Col. ii. 8, 20.

[49] Ps. lxxviii. 17; Dan. vii. 10.

[50] Matt, xviii. 10; Acts xii. 15.

[51] Gal. iii. 19; Heb. ii. 2; LXX. of Deut. xxxiii. 2.

**ANGEL**, a gold coin, first used in France (*angelot*, *ange*) in 1340, and introduced into England by Edward IV. in 1465 as a new issue of the "noble," and so at first called the "angel-noble." It varied in value between that period and the time of Charles I. (when it was last coined) from 6s. 8d. to 10s. The name was derived from the representation it bore of St. Michael and the dragon. The angel was the coin given to those who came to be touched for the disease known as king's evil; after it was no longer coined, medals, called touch-pieces, with the same device, were given instead.

**ANGELICA**, a genus of plants of the natural order *Umbelliferae*, represented in Britain by one species, *A. sylvestris*, a tall perennial herb with large bipinnate leaves and large compound umbels of white or purple flowers. The name Angelica is popularly given to a plant of an allied genus, *Archangelica officinalis*, the tender shoots of which are used in making certain kinds of aromatic sweetmeats. *Angelica balsam* is obtained by extracting the roots with alcohol, evaporating and extracting the residue with ether. It is of a dark brown colour and contains angelica oil, angelica wax and angelicin, C<sub>18</sub>H<sub>30</sub>O. The essential oil of the roots of *Angelica archangelica* contains β-terebangelene, C<sub>10</sub>H<sub>16</sub>, and other terpenes; the oil of the seeds also contains β-terebangelene, together with methylethylacetic acid and hydroxymyristic acid.

The angelica tree is a member of the order *Avaliaceae*, a species of *Aralia* (*A. spinosa*), a native of North America; it grows 8 to 12 ft. high, has a simple prickly-bearing stem forming an umbrella-like head, and much divided leaves.

**ANGELICO, FRA** (1387-1455), Italian painter. Il Beato Fra Giovanni Angelico da Fiesole is the name given to a far-famed painter-friar of the Florentine state in the 15th century, the representative, beyond all other men, of pietistic painting. He is often, but not accurately, termed simply "Fiesole," which is merely the name of the town where he first took the vows; more often Fra Angelico. If we turn his compound designation into English, it runs thus—"the Beatified Friar John the Angelic of Fiesole." In his lifetime he was known no doubt simply as Fra Giovanni or Friar John; "The Angelic" is a laudatory term which was assigned to him at an early date,—we find it in use within thirty years after his death; and, at some period which is not defined in our authorities, he was beatified by due ecclesiastical process. His baptismal name was Guido, Giovanni being only his name in religion. He was born at Vicchio, in the Tuscan province of Mugello, of unknown but seemingly well-to-do parentage, in 1387 (not 1390 as sometimes stated); in 1407 he became a novice in the convent of S. Domenico at Fiesole, and in 1408 he took the vows and entered the Dominican order. Whether he had previously been a painter by profession is not certain, but may be pronounced probable. The painter named Lorenzo Monaco may have contributed to his art-training, and the influence of the Sienese school is discernible in his work.

[v.02 p.0007] According to Vasari, the first paintings of this artist were in the Certosa of Florence; none such exist there now. His earliest extant performances, in considerable number, are at Cortona, whither he was sent during his novitiate, and here apparently he spent all the opening years of his monastic life. His first works executed in fresco were probably those, now destroyed, which he painted in the convent of S. Domenico in this city; as a fresco-painter, he may have worked under, or as a follower of, Gherardo Starnina. From 1418 to 1436 he was back at Fiesole; in 1436 he was transferred to the Dominican convent of S. Marco in Florence, and in 1438 undertook to paint the altarpiece for the choir, followed by many other works; he may have studied about this time the renowned frescoes in the Brancacci chapel in the Florentine church of the Carmine and also the paintings of Orcagna. In or about 1445 he was invited by the pope to Rome. The pope who reigned from 1431 to 1447 was Eugenius IV., and he it was who in 1445 appointed another Dominican friar, a colleague of Angelico, to be archbishop of Florence. If the story (first told by Vasari) is true—that this appointment was made at the suggestion of Angelico only after the archbishopric had been offered to himself, and by him declined on the ground of his inaptitude for so elevated and responsible a station—Eugenius, and not (as stated by Vasari) his successor Nicholas V., must have been the pope who sent the invitation and made the offer to Fra Giovanni, for Nicholas only succeeded in 1447. The whole statement lacks authentication, though in itself credible enough. Certain it is that Angelico was staying in Rome in the first half of 1447; and he painted in the Vatican the Cappella del Sacramento, which was afterwards demolished by Paul III. In June 1447 he proceeded to Orvieto, to paint in the Cappella Nuova of the cathedral, with the co-operation of his pupil Benozzo Gozzoli. He afterwards returned to Rome to paint the chapel of Nicholas V. In this capital he died in 1455, and he lies buried in the church of the Minerva.

According to all the accounts which have reached us, few men on whom the distinction of beatification has been conferred could have deserved it more nobly than Fra Giovanni. He led a

holy and self-denying life, shunning all advancement, and was a brother to the poor; no man ever saw him angered. He painted with unceasing diligence, treating none but sacred subjects; he never retouched or altered his work, probably with a religious feeling that such as divine providence allowed the thing to come, such it should remain. He was wont to say that he who illustrates the acts of Christ should be with Christ. It is averred that he never handled a brush without fervent prayer and he wept when he painted a Crucifixion. The Last Judgment and the Annunciation were two of the subjects he most frequently treated.

Bearing in mind the details already given as to the dates of Fra Giovanni's sojournings in various localities, the reader will be able to trace approximately the sequence of the works which we now proceed to name as among his most important productions. In Florence, in the convent of S. Marco (now converted into a national museum), a series of frescoes, beginning towards 1443; in the first cloister is the Crucifixion with St. Dominic kneeling; and the same treatment recurs on a wall near the dormitory; in the chapterhouse is a third Crucifixion, with the Virgin swooning, a composition of twenty life-sized figures—the red background, which has a strange and harsh effect, is the misdoing of some restorer; an "Annunciation," the figures of about three-fourths of life-size, in a dormitory; in the adjoining passage, the "Virgin enthroned," with four saints; on the wall of a cell, the "Coronation of the Virgin," with Saints Paul, Thomas Aquinas, Benedict, Dominic, Francis and Peter Martyr; two Dominicans welcoming Jesus, habited as a pilgrim; an "Adoration of the Magi"; the "Marys at the Sepulchre." All these works are later than the altarpiece which Angelico painted (as before mentioned) for the choir connected with this convent, and which is now in the academy of Florence; it represents the Virgin with Saints Cosmas and Damian (the patrons of the Medici family), Dominic, Peter, Francis, Mark, John Evangelist and Stephen; the pediment illustrated the lives of Cosmas and Damian, but it has long been severed from the main subject. In the Uffizi gallery, an altarpiece, the Virgin (life-sized) enthroned, with the Infant and twelve angels. In S. Domenico, Fiesole, a few frescoes, less fine than those in S. Marco; also an altarpiece in tempera of the Virgin and Child between Saints Peter, Thomas Aquinas, Dominic and Peter Martyr, now much destroyed. The subject which originally formed the predella of this picture has, since 1860, been in the National Gallery, London, and worthily represents there the hand of the saintly painter. The subject is a Glory, Christ with the banner of the Resurrection, and a multitude of saints, including, at the extremities, the saints or beati of the Dominican order; here are no fewer than 266 figures or portions of figures, many of them having names inscribed. This predella was highly lauded by Vasari; still more highly another picture which used to form an altarpiece in Fiesole, and which now obtains world-wide celebrity in the Louvre—the "Coronation of the Virgin," with eight predella subjects of the miracles of St. Dominic. For the church of Santa Trinita, Florence, Angelico executed a "Deposition from the Cross," and for the church of the Angeli, a "Last Judgment," both now in the Florentine academy; for S. Maria Novella, a "Coronation of the Virgin," with a predella in three sections, now in the Uffizi,—this again is one of his masterpieces. In Orvieto cathedral he painted three triangular divisions of the ceiling, portraying respectively Christ in a glory of angels, sixteen saints and prophets, and the virgin and apostles: all these are now much repainted and damaged. In Rome, in the Chapel of Nicholas V., the acts of Saints Stephen and Lawrence; also various figures of saints, and on the ceiling the four evangelists. These works of the painter's advanced age, which have suffered somewhat from restorations, show vigour superior to that of his youth, along with a more adequate treatment of the architectural perspectives. Naturally, there are a number of works currently attributed to Angelico, but not really his; for instance, a "St Thomas with the Madonna's girdle," in the Lateran museum, and a "Virgin enthroned," in the church of S. Girolamo, Fiesole. It has often been said that he commenced and frequently practised as an illuminator; this is dubious and a presumption arises that illuminations executed by Giovanni's brother, Benedetto, also a Dominican, who died in 1448, have been ascribed to the more famous artist. Benedetto may perhaps have assisted Giovanni in the frescoes at S. Marco, but nothing of the kind is distinctly traceable. A folio series of engravings from these paintings was published in Florence, in 1852. Along with Gozzoli already mentioned, Zanobi Strozzi and Gentile da Fabriano are named as pupils of the Beato.

We have spoken of Angelico's art as "pietistic"; this is in fact its predominant character. His visages have an air of rapt suavity, devotional fervency and beaming esoteric consciousness, which is intensely attractive to some minds and realizes beyond rivalry a particular ideal—that of ecclesiastical saintliness and detachment from secular fret and turmoil. It should not be denied that he did not always escape the pitfalls of such a method of treatment, the faces becoming sleek and prim, with a smirk of sexless religiosity which hardly eludes the artificial or even the hypocritical; on other minds, therefore, and these some of the most masculine and resolute, he produces little genuine impression. After allowing for this, Angelico should nevertheless be accepted beyond cavil as an exalted typical painter according to his own range of conceptions, consonant with his monastic calling, unsullied purity of life and exceeding devoutness. Exquisite as he is in his special mode of execution, he undoubtedly falls far short, not only of his great naturalist contemporaries such as Masaccio and Lippo Lippi, but even of so distant a precursor as Giotto, in all that pertains to bold or life-like invention of a subject or the realization of ordinary appearances, expressions and actions—the facts of nature, as distinguished from the aspirations or contemplations of the spirit. Technically speaking, he had much finish and harmony of composition and colour, without corresponding mastery of light and shade, and his knowledge of the human frame was restricted. The brilliancy and fair light scale of his tints is constantly remarkable, combined with a free use of gilding; this conduces materially to that celestial character which so pre-eminently distinguishes his pictured visions of the divine persons, the hierarchy of heaven and the glory of the redeemed.

Books regarding Fra Angelico are numerous. We may mention those by S. Beissel, 1895; V. M. Crawford, 1900; R. L. Douglas, 1900; I. B. Supino, 1901; D. Tumiati, 1897; G. Williamson, 1901.

(W. M. R.)

**ANGELL, GEORGE THORNDIKE** (1823-1909), American philanthropist, was born at Southbridge, Massachusetts, on the 5th of June 1823. He graduated at Dartmouth in 1846, studied law at the Harvard Law School, and in 1851 was admitted to the bar in Boston, where he practised for many years. In 1868 he founded and became president of the Massachusetts Society for the Prevention of Cruelty to Animals, in the same year establishing and becoming editor of *Our Dumb Animals*, a journal for the promotion of organized effort in securing the humane treatment of animals. For many years he was active in the organization of humane societies in England and America. In 1882 he initiated the movement for the establishment of Bands of Mercy (for the promotion of humane treatment of animals), of which in 1908 there were more than 72,000 in active existence. In 1889 he founded and became president of the American Humane Education Society. He became well known as a criminologist and also as an advocate of laws for the safeguarding of the public health and against adulteration of food. He died at Boston on the 16th of March 1909.

**ANGEL-LIGHTS**, in architecture, the outer upper lights in a perpendicular window, next to the springing; probably a corruption of the word angle-lights, as they are nearly triangular.

**ANGELUS**, a Roman Catholic devotion in memory of the Annunciation. It has its name from the opening words, *Angelus Domini nuntiavit Mariae*. It consists of three texts describing the mystery, recited as versicle and response alternately with the salutation "Hail, Mary!" This devotion is recited in the Catholic Church three times daily, about 6 A.M., noon and 6 P.M. At these hours a bell known as the Angelus bell is rung. This is still rung in some English country churches, and has often been mistaken for and alleged to be a survival of the curfew bell. The institution of the Angelus is by some ascribed to Pope Urban II., by some to John XXII. The triple recitation is ascribed to Louis XI. of France, who in 1472 ordered it to be thrice said daily.

**ANGELUS SILESIUS** (1624-1677), German religious poet, was born in 1624 at Breslau. His family name was Johann Scheffler, but he is generally known by the pseudonym Angelus Silesius, under which he published his poems and which marks the country of his birth. Brought up a Lutheran, and at first physician to the duke of Württemberg-Oels, he joined in 1652 the Roman Catholic Church, in 1661 took orders as a priest, and became coadjutor to the prince bishop of Breslau. He died at Breslau on the 9th of July 1677. In 1657 Silesius published under the title *Heilige Seelenlust, oder geistliche Hirtenlieder der in ihren Jesum verliebten Psyche* (1657), a collection of 205 hymns, the most beautiful of which, such as, *Liebe, die du mich zum Bilde deiner Gottheit hast gemacht* and *Mir nach, spricht Christus, unser Held*, have been adopted in the German Protestant hymnal. More remarkable, however, is his *Geistreiche Sinn- und Schlussreime* (1657), afterwards called *Cherubinischer Wandersmann* (1674). This is a collection of "Reimsprüche" or rhymed distichs embodying a strange mystical pantheism drawn mainly from the writings of Jakob Böhme and his followers. Silesius delighted specially in the subtle paradoxes of mysticism. The essence of God, for instance, he held to be love; God, he said, can love nothing inferior to himself; but he cannot be an object of love to himself without going out, so to speak, of himself, without manifesting his infinity in a finite form; in other words, by becoming man. God and man are therefore essentially one.

A complete edition of Scheffler's works (*Sämtliche poetische Werke*) was published by D. A. Rosenthal, 2 vols. (Regensburg, 1862). Both the *Cherubinischer Wandersmann* and *Heilige Seelenlust* have been republished by G. Ellinger (1895 and 1901); a selection from the former work by O. E. Hartleben (1896). For further notices of Silesius' life and work, see Hoffmann von Fallersleben in *Weimarische Jahrbuch I.* (Hanover, 1854); A. Kahlert, *Angelus Silesius* (1853); C. Seltmann, *Angelus Silesius und seine Mystik* (1896), and a biog. by H. Mahn (Dresden, 1896).

**ANGERMÜNDE**, a town of Germany, in the Prussian province of Brandenburg, on Lake Münde, 43 m. from Berlin by the Berlin-Stettin railway, and at the junction of lines to Prenzlau, Freienwalde and Schwedt. Pop. (1900) 7465. It has three Protestant churches, a grammar school and court of law. Its industries embrace iron founding and enamel working. In 1420 the elector Frederick I. of Brandenburg gained here a signal victory over the Pomeranians.

**ANGERONA**, or ANGERONIA, an old Roman goddess, whose name and functions are variously explained. According to ancient authorities, she was a goddess who relieved men from pain and sorrow, or delivered the Romans and their flocks from *angina* (quinsy); or she was the protecting goddess of Rome and the keeper of the sacred name of the city, which might not be pronounced lest it should be revealed to her enemies; it was even thought that Angerona itself was this name.

Modern scholars regard her as a goddess akin to Ops, Acca Larentia and Dea Dia; or as the goddess of the new year and the returning sun (according to Mommsen, *ab angerendo*= ἀπὸ τοῦ ἀναφέρεσθαι. τὸν ἥλιον). Her festival, called Divalia or Angerona, was celebrated on the 21st of December. The priests offered sacrifice in the temple of Volupia, the goddess of pleasure, in which stood a statue of Angerona, with a finger on her mouth, which was bound and closed (Macrobius i. 10; Pliny, *Nat. Hist.* iii. 9; Varro, *L. L.* vi. 23). She was worshipped as Ancharia at Faesulae, where an altar belonging to her has been recently discovered. (See FAESULAE.)

**ANGERS**, a city of western France, capital of the department of Maine-et-Loire, 191 m. S.W. of Paris by the Western railway to Nantes. Pop. (1906) 73,585. It occupies rising ground on both banks of the Maine, which are united by three bridges. The surrounding district is famous for its flourishing nurseries and market gardens. Pierced with wide, straight streets, well provided with public gardens, and surrounded by ample, tree-lined boulevards, beyond which lie new suburbs, Angers is one of the pleasantest towns in France. Of its numerous medieval buildings the most important is the cathedral of St. Maurice, dating in the main from the 12th and 13th centuries. Between the two flanking towers of the west façade, the spires of which are of the 16th century, rises a central tower of the same period. The most prominent feature of the façade is the series of eight warriors carved on the base of this tower. The vaulting of the nave takes the form of a series of cupolas, and that of the choir and transept is similar. The chief treasures of the church are its rich stained glass (12th, 13th and 15th centuries) and valuable tapestry (14th to 18th centuries). The bishop's palace which adjoins the cathedral contains a fine synodal hall of the 12th century. Of the other churches of Angers, the principal are St. Serge, an abbey-church of the 12th and 15th centuries, and La Trinité (12th century). The prefecture occupies the buildings of the famous abbey of St. Aubin; in its courtyard are elaborately sculptured arcades of the 11th and 12th centuries, from which period dates the tower, the only survival of the splendid abbey-church. Ruins of the old churches of Toussaint (13th century) and Notre-Dame du Ronceray (11th century) are also to be seen. The castle of Angers, an imposing building girt with towers and a moat, dates from the 13th century and is now used as an armoury. The ancient hospital of St. Jean (12th century) is occupied by an archaeological museum; and the Logis Barrault, a mansion built about 1500, contains the public library, the municipal museum, which has a large collection of pictures and sculptures, and the Musée David, containing works by the famous sculptor David d'Angers, who was a native of the town. One of his masterpieces, a bronze statue of René of Anjou, stands close by the castle. The Hôtel de Pincé or d'Anjou (1523-1530) is the finest of the stone mansions of Angers; there are also many curious wooden houses of the 15th and 16th centuries. The palais de justice, the Catholic institute, a fine theatre, and a hospital with 1500 beds are the more remarkable of the modern buildings of the town. Angers is the seat of a bishopric, dating from the 3rd century, a prefecture, a court of appeal and a court of assizes. It has a tribunal of first instance, a tribunal of commerce, a board of trade-arbitrators, a chamber of commerce, a branch of the Bank of France and several learned societies. Its educational institutions include ecclesiastical seminaries, a lycée, a preparatory school of medicine and pharmacy, a university with free faculties (*facultés libres*) of theology, law, letters and science, a higher school of agriculture, training colleges, a school of arts and handicrafts and a school of fine art. The prosperity of the town is largely due to the great slate-quarries of the vicinity, but the distillation of liqueurs from fruit, cable, rope and thread-making, and the manufacture of boots and shoes, umbrellas and parasols are leading industries. The weaving of sail-cloth and woollen and other fabrics, machine construction, wire-drawing, and manufacture of sparkling wines and preserved fruits are also carried on. The chief articles of commerce, besides slate and manufactured goods, are hemp, early vegetables, fruit, flowers and live-stock.

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Angers, capital of the Gallic tribe of the Andecavi, was under the Romans called Juliomagus. During the 9th century it became the seat of the counts of Anjou (*q.v.*). It suffered severely from the invasions of the Northmen in 845 and the succeeding years, and of the English in the 12th and 15th centuries; the Huguenots took it in 1585, and the Vendean royalists were repulsed near it in 1793. Till the Revolution, Angers was the seat of a celebrated university founded in the 14th century.

See L. M. Thorode, *Notice de la ville d'Angers* (Angers, 1897).

**ANGERSTEIN, JOHN JULIUS** (1735-1822), London merchant, and patron of the fine arts, was born at St. Petersburg and settled in London about 1749. His collection of paintings, consisting of about forty of the most exquisite specimens of the art, purchased by the British government, on his death, formed the nucleus of the National Gallery.

**ANGILBERT** (d. 814), Frankish Latin poet, and minister of Charlemagne, was of noble Frankish parentage, and educated at the palace school under Alcuin. As the friend and adviser of the emperor's son, Pippin, he assisted for a while in the government of Italy, and was later sent on three important embassies to the pope, in 792, 794 and 796. Although he was the father of two children by Charlemagne's daughter, Bertha, one of them named Nithard, we have no authentic account of his marriage, and from 790 he was abbot of St. Riquier, where his brilliant rule gained for him later the renown of a saint. Angilbert, however, was little like the true medieval saint; his poems reveal rather the culture and tastes of a man of the world, enjoying the closest intimacy

with the imperial family. He accompanied Charlemagne to Rome in 800 and was one of the witnesses to his will in 814. Angilbert was the Homer of the emperor's literary circle, and was the probable author of an epic, of which the fragment which has been preserved describes the life at the palace and the meeting between Charlemagne and Leo III. It is a mosaic from Virgil, Ovid, Lucan and Fortunatus, composed in the manner of Einhard's use of Suetonius, and exhibits a true poetic gift. Of the shorter poems, besides the greeting to Pippin on his return from the campaign against the Avars (796), an epistle to David (Charlemagne) incidentally reveals a delightful picture of the poet living with his children in a house surrounded by pleasant gardens near the emperor's palace. The reference to Bertha, however, is distant and respectful, her name occurring merely on the list of princesses to whom he sends his salutation.

Angilbert's poems have been published by E. Dummler in the *Monumenta Germaniae Historica*. For criticisms of this edition see Traube in Roederer's *Schriften für germanische Philologie* (1888). See also A. Molinier, *Les Sources de l'histoire de France*.

**ANGINA PECTORIS** (Latin for "pain of the chest"), a term applied to a violent paroxysm of pain, arising almost invariably in connexion with disease of the coronary arteries, a lesion causing progressive degeneration of the heart muscle (see HEART: *Disease*). An attack of angina pectoris usually comes on with a sudden seizure of pain, felt at first over the region of the heart, but radiating through the chest in various directions, and frequently extending down the left arm. A feeling of constriction and of suffocation accompanies the pain, although there is seldom actual difficulty in breathing. When the attack comes on, as it often does, in the course of some bodily exertion, the sufferer is at once brought to rest, and during the continuance of the paroxysm experiences the most intense agony. The countenance becomes pale, the surface of the body cold, the pulse feeble, and death appears to be imminent, when suddenly the attack subsides and complete relief is obtained. The duration of a paroxysm rarely exceeds two or three minutes, but it may last for a longer period. The attacks are apt to recur on slight exertion, and even in aggravated cases without any such exciting cause. Occasionally the first seizure proves fatal; but more commonly death takes place as the result of repeated attacks. Angina pectoris is extremely rare under middle life, and is much more common in males than in females. It must always be regarded as a disorder of a very serious nature. In the treatment of the paroxysm, nitrite of amyl has now replaced all other remedies. It can be carried by the patient in the form of nitrite of amyl pearls, each pearl containing the dose prescribed by the physician. Kept in this way the drug does not lose strength. As soon as the pain begins the patient crushes a pearl in his handkerchief and holds it to his mouth and nose. The relief given in this way is marvellous and usually takes place within a very few seconds. In the rare cases where this drug does not relieve, hypodermic injections of morphia are used. But on account of the well-known dangers of this drug, it should only be administered by a medical man. To prevent recurrence of the attacks something may be done by scrupulous attention to the general health, and by the avoidance of mental and physical strain. But the most important preventive of all is "bed," of which fourteen days must be enforced on the least premonition of anginal pain.

*Pseudo-angina*.—In connexion with angina pectoris, a far more common condition must be mentioned that has now universally received the name of pseudo-angina. This includes the praecordial pains which very closely resemble those of true angina. The essential difference lies in the fact that pseudo-angina is independent of structural disease of the heart and coronary arteries. In true angina there is some condition within the heart which starts the stimulus sent to the nerve centres. In pseudo-angina the starting-point is not the heart but some peripheral or visceral nerve. The impulse passes thence to the medulla, and so reaching the sensory centres starts a feeling of pain that radiates into the chest or down the arm. There are three main varieties:—(1) the reflex, (2) the vaso-motor, (3) the toxic. The reflex is by far the most common, and is generally due to irritation from one of the abdominal organs. An attack of pseudo-angina may be agonizing, the pain radiating through the chest and into the left arm, but the patient does not usually assume the motionless attitude of true angina, and the duration of the seizure is usually much longer. The treatment is that of the underlying neurosis and the prognosis is a good one, sudden death not occurring.

**ANGIOSPERMS.** The botanical term "Angiosperm" (ἀγγεῖον, receptacle, and σπέρμα, seed) was coined in the form Angiospermae by Paul Hermann in 1690, as the name of that one of his primary divisions of the plant kingdom, which included flowering plants possessing seeds enclosed in capsules, in contradistinction to his Gymnospermae, or flowering plants with achenial or schizo-carpic fruits—the whole fruit or each of its pieces being here regarded as a seed and naked. The term and its antonym were maintained by Linnaeus with the same sense, but with restricted application, in the names of the orders of his class Didynamia. Its use with any approach to its modern scope only became possible after Robert Brown had established in 1827 the existence of truly naked seeds in the Cycadeae and Coniferae, entitling them to be correctly called Gymnosperms. From that time onwards, so long as these Gymnosperms were, as was usual, reckoned as dicotyledonous flowering plants, the term Angiosperm was used antithetically by botanical writers, but with varying limitation, as a group-name for other dicotyledonous plants. The advent in 1851 of Hofmeister's brilliant discovery of the changes proceeding in the embryo-sac of flowering plants, and his determination of the correct relationships of these with the Cryptogamia, fixed the true position of Gymnosperms as a class distinct from Dicotyledons, and the term Angiosperm then gradually came to be accepted as the suitable designation for the



whole of the flowering plants other than Gymnosperms, and as including therefore the classes of Dicotyledons and Monocotyledons. This is the sense in which the term is nowadays received and in which it is used here.

The trend of the evolution of the plant kingdom has been in the direction of the establishment of a vegetation of fixed habit and adapted to the vicissitudes of a life on land, and the Angiosperms are the highest expression of this evolution and constitute the dominant vegetation of the earth's surface at the present epoch. There is no land-area from the poles to the equator, where plant-life is possible, upon which Angiosperms are not found. They occur also abundantly in the shallows of rivers and fresh-water lakes, and in less number in salt lakes and in the sea; such aquatic Angiosperms are not, however, primitive forms, but are derived from immediate land-ancestors. Associated with this diversity of habitat is great variety in general form and manner of growth. The familiar duckweed which covers the surface of a pond consists of a tiny green "thalloid" shoot, one, that is, which shows no distinction of parts—stem and leaf, and a simple root growing vertically downwards into the water. The great forest-tree has a shoot, which in the course perhaps of hundreds of years, has developed a wide-spreading system of trunk and branches, bearing on the ultimate twigs or branchlets innumerable leaves, while beneath the soil a widely-branching root-system covers an area of corresponding extent. Between these two extremes is every conceivable gradation, embracing aquatic and terrestrial herbs, creeping, erect or climbing in habit, shrubs and trees, and representing a much greater variety than is to be found in the other subdivision of seed-plants, the Gymnosperms.

In internal structure also the variety of tissue-formation far exceeds that found in Gymnosperms (see PLANTS: *Anatomy*). The vascular bundles of the stem belong to the collateral type, that is to say, the elements of the wood or xylem and the bast or phloem stand side by side on the same radius. In the larger of the two great groups into which the Angiosperms are divided, the Dicotyledons, the bundles in the very young stem are arranged in an open ring, separating a central pith from an outer cortex. In each bundle, separating the xylem and phloem, is a layer of meristem or active formative tissue, known as cambium; by the formation of a layer of cambium between the bundles (interfascicular cambium) a complete ring is formed, and a regular periodical increase in thickness results from it by the development of xylem on the inside and phloem on the outside. The soft phloem soon becomes crushed, but the hard wood persists, and forms the great bulk of the stem and branches of the woody perennial. Owing to differences in the character of the elements produced at the beginning and end of the season, the wood is marked out in transverse section into concentric rings, one for each season of growth—the so-called annual rings. In the smaller group, the Monocotyledons, the bundles are more numerous in the young stem and scattered through the ground tissue. Moreover they contain no cambium and the stem once formed increases in diameter only in exceptional cases.

*Internal structure.*

As in Gymnosperms, branching is monopodial; dichotomy or the forking of the growing point into two equivalent branches which replace the main stem, is absent both in the case of the stem and the root. The leaves show a remarkable variety in form (see LEAF), but are generally small in comparison with the size of the plant; exceptions occur in some Monocotyledons, *e.g.* in the Aroid family, where in some genera the plant produces one huge, much-branched leaf each season.

*Vegetative organs.*

In rare cases the main axis is unbranched and ends in a flower, as, for instance, in the tulip, where scale-leaves, forming the underground bulb, green foliage-leaves and coloured floral leaves are borne on one and the same axis. Generally, flowers are formed only on shoots of a higher order, often only on the ultimate branches of a much branched system. A potential branch or bud, either foliage or flower, is formed in the axil of each leaf; sometimes more than one bud arises, as for instance in the walnut, where two or three stand in vertical series above each leaf. Many of the buds remain dormant, or are called to development under exceptional circumstances, such as the destruction of existing branches. For instance, the clipping of a hedge or the lopping of a tree will cause to develop numerous buds which may have been dormant for years. Leaf-buds occasionally arise from the roots, when they are called adventitious; this occurs in many fruit trees, poplars, elms and others. For instance, the young shoots seen springing from the ground around an elm are not seedlings but root-shoots. Frequently, as in many Dicotyledons, the primary root, the original root of the seedling, persists throughout the life of the plant, forming, as often in biennials, a thickened tap-root, as in carrot, or in perennials, a much-branched root system. In many Dicotyledons and most Monocotyledons, the primary root soon perishes, and its place is taken by adventitious roots developed from the stem.

The most characteristic feature of the Angiosperm is the flower, which shows remarkable variety in form and elaboration, and supplies the most trustworthy characters for the distinction of the series and families or natural orders, into which the group is divided. The flower is a shoot (stem bearing leaves) which has a special form associated with the special function of ensuring the fertilization of the egg and the development of fruit containing seed. Except where it is terminal it arises, like the leaf-shoot, in the axil of a leaf, which is then known as a bract. Occasionally, as in violet, a flower arises singly in the axil of an ordinary foliage-leaf; it is then termed axillary. Generally, however, the flower-bearing portion of the plant is sharply distinguished from the foliage leaf-bearing or vegetative portion, and forms a more or less elaborate branch-system in which the bracts are small and scale-like. Such a branch-system is called an inflorescence. The primary function of the flower is to bear the spores. These, as in Gymnosperms, are of two kinds, microspores or pollen-

*Flower.*

grains, borne in the stamens (or microsporophylls) and megaspores, in which the egg-cell is developed, contained in the ovule, which is borne enclosed in the carpel (or megasporophyll). The flower may consist only of spore-bearing leaves, as in willow, where each flower comprises only a few stamens or two carpels. Usually, however, other leaves are present which are only indirectly concerned with the reproductive process, acting as protective organs for the sporophylls or forming an attractive envelope. These form the perianth and are in one series, when the flower is termed monochlamydeous, or in two series (dichlamydeous). In the second case the outer series (calyx of sepals) is generally green and leaf-like, its function being to protect the rest of the flower, especially in the bud; while the inner series (corolla of petals) is generally white or brightly coloured, and more delicate in structure, its function being to attract the particular insect or bird by agency of which pollination is effected. The insect, &c., is attracted by the colour and scent of the flower, and frequently also by honey which is secreted in some part of the flower. (For further details on the form and arrangement of the flower and its parts, see FLOWER.)

Each stamen generally bears four pollen-sacs (*microsporangia*) which are associated to form the anther, and carried up on a stalk or filament. The development of the microsporangia and the contained spores (pollen-grains)

*Stamen and pollen.*

is closely comparable with that of the microsporangia in Gymnosperms or heterosporous ferns. The pollen is set free by the opening (dehiscence) of the anther, generally by means of longitudinal slits, but sometimes by pores, as in the heath family (Ericaceae), or by valves, as in the barberry. It is then dropped or carried by some external agent, wind, water or some member of the animal kingdom, on to the receptive surface of the carpel of the same or another flower. The carpel, or aggregate of carpels forming the pistil or gynaecium, comprises an ovary containing one or more ovules and a receptive surface or stigma; the stigma is sometimes carried up on a style. The mature pollen-grain is, like other spores, a single cell; except in the case of some submerged aquatic plants, it has a double wall, a thin delicate wall of unaltered cellulose, the endospore or intine, and a tough outer cuticularized exospore or extine. The exospore often bears spines or warts, or is variously sculptured, and the character of the markings is often of value for the distinction of genera or higher groups. Germination of the microspore begins before it leaves the pollen-sac. In very few cases has anything representing prothallial development been observed; generally a small cell (the antheridial or generative cell) is cut off, leaving a larger tube-cell. When placed on the stigma, under favourable circumstances, the pollen-grain puts forth a pollen-tube which grows down the tissue of the style to the ovary, and makes its way along the placenta, guided by projections or hairs, to the mouth of an ovule. The nucleus of the tube-cell has meanwhile passed into the tube, as does also the generative nucleus which divides to form two male- or sperm-cells. The male-cells are carried to their destination in the tip of the pollen-tube.

[v.02 p.0011]

The ovary contains one or more ovules borne on a placenta, which is generally some part of the ovary-wall. The development of the ovule, which represents the macrosporangium, is very similar to the process in

*Pistil and embryo-sac.*

Gymnosperms; when mature it consists of one or two coats surrounding the central nucellus, except at the apex where an opening, the micropyle, is left. The nucellus is a cellular tissue enveloping one large cell, the embryo-sac or macrospore. The germination of the macrospore consists in the repeated division of its nucleus to form two groups of four, one group at each end of the embryo-sac. One nucleus from each group, the polar nucleus, passes to the centre of the sac, where the two fuse to form the so-called definitive nucleus. Of the three cells at the micropylar end of the sac, all naked cells (the so-called egg-apparatus), one is the egg-cell or oosphere, the other two, which may be regarded as representing abortive egg-cells (in rare cases capable of fertilization), are known as synergidae. The three cells at the opposite end are known as antipodal cells and become invested with a cell-wall. The gametophyte or prothallial generation is thus extremely reduced, consisting of but little more than the male and female sexual cells—the two sperm-cells in the pollen-tube and the egg-cell (with the synergidae) in the embryo-sac.

At the period of fertilization the embryo-sac lies in close proximity to the opening of the micropyle, into which the pollen-tube has penetrated, the separating cell-wall becomes absorbed, and the male or sperm-cells are

*Fertilization.*

ejected into the embryo-sac. Guided by the synergidae one male-cell passes into the oosphere with which it fuses, the two nuclei uniting, while the other fuses with the definitive nucleus, or, as it is also called, the endosperm nucleus. This remarkable double fertilization as it has been called, although only recently discovered, has been proved to take place in widely-separated families, and both in Monocotyledons and Dicotyledons, and there is every probability that, perhaps with variations, it is the normal process in Angiosperms. After impregnation the fertilized oosphere immediately surrounds itself with a cell-wall and becomes the oospore which by a process of growth forms the embryo of the new plant. The endosperm-nucleus divides rapidly to produce a cellular tissue which fills up the interior of the rapidly-growing embryo-sac, and forms a tissue, known as endosperm, in which is stored a supply of nourishment for the use later on of the embryo. It has long been known that after fertilization of the egg has taken place, the formation of endosperm begins from the endosperm nucleus, and this had come to be regarded as the recommencement of the development of a prothallium after a pause following the reinvigorating union of the polar nuclei. This view is still maintained by those who differentiate two acts of fertilization within the embryo-sac, and regard that of the egg by the first male-cell, as the true or generative fertilization, and that of the polar nuclei by the second male gamete as a vegetative fertilization which gives a stimulus to development in correlation

with the other. If, on the other hand, the endosperm is the product of an act of fertilization as definite as that giving rise to the embryo itself, we have to recognize that twin-plants are produced within the embryo-sac—one, the embryo, which becomes the angiospermous plant, the other, the endosperm, a short-lived, undifferentiated nurse to assist in the nutrition of the former, even as the subsidiary embryos in a pluri-embryonic Gymnosperm may facilitate the nutrition of the dominant one. If this is so, and the endosperm like the embryo is normally the product of a sexual act, hybridization will give a hybrid endosperm as it does a hybrid embryo, and herein (it is suggested) we may have the explanation of the phenomenon of xenia observed in the mixed endosperms of hybrid races of maize and other plants, regarding which it has only been possible hitherto to assert that they were indications of the extension of the influence of the pollen beyond the egg and its product. This would not, however, explain the formation of fruits intermediate in size and colour between those of crossed parents. The signification of the coalescence of the polar nuclei is not explained by these new facts, but it is noteworthy that the second male-cell is said to unite sometimes with the apical polar nucleus, the sister of the egg, before the union of this with the basal polar one. The idea of the endosperm as a second subsidiary plant is no new one; it was suggested long ago in explanation of the coalescence of the polar nuclei, but it was then based on the assumption that these represented male and female cells, an assumption for which there was no evidence and which was inherently improbable. The proof of a coalescence of the second male nucleus with the definitive nucleus gives the conception a more stable basis. The antipodal cells aid more or less in the process of nutrition of the developing embryo, and may undergo multiplication, though they ultimately disintegrate, as do also the synergidae. As in Gymnosperms and other groups an interesting qualitative change is associated with the process of fertilization. The number of chromosomes (see PLANTS: *Cytology*) in the nucleus of the two spores, pollen-grain and embryo-sac, is only half the number found in an ordinary vegetative nucleus; and this reduced number persists in the cells derived from them. The full number is restored in the fusion of the male and female nuclei in the process of fertilization, and remains until the formation of the cells from which the spores are derived in the new generation.

In several natural orders and genera departures from the course of development just described have been noted. In the natural order Rosaceae, the series Querciflorae, and the very anomalous genus *Casuarina* and others, instead of a single macrospore a more or less extensive sporogenous tissue is formed, but only one cell proceeds to the formation of a functional female cell. In *Casuarina*, *Juglans* and the order Corylaceae, the pollen-tube does not enter by means of the micropyle, but passing down the ovary wall and through the placenta, enters at the chalazal end of the ovule. Such a method of entrance is styled chalazogamic, in contrast to the porogamic or ordinary method of approach by means of the micropyle.

The result of fertilization is the development of the ovule into the seed. By the segmentation of the fertilized egg, now invested by cell-membrane, the embryo-plant arises. A varying number of transverse segment-walls transform it into a pro-embryo—a cellular row of which the cell nearest the micropyle becomes attached to the apex of the embryo-sac, and thus fixes the position of the developing embryo, while the terminal cell is projected into its cavity. In Dicotyledons the shoot of the embryo is wholly derived from the terminal cell of the pro-embryo, from the next cell the root arises, and the remaining ones form the suspensor. In many Monocotyledons the terminal cell forms the cotyledonary portion alone of the shoot of the embryo, its axial part and the root being derived from the adjacent cell; the cotyledon is thus a terminal structure and the apex of the primary stem a lateral one—a condition in marked contrast with that of the Dicotyledons. In some Monocotyledons, however, the cotyledon is not really terminal. The primary root of the embryo in all Angiosperms points towards the micropyle. The developing embryo at the end of the suspensor grows out to a varying extent into the forming endosperm, from which by surface absorption it derives good material for growth; at the same time the suspensor plays a direct part as a carrier of nutrition, and may even develop, where perhaps no endosperm is formed, special absorptive "suspensor roots" which invest the developing embryo, or pass out into the body and coats of the ovule, or even into the placenta. In some cases the embryo or the embryo-sac sends out suckers into the nucellus and ovular integument. As the embryo develops it may absorb all the food material available, and store, either in its cotyledons or in its hypocotyl, what is not immediately required for growth, as reserve-food for use in germination, and by so doing it increases in size until it may fill entirely the embryo-sac; or its absorptive power at this stage may be limited to what is necessary for growth and it remains of relatively small size, occupying but a small area of the embryo-sac, which is otherwise filled with endosperm in which the reserve-food is stored. There are also intermediate states. The position of the embryo in relation to the endosperm varies, sometimes it is internal, sometimes external, but the significance of this has not yet been established.

[v.02 p.0012]

*Embryology.*

The formation of endosperm starts, as has been stated, from the endosperm nucleus. Its segmentation always begins before that of the egg, and thus there is timely preparation for the nursing of the young embryo. If in its extension to contain the new formations within it the embryo-sac remains narrow, endosperm formation proceeds upon the lines of a cell-division, but in wide embryo-sacs the endosperm is first of all formed as a layer of naked cells around the wall of the sac, and only gradually acquires a pluricellular character, forming a tissue filling the sac. The function of the endosperm is primarily that of nourishing the embryo, and its basal position in the embryo-sac places it favourably for the absorption of food material entering the ovule. Its duration varies with the precocity of the embryo. It may be wholly absorbed by the progressive growth of the embryo within the embryo-sac, or it may persist as a definite and more or less conspicuous constituent of the seed. When it persists as a massive element of the seed its

nutritive function is usually apparent, for there is accumulated within its cells reserve-food, and according to the dominant substance it is starchy, oily, or rich in cellulose, mucilage or proteid. In cases where the embryo has stored reserve food within itself and thus provided for self-nutrition, such endosperm as remains in the seed may take on other functions, for instance, that of water-absorption.

Some deviations from the usual course of development may be noted. Parthenogenesis, or the development of an embryo from an egg-cell without the latter having been fertilized, has been described in species of *Thalictrum*, *Antennaria* and *Alchemilla*. Polyembryony is generally associated with the development of cells other than the egg-cell. Thus in *Erythronium* and *Limncharis* the fertilized egg may form a mass of tissue on which several embryos are produced. Isolated cases show that any of the cells within the embryo-sac may exceptionally form an embryo, e.g. the synergidae in species of *Mimosa*, *Iris* and *Allium*, and in the last-mentioned the antipodal cells also. In *Coelebogyne* (Euphorbiaceae) and in *Funkia* (Liliaceae) polyembryony results from an adventitious production of embryos from the cells of the nucellus around the top of the embryo-sac. In a species of *Allium*, embryos have been found developing in the same individual from the egg-cell, synergids, antipodal cells and cells of the nucellus. In two Malayan species of *Balanophora*, the embryo is developed from a cell of the endosperm, which is formed from the upper polar nucleus only, the egg apparatus becoming disorganized. The last-mentioned case has been regarded as representing an apogamous development of the sporophyte from the gametophyte comparable to the cases of apogamy described in Ferns. But the great diversity of these abnormal cases as shown in the examples cited above suggests the use of great caution in formulating definite morphological theories upon them.

As the development of embryo and endosperm proceeds within the embryo-sac, its wall enlarges and commonly absorbs the substance of the nucellus (which is likewise enlarging) to near its outer limit, and combines with it and the integument to form the *seed-coat*; or the whole nucellus and even the integument may be absorbed. In some plants the nucellus is not thus absorbed, but itself becomes a seat of deposit of reserve-food constituting the *perisperm* which may coexist with endosperm, as in the water-lily order, or may alone form a food-reserve for the embryo, as in *Canna*. Endospermic food-reserve has evident advantages over perispermic, and the latter is comparatively rarely found and only in non-progressive series. Seeds in which endosperm or perisperm or both exist are commonly called *albuminous* or *endospermic*, those in which neither is found are termed *exalbuminous* or *exendospermic*. These terms, extensively used by systematists, only refer, however, to the grosser features of the seed, and indicate the more or less evident occurrence of a food-reserve; many so-called exalbuminous seeds show to microscopic examination a distinct endosperm which may have other than a nutritive function. The presence or absence of endosperm, its relative amount when present, and the position of the embryo within it, are valuable characters for the distinction of orders and groups of orders. Meanwhile the ovary wall has developed to form the fruit or pericarp, the structure of which is closely associated with the manner of distribution of the seed. Frequently the influence of fertilization is felt beyond the ovary, and other parts of the flower take part in the formation of the fruit, as the floral receptacle in the apple, strawberry and others. The character of the seed-coat bears a definite relation to that of the fruit. Their function is the twofold one of protecting the embryo and of aiding in dissemination; they may also directly promote germination. If the fruit is a dehiscent one and the seed is therefore soon exposed, the seed-coat has to provide for the protection of the embryo and may also have to secure dissemination. On the other hand, indehiscent fruits discharge these functions for the embryo, and the seed-coat is only slightly developed.

Dissemination is effected by the agency of water, of air, of animals—and fruits and seeds are therefore grouped in respect of this as hydrophilous, anemophilous and zooidiophilous. The needs for these are obvious—buoyancy in water and resistance to wetting for the first, some form of parachute for the second, and some attaching mechanism or attractive structure for the third. The methods in which these are provided are of infinite variety, and any and every part of the flower and of the inflorescence may be called into requisition to supply the adaptation (see FRUIT). Special outgrowths, arils, of the seed-coat are of frequent occurrence. In the feature of fruit and seed, by which the distribution of Angiosperms is effected, we have a distinctive character of the class. In Gymnosperms we have seeds, and the carpels may become modified and close around these, as in *Pinus*, during the process of ripening to form an imitation of a box-like fruit which subsequently opening allows the seeds to escape; but there is never in them the closed ovary investing from the outset the ovules, and ultimately forming the ground-work of the fruit.

Their fortuitous dissemination does not always bring seeds upon a suitable nidus for germination, the primary essential of which is a sufficiency of moisture, and the duration of vitality of the embryo is a point of interest. Some seeds retain vitality for a period of many years, though there is no warrant for the popular notion that genuine "mummy wheat" will germinate; on the other hand some seeds lose vitality in little more than a year. Further, the older the seed the more slow as a general rule will germination be in starting, but there are notable exceptions. This pause, often of so long duration, in the growth of the embryo between the time of its perfect development within the seed and the moment of germination, is one of the remarkable and distinctive features of the life of Spermatophytes. The aim of germination is the fixing of the embryo in the soil, effected usually by means of the root, which is the first part of the embryo to appear, in preparation for the elongation of the epicotyledonary portion of the shoot, and there is infinite variety in the details

of the process. In albuminous Dicotyledons the cotyledons act as the absorbents of the reserve-food of the seed and are commonly brought above ground (*epigeal*), either withdrawn from the seed-coat or carrying it upon them, and then they serve as the first green organs of the plant. The part of the stem below the cotyledons (*hypocotyl*) commonly plays the greater part in bringing this about. Exalbuminous Dicotyledons usually store reserve-food in their cotyledons, which may in germination remain below ground (*hypogean*). In albuminous Monocotyledons the cotyledon itself, probably in consequence of its terminal position, is commonly the agent by which the embryo is thrust out of the seed, and it may function solely as a feeder, its extremity developing as a sucker through which the endosperm is absorbed, or it may become the first green organ, the terminal sucker dropping off with the seed-coat when the endosperm is exhausted. Exalbuminous Monocotyledons are either hydrophytes or strongly hygrophilous plants and have often peculiar features in germination.

Distribution by seed appears to satisfy so well the requirements of Angiosperms that distribution by vegetative buds is only an occasional process. At the same time every bud on a shoot has the capacity to form a new plant if placed in suitable conditions, as the horticultural practice of propagation by cuttings shows; in nature we see plants spreading by the rooting of their shoots, and buds we know may be freely formed not only on stems but on leaves and on roots. Where detachable buds are produced, which can be transported through the air to a distance, each of them is an incipient shoot which may have a root, and there is always reserve-food stored in some part of it. In essentials such a bud resembles a seed. A relation between such vegetative distribution buds and production of flower is usually marked. Where there is free formation of buds there is little flower and commonly no seed, and the converse is also the case. Viviparous plants are an illustration of substitution of vegetative buds for flower.

*Vegetative reproduction.*

The position of Angiosperms as the highest plant-group is unassailable, but of the point or points of their origin from the general stem of the plant kingdom, and of the path or paths of their evolution, we can as yet say little.

*Phylogeny and taxonomy.*

Until well on in the Mesozoic period geological history tells us nothing about Angiosperms, and then only by their vegetative organs. We readily recognize in them now-a-days the natural classes of Dicotyledons and Monocotyledons distinguished alike in vegetative and in reproductive construction, yet showing remarkable parallel sequences in development; and we see that the Dicotyledons are the more advanced and show the greater capacity for further progressive evolution. But there is no sound basis for the assumption that the Dicotyledons are derived from Monocotyledons; indeed, the palaeontological evidence seems to point to the Dicotyledons being the older. This, however, does not entitle us to assume the origin of Monocotyledons from Dicotyledons, although there is manifestly a temptation to connect helobiac forms of the former with ranal ones of the latter. There is no doubt that the phylum of Angiosperms has not sprung from that of Gymnosperms.

Within each class the flower-characters as the essential feature of Angiosperms supply the clue to phylogeny, but the uncertainty regarding the construction of the primitive angiospermous flower gives a fundamental point of divergence in attempts to construct progressive sequences of the families. Simplicity of flower-structure has appeared to some to be always primitive, whilst by others it has been taken to be always derived. There is, however, abundant evidence that it may have the one or the other character in different cases. Apart from this, botanists are generally agreed that the concrescence of parts of the flower-whorls—in the gynaecium as the seed-covering, and in the corolla as the seat of attraction, more than in the androecium and the calyx—is an indication of advance, as is also the concrescence that gives the condition of epigyny. Dorsiventrality is also clearly derived from radial construction, and anatropy of the ovule has followed atropy. We should expect the albuminous state of the seed to be an antecedent one to the exalbuminous condition, and the recent discoveries in fertilization tend to confirm this view. Amongst Dicotyledons the gamopetalous forms are admitted to be the highest development and a dominant one of our epoch. Advance has been along two lines, markedly in relation to insect-pollination, one of which has culminated in the hypogynous epipetalous bicarpellate forms with dorsiventral often large and loosely arranged flowers such as occur in Scrophulariaceae, and the other in the epigynous bicarpellate small-flowered families of which the Compositae represent the most elaborate type. In the polypetalous forms progression from hypogyny to epigyny is generally recognized, and where dorsiventrality with insect-pollination has been established, a dominant group has been developed as in the Leguminosae. The starting-point of the class, however, and the position within it of apetalous families with frequently unisexual flowers, have provoked much discussion. In Monocotyledons a similar advance from hypogyny to epigyny is observed, and from the dorsiventral to the radial type of flower. In this connexion it is noteworthy that so many of the higher forms are adapted as bulbous geophytes, or as aerophytes to special xerophilous conditions. The Gramineae offer a prominent example of a dominant self-pollinated or wind-pollinated family, and this may find explanation in a multiplicity of factors.

Though best known for his artificial (or sexual) system, Linnaeus was impressed with the importance of elaborating a natural system of arrangement in which plants should be arranged according to their true affinities. In his *Philosophia Botanica* (1751) Linnaeus grouped the genera then known into sixty-seven orders (*fragmenta*), all except five of which are Angiosperms. He gave names to these but did not characterize them or attempt to arrange them in larger groups. Some represent natural groups and had in several cases been already recognized by Ray and others, but the majority are, in the light of modern knowledge, very mixed. Well-defined

polypetalous and gamopetalous genera sometimes occur in the same order, and even Monocotyledons and Dicotyledons are classed together where they have some striking physiological character in common.

Work on the lines suggested by the Linnaean *fragmenta* was continued in France by Bernard de Jussieu and his nephew, Antoine Laurent, and the arrangement suggested by the latter in his *Genera Plantarum secundum Ordines Naturales disposita* (1789) is the first which can claim to be a natural system. The orders are carefully characterized, and those of Angiosperms are grouped in fourteen classes under the two main divisions Monocotyledons and Dicotyledons. The former comprise three classes, which are distinguished by the relative position of the stamens and ovary; the eleven classes of the latter are based on the same set of characters and fall into the larger subdivisions Apetalae, Monopetalae and Polypetalae, characterized respectively by absence, union or freedom of the petals, and a subdivision, *Diclinales Irregulares*, a very unnatural group, including one class only. A. P. de Candolle introduced several improvements into the system. In his arrangement the last subdivision disappears, and the Dicotyledons fall into two groups, a larger containing those in which both calyx and corolla are present in the flower, and a smaller, Monochlamydeae, representing the Apetalae and *Diclinales Irregulares* of Jussieu. The dichlamydeous group is subdivided into three, Thalamiflorae, Calyciflorae and Corolliflorae, depending on the position and union of the petals. This, which we may distinguish as the French system, finds its most perfect expression in the classic *Genera Plantarum* (1862-1883) of Bentham and Hooker, a work containing a description, based on careful examination of specimens, of all known genera of flowering plants. The subdivision is as follows:—

## DICOTYLEDONS.

- Polypetalae:
  - Thalamiflorae.
  - Disciflorae.
  - Calyciflorae.
- Gamopetalae:
  - Inferae.
  - Heteromerae.
  - Bicarpellatae.
- Monochlamydeae in eight series.
- Monocotyledons in seven series.

Of the Polypetalae, series 1, Thalamiflorae, is characterized by hypogynous petals and stamens, and contains 34 orders distributed in 6 larger groups or cohorts. Series 2, Disciflorae, takes its name from a development of the floral axis which forms a ring or cushion at the base of the ovary or is broken up into glands; the ovary is superior. It contains 23 orders in 4 cohorts. Series 3, Calyciflorae, has petals and stamens perigynous, or sometimes superior. It contains 27 orders in 5 cohorts.

Of the Gamopetalae, series 1, Inferae, has an interior ovary and stamens usually as many as the corolla-lobes. It contains 9 orders in 3 cohorts. Series 2, Heteromerae, has generally a superior ovary, stamens as many as the corolla-lobes or more, and more than two carpels. It contains 12 orders in 3 cohorts. Series 3, Bicarpellatae, has generally a superior ovary and usually two carpels. It contains 24 orders in 4 cohorts.

The eight series of Monochlamydeae, containing 36 orders, form groups characterized mainly by differences in the ovary and ovules, and are now recognized as of unequal value.

The seven series of Monocotyledons represent a sequence beginning with the most complicated epigynous orders, such as Orchideae and Scitamineae, and passing through the petaloid hypogynous orders (series Coronarieae) of which Liliaceae is the representative to Juncaceae and the palms (series Calycinae) where the perianth loses its petaloid character and thence to the Aroids, screw-pines and others where it is more or less aborted (series Nudiflorae). Series 6, Apocarpeae, is characterized by 5 carpels, and in the last series Glumaceae, great simplification in the flower is associated with a grass-like habit.

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The sequence of orders in the polypetalous subdivision of Dicotyledons undoubtedly represents a progression from simpler to more elaborate forms, but a great drawback to the value of the system is the inclusion among the Monochlamydeae of a number of orders which are closely allied with orders of Polypetalae though differing in absence of a corolla. The German systematist, A. W. Eichler, attempted to remove this disadvantage which since the time of Jussieu had characterized the French system, and in 1883 grouped the Dicotyledons in two subclasses. The earlier Choripetalae embraces the Polypetalae and Monochlamydeae of the French systems. It includes 21 series, and is an attempt to arrange as far as possible in a linear series those orders which are characterized by absence or freedom of petals. The second subclass, Gamopetalae, includes 9 series and culminates in those which show the most elaborate type of flower, the series Aggregatae, the chief representative of which is the great and wide-spread order Compositae. A modification of Eichler's system, embracing the most recent views of the affinities of the orders of Angiosperms, has been put forward by Dr. Adolf Engler of Berlin, who adopts the suggestive names Archichlamydeae and Metachlamydeae for the two subdivisions of Dicotyledons. Dr. Engler is the principal editor of a large series of volumes which, under the title *Die natürlichen Pflanzenfamilien*, is a systematic account of all the known genera of plants and represents the work of many botanists. More recently in *Das Pflanzenreich* the same author

organized a series of complete monographs of the families of seed-plants.

As an attempt at a phylogenetic arrangement, Engler's system is now preferred by many botanists. More recently a startling novelty in the way of system has been produced by van Tieghem, as follows:

- **Monocotyledons.**
- **Liorhizal Dicotyledons.**
- **Dicotyledons.**
  - INSEMINEAE.
  - SEMINEAE.
    - *Unitegmineae.*
    - *Bitegmineae.*

The most remarkable feature here is the class of Liorhizal Dicotyledons, which includes only the families of Nymphaeaceae and Gramineae. It is based upon the fact that the histological differentiation of the epidermis of their root is that generally characteristic of Monocotyledons, whilst they have two cotyledons—the old view of the epiblast as a second cotyledon in Gramineae being adopted. But the presence of a second cotyledon in grasses is extremely doubtful, and though there may be ground for reconsidering the position of Nymphaeaceae, their association with the grasses as a distinct class is not warranted by a comparative examination of the members of the two orders. Ovular characters determine the grouping in the Dicotyledons, van Tieghem supporting the view that the integument, the outer if there be two, is the lamina of a leaf of which the funicle is the petiole, whilst the nucellus is an outgrowth of this leaf, and the inner integument, if present, an indusium. The Insemineae include forms in which the nucellus is not developed, and therefore there can be no seed. The plants included are, however, mainly well-established parasites, and the absence of nucellus is only one of those characters of reduction to which parasites are liable. Even if we admit van Tieghem's interpretation of the integuments to be correct, the diagnostic mark of his unitegminous and bitegminous groups is simply that of the absence or presence of an indusium, not a character of great value elsewhere, and, as we know, the number of the ovular coats is inconstant within the same family. At the same time the groups based upon the integuments are of much the same extent as the Polypetalae and Gamopetalae of other systems. We do not yet know the significance of this correlation, which, however, is not an invariable one, between number of integuments and union of petals.

Within the last few years Prof. John Coulter and Dr. C. J. Chamberlain of Chicago University have given a valuable general account of the morphology of Angiosperms as far as concerns the flower, and the series of events which ends in the formation of the seed (*Morphology of Angiosperms*, Chicago, 1903).

AUTHORITIES.—The reader will find in the following works details of the subject and references to the literature: Bentham and Hooker, *Genera Plantarum* (London, 1862-1883); Eichler, *Bluthendiagramme* (Leipzig, 1875-1878); Engler and Prantl, *Die natürlichen Pflanzenfamilien* (Leipzig, 1887-1899); Engler, *Syllabus der Pflanzenfamilien*, 3rd ed. (Berlin, 1903); Knuth, *Handbuch der Blütenbiologie* (Leipzig, 1898, 1899); Sachs, *History of Botany*, English ed. (Oxford, 1890); Solereder, *Systematische Anatomie der Dicotyledonen* (Stuttgart, 1899); van Tieghem, *Elements de botanique*; Coulter and Chamberlain, *Morphology of Angiosperms* (New York, 1903).

(I. B. B.; A. B. R.)

**ANGKOR**, an assemblage of ruins in Cambodia, the relic of the ancient Khmer civilization. They are situated in forests to the north of the Great Lake (Tonle-Sap), the most conspicuous of the remains being the town of Angkor-Thom and the temple of Angkor-Vat, both of which lie on the right bank of the river Siem-Reap, a tributary of Tonle-Sap. Other remains of the same form and character lie scattered about the vicinity on both banks of the river, which is crossed by an ancient stone bridge.

Angkor-Thom lies about a quarter of a mile from the river. According to Aymonier it was begun about A.D. 860, in the reign of the Khmer sovereign Jayavarman III., and finished towards A.D. 900. It consists of a rectangular enclosure, nearly 2 m. in each direction, surrounded by a wall from 20 to 30 ft. in height. Within the enclosure, which is entered by five monumental gates, are the remains of palaces and temples, overgrown by the forest. The chief of these are:—

(1) The vestiges of the royal palace, which stood within an enclosure containing also the pyramidal religious structure known as the Phimeanakas. To the east of this enclosure there extends a terrace decorated with magnificent reliefs.

(2) The temple of Bayon, a square enclosure formed by galleries with colonnades, within which is another and more elaborate system of galleries, rectangular in arrangement and enclosing a cruciform structure, at the centre of which rises a huge tower with a circular base. Fifty towers, decorated with quadruple faces of Brahma, are built at intervals upon the galleries, the whole temple ranking as perhaps the most remarkable of the Khmer remains.

Angkor-Vat, the best preserved example of Khmer architecture, lies less than a mile to the south

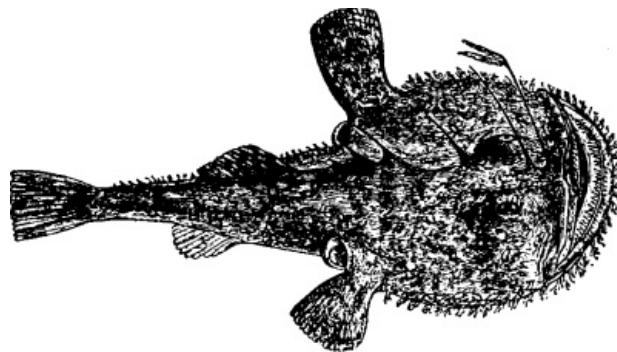
of the royal city, within a rectangular park surrounded by a moat, the outer perimeter of which measures 6060 yds. On the west side of the park a paved causeway, leading over the moat and under a magnificent portico, extends for a distance of a quarter of a mile to the chief entrance of the main building. The temple was originally devoted to the worship of Brahma, but afterwards to that of Buddha; its construction is assigned by Aymonier to the first half of the 12th century A.D. It consists of three stages, connected by numerous exterior staircases and decreasing in dimensions as they rise, culminating in the sanctuary, a great central tower pyramidal in form. Towers also surmount the angles of the terraces of the two upper stages. Three galleries with vaulting supported on columns lead from the three western portals to the second stage. They are connected by a transverse gallery, thus forming four square basins. Khmer decoration, profuse but harmonious, consists chiefly in the representation of gods, men and animals, which are displayed on every flat surface. Combats and legendary episodes are often depicted; floral decoration is reserved chiefly for borders, mouldings and capitals. Sandstone of various colours was the chief material employed by the Khmers; limonite was also used. The stone was cut into huge blocks which are fitted together with great accuracy without the use of cement.

See E. Aymonier, *Le Cambodge* (3 vols., 1900-1904); Doudart de Lagrée, *Voyage d'exploration en Indo-Chine* (1872-1873); A. H. Mouhot, *Travels in Indo-China, Cambodia and Laos* (2 vols., 1864); Fournereau and Porcher, *Les Ruines d'Angkor* (1890); L. Delaporte, *Voyage au Cambodge: l'architecture Khmer* (1880); J. Moura, *Le Royaume de Cambodge* (2 vols., 1883).

**ANGLE** (from the Lat. *angulus*, a corner, a diminutive, of which the primitive form, *angus*, does not occur in Latin; cognate are the Lat. *angere*, to compress into a bend or to strangle, and the Gr. ἄγκος, a bend; both connected with the Aryan root *ank-*, to bend: see ANGLING), in geometry, the inclination of one line or plane to another. Euclid (*Elements*, book I) defines a plane angle as the inclination to each other, in a plane, of two lines which meet each other, and do not lie straight with respect to each other (see GEOMETRY, EUCLIDEAN). According to Proclus an angle must be either a quality or a quantity, or a relationship. The first concept was utilized by Eudemus, who regarded an angle as a deviation from a straight line; the second by Carpus of Antioch, who regarded it as the interval or space between the intersecting lines; Euclid adopted the third concept, although his definitions of right, acute, and obtuse angles are certainly quantitative. A discussion of these concepts and the various definitions of angles in Euclidean geometry is to be found in W. B. Frankland, *The First Book of Euclid's Elements* (1905). Following Euclid, a right angle is formed by a straight line standing upon another straight line so as to make the adjacent angles equal; any angle less than a right angle is termed an acute angle, and any angle greater than a right angle an obtuse angle. The difference between an acute angle and a right angle is termed the complement of the angle, and between an angle and two right angles the supplement of the angle. The generalized view of angles and their measurement is treated in the article TRIGONOMETRY. A solid angle is definable as the space contained by three or more planes intersecting in a common point; it is familiarly represented by a corner. The angle between two planes is termed dihedral, between three trihedral, between any number more than three polyhedral. A spherical angle is a particular dihedral angle; it is the angle between two intersecting arcs on a sphere, and is measured by the angle between the planes containing the arcs and the centre of the sphere.

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The angle between a line and a curve (mixed angle) or between two curves (curvilinear angle) is measured by the angle between the line and the tangent at the point of intersection, or between the tangents to both curves at their common point. Various names (now rarely, if ever, used) have been given to particular cases:—amphicyrtic (Gr. ἀμφί, on both sides, κυρτός, convex) or cissoidal (Gr. κισσός, ivy), biconvex; xystroidal or sistroidal (Gr. ξυστήρις, a tool for scraping), concavo-convex; amphicoelic (Gr. κοίλη, a hollow) or *angulus lunularis*, biconcave.



The Angler (*Lophius piscatorius*).

**ANGLER**, also sometimes called fishing-frog, frog-fish, sea-devil (*Lophius piscatorius*), a fish well known off the coasts of Great Britain and Europe generally, the grotesque shape of its body and its singular habits having attracted the attention of naturalists of all ages. To the North Sea fishermen this fish is known as the "monk," a name which more properly belongs to *Rhina squatina*, a fish allied to the skates. Its head is of enormous size, broad, flat and depressed, the remainder of the body appearing merely like an appendage. The wide mouth extends all round



the anterior circumference of the head; and both jaws are armed with bands of long pointed teeth, which are inclined inwards, and can be depressed so as to offer no impediment to an object gliding towards the stomach, but to prevent its escape from the mouth. The pectoral and ventral fins are so articulated as to perform the functions of feet, the fish being enabled to move, or rather to walk, on the bottom of the sea, where it generally hides itself in the sand or amongst sea-weed. All round its head and also along the body the skin bears fringed appendages resembling short fronds of sea-weed, a structure which, combined with the extraordinary faculty of assimilating the colour of the body to its surroundings, assists this fish greatly in concealing itself in places which it selects on account of the abundance of prey. To render the organization of this creature perfect in relation to its wants, it is provided with three long filaments inserted along the middle of the head, which are, in fact, the detached and modified three first spines of the anterior dorsal fin. The filament most important in the economy of the angler is the first, which is the longest, terminates in a lappet, and is movable in every direction. The angler is believed to attract other fishes by means of its lure, and then to seize them with its enormous jaws. It is probable enough that smaller fishes are attracted in this way, but experiments have shown that the action of the jaws is automatic and depends on contact of the prey with the tentacle. Its stomach is distensible in an extraordinary degree, and not rarely fishes have been taken out quite as large and heavy as their destroyer. It grows to a length of more than 5 ft.; specimens of 3 ft. are common. The spawn of the angler is very remarkable. It consists of a thin sheet of transparent gelatinous material 2 or 3 ft. broad and 25 to 30 ft. in length. The eggs in this sheet are in a single layer, each in its own little cavity. The spawn is free in the sea. The larvae are free-swimming and have the pelvic fins elongated into filaments. The British species is found all round the coasts of Europe and western North America, but becomes scarce beyond 60° N. lat.; it occurs also on the coasts of the Cape of Good Hope. A second species (*Lophius budegassa*) inhabits the Mediterranean, and a third (*L. setigerus*) the coasts of China and Japan.

**ANGLESEY, ARTHUR ANNESLEY, 1st EARL OF (1614-1686)**, British statesman, son of the 1st Viscount Valentia (cr. 1621) and Baron Mountnorris (cr. 1628), and of Dorothy, daughter of Sir John Philipps of Picton Castle, Pembrokeshire, was born at Dublin on the 10th of July 1614, was educated at Magdalen College, Oxford, and was admitted to Lincoln's Inn in 1634. Having made the grand tour he returned to Ireland; and being employed by the parliament in a mission to the duke of Ormonde, now reduced to the last extremities, he succeeded in concluding a treaty with him on the 19th of June 1647, thus securing the country from complete subjection to the rebels. In April 1647 he was returned for Radnorshire to the House of Commons. He supported the parliamentary as against the republican or army party, and appears to have been one of the members excluded in 1648. He sat in Richard Cromwell's parliament for Dublin city, and endeavoured to take his seat in the restored Rump Parliament of 1659. He was made president of the council in February 1660, and in the Convention Parliament sat for Carmarthen borough. The anarchy of the last months of the commonwealth converted him to royalism, and he showed great activity in bringing about the Restoration. He used his influence in moderating measures of revenge and violence, and while sitting in judgment on the regicides was on the side of leniency. In November 1660 by his father's death he had become Viscount Valentia and Baron Mountnorris in the Irish peerage, and on the 20th April 1661 he was created Baron Annesley of Newport Pagnell in Buckinghamshire and earl of Anglesey in the peerage of Great Britain. He supported the king's administration in parliament, but opposed strongly the unjust measure which, on the abolition of the court of wards, placed the extra burden of taxation thus rendered necessary on the excise. His services in the administration of Ireland were especially valuable. He filled the office of vice-treasurer from 1660 till 1667, served on the committee for carrying out the declaration for the settlement of Ireland and on the committee for Irish affairs, while later, in 1671 and 1672, he was a leading member of various commissions appointed to investigate the working of the Acts of Settlement. In February 1661 he had obtained a captaincy of horse, and in 1667 he exchanged his vice-treasuryship of Ireland for the treasuryship of the navy. His public career was marked by great independence and fidelity to principle. On the 24th of July 1663 he alone signed a protest against the bill "for the encouragement of trade," on the plea that owing to the free export of coin and bullion allowed by the act, and to the importation of foreign commodities being greater than the export of home goods, "it must necessarily follow ... that our silver will also be carried away into foreign parts and all trade fail for want of money."<sup>[1]</sup> He especially disapproved of another clause in the same bill forbidding the importation of Irish cattle into England, a mischievous measure promoted by the duke of Buckingham, and he opposed again the bill brought in with that object in January 1667. This same year his naval accounts were subjected to an examination in consequence of his indignant refusal to take part in the attack upon Ormonde;<sup>[2]</sup> and he was suspended from his office in 1668, no charge, however, against him being substantiated. He took a prominent part in the dispute in 1671 between the two Houses concerning the right of the Lords to amend money bills, and wrote a learned pamphlet on the question entitled *The Privileges of the House of Lords and Commons* (1702), in which the right of the Lords was asserted. In April 1673 he was appointed lord privy seal, and was disappointed at not obtaining the great seal the same year on the removal of Shaftesbury. In 1679 he was included in Sir W. Temple's new-modelled council.

In the bitter religious controversies of the time Anglesey showed great moderation and toleration. In 1674 he is mentioned as endeavouring to prevent the justices putting into force the laws against the Roman Catholics and Nonconformists.<sup>[3]</sup> In the panic of the "Popish Plot" in 1678 he exhibited a saner judgment than most of his contemporaries and a conspicuous courage.

On the 6th of December he protested with three other peers against the measure sent up from the Commons enforcing the disarming of all convicted recusants and taking bail from them to keep the peace; he was the only peer to dissent from the motion declaring the existence of an Irish plot; and though believing in the guilt and voting for the death of Lord Stafford, he interceded, according to his own account,<sup>[4]</sup> with the king for him as well as for Langhorne and Plunket. His independent attitude drew upon him an attack by Dangerfield, and in the Commons by the attorney-general, Sir W. Jones, who accused him of endeavouring to stifle the evidence against the Romanists. In March 1679 he protested against the second reading of the bill for disabling Danby. In 1681 Anglesey wrote *A Letter from a Person of Honour in the Country*, as a rejoinder to the earl of Castlehaven, who had published memoirs on the Irish rebellion defending the action of the Irish and the Roman Catholics. In so doing Anglesey was held by Ormonde to have censured his conduct and that of Charles I. in concluding the "Cessation," and the duke brought the matter before the council. In 1682 he wrote *The Account of Arthur, Earl of Anglesey ... of the true state of Your Majesty's Government and Kingdom*, which was addressed to the king in a tone of censure and remonstrance, but appears not to have been printed till 1694.<sup>[5]</sup> In consequence he was dismissed on the 9th of August 1682 from the office of lord privy seal. In 1683 he appeared at the Old Bailey as a witness in defence of Lord Russell, and in June 1685 he protested alone against the revision of Stafford's attainder. He died at his home at Blechingdon in Oxfordshire on the 26th of April 1686, closing a career marked by great ability, statesmanship and business capacity, and by conspicuous courage and independence of judgment. He amassed a large fortune in Ireland, in which country he had been allotted lands by Cromwell.

The unfavourable character drawn of him by Burnet is certainly unjust and not supported by any evidence. Pepys, a far more trustworthy judge, speaks of him invariably in terms of respect and approval as a "grave, serious man," and commends his appointment as treasurer of the navy as that of "a very notable man and understanding and will do things regular and understand them himself."<sup>[6]</sup> He was a learned and cultivated man and collected a celebrated library, which was dispersed at his death. Besides the pamphlets already mentioned, he wrote:—*A True Account of the Whole Proceedings betwixt ... the Duke of Ormond and ... the Earl of Anglesey* (1682); *A Letter of Remarks upon Jovian* (1683); other works ascribed to him being *The King's Right of Indulgence in Matters Spiritual ... asserted* (1688); *Truth Unveiled, to which is added a short Treatise on ... Transubstantiation* (1676); *The Obligation resulting from the Oath of Supremacy* (1688); and *England's Confusion* (1659). *Memoirs* of Lord Anglesey were published by Sir P. Pett in 1693, but contain little biographical information and were repudiated as a mere imposture by Sir John Thompson (Lord Haversham), his son-in-law, in his preface to Lord Anglesey's *State of the Government* in 1694. The author however of the preface to *The Rights of the Lords asserted* (1702), while blaming their publication as "scattered and unfinished papers," admits their genuineness.

Lord Anglesey married Elizabeth, daughter and co-heiress of Sir James Altham of Oxey, Hertfordshire, by whom, besides other children, he had James, who succeeded him, Altham, created Baron Altham, and Richard, afterwards 3rd Baron Altham. His descendant Richard, the 6th earl (d. 1761), left a son Arthur, whose legitimacy was doubted, and the peerage became extinct. He was summoned to the Irish House of Peers as Viscount Valentia, but was denied his writ to the parliament of Great Britain by a majority of one vote. He was created in 1793 earl of Mountnorris in the peerage of Ireland. All the male descendants of the 1st earl of Anglesey became extinct in the person of George, 2nd earl of Mountnorris, in 1844, when the titles of Viscount Valentia and Baron Mountnorris passed to his cousin Arthur Annesley (1785-1863), who thus became 10th Viscount Valentia, being descended from the 1st Viscount Valentia the father of the 1st earl of Anglesey in the Annesley family. The 1st viscount was also the ancestor of the Earls Annesley in the Irish peerage.

AUTHORITIES.—*Dict. of Nat. Biography*, with authorities there collected; lives in Wood's *Athenae Oxonienses* (Bliss), iv. 181, *Biographia Britannica*, and H. Walpole's *Royal and Noble Authors* (1806), iii. 288 (the latter a very inadequate review of Anglesey's character and career); also *Bibliotheca Anglesiana ... per Thomam Philippum* (1686); *The Happy Future State of England*, by Sir Peter Pett (1688); *Great News from Poland* (1683), where his religious tolerance is ridiculed; *Somers Tracts* (Scott, 1812), viii. 344; *Notes of the Privy Council* (Roxburghe Club, 1896); *Cal. of State Papers, Dom.*; *State Trials*, viii. and ix. 619.

(P. C. Y.)

[1] *Protests of the Lords*, by J. E. Thorold Rogers (1875), i. 27; Carti's *Life of Ormonde* (1851), iv. 234; *Parl. Hist.* iv. 284.

[2] Carti's *Ormonde*, iv. 330, 340.

[3] *Cal. of State Pap. Dom.* (1673-1675), p. 152.

[4] *Memoirs*, 8, 9.

[5] By Sir J. Thompson, his son-in-law. Reprinted in *Somers Tracts* (Scott, 1812), viii. 344, and in *Parl. Hist.* iv. app. xvi.

[6] *Diary* (ed. Wheatley, 1904), iv. 298, vii. 14.

**ANGLESEY, HENRY WILLIAM PAGET**, 1st MARQUESS OF (1768-1854), British field-marshal, was born on the 17th of May 1768. He was the eldest son of Henry Paget, 1st earl of Uxbridge (d. 1812), and was educated at Westminster School and Christ Church, Oxford, afterwards entering parliament in 1790 as member for Carnarvon, for which he sat for six years. At the outbreak of the French Revolutionary wars Lord Paget (as he was then styled), who had already served in the militia, raised on his father's estate the regiment of Staffordshire volunteers, in which he was given the temporary rank of lieutenant-colonel (1793). The corps soon became part of the regular army as the 80th Foot, and it took part, under Lord Paget's command, in the Flanders campaign of 1794. In spite of his youth he held a brigade command for a time, and gained also, during the campaign, his first experience of the cavalry arm, with which he was thenceforward associated. His substantive commission as lieutenant-colonel of the 16th Light Dragoons bore the date of the 15th of June 1795, and in 1796 he was made a colonel in the army. In 1795 he married Lady Caroline Elizabeth Villiers, daughter of the earl of Jersey. In April 1797 Lord Paget was transferred to a lieut.-colonelcy in the 7th Light Dragoons, of which regiment he became colonel in 1801. From the first he applied himself strenuously to the improvement of discipline, and to the perfection of a new system of cavalry evolutions. In the short campaign of 1799 in Holland, Paget commanded the cavalry brigade, and in spite of the unsuitable character of the ground, he made, on several occasions, brilliant and successful charges. After the return of the expedition, he devoted himself zealously to his regiment, which under his command became one of the best corps in the service. In 1802 he was promoted major-general, and six years later lieutenant-general. In command of the cavalry of Sir John Moore's army during the Corunna campaign, Lord Paget won the greatest distinction. At Sahagun, Mayorga and Benavente, the British cavalry behaved so well under his leadership that Moore wrote:—"It is impossible for me to say too much in its praise.... Our cavalry is very superior in quality to any the French have, and the right spirit has been infused into them by the example and instruction of their ... leaders...." At Benavente one of Napoleon's best cavalry leaders, General Lefebvre Desnoëttes, was taken prisoner. Corunna was Paget's last service in the Peninsula. His *liaison* with the wife of Henry Wellesley, afterwards Lord Cowley, made it impossible at that time for him to serve with Wellington, whose cavalry, on many occasions during the succeeding campaigns, felt the want of the true cavalry leader to direct them. His only war service from 1809 to 1815 was in the disastrous Walcheren expedition (1809) in which he commanded a division. During these years he occupied himself with his parliamentary duties as member for Milborne Port, which he represented almost continuously up to his father's death in 1812, when he took his seat in the House of Lords as earl of Uxbridge. In 1810 he was divorced and married Mrs Wellesley, who had about the same time been divorced from her husband. Lady Paget was soon afterwards married to the duke of Argyll. In 1815 Lord Uxbridge received command of the British cavalry in Flanders. At a moment of danger such as that of Napoleon's return from Elba, the services of the best cavalry general in the British army could not be neglected. Wellington placed the greatest confidence in him, and on the eve of Waterloo extended his command so as to include the whole of the allied cavalry and horse artillery. He covered the retirement of the allies from Quatre Bras to Waterloo on the 17th of June, and on the 18th gained the crowning distinction of his military career in leading the great cavalry charge of the British centre, which checked and in part routed D'Erlon's *corps d'armée* (see WATERLOO CAMPAIGN). Freely exposing his own life throughout, the earl received, by one of the last cannon shots fired, a severe wound in the leg, necessitating amputation. Five days later the prince regent created him marquess of Anglesey in recognition of his brilliant services, which were regarded universally as second only to those of the duke himself. He was made a G. C. B. and he was also decorated by many of the allied sovereigns.

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In 1818 the marquess was made a knight of the Garter, in 1819 he became full general, and at the coronation of George IV. he acted as lord high steward of England. His support of the proceedings against Queen Caroline made him for a time unpopular, and when he was on one occasion beset by a crowd, who compelled him to shout "The Queen," he added the wish, "May all your wives be like her." At the close of April 1827 he became a member of the Canning administration, taking the post of master-general of the ordnance, previously held by Wellington. He was at the same time sworn a member of the privy council. Under the Wellington administration he accepted the appointment of lord-lieutenant of Ireland (March 1828), and in the discharge of his important duties he greatly endeared himself to the Irish people. The spirit in which he acted and the aims which he steadily set before himself contributed to the allaying of party animosities, to the promotion of a willing submission to the laws, to the prosperity of trade and to the extension and improvement of education. On the great question of the time his views were opposed to those of the government. He saw clearly that the time was come when the relief of the Catholics from the penal legislation of the past was an indispensable measure, and in December 1828 he addressed a letter to the Roman Catholic primate of Ireland distinctly announcing his view. This led to his recall by the government, a step sincerely lamented by the Irish. He pleaded for Catholic emancipation in parliament, and on the formation of Earl Grey's administration in November 1830, he again became lord-lieutenant of Ireland. The times were changed; the act of emancipation had been passed, and the task of viceroy in his second tenure of office was to resist the agitation for repeal of the union carried on by O'Connell. He felt it his duty now to demand Coercion Acts for the security of the public peace; his popularity was diminished, differences appeared in the cabinet on the difficult subject, and in July 1833 the ministry resigned. To the marquess of Anglesey Ireland is indebted for the board of education, the origination of which may perhaps be reckoned as the most memorable act of his viceroyalty. For thirteen years after his retirement he remained out of office, and took little part in the affairs of government. He joined the Russell administration in July 1846 as master-general of the ordnance, finally retiring with his chief in March 1852. His promotion in the army was completed

by his advancement to the rank of field-marshal in 1846. Four years before, he exchanged his colonelcy of the 7th Light Dragoons which he had held over forty years, for that of the Royal Horse Guards. He died on the 29th of April 1854.

The marquess had a large family by each of his two wives, two sons and six daughters by the first and six sons and four daughters by the second. His eldest son, Henry, succeeded him in the marquessate; but the title passed rapidly in succession to the 3rd, 4th and 5th marquesses. The latter, whose extravagances were notorious, died in 1905, when the title passed to his cousin.

Other members of the Paget family distinguished themselves in the army and the navy. Of the first marquess's brothers one, SIR CHARLES PAGET (1778-1839), rose to the rank of vice-admiral in the Royal Navy; another, General SIR EDWARD PAGET (1775-1849), won great distinction by his skilful and resolute handling of a division at Corunna, and from 1822 to 1825 was commander-in-chief in India. One of the marquess's sons by his second marriage, LORD CLARENCE EDWARD PAGET (1811-1895), became an admiral; another, LORD GEORGE AUGUSTUS FREDERICK PAGET (1818-1880), led the 4th Light Dragoons in the charge of the Light Brigade at Balaklava, and subsequently commanded the brigade, and, for a short time, the cavalry division in the Crimea. In 1865 he was made inspector-general of cavalry, in 1871 lieutenant-general and K. C. B., and in 1877 full general. His Crimean journals were published in 1881.

**ANGLESEY**, or ANGLESEA, an insular northern county of Wales. Its area is 176,630 acres or about 276 sq. m. Anglesey, in the see of Bangor, is separated from the mainland by the Menai Straits (Afon Menai), over which were thrown Telford's suspension bridge, in 1826, and the Stephenson tubular railway bridge in 1850. The county is flat, with slight risings such as Parys, Cadair Mynachdy (or Monachdy, *i.e.* "chair of the monastery"; there is a Nanner, "convent," not far away) and Holyhead Mountain. There are a few lakes, such as Cors cerrig y daran, but rising water is generally scarce. The climate is humid, the land poor for the most part compared with its old state of fertility, and there are few industries.

As regards geology, the younger strata in Anglesey rest upon a foundation of very old pre-Cambrian rocks which appear at the surface in three areas:—(1) a western region including Holyhead and Llanfaethlu, (2) a central area about Aberffraw and Trefdraeth, and (3) an eastern region which includes Newborough, Caerwen and Pentraeth. These pre-Cambrian rocks are schists and slates, often much contorted and disturbed. The general line of strike of the formations in the island is from N.E. to S.W. A belt of granitic rocks lies immediately north-west of the central pre-Cambrian mass, reaching from Llanfaelog near the coast to the vicinity of Llanerchymedd. Between this granite and the pre-Cambrian of Holyhead is a narrow tract of Ordovician slates and grits with Llandovery beds in places; this tract spreads out in the N. of the island between Dulas Bay and Carmel Point. A small patch of Ordovician strata lies on the northern side of Beaumaris. In parts, these Ordovician rocks are much folded, crushed and metamorphosed, and they are associated with schists and altered volcanic rocks which are probably pre-Cambrian. Between the eastern and central pre-Cambrian masses carboniferous rocks are found. The carboniferous limestone occupies a broad area S. of Ligwy Bay and Pentraeth, and sends a narrow spur in a south-westerly direction by Llangefni to Malldraeth sands. The limestone is underlain on the N.W. by a red basement conglomerate and yellow sandstone (sometimes considered to be of Old Red Sandstone age). Limestone occurs again on the N. coast about Llanfihangel and Llangoed; and in the S.W. round Llanidan on the border of the Menai Strait. Puffin Island is made of carboniferous limestone. Malldraeth Marsh is occupied by coal measures, and a small patch of the same formation appears near Tall-y-foel Ferry on the Menai Straits. A patch of granitic and felsitic rocks form Parys Mountain, where copper and iron ochre have been worked. Serpentine (Mona Marble) is found near Llanfaerynneubwll and upon the opposite shore in Holyhead. There are abundant evidences of glaciation, and much boulder clay and drift sand covers the older rocks. Patches of blown sand occur on the S.W. coast.

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The London & North-Western railway (Chester and Holyhead branch) crosses Anglesey from Llanfairpwllgwyngyll to Gaerwen and Holyhead (Caer Gybi), also from Gaerwen to Amlwch. The staple of the island is farming, the chief crops being turnips, oats, potatoes, with flax in the centre. Copper (near Amlwch), lead, silver, marble, asbestos, lime and sandstone, marl, zinc and coal have all been worked in Anglesey, coal especially at Malldraeth and Trefdraeth. The population of the county in 1901 was 50,606. There is no parliamentary borough, but one member is returned for the county. It is in the north-western circuit, and assizes are held at Beaumaris, the only municipal borough (pop. 2326). Amlwch (2994), Holyhead (10,079), Llangefni (1751) and Menai Bridge (Pont y Borth, 1700) are urban districts. There are six hundreds and seventy-eight parishes.

Môn (a cow) is the Welsh name of Anglesey, itself a corrupted form of O. E., meaning the Isle of the Angles. Old Welsh names are Ynys Dywyll ("Dark Isle") and Ynys y cedairn (cedyrn or kedyrn; "Isle of brave folk"). It is the Mona of Tacitus (*Ann.* xiv. 29, *Agr.* xiv. 18), Pliny the Elder (iv. 16) and Dio Cassius (62). It is called Mam Cymru by Giraldus Cambrensis. Clas Merddin, Y vel Ynys (honey isle), Ynys Prydein, Ynys Brut are other names. According to the Triads (67), Anglesey was once part of the mainland, as geology proves. The island was the seat of the Druids, of whom 28 cromlechs remain, on uplands overlooking the sea, *e.g.* at Plâs Newydd. The Druids were attacked in A.D. 61 by Suetonius Paulinus, and by Agricola in A.D. 78. In the 5th century Caswallon lived here, and here, at Aberffraw, the princes of Gwynedd lived till 1277. The present

road from Holyhead to Llanfairpwllgwyngyll is originally Roman. British and Roman camps, coins and ornaments have been dug up and discussed, especially by the Hon. Mr. Stanley of Penrhos. Pen Caer Gybi is Roman. The island was devastated by the Danes (*Dub Gint* or black nations, *gentes*), especially in A.D. 853.

See Edw. Breese, *Kalendar of Gwynedd* (Venedocia), on Anglesey, Carnarvon and Merioneth (London, 1873); and *The History of Powys Fadog*.

**ANGLESITE**, a mineral consisting of lead sulphate,  $PbSO_4$ , crystallizing in the orthorhombic system, and isomorphous with barytes and celestite. It was first recognized as a mineral species by Dr. Withering in 1783, who discovered it in the Parys copper-mine in Anglesey; the name anglesite, from this locality, was given by F. S. Beudant in 1832. The crystals from Anglesey, which were formerly found abundantly on a matrix of dull limonite, are small in size and simple in form, being usually bounded by four faces of a prism and four faces of a dome; they are brownish-yellow in colour owing to a stain of limonite. Crystals from some other localities, notably from Monteponi in Sardinia, are transparent and colourless, possessed of a brilliant adamantine lustre, and usually modified by numerous bright faces. The variety of combinations and habits presented by the crystals is very extensive, nearly two hundred distinct forms being figured by V. von Lang in his monograph of the species; without measurement of the angles the crystals are frequently difficult to decipher. The hardness is 3 and the specific gravity 6.3. There are distinct cleavages parallel to the faces of the prism (110) and the basal plane (001), but these are not so well developed as in the isomorphous minerals barytes and celestite.



Anglesite specimen.

Anglesite is a mineral of secondary origin, having been formed by the oxidation of galena in the upper parts of mineral lodes where these have been affected by weathering processes. At Monteponi the crystals encrust cavities in glistening granular galena; and from Leadhills, in Scotland, pseudomorphs of anglesite after galena are known. At most localities it is found as isolated crystals in the lead-bearing lodes, but at some places, in Australia and Mexico, it occurs as large masses, and is then mined as an ore of lead, of which the pure mineral contains 68%.

**ANGLI**, **ANGLII** or **ANGLES**, a Teutonic people mentioned by Tacitus in his *Germania* (cap. 40) at the end of the 1st century. He gives no precise indication of their geographical position, but states that, together with six other tribes, including the Varini (the Warni of later times), they worshipped a goddess named Nerthus, whose sanctuary was situated on "an island in the Ocean." Ptolemy in his *Geography* (ii. 11. § 15), half a century later, locates them with more precision between the Rhine, or rather perhaps the Ems, and the Elbe, and speaks of them as one of the chief tribes of the interior. Unfortunately, however, it is clear from a comparison of his map with the evidence furnished by Tacitus and other Roman writers that the indications which he gives cannot be correct. Owing to the uncertainty of these passages there has been much speculation regarding the original home of the Angli. One theory, which however has little to recommend it, is that they dwelt in the basin of the Saale (in the neighbourhood of the canton Engilin), from which region the *Lex Angliorum et Werinorum hoc est Thuringorum* is believed by many to have come. At the present time the majority of scholars believe that the Angli had lived from the beginning on the coasts of the Baltic, probably in the southern part of the Jutish peninsula. The evidence for this view is derived partly from English and Danish traditions dealing with persons and events of the 4th century (see below), and partly from the fact that striking affinities to the cult of Nerthus as described by Tacitus are to be found in Scandinavian, especially Swedish and Danish, religion. Investigations in this subject have rendered it very probable that the island of Nerthus was Sjaelland (Zealand), and it is further to be observed that the kings of Wessex traced their ancestry ultimately to a certain Scyld, who is clearly to be identified with Skiöldr, the mythical founder of the Danish royal family (Skiöldungar). In English tradition this person is connected with "Scedeland" (pl.), a name which may have been applied to Sjaelland as well as Skåne, while in Scandinavian tradition he is specially associated with the ancient royal residence at Leire in Sjaelland.

Bede states that the Angli before they came to Britain dwelt in a land called Angulus, and similar evidence is given by the *Historia Brittonum*. King Alfred and the chronicler Æthelweard identified this place with the district which is now called Angel in the province of Schleswig (Slesvig), though it may then have been of greater extent, and this identification agrees very well with the indications given by Bede. Full confirmation is afforded by English and Danish traditions relating to two kings named Wermund (*q.v.*) and Offa (*q.v.*), from whom the Mercian royal family were descended, and whose exploits are connected with Angel, Schleswig and Rendsburg. Danish tradition has preserved record of two governors of Schleswig, father and son, in their service, Frowinus (Freawine) and Wigo (Wig), from whom the royal family of Wessex claimed descent. During the 5th century the Angli invaded this country (see BRITAIN, *Anglo-Saxon*), after which time their name does not recur on the continent except in the title of the code mentioned above.

The province of Schleswig has proved exceptionally rich in prehistoric antiquities which date apparently from the 4th and 5th centuries. Among the places where these have been found, special mention should be made of the large cremation cemetery at Borgstedterfeld, between Rendsburg and Eckernförde, which has yielded many urns and brooches closely resembling those found in heathen graves in England. Of still greater importance are the great deposits at Thorsbjaerg (in Angel) and Nydam, which contained large quantities of arms, ornaments, articles of clothing, agricultural implements, &c., and in the latter case even ships. By the help of these discoveries we are able to reconstruct a fairly detailed picture of English civilization in the age preceding the invasion of Britain.

AUTHORITIES.—Bede, *Hist. Ecc.* i. 15: King Alfred's version of *Orosius*, i. 1. §§ 12, 19; Æthelweard's *Chronicle*, lib. i. For traditions concerning the kings of Angel, see under OFFA (1).  
[v.02 p.0019] L. Weiland, *Die Angeln* (1889); A. Erdmann, *Über die Heimat und den Namen der Angeln* (Upsala, 1890—cf. H. Möller in the *Anzeiger für deutsches Altertum und deutsche Litteratur*, xxii. 129 ff.); A. Kock in the *Historisk Tidskrift* (Stockholm), 1895, xv. p. 163 ff.; G. Schütte, *Var Anglerne Tyskere?* (Flensburg, 1900); R. Munro Chadwick, *The Origin of the English Nation* (Cambridge, 1907); C. Engelhardt, *Denmark in the Early Iron Age* (London, 1866); J. Mestorf, *Urnenfriedhofs in Schleswig-Holstein* (Hamburg, 1886); S. Müller, *Nordische Altertumskunde* (Ger. trans., Strassburg, 1898), ii. p. 122 ff.; see further ANGLO-SAXONS and BRITAIN, *Anglo-Saxon*.

(H. M. C.)

**ANGLICAN COMMUNION**, the name used to denote that great branch of the Christian Church consisting of the various churches in communion with the Church of England. The necessity for such a phrase as "Anglican Communion," first used in the 19th century, marked at once the immense development of the Anglican Church in modern times and the change which has taken place in the traditional conceptions of its character and sphere. The Church of England itself is the subject of a separate article (see ENGLAND, CHURCH OF); and it is not without significance that for more than two centuries after the Reformation the history of Anglicanism is practically confined to its developments within the limits of the British Isles. Even in Ireland, where it was for over three centuries the established religion, and in Scotland, where it early gave way to the dominant Presbyterianism, its religious was long overshadowed by its political significance. The Church, in fact, while still claiming to be Catholic in its creeds and in its religious practice, had ceased to be Catholic in its institutional conception, which was now bound up with a particular state and also with a particular conception of that state. To the native Irishman and the Scotsman, as indeed to most Englishmen, the Anglican Church was one of the main buttresses of the supremacy of the English crown and nation. This conception of the relations of church and state was hardly favourable to missionary zeal; and in the age succeeding the Reformation there was no disposition on the part of the English Church to emulate the wonderful activity of the Jesuits, which, in the 16th and 17th centuries, brought to the Church of Rome in countries beyond the ocean compensation for what she had lost in Europe through the Protestant reformation. Even when English churchmen passed beyond the seas, they carried with them their creed, but not their ecclesiastical organization. Prejudice and real or imaginary legal obstacles stood in the way of the erection of episcopal sees in the colonies; and though in the 17th century Archbishop Laud had attempted to obtain a bishop for Virginia, up to the time of the American revolution the churchmen of the colonies had to make the best of the legal fiction that their spiritual needs were looked after by the bishop of London, who occasionally sent commissaries to visit them and ordained candidates for the ministry sent to England for the purpose.

The change which has made it possible for Anglican churchmen to claim that their communion ranks with those of Rome and the Orthodox East as one of the three great historical divisions of the Catholic Church, was due, in the first instance, to the American revolution. The severance of the colonies from their allegiance to the crown brought the English bishops for the first time face to face with the idea of an Anglican Church which should have nothing to do either with the royal supremacy or with British nationality. When, on the conclusion of peace, the church-people of Connecticut sent Dr. Samuel Seabury to England, with a request to the archbishop of Canterbury to consecrate him, it is not surprising that Archbishop Moore refused. In the opinion of prelates and lawyers alike, an act of parliament was necessary before a bishop could be consecrated for a see abroad; to consecrate one for a foreign country seemed impossible, since, though the bestowal of the *potestas ordinis* would be valid, the crown, which, according to the law, was the source of the episcopal *jurisdiction*, could hardly issue the necessary mandate for the consecration of a bishop to a see outside the realm (see BISHOP). The Scottish bishops, however, being hampered by no such legal restrictions, were more amenable; and on the 11th of November 1784 Seabury was consecrated by them to the see of Connecticut. In 1786, on the initiative of the archbishop, the legal difficulties in England were removed by the act for the consecration of bishops abroad; and, on being satisfied as to the orthodoxy of the church in America and the nature of certain liturgical changes in contemplation, the two English archbishops proceeded, on the 14th of February 1787, to consecrate William White and Samuel Prevoost to the sees of Pennsylvania and New York (see PROTESTANT EPISCOPAL CHURCH).

This act had a significance beyond the fact that it established in the United States of America a flourishing church, which, while completely loyal to its own country, is bound by special ties to the religious life of England. It marked the emergence of the Church of England from that insularity to which what may be called the territorial principles of the Reformation had

condemned her. The change was slow, and it is not yet by any means complete.

Since the Church of England, whatever her attitude towards the traditional Catholic doctrines, never disputed the validity of Catholic orders whether Roman or Orthodox, nor the jurisdiction of Catholic bishops in foreign countries, the expansion of the Anglican Church has been in no sense conceived as a Protestant aggressive movement against Rome. Occasional exceptions, such as the consecration by Archbishop Plunket of Dublin of a bishop for the reformed church in Spain, raised so strong a protest as to prove the rule. In the main, then, the expansion of the Anglican Church has followed that of the British empire, or, as in America, of its daughter states; its claim, so far as rights of jurisdiction are concerned, is to be the Church of England and the English race, while recognizing its special duties towards the non-Christian populations subject to the empire or brought within the reach of its influence. As against the Church of Rome, with its system of rigid centralization, the Anglican Church represents the principle of local autonomy, which it holds to be once more primitive and more catholic. In this respect the Anglican communion has developed on the lines defined in her articles at the Reformation; but, though in principle there is no great difference between a church defined by national, and a church defined by racial boundaries, there is an immense difference in effect, especially when the race—as in the case of the English—is itself ecumenical.

The realization of what may be called this catholic mission of the English church, in the extension of its organization to the colonies, was but a slow process.

On the 12th of August 1787 Dr. Charles Inglis was consecrated bishop of Nova Scotia, with jurisdiction over all the British possessions in North America. In 1793 the see of the Québec was founded; Jamaica and Barbados followed in 1824, and Toronto and Newfoundland in 1839. Meanwhile the needs of India has been tardily met, on the urgent representations in parliament of William Wilberforce and others, by the consecration of Dr. T. F. Middleton as bishop of Calcutta, with three archdeacons to assist him. In 1817 Ceylon was added to his charge; in 1823 all British subjects in the East Indies and the islands of the Indian Ocean; and in 1824 "New South Wales and its dependencies"! Some five years later, on the nomination of the duke of Wellington, William Broughton was sent out to work in this enormous jurisdiction as archdeacon of Australia. Soon afterwards, in 1835 and 1837, the sees of Madras and Bombay were founded; whilst in 1836 Broughton himself was consecrated as first bishop of Australia. Thus down to 1840 there were but ten colonial bishops; and of these several were so hampered by civil regulations that they were little more than government chaplains in episcopal orders. In April of that year, however, Bishop Blomfield of London published his famous letter to the archbishop of Canterbury, declaring that "an episcopal church without a bishop is a contradiction in terms," and strenuously advocating a great effort for the extension of the episcopate. It was not in vain. The plan was taken up with enthusiasm, and on Whitsun Tuesday of 1841 the bishops of the United Kingdom met and issued a declaration which inaugurated the Colonial Bishops Council. Subsequent declarations in 1872 and 1891 have served both to record progress and to stimulate to new effort. The diocese of New Zealand was founded in 1841, being endowed by the Church Missionary Society through the council, and George Augustus Selwyn was chosen as the first bishop. Since then the increase has gone on, as the result both of home effort and of the action of the colonial churches. Moreover, in many cases bishops have been sent to inaugurate new missions, as in the cases of the Universities' Mission to Central Africa, Lebombo, Corea and New Guinea; and the missionary jurisdictions so founded develop in time into dioceses. Thus, instead of the ten colonial jurisdictions of 1841, there are now about a hundred foreign and colonial jurisdictions, in addition to those of the Protestant Episcopal Church of the United States.

*The Church in the Colonies.*

[v.02 p.0020]

It was only very gradually that these dioceses acquired legislative independence and a determinate organization. At first, sees were created and bishops were nominated by the crown by means of letters patent; and in some cases an income was assigned out of public funds. Moreover, for many years all bishops alike were consecrated in England, took the customary "oath of due obedience" to the archbishop of Canterbury, and were regarded as his extra-territorial suffragans. But by degrees changes have been made on all these points.

(1) Local conditions soon made a provincial organization necessary, and it was gradually introduced. The bishop of Calcutta received letters patent as metropolitan of India when the sees of Madras and Bombay were founded; and fresh patents were issued to Bishop Broughton in 1847 and Bishop Gray in 1853, as metropolitans of Australia and South Africa respectively. Similar action was taken in 1858, when Bishop Selwyn became metropolitan of New Zealand; and again in 1860, when, on the petition of the Canadian bishops to the crown and the colonial legislature for permission to elect a metropolitan, letters patent were issued appointing Bishop Fulford of Montreal to that office. Since then metropolitans have been chosen and provinces formed by regular synodical action, a process greatly encouraged by the resolutions of the Lambeth conferences on the subject. The constitution of these provinces is not uniform. In some cases, as South Africa, New South Wales, and Queensland, the metropolitan see is fixed. Elsewhere, as in New Zealand, where no single city can claim pre-eminence, the metropolitan is either elected or else is the senior bishop by consecration. Two further developments must be mentioned: (a) The creation of diocesan and provincial synods, the first diocesan synod to meet being that of New Zealand in 1844, whilst the formation of a provincial synod was foreshadowed by a conference of Australasian bishops at Sydney in 1850; (b) towards the close of the 19th century the title of *archbishop* began to be assumed by the metropolitans of several provinces. It was first assumed

*Provincial Organization.*

by the metropolitans of Canada and Rupert's Land, at the desire of the Canadian general synod in 1893; and subsequently, in accordance with a resolution of the Lambeth conference of 1897, it was given by their synods to the bishop of Sydney as metropolitan of New South Wales and to the bishop of Cape Town as metropolitan of South Africa. Civil obstacles have hitherto delayed its adoption by the metropolitan of India.

(2) By degrees, also, the colonial churches have been freed from their rather burdensome relations with the state. The church of the West Indies was disestablished and disendowed in 1868. In 1857 it was decided, in *Regina v. Eton College*, that the crown could not claim the presentation to a living when it had appointed the former incumbent to a colonial bishopric, as it does in the case of an English bishopric. In 1861, after some protest from the crown lawyers, two missionary bishops were consecrated without letters patent for regions outside British territory: C. F. Mackenzie for the Zambezi region and J. C. Patteson for Melanesia, by the metropolitans of Cape Town and New Zealand respectively. In 1863 the privy council declared, in *Long v. The Bishop of Cape Town*, that "the Church of England, in places where there is no church established by law, is in the same situation with any other religious body." In 1865 it adjudged Bishop Gray's letters patent, as metropolitan of Cape Town, to be powerless to enable him "to exercise any coercive jurisdiction, or hold any court or tribunal for that purpose," since the Cape colony already possessed legislative institutions when they were issued; and his deposition of Bishop Colenso was declared to be "null and void in law" (*re The Bishop of Natal*). With the exception of Colenso the South African bishops forthwith surrendered their patents, and formally accepted Bishop Gray as their metropolitan, an example followed in 1865 in the province of New Zealand. In 1862, when the diocese of Ontario was formed, the bishop was elected in Canada, and consecrated under a royal mandate, letters patent being by this time entirely discredited. And when, in 1867, a coadjutor was chosen for the bishop of Toronto, an application for a royal mandate produced the reply from the colonial secretary that "it was not the part of the crown to interfere in the creation of a new bishop or bishopric, and not consistent with the dignity of the crown that he should advise Her Majesty to issue a mandate which would not be worth the paper on which it was written, and which, having been sent out to Canada, might be disregarded in the most complete manner." And at the present day the colonial churches are entirely free in this matter. This, however, is not the case with the church in India. Here the bishops of sees founded down to 1879 receive a stipend from the revenue (with the exception of the bishop of Ceylon, who no longer does so). They are not only nominated by the crown and consecrated under letters patent, but the appointment is expressly subjected "to such power of revocation and recall as is by law vested" in the crown; and where additional oversight was necessary for the church in Tinnevely, it could only be secured by the consecration of two assistant bishops, who worked under a commission for the archbishop of Canterbury which was to expire on the death of the bishop of Madras. Since then, however, new sees have been founded which are under no such restrictions: by the creation of dioceses either in native states (Travancore and Cochin), or out of the existing dioceses (Chota Nagpur, Lucknow, &c.). In the latter case there is no *legal* subdivision of the older diocese, the new bishop administering such districts as belonged to it under commission from its bishop, provision being made, however, that in all matters ecclesiastical there shall be no appeal but to the metropolitan of India.

*Freedom from state control.*

(3) By degrees, also, the relations of colonial churches to the archbishop of Canterbury have changed. Until 1855 no colonial bishop was consecrated outside the British Isles, the first instance being Dr. MacDougall of Labuan, consecrated in India under a commission from the archbishop of Canterbury; and until 1874 it was held to be unlawful for a bishop to be consecrated in England without taking the suffragan's oath of due obedience. This necessity was removed by the Colonial Clergy Act of 1874, which permits the archbishop at his discretion to dispense with the oath. This, however, has not been done in all cases; and as late as 1890 it was taken by the metropolitan of Sydney at his consecration. Thus the constituent parts of the Anglican communion gradually acquire autonomy: missionary jurisdictions develop into organized dioceses, and dioceses are grouped into provinces with canons of their own. But the most complete autonomy does not involve isolation. The churches are in full communion with one another, and act together in many ways; missionary jurisdictions and dioceses are mapped out by common arrangement, and even transferred if it seems advisable; *e.g.* the diocese Honolulu (Hawaii), previously under the jurisdiction of the archbishop of Canterbury, was transferred in 1900 to the Episcopal Church in the United States on account of political changes. Though the see of Canterbury claims no primacy over the Anglican communion analogous to that exercised over the Roman Church by the popes, it is regarded with a strong affection and deference, which shows itself by frequent consultation and interchange of greetings. There is also a strong common life emphasized by common action.

*Spiritual autonomy.*

[v.02 p.0021] The conference of Anglican bishops from all parts of the world, instituted by Archbishop Longley in 1867, and known as the Lambeth Conferences (*q.v.*), though even for the Anglican communion they have not the authority of an ecumenical synod, and their decisions are rather of the nature of counsels than commands, have done much to promote the harmony and co-operation of the various branches of the Church. An even more imposing manifestation of this common life was given by the great pan-Anglican congress held in London between the 12th and 24th of June 1908, which preceded the Lambeth conference opened on the 5th of July. The idea of this originated with Bishop Montgomery, secretary to the Society for the Propagation of the Gospel, and was endorsed by a resolution of the United Boards of Mission in 1903. As the result of negotiations and preparations extending over five years, 250 bishops, together with delegates, clerical and lay, from every diocese in the

*Pan-Anglican Congress.*



Anglican communion, met in London, the opening service of intercession being held in Westminster Abbey. In its general character, the meeting was but a Church congress on an enlarged scale, and the subjects discussed, *e.g.* the attitude of churchmen towards the question of the marriage laws or that of socialism, followed much the same lines. The congress, of course, had no power to decide or to legislate for the Church, its main value being in drawing its scattered members closer together, in bringing the newer and more isolated branches into consciousness of their contact with the parent stem, and in opening the eyes of the Church of England to the point of view and the peculiar problems of the daughter-churches.

The Anglican communion consists of the following:—(1) The Church of England, 2 provinces, Canterbury and York, with 24 and 11 dioceses respectively. (2) The Church of Ireland, 2 provinces, Armagh and Dublin, with 7 and 6 dioceses respectively. (3) The Scottish Episcopal Church, with 7 dioceses. (4) The Protestant Episcopal Church of the United States, with 89 dioceses and missionary jurisdictions, including North Tokyo, Kyoto, Shanghai, Cape Palmas, and the independent dioceses of Hayti and Brazil. (5) The Canadian Church, consisting of (a) the province of Canada, with 10 dioceses; (b) the province of Rupert's Land, with 8 dioceses. (6) The Church in India and Ceylon, 1 province of 11 dioceses. (7) The Church of the West Indies, 1 province of 8 dioceses, of which Barbados and the Windward Islands are at present united. (8) The Australian Church, consisting of (a) the province of New South Wales, with 10 dioceses; (b) the province of Queensland, with 5 dioceses; (c) the province of Victoria, with 5 dioceses. (9) The Church of New Zealand, 1 province of 7 dioceses, together with the missionary jurisdiction of Melanesia. (10) The South African Church, 1 province of 10 dioceses, with the 2 missionary jurisdictions of Masbonaland and Lebombo. (11) Nearly 30 isolated dioceses and missionary jurisdictions holding mission from the see of Canterbury.

AUTHORITIES.—*Official Year-book of the Church of England*; Phillimore, *Ecclesiastical Law*, vol. ii. (London, 1895); *Digest of S. P. G. Records* (London, 1893); E. Stock, *History of the Church Missionary Society*, 3 vols. (London, 1899); H. W. Tucker, *The English Church in Other Lands* (London, 1886); A. T. Wirgman, *The Church and the Civil Power* (London, 1893).

**ANGLING**, the art or practice of the sport of catching fish by means of a baited hook or "angle" (from the Indo-European root *ank-*, meaning "bend").<sup>[1]</sup> It is among the most ancient of human activities, and may be said to date from the time when man was in the infancy of the Stone Age, eking out a precarious existence by the slaughter of any living thing which he could reach with the rude weapons at his command. It is probable that attack on fishes was at first much the same as attack on animals, a matter of force rather than of guile, and conducted by means of a rude spear with a flint head. It is probable, too, that the primitive harpooners were not signally successful in their efforts, and so set their wits to work to devise other means of getting at the abundant food which waited for them in every piece of water near their caves. Observation would soon show them that fish fed greedily on each other and on other inhabitants of the water or living things that fell into it, and so, no doubt, arose the idea of entangling the prey by means of its appetite. Hence came the notion of the first hook, which, it seems certain, was not a hook at all but a "gorge," a piece of flint or stone which the fish could swallow with the bait but which it could not eject afterwards. From remains found in cave-dwellings and their neighbourhood in different parts of the world it is obvious that these gorges varied in shape, but in general the idea was the same, a narrow strip of stone or flake of flint, either straight or slightly curved at the ends, with a groove in the middle round which the line could be fastened. Buried in the bait it would be swallowed end first; then the tightening of the line would fix it cross-wise in the quarry's, stomach or gullet and so the capture would be assured. The device still lingers in France and in a few remote parts of England in the method of catching eels which is known as "snigging." In this a needle buried in a worm plays the part of the prehistoric gorge.

The evolution of the fish-hook from the slightly curved gorge is easily intelligible. The ends became more and more curved, until eventually an object not unlike a double hook was attained. This development would be materially assisted by man's discovery of the uses of bronze and its adaptability to his requirements. The single hook, of the pattern more or less familiar to us, was possibly a concession of the lake-dweller to what may even then have been a problem—the "education" of fish, and to a recognition of the fact that sport with the crude old methods was falling off. But it is also not improbable that in some parts of the world the single hook developed *pari passu* with the double, and that, on the sea-shore for instance, where man was able to employ so adaptable a substance as shell, the first hook was a curved fragment of shell lashed with fibre to a piece of wood or bone, in such a way that the shell formed the bend of the hook while the wood or bone formed the shank. Both early remains and recent hooks from the Fiji Islands bear out this supposition. It is also likely that flint, horn and bone were pressed into service in a similar manner. The nature of the line or the rod that may have been used with these early hooks is largely a matter of conjecture. The first line was perhaps the tendril of a plant, the first rod possibly a sapling tree. But it is fairly obvious that the rod must have been suggested by the necessity of getting the bait out over obstacles which lay between the fisherman and the water, and that it was a device for increasing both the reach of the arm and the length of the line. It seems not improbable that the rod very early formed a part of the fisherman's equipment.

*Literary History*.—From prehistoric times down to comparatively late in the days of chronicles, angling appears to have remained a practice; its development into an art or sport is a modern idea. In the earliest literature references to angling are not very numerous, but there are passages in the Old Testament which show that fish-taking with hook as well as net was one of

the common industries in the East, and that fish, where it was obtainable, formed an important article of diet. In *Numbers* (xi. 5) the children of Israel mourn for the fish which they "did eat in Egypt freely." So much too is proved by the monuments of Egypt; indeed more, for the figures found in some of the Egyptian fishing pictures using short rods and stout lines are sometimes attired after the manner of those who were great in the land. This indicates that angling had already, in a highly civilized country, taken its place among the methods of diversion at the disposal of the wealthy, though from the uncompromising nature of the tackle depicted and the apparent simplicity of the fish it would scarcely be safe to assume that in Egypt angling arrived at the dignity of becoming an "art." In Europe it took very much longer for the taking of fish to be regarded even as an amusement, and the earliest references to it in the Greek and Latin classics are not very satisfying to the sportsman. There is, however, a passage in the *Odyssey* (xii. 247) which is of considerable importance, as it shows that fishing with rod and line was well enough understood in early Greece to be used as a popular illustration. It occurs in the well-known scene where Scylla seizes the companions of Odysseus out of the ship and bears them upwards, just as "some fisher on a headland with a long rod" brings small fishes gasping to the shore. Another important, though comparatively late, passage in Greek poetry is the twenty-first idyll of Theocritus. In this the fisherman Asphalion relates how in a dream he hooked a large golden fish and describes graphically, albeit with some obscurity of language, how he "played" it. Asphalion used a rod and fished from a rock, much after the manner of the Homeric angler. Among other Greek writers, Herodotus has a good many references to fish and fishing; the capture of fish is once or twice mentioned or implied by Plato, notably in the *Laws* (vii. 823); Aristotle deals with fishes in his *Natural History*, and there are one or two fishing passages in the anthology. But in Greek literature, as a whole the subject of angling is not at all prominent. In writers of late Greek, however, there is more material. Plutarch, for instance, gives us the famous story of the fishing match between Antony and Cleopatra, which has been utilized by Shakespeare. Moreover, it is in Greek that the first complete treatise on fishing which has come down to us is written, the *Halieutica* of Oppian (c. A.D. 169). It is a hexameter poem in five books with perhaps more technical than sporting interest, and not so much even of that as the length of the work would suggest. Still it contains some information about tackle and methods, and some passages describing battles with big fish, in the right spirit of enthusiasm. Also in Greek is what is famous as the first reference in literature to fly-fishing, in the fifteenth book of Aelian's *Natural History* (3rd century A.D.). It is there described how the Macedonians captured a certain spotted fish in the river Astraeus by means of a lure composed of coloured wool and feathers, which was presumably used in the manner now known as "dapping." That there were other Greek writers who dealt with fish and fishing and composed "halieutics" we know from Athenaeus. In the first book of his *Deipnosophistae* he gives a list of them. But he compares their work unfavourably with the passage of Homer already cited, in a way which suggests that their knowledge of angling was not a great advance upon the knowledge of their remote literary ancestors. In Latin literature allusions to angling are rather more numerous than in Greek, but on the whole they are unimportant. Part of a poem by Ovid, the *Halieuticon*, composed during the poet's exile at Tomi after A.D. 9, still survives. In other Roman writers the subject is only treated by way of allusion or illustration. Martial, however, provides, among other passages, what may perhaps be entitled to rank as the earliest notice of private fishery rights—the epigram *Ad Piscatorem*, which warns would-be poachers from casting a line in the Baian lake. Pliny the elder devoted the ninth book of his *Natural History* to fishes and water-life, and Plautus, Cicero, Catullus, Horace, Juvenal, Pliny the younger and Suetonius all allude to angling here and there. Agricultural writers, too, such as Varro and Columella, deal with the subject of fish ponds and stews rather fully. Later than any of these, but still just included in Latin literature, we have Ausonius (c. A.D. 320) and his well-known idyll the *Mosella*, which contains a good deal about the fish of the Moselle and the methods of catching them. In this poem is to be found the first recognizable description of members of the salmon family, and, though the manner of their application is rather doubtful, the names *salmo*, *salar* and *fario* strike a responsive note in the breast of the modern angler.

*Post-classical Literature.*—As to what happened in the world of angling in the first few centuries of the Christian era we know little. It may be inferred, however, that both fish and fishermen occupied a more honourable position in Christendom than they ever did before. The prominence of fishermen in the gospel narratives would in itself have been enough to bring this about, but it also happened that the Greek word for fish, ΙΧΘΥΣ, had an anagrammatic significance which the devout were not slow to perceive. The initials of the word resolve into what is practically a confession of faith, Ἰησοῦς Χριστὸς Θεοῦ Υἱὸς Σωτὴρ (Jesus Christ, Son of God, Saviour). It is therefore not surprising that we find the fish very prominent as a sacred emblem in the painting and sculpture of the primitive church, or that Clement of Alexandria should have recommended it, among other things, as a device for signet rings or seals. The fisherman too is frequently represented in early Christian art, and it is worthy of remark that he more often uses a line and hook than a net. The references to fish and fishing scattered about in the writings of the early fathers for the most part reflect the two ideas of the sacredness of the fish and divine authorization of the fisherman; the second idea certainly prevailed until the time of Izaak Walton, for he uses it to justify his pastime. It is also not unlikely that the practice of fasting (in many cases fish was allowed when meat was forbidden) gave the art of catching fish additional importance. It seems at any rate to have been a consideration of weight when sites were chosen for monasteries in Europe, and in many cases when no fish-producing river was at hand the lack was supplied by the construction of fish-ponds. Despite all this, however, save for an occasional allusion in the early fathers, there is hardly a connecting link between the literature of Pagan Rome and the literature that sprang up on the invention of printing. One volume, the *Geoponica*, a Greek compilation concerning whose authorship and date there has been much dispute, is

attributed in *Bibliotheca Piscatoria* to the beginning of the 10th century. It contains one book on fish, fish-ponds and fishing, with prescriptions for baits, &c., extracted for the most part from other writers. But it seems doubtful whether its date should not be placed very much earlier. Tradition makes it a Carthaginian treatise translated into Greek. A more satisfactory fragment of fishing literature is to be found in the Colloquy of Ælfric, written (*ad pucros lingue latinæ locutionis exercendos*) towards the end of the same century. Ælfric became archbishop of Canterbury in A.D. 995, and the passage in the Anglo-Saxon text-book takes honourable rank as the earliest reference to fishing in English writings, though it is not of any great length. It is to be noted that the fisher who takes a share in the colloquy states that he prefers fishing in the river to fishing in the sea. Ascribed to the 13th or 14th century is a Latin poem *De Vetula*, whose author was apparently Richard de Fournival. It contains a passage on angling, and was placed to the credit of Ovid when first printed (c. 1470). A manuscript in the British museum, *Comptes des pêcheries de l'église de Troyes* (A.D. 1349-1413), gives a minute account of the fisheries with the weights of fish captured and the expenses of working. There is, however, practically nothing else of importance till we come to the first printed book on angling (a translation of Oppian, 1478, excepted), and so to the beginning of the literature proper. This first book was a little volume printed in Antwerp probably in 1492 at the press of Matthias van der Goes. In size it is little more than a pamphlet, and it treats of birds as well as fish:—*Dit Boecxken leert hoe men mach Voghelen ... ende ... visschen vangen metten kanden. Ende oeck andersins...* ("This book teaches how one may catch birds ... and ... fish with the hands, and also otherwise"). Only one copy apparently survives, in the Denison library, and a translation privately printed for Mr. Alfred Denison in 1872 was limited to twenty-five copies. At least two other editions of the book appeared in Flemish, and it also made its way, in 1502, to Germany, where, translated and with certain alterations and additions, it seems to have been re-issued frequently. Next in date comes the famous *Treatyse of Fysshynge wyth an Angle*, printed at Westminster by Wynkyn de Worde in 1496 as a part of the second edition of *The Book of St. Albans*. The treatise is for this reason associated with the name of Dame Juliana Berners, but that somewhat dubious compiler can have had nothing whatever to do with it. The treatise is almost certainly a compilation from some earlier work on angling ("bokes of credence" are mentioned in its text), possibly from a manuscript of the earlier part of the 15th century, of which a portion is preserved in the Denison collection. This was published in 1883 by Mr. Thomas Satchell under the title *An Older Form of the Treatyse of Fysshynge wyth an Angle*. But it is also possible that a still older work was the parent of both books, for it has been held that the manuscript is an independent version. However this may be, it is certain that the treatise itself has been the parent of many other works. Many of the instructions contained in it are handed down from generation to generation with little change except in diction. Especially is this the case with the list of trout-flies, a meagre twelve, which survives in many fishing books until well into the 18th century.

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From the beginning of the 16th century the fisherman's library begins to grow apace, as, though books solely devoted to fishing are not yet frequent, works on husbandry and country pursuits almost all contain something on the subject. In Italy the fisherman and his occupation apparently were considered poetically; the word *pescatore* or its cognates are common on Italian 16th and 17th century title-pages, though in many instances the fulfilment of the implied promise is not adequate, from an angler's point of view. From the pages of *Bibliotheca Piscatoria* a fairly long list of Italian writers could be gleaned. Among them may be mentioned Sannazaro (*Piscatoria*, &c., Rome, 1526) and Andrea Calmo (*Rime pescatorie*, Venice, 1557). A century later was Parthenius, who published a volume of *Haliœutica* at Naples. This writer has an amusing reference to the art of "tickling" trout as practised in Britain. In Germany, as has been shown, the original little Flemish treatise had a wide vogue in the 16th century, and fishing played a part in a good many books on husbandry such as that of Conrad Heresbach (1570). Fish and fish-ponds formed the main topic of a Latin work by Dubravius (1552), while Gesner in the middle of the 16th and Aldrovandi at the beginning of the 17th centuries wrote at length on the natural history of fishes. In France the subject is less well represented, but *Les Pescheries* of Chris. de Gamon (Lyons, 1599) and *Le Plaisir des champs* of Cl. Gauchet (Paris, 1604) deserve to be noted. *Les Ruses innocentes* by François Fortin, first published at Paris in 1600, and several times in later editions, is characterized by Messrs Westwood and Satchell as "on the whole the most interesting contribution made by France to the literature of angling." England during the most part of the 16th century was evidently well enough served by the original treatise out of *The Book of St. Albans*. It was republished twice by Wynkyn de Worde, six or seven times by Copland, and some five times by other printers. It was also practically republished in *A Booke of Fishing* by L. M. (1590). L. M. (Leonard Mascall) ranks as an angling author, but he did little more than borrow and edit the treatise. The same may be said of another version of *The Book of St. Albans* "now newly collected by W. G. Faulkener" and issued in 1596.

*Modern Literature*.—In 1600 appeared John Taverner's *Certaine Experiments concerning Fish and Fruite*, and after this the period of angling literature proper begins. The *Secrets of Angling* (1613), by J(ohn) D(ennys). Esq., is one of the most important volumes in the angler's library, both on account of the excellence of the verse in which it is written and also on account of its practical value. Gervase Markham, "the first journalist," as he has been called, published his first book of husbandry at the same date, and, as in most of his many books on the same subject, devoted a certain amount of space to fishing. But Markham gathered his materials in a rather shameless manner and his angling passages have little originality. Thomas Barker's *The Art of Angling* (1st ed., 1651) takes a more honourable position, and received warm commendation from Izaak Walton himself, who followed it in 1653 with *The Compleat Angler*. So much has been written about this treasured classic that it is only necessary to indicate its popularity here by

saying that its editions occupy some twenty pages in *Bibliotheca Piscatoria* (1883), and that since that work was published at least forty new editions have to be added to the list. During Walton's life-time the book ran through five editions, and with the fifth (1676) was incorporated Charles Cotton's second part, the "instructions how to angle for a trout or grayling, in a clear stream." In some cases too there was added a third book, the fourth edition of *The Experienced Angler*, by Robert Venables (1st ed., 1662). The three books together bore the title of *The Universal Angler*. Venables's portion was dropped later, but it is worth reading, and contained sound instruction though it has not the literary merit of Walton and Cotton.

A few other notable books of the century call for enumeration, *The Gentleman's Recreation* by Nicholas Cox (1674), Gilbert's *The Angler's Delight* (1676), Chetham's *Vade-Mecum* (1681), *The Complete Troller* by Robert Nobbes (1682), R. Franck's *Northern Memoirs* (1694), and *The True Art of Angling* by J. S. (1696). Of these Chetham, Nobbes, Franck and J. S. have the merit of considerable originality. Franck has gained some notoriety by his round abuse of Walton. In the 18th century among others we find *The Secrets of Angling* by C. G. (1705), Robert Hewlett's *The Angler's Sure Guide* (1706), *The Whole Art of Fishing* (1714), *The Compleat Fisherman* by James Saunders (1724), *The Art of Angling* by R. Brookes (1740), another book with the same title by R. and C. Bowlker (Worcester, c. 1750), *The Complete Sportsman* by Thomas Fairfax (c. 1760), *The Angler's Museum* by T. Shirley (1784), and *A Concise Treatise on the Art of Angling* by Thomas Best (1787). Of these only Saunders's, Bowlker's and Best's books are of much importance, the rest being for the most part "borrowed." One volume of verse in the 18th century calls for notice, Moses Browne's *Piscatory Eclogues* (1729). Among greater names we get angling passages in Pope, Gay and Thomson; the two last were evidently brothers of the angle.

With the 19th century angling literature becomes too big a subject to be treated in detail, and it is only possible to glance at a few of the more important books and writers. Daniel's *Rural Sports* appeared in 1801; it is a treasure-house of odd facts. In 1828 Sir Humphry Davy published his famous *Salmonia*, which was reviewed in the *Quarterly* by Sir Walter Scott. At about this time too were appearing the *Noctes Ambrosianae* in *Blackwood's Magazine*. Christopher North (Professor Wilson) often touched upon angling in them, besides contributing a good many angling articles to the magazine. In 1835 that excellent angling writer Thomas Tod Stoddart began his valuable series of books with *The Art of Angling as Practised in Scotland*. In 1839 he published *Songs and Poems*, among which are pieces of great merit. During this period, too, first appeared, year by year, the *Newcastle Fishers' Garlands*, collected by Joseph Crawhall afterwards and republished in 1864. These border verses, like Stoddart's, have often a genuine ring about them which is missing from the more polished effusions of Gay and Thomson. Alfred Ronalds's *The Fly-Fisher's Entomology* (1st ed., 1836) was a publication of great importance, for it marked the beginning of the scientific spirit among trout-fishers. It ran through many editions and is still a valuable book of reference. A step in angling history is also marked by George Pulman's *Vade-Mecum of Fly-fishing for Trout* (1841), for it contains the first definite instructions on fishing with a "dry fly." Another is marked by Hewett Wheatley's *The Rod and the Line* (1849), where is to be found the earliest reference to the "eyed" hook. Yet another is marked by W. C. Stewart's *The Practical Angler* (1857), in which is taught the new doctrine of "up-stream" fishing for trout. This is a book of permanent value. Among the many books of this period Charles Kingsley's *Miscellanies* (1859) stands out, for it contains the immortal "Chalk-Stream Studies." The work of Francis Francis begins at about the same time, though his *A Book on Angling*, which is still one of the most valuable text-books, was not first published till 1867. Another well-known and excellent writer, Mr. H. Cholmondeley Pennell, began in the early 'sixties; it is to him that we owe the admirable volumes on fresh-water fishing in the "Badminton Library." Among other English writers mention must be made of Messrs William Senior, John Bickerdyke and F. M. Halford, who have all performed signal services for angling and its literature. (See further bibliography *ad fin.*) In America the latter half of the 19th century produced a good deal of fishing literature, much of it of a high standard.

[v.02 p.0024] *I go a-Fishing* by Dr. W. C. Prime (1873), *Fishing with the Fly* by C. F. Orvis, A. Nelson Cheney and others (1883), *The American Salmon Fisherman* and *Fly Rods and Fly Tackle* by H. P. Wells (1886 and 1885), *Little Rivers* and other books by the Rev. H. Van Dyke—these are only a few specially distinguished in style and matter. Germany and France have not contributed so largely to the modern library, but in the first country we find several useful works by Max von dem Borne, beginning with the *Handbuch der Angelfischerei* of 1875, and there are a good many other writers who have contributed to the subject, while in France there are a few volumes on fishing by different hands. The most noticeable is M. G. Albert Petit's *La Truite de rivière* (1897), an admirable book on fly-fishing. As yet, however, though there are many enthusiastic anglers in France, the sport has not established itself so firmly as to have inspired much literature of its own; the same may be said of Germany.

*Modern Conditions.*—In the modern history of angling there are one or two features that should be touched upon. The great increase in the number of fishermen has had several results. One is a corresponding increase in the difficulty of obtaining fishing, and a notable rise in the value of rivers, especially those which are famed for salmon and trout. Salmon-fishing now may be said to have become a pastime of the rich, and there are signs that trout-fishing will before long have to be placed in the same exclusive category, while even the right to angle for less-esteemed fish will eventually be a thing of price. The development is natural, and it has naturally led to efforts on the part of the angling majority to counteract, if possible, the growing difficulty. These efforts have been directed chiefly in two ways, one the establishment of fishing clubs, the other the adoption of angling in salt water. The fishing club of the big towns was originally a social

institution, and its members met together to sup, converse on angling topics and perhaps to display notable fish that they had caught. Later, however, arose the idea that it would be a convenience if a club could give its members privileges of fishing as well as privileges of reunion. So it comes about that all over the United Kingdom, in British colonies and dependencies, in the United States, and also in Germany and France, fishing clubs rent waters, undertake preservation and restocking and generally lead an active and useful existence. It is a good sign for the future of angling and anglers that they are rapidly increasing in number. One of the oldest fishing clubs, if not the oldest, was the Schuylkill club, founded in Pennsylvania in 1732. An account of its history was published in Philadelphia in 1830. Among the earliest clubs in London are to be numbered such societies as The True Waltonians, The Piscatorial, The Friendly Anglers and The Gresham, which are still flourishing. A certain amount of literary activity has been observable in the world of angling clubs, and several volumes of "papers" are on the records. Most noticeable perhaps are the three volumes of *Anglers' Evenings* published in 1880-1894, a collection of essays by members of the Manchester Anglers' Association. The other method of securing a continuance of sport, the adoption of sea-angling as a substitute for fresh-water fishing, is quite a modern thing. Within the memory of men still young the old tactics of hand-line and force were considered good enough for sea fish. Now the fresh-water angler has lent his centuries of experience in deluding his quarry; the sea-angler has adopted many of the ideas presented to him, has modified or improved others, and has developed the capture of sea-fish into a science almost as subtle as the capture of their fresh-water cousins. One more modern feature, which is also a result of the increase of anglers, is the great advance made in fish-culture, fish-stocking and fish-acclimatization during the last half-century. Fish-culture is now a recognized industry; every trout-stream of note and value is restocked from time to time as a matter of course; salmon-hatcheries are numerous, though their practical utility is still a debated matter, in Great Britain at any rate; coarse fish are also bred for purposes of restocking; and, lastly, it is now considered a fairly simple matter to introduce fish from one country to another, and even from continent to continent. In England the movement owes a great deal to Francis Francis, who, though he was not the earliest worker in the field, was among the first to formulate the science of fish-breeding; his book *Fish-Culture*, first published in 1863, still remains one of the best treatises on the subject. In the United States, where fishery science has had the benefit of generous governmental and official support and countenance and so has reached a high level of achievement, Dr. T. Garlick (*The Artificial Reproduction of Fishes*, Cleveland, 1857) is honoured as a pioneer. On the continent of Europe the latter half of the 19th century saw a very considerable and rapid development in fish-culture, but until comparatively recently the propagation and care of fish in most European waters have been considered almost entirely from the point of view of the fish-stew and the market. As to what has been done in the way of acclimatization it is not necessary to say much. Trout (*Salmo fario*) were introduced to New Zealand in the late 'sixties from England; in the 'eighties rainbow trout (*Salmo irideus*) were also introduced from California; now New Zealand provides the finest trout-fishing of its kind in the world. American trout of different kinds have been introduced into England, and brown trout have been introduced to America; but neither innovation can be said to have been an unqualified success, though the rainbow has established itself firmly in some waters of the United Kingdom. It is still regarded with some suspicion, as it has a tendency to wander from waters which do not altogether suit it. For the rest, trout have been established in Ceylon, in Kashmir and in South Africa, and early in 1906 an attempt was made to carry them to British Central Africa. In fact the possibilities of acclimatization are so great that, it seems probable, in time no river of the civilized world capable of holding trout will be without them.

## METHODS AND PRACTICE

Angling now divides itself into two main divisions, fishing in fresh water and fishing in the sea. The two branches of the sport have much in common, and sea-angling is really little more than an adaptation of fresh-water methods to salt-water conditions. Therefore it will not be necessary to deal with it at great length and it naturally comes in the second place. Angling in fresh water is again divisible into three principal parts, fishing on the surface, *i.e.* with the fly; in mid-water, *i.e.* with a bait simulating the movements of a small fish or with the small fish itself; and on the bottom with worms, paste or one of the many other baits which experience has shown that fish will take. With the premise that it is not intended here to go into the minutiae of instruction which may more profitably be discovered in the many works of reference cited at the end of this article, some account of the subdivisions into which these three styles of fishing fall may be given.

### *Fresh-Water Fishing.*

*Fly-fishing.*—Fly-fishing is the most modern of them, but it is the most highly esteemed, principally because it is the method par excellence of taking members of the most valuable sporting family of fish, the *Salmonidae*. It may roughly be considered under three heads, the use of the "wet" or sunk fly, of the "dry" or floating fly, and of the natural insect. Of these the first is the most important, for it covers the widest field and is the most universally practised. There are few varieties of fish which may not either consistently or occasionally be taken with the sunk fly in one of its two forms. The large and gaudy bunch of feathers, silk and tinsel with which salmon, very large trout, black bass and occasionally other predaceous fish are taken is not, strictly speaking, a fly at all. It rather represents, if anything, some small fish or subaqueous creature on which the big fish is accustomed to feed and it may conveniently receive the generic name of

salmon-fly. The smaller lures, however, which are used to catch smaller trout and other fish that habitually feed on insect food are in most cases intended to represent that food in one of its forms and are entitled to the name of "artificial flies." The dry or floating fly is simply a development of the imitation theory, and has been evolved from the wet fly in course of closer observation of the habits of flies and fish in certain waters. Both wet and dry fly methods are really a substitute for the third and oldest kind of surface-fishing, the use of a natural insect as a bait. Each method is referred to incidentally below.

*Spinning, &c.*—Mid-water fishing, as has been said, broadly consists in the use of a small fish, or something that simulates it, and its devices are aimed almost entirely at those fish which prey on their fellows. Spinning, live-baiting and trolling<sup>[2]</sup> are these devices. In the first a small dead fish or an imitation of it made in metal, india-rubber, or other substance, is caused to revolve rapidly as it is pulled through the water, so that it gives the idea of something in difficulties and trying to escape. In the second a small fish is put on the angler's hook alive and conveys the same idea by its own efforts. In the third a small dead fish is caused to dart up and down in the water without revolving; it conveys the same idea as the spinning fish, though the manipulation is different.

*Bottom-Fishing.*—Bottom-fishing is the branch of angling which is the most general. There is practically no fresh-water fish that will not take some one or more of the baits on the angler's list if they are properly presented to it when it is hungry. Usually the baited hook is on or near the bottom of the water, but the rule suggested by the name "bottom-fishing" is not invariable and often the bait is best used in mid-water; similarly, in "mid-water fishing" the bait must sometimes be used as close to the bottom as possible. Bottom-fishing is roughly divisible into two kinds, float-fishing, in which a bite is detected by the aid of a float fastened to the line above the hook and so balanced that its tip is visible above the water, and hand-fishing, in which no float is used and the angler trusts to his hand to feel the bite of a fish. In most cases either method can be adopted and it is a matter of taste, but broadly speaking the float-tackle is more suited to water which is not very deep and is either still or not rapid. In great depths or strong streams a float is difficult to manage.

### **The Fish.**

It is practically impossible to classify the fish an angler catches according to the methods which he employs, as most fish can be taken by at least two of these methods, while many of those most highly esteemed can be caught by all three. Sporting fresh-water fish are therefore treated according to their families and merits from the angler's point of view, and it is briefly indicated which method or methods best succeed in pursuit of them.

*Salmon.*—First in importance come the migratory *Salmonidae*, and at the head of them the salmon (*Salmo salar*), which has a two-fold reputation as a sporting and as a commercial asset. The salmon fisheries of a country are a very valuable possession, but it is only comparatively recently that this has been realized and that salmon rivers have received the legal protection which is necessary to their well-being. Even now it cannot be asserted that in England the salmon question, as it is called, is settled. Partly owing to our ignorance of the life-history of the fish, partly owing to the difficulty of reconciling the opposed interests of commerce and sport, the problem as to how a river should be treated remains only partially solved, though it cannot be denied that there has been a great advance in the right direction. The life-history of the salmon, so far as it concerns the matter in hand, may be very briefly summed up. It is bred in the rivers and fed in the sea. The parent fish ascend in late autumn as high as they can get, the ova are deposited on gravel shallows, hatching out in the course of a few weeks into parr. The infant salmon remains in fresh water at least one year, generally two years, without growing more than a few inches, and then about May assumes what is called the smolt-dress, that is to say, it loses the dark parr-bands and red spots of infancy and becomes silvery all over. After this it descends without delay to the sea, where it feeds to such good purpose that in a year it has reached a weight of 2 lb to 4 lb or more, and it may then reascend as a grilse. Small grilse indeed may only have been in the sea a few months, ascending in the autumn of the year of their first descent. If the fish survives the perils of its first ascent and spawning season and as a kelt or spawned fish gets down to the sea again, it comes up a second time as a salmon of weight varying from 8 lb upwards. Whether salmon come up rivers, and, if so, spawn, every year, why some fish are much heavier than others of the same age, what their mode of life is in the sea, why some run up in spring and summer when the breeding season is not till about November or December, whether they were originally sea-fish or river-fish—these and other similar questions await a conclusive answer. One principal fact, however, stands out amid the uncertainty, and that is that without a free passage up and down unpolluted rivers and without protection on the spawning beds salmon have a very poor chance of perpetuating their species. Economic prudence dictates therefore that every year a considerable proportion of running salmon should be allowed to escape the dangers that confront them in the shape of nets, obstructions, pollutions, rods and poachers. And it is in the adjustment of the interests which are bound up in these dangers (the last excepted; officially poachers have no interests, though in practice their plea of "custom and right" has too often to be taken into consideration) that the salmon question consists. To secure a fair proportion of fish for the market, a fair proportion for the rods and a fair proportion for the redds, without unduly damaging manufacturing interests, this is the object of those who have the question at heart, and with many organizations and scientific observers at work it should not be long before the object is attained. Already the system of "marking" kelts with a small silver label has resulted in a considerable array of valuable statistics which have made it possible to estimate the salmon's

ordinary rate of growth from year to year. It is very largely due to the efforts of anglers that the matter has gone so far. Whether salmon feed in fresh water is another question of peculiar interest to anglers, for it would seem that if they do not then the whole practice of taking them must be an anomaly. Champions have arisen on both sides of the argument, some, scientists, asserting that salmon (parr and kelts excluded, for both feed greedily as opportunity occurs) do not feed, others, mostly anglers, maintaining strongly that they do, and bringing as evidence their undoubted and customary capture by rod and line, not only with the fly, but also with such obvious food-stuffs as dead baits, worms and prawns. On the other side it is argued that food is never found inside a salmon after it has been long enough in a river to have digested its last meal taken in salt water. The very few instances of food found in salmon which have been brought forward to support the contrary opinion are in the scientific view to be regarded with great caution; certainly in one case of recent years, which at first appeared to be well authenticated, it was afterwards found that a small trout had been pushed down a salmon's throat after capture by way of a joke. A consideration of the question, however, which may perhaps make some appeal to both sides, is put forward by Dr. J. Kingston Barton in the first of the two volumes on *Fishing* (*Country Life* Series). He maintains that salmon do not habitually feed in fresh water, but he does not reject the possibility of their occasionally taking food. His view is that after exertion, such as that entailed by running from pool to pool during a spate, the fish may feel a very transient hunger and be impelled thereby to snap at anything in its vicinity which looks edible. The fact that the angler's best opportunity is undoubtedly when salmon have newly arrived into a pool, supports this contention. The longer they are compelled to remain in the same spot by lack of water the worse becomes the prospect of catching them, and "unfishable" is one of the expressive words which fishermen use to indicate the condition of a river during the long periods of drought which too often distinguish the sport.

*Salmon Tackle and Methods.*—It is when the drought breaks up and the long-awaited rain has come that the angler has his chance and makes ready his tackle, against the period of a few days (on some short streams only a few hours) during which the water will be right; *right* is a very exact term on some rivers, meaning not only that the colour of the water is suitable to the fly, but that its height shall be within an inch or two of a given mark, prescribed by experience. As to the tackle which is made ready, there is, as in most angling matters, divergence of opinion. Salmon fly-rods are now made principally of two materials, greenheart and split-cane; the former is less expensive, the latter is more durable; it is entirely a matter of taste which a man uses, but the split-cane rod is now rather more in favour, and for salmon-fishing it is in England usually built with a core of steel running from butt to tip and known as a "steel centre." How long the rod shall be is also a matter on which anglers differ, but from 16 ft. to 17 ft. 6 in. represents the limits within which most rods are preferred. The tendency is to reduce rather than to increase the length of the rod, which may be accounted for by the adoption of a heavy line. Early in the 19th century anglers used light-topped rods of 20 ft. and even more, and with them a light line composed partly of horse-hair; they thought 60 ft. with such material a good cast. Modern experience, however, has shown that a shorter rod with a heavier top will throw a heavy dressed silk line much farther with less exertion. Ninety feet is now considered a good fishing cast, while many men can throw a great deal more. In the United States, where rods have long been used much lighter than in England, the limits suggested would be considered too high. From 12 ft. 6 in. to 15 ft. 6 in. is about the range of the American angler's choice, though long rods are not unknown with him. The infinite variety of reels, lines, gut collars<sup>[3]</sup> and other forms of tackle which is now presented to the angler's consideration and for his bewilderment is too wide a subject to be touched upon here. Something, however, falls to be said about flies. One of the perennially fruitful topics of inquiry is what the fish takes a salmon-fly to be. Beyond a fairly general admission that it is regarded as something endowed with life, perhaps resembling a remembered article of marine diet, perhaps inviting gastronomic experiment, perhaps irritating merely and rousing an impulse to destroy, the discussion has not reached any definite conclusion. But more or less connected with it is the controversy as to variety of colour and pattern. Some authorities hold that a great variety of patterns with very minute differences in colour and shades of colour is essential to complete success; others contend that salmon do not differentiate between nice shades of colour, that they only draw distinctions between flies broadly as being light, medium or dark in general appearance, and that the size of a fly rather than its colour is the important point for the angler's consideration. Others again go some way with the supporters of the colour-scheme and admit the efficacy of flies whose general character is red, or yellow, or black, and so on. The opinion of the majority, however, is probably based on past experience, and a man's favourite flies for different rivers and condition of water are those with which he or someone else has previously succeeded. It remains a fact that in most fly-books great variety of patterns will be discoverable, while certain old standard favourites such as the Jock Scott, Durham Ranger, Silver Doctor, and Thunder and Lightning will be prominent. Coming out of the region of controversy it is a safe generalization to say that the general rule is: big flies for spring fishing when rivers are probably high, small flies for summer and low water, and flies medium or small in autumn according to the conditions. Spring fishing is considered the cream of the sport. Though salmon are not as a rule so numerous or so heavy as during the autumn run, and though kelts are often a nuisance in the early months, yet the clean-run fish of February, March or April amply repays patience and disappointment by its fighting powers and its beauty. Summer fishing on most rivers in the British Islands is uncertain, but in Norway summer is the season, which possibly explains to some extent the popularity of that country with British anglers, for the pleasure of a sport is largely increased by good weather.

Two methods of using the fly are in vogue, casting and harling. The first is by far the more

artistic, and it may be practised either from a boat, from the bank or from the bed of the river itself; in the last case the angler wades, wearing waterproof trousers or wading-stockings and stout nail-studded brogues. In either case the fishing is similar. The fly is cast across and down stream, and has to be brought over the "lie" of the fish, swimming naturally with its head to the stream, its feathers working with tempting movement and its whole appearance suggesting some live thing dropping gradually down and across stream. Most anglers add to the motion of the fly by "working" it with short pulls from the rod-top. When a fish takes, the rise is sometimes seen, sometimes not; in any case the angler should not respond with the rod until he *feels* the pull. Then he should *tighten*, not strike. The fatal word "strike," with its too literal interpretation, has caused many a breakage. Having hooked his fish, the angler must be guided by circumstances as to what he does; the salmon will usually decide that for him. But it is a sound rule to give a well-hooked fish no unnecessary advantage and to hold on as hard as the tackle will allow. Good tackle will stand an immense strain, and with this "a minute a pound" is a fair estimate of the time in which a fish should be landed. A foul-hooked salmon (no uncommon thing, for a fish not infrequently misses the fly and gets hooked somewhere in the body) takes much longer to land. The other method of using the fly, harling, which is practised on a few big rivers, consists in trailing the fly behind a boat rowed backward and forwards across the stream and dropping gradually downwards. Fly-fishing for salmon is also practised on some lakes, into which the fish run. On lakes the boat drifts slowly along a "beat," while the angler casts diagonally over the spots where salmon are wont to lie. Salmon may also be caught by "mid-water fishing," with a natural bait either spun or trolled and with artificial spinning-baits of different kinds, and by "bottom-fishing" with prawns, shrimps and worms. Spinning is usually practised when the water is too high or too coloured for the fly; trolling is seldom employed, but is useful for exploring pools which cannot be fished by spinning or with the fly; the prawn is a valuable lure in low water and when fish are unwilling to rise; while the worm is killing at all states of the river, but except as a last resource is not much in favour. There are a few waters where salmon have the reputation of not taking a fly at all; in them spinning or prawning are the usual modes of fishing. But most anglers, wherever possible, prefer to use the fly. The rod for the alternative methods is generally shorter and stiffer than the fly-rod, though made of like material. Twelve to fourteen feet represents about the range of choice. Outside the British Islands the salmon-fisher finds the headquarters of his sport in Europe in Scandinavia and Iceland, and in the New World in some of the waters of Canada and Newfoundland.

*Land-locked Salmon.*—The land-locked salmon (*Salmo salar sebago*) of Canada and the lakes of Maine is, as its name implies, now regarded by scientists as merely a land-locked form of the salmon. It does not often attain a greater size than 20 ft, but it is a fine fighter and is highly esteemed by American anglers. In most waters it does not take a fly so well as a spinning-bait, live-bait or worm. The methods of angling for it do not differ materially from those employed for other *Salmonidae*.

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*Pacific Salmon.*—Closely allied to *Salmo salar* both in appearance and habits is the genus *Oncorhynchus*, commonly known as Pacific salmon. It contains six species, is peculiar to the North Pacific Ocean, and is of some importance to the angler, though of not nearly so much as the Atlantic salmon. The quinnat is the largest member of the genus, closely resembles *salar* in appearance and surpasses him in size. The others, sockeye, humpback, coho, dog-salmon and masu, are smaller and of less interest to the angler, though some of them have great commercial value. The last-named is only found in the waters of Japan, but the rest occur in greater or less quantities in the rivers of Kamchatka, Alaska, British Columbia and Oregon. The problems presented to science by *salar* are offered by *Oncorhynchus* also, but there are variations in his life-history, such as the fact that few if any fish of the genus are supposed to survive their first spawning season. When once in the rivers none of these salmon is of very much use to the angler; as, though it is stated that they will occasionally take a fly or spoon in fresh water, they are not nearly so responsive as their Atlantic cousin and in many streams are undoubtedly not worth trying for. At the mouths of some rivers, however, where the water is distinctly tidal, and in certain bays of the sea itself they give very fine sport, the method of fishing for them being usually to trail a heavy spoonbait behind a boat. By this means remarkable bags of fish have been made by anglers. The sport is of quite recent development.

*Sea-Trout.*—Next to the salmon comes the sea-trout, the other migratory salmonid of Europe. This is a fish with many local names and a good deal of local variation. Modern science, however, recognises two "races" only, *Salmo trutta*, the sea-trout proper, and *Salmo cambricus* or *eriox*, the bull-trout, or sewin of Wales, which is most prominent in such rivers as the Coquet and Tweed. The life-history of sea-trout is much the same as that of salmon, and the fish on their first return from the sea in the grilse-stage are called by many names, finnock, herling and whiting being perhaps the best known. Of the two races *Salmo trutta* alone is of much use to the fly-fisher. The bull-trout, for some obscure reason, is not at all responsive to his efforts, except in its kelt stage. Then it will take greedily enough, but that is small consolation. The bull-trout is a strong fish and grows to a great size and it is a pity that it is not of greater sporting value, if only to make up for its bad reputation as an article of food. Some amends, however, are made by its cousin the sea-trout, which is one of the gamest and daintiest fish on the angler's list. It is found in most salmon rivers and also in not a few streams which are too small to harbour the bigger fish, while there are many lakes in Scotland and Ireland (where the fish is usually known as white trout) where the fishing is superb when the trout have run up into them. Fly-fishing for sea-trout is not a thing apart. A three-pounder that will impale itself on a big salmon-fly, might equally well have taken a tiny trout-fly. Many anglers, when fishing a sea-trout river where they run large, 5 lb or more, and where there is also a chance of a salmon, effect a compromise by using a light 13



ft. or 14 ft. double-handed rod, and tackle not so slender as to make hooking a salmon a certain disaster. But undoubtedly to get the full pleasure out of sea-trout-fishing a single-handed rod of 10 ft. to 12 ft. with reasonably fine gut and small flies should be used, and the way of using it is much the same as in wet-fly fishing for brown trout, which will be treated later. When the double-handed rod and small salmon-flies are used, the fishing is practically the same as salmon-fishing except that it is on a somewhat smaller scale. Flies for sea-trout are numberless and local patterns abound, as may be expected with a fish which has so catholic a taste. But, as with salmon-fishers so with sea-trout-fishers, experience forms belief and success governs selection. Among the small salmon-flies and loch-flies which will fill his book, the angler will do well to have a store of very small trout-flies at hand, while experience has shown that even the dry fly will kill sea-trout on occasion, a thing that is worth remembering where rivers are low and fish shy. July, August and September are in general the best months for sea-trout, and as they are dry months the angler often has to put up with indifferent sport. The fish will, however, rise in tidal water and in a few localities even in the sea itself, or in salt-water lochs into which streams run. Sea-trout have an irritating knack of "coming short," that is to say, they will pluck at the fly without really taking it. There are occasions, on the other hand, in loch-fishing where plenty of time must be given to the fish without tightening on it, especially if it happens to be a big one. Like salmon, sea-trout are to be caught with spinning-baits and also with the worm. The main controversy that is concerned with sea-trout is whether or no the fish captured in early spring are clean fish or well-mended kelts. On the whole, as sea-trout seldom run before May, the majority of opinion inclines to their being kelts.

*Non-migratory Salmonidae.*—Of the non-migratory members of the *Salmonidae* the most important in Great Britain is the brown trout (*Salmo fario*). Its American cousin the rainbow trout (*S. irideus*) is now fairly well established in the country too, while other transatlantic species both of trout and char (which are some of them partially migratory, that is to say, migratory when occasion offers), such as the steelhead (*S. rivularis*), fontinalis (*S. fontinalis*) and the cut-throat trout (*S. clarkii*), are at least not unknown. All these fish, together with their allied forms in America, can be captured with the fly, and, speaking broadly, the wet-fly method will do well for them all. Therefore it is only necessary to deal with the methods applicable to one species, the brown trout.

*Trout.*—Of the game-fishes the brown trout is the most popular, for it is spread over the whole of Great Britain and most of Europe, wherever there are waters suited to it. It is a fine sporting fish and is excellent for the table, while in some streams and lakes it grows to a very considerable size, examples of 16 lb from southern rivers and 20 lb from Irish and Scottish lakes being not unknown. One of the signs of its popularity is that its habits and history have produced some very animated controversies. Some of the earliest discussions were provoked by the liability of the fish to change its appearance in different surroundings and conditions, and so at one time many a district claimed its local trout as a separate species. Now, however, science admits but one species, though, to such well-defined varieties as the Loch Leven trout, the estuarine trout and the gillaroo, it concedes the right to separate names and "races." In effect all, from the great *ferox* of the big lakes of Scotland and Ireland to the little fingerling of the Devonshire brook, are one and the same—*Salmo fario*.

*Wet-Fly Fishing for Trout.*—Fly-fishing for trout is divided into three kinds: fishing with the artificial fly sunk or "wet," fishing with it floating or "dry" and fishing with the natural insect. Of the two first methods the wet fly is the older and may be taken first. Time was when all good anglers cast their flies downstream and thought no harm. But in 1857 W. C. Stewart published his *Practical Angler*, in which he taught that it paid better to fish up-stream, for by so doing the angler was not only less likely to be seen by the trout but was more likely to hook his fish. The doctrine was much discussed and criticized, but it gradually won adherents, until now up-stream fishing is the orthodox method where it is possible. Stewart was also one of the first to advocate a lighter rod in place of the heavy 12 ft. and 13 ft. weapons that were used in the North in his time. There are still many men who use the long rod for wet-fly fishing in streams, but there are now more who find 10 ft. quite enough for their purpose. For lake-fishing from a boat, however, the longer rod is still in many cases preferred. In fishing rivers the main art is to place the right flies in the right places and to let them come naturally down with the stream. The right flies may be ascertained to some extent from books and from local wisdom, but the right places can only be learnt by experience. It does not, however, take long to acquire "an eye for water" and that is half the battle, for the haunts of trout in rapid rivers are very much alike. In lake-fishing chance has a greater share in bringing about success, but here too the right fly and the right place are important; the actual management of rod, line and flies, of course, is easier, for there is no stream to be reckoned with. Though there is little left to be said about wet-fly fishing where the fly is an imitation more or less exact of a natural insect, there is another branch of the art which has been stimulated by modern developments. This is the use of salmon-flies for big trout much in the same way as for salmon. In such rivers as the Thames, where the trout are cannibals and run very large, ordinary trout-flies are of little use, and the fly-fisher's only chance is to use a big fly and "work" it, casting across and down stream. The big fly has also been found serviceable with the great fish of New Zealand and with the inhabitants of such a piece of water as Blagdon Lake near Bristol, where the trout run very large. For this kind of fishing much stronger tackle and a heavier rod are required than for catching fish that seldom exceed the pound.

*Dry Fly.*—Fishing with the floating fly is a device of southern origin, and the idea no doubt arose from the facts that on the placid south country streams the natural fly floats on the surface and that the trout are accustomed to feed on it there. The controversy "dry versus wet" was long and

spirited, but the new idea won the day and now not only on the chalk-streams, but on such stretches of even Highland rivers as are suitable, the dry-fly man may be seen testing his theories. These theories are simple and consist in placing before the fish an exact imitation of the insect on which it is feeding, in such a way that it shall float down exactly as if it were an insect of the same kind. To this end special tackle and special methods have been found necessary. Not only the fly but also the line has to float on the wafer; the line is very heavy and therefore the rod (split-cane or greenheart) must be stiff and powerful; special precautions have to be taken that the fly shall float unhindered and shall not "drag"; special casts have to be made to counteract awkward winds; and, lastly, the matching of the fly with the insect on the water is a matter of much nicety, for the water-flies are of many shades and colours. Many brains have busied themselves with the solution of these problems with such success that dry-fly fishing is now a finished art. The entomology of the dry-fly stream has been studied very deeply by Mr. F. M. Halford, the late G. S. Marryat and others, and improvements both in flies and tackle have been very great. Quite lately, however, there has been a movement in favour of light rods for dry-fly fishing as well as wet-fly fishing. The English split-cane rod for dry-fly work weighs about an ounce to the foot, rather more or rather less. The American rod of similar action and material weighs much less—approximately 6 oz. to 10 ft. The light rod, it is urged, is much less tiring and is quite powerful enough for ordinary purposes. Against it is claimed that dry-fly fishing is not "ordinary purposes," that chalk-stream weeds are too strong and chalk-stream winds too wild for the light rod to be efficient against them. However, the light rod is growing in popular favour; British manufacturers are building rods after the American style; and anglers are taking to them more and more. The dry-fly method is now practised by many fishermen both in Germany and France, but it has scarcely found a footing as yet in the United States or Canada.

*Fishing with the Natural Fly.*—The natural fly is a very killing bait for trout, but its use is not wide-spread except in Ireland. In Ireland "dapping" with the green drake or the daddy-longlegs is practised from boats on most of the big loughs. A light whole-cane rod of stiff build, about 16 ft. in length, is required with a floss-silk line light enough to be carried out on the breeze; the "dap" (generally two mayflies or daddy-longlegs on a small stout-wired hook) is carried out by the breeze and just allowed to touch the water. When a trout rises it is well to count "ten" before striking. Very heavy trout are caught in this manner during the mayfly season. In the North "creeper-fishing" is akin to this method, but the creeper is the larva of the stone-fly, not a fly itself, and it is cast more like an ordinary fly and allowed to sink. Sometimes, however, the mature insect is used with equally good results. A few anglers still practise the old style of dapping or "dibbling" after the manner advised by Izaak Walton. It is a deadly way of fishing small overgrown brooks. A stiff rod and strong gut are necessary, and a grasshopper or almost any large fly will serve for bait.

*Other Methods.*—The other methods of taking trout principally employed are spinning, live-baiting and worming. For big river trout such as those of the Thames a gudgeon or bleak makes the best spinning or live bait, for great lake trout (*Jerox*) a small fish of their own species and for smaller trout a minnow. There are numberless artificial spinning-baits which kill well at times, the Devon being perhaps the favourite. The use of the drop-minnow, which is trolling on a lesser scale, is a killing method employed more in the north of England than elsewhere. The worm is mostly deadly in thick water, so deadly that it is looked on askance. But there is a highly artistic mode of fishing known as "clear-water worming." This is most successful when rivers are low and weather hot, and it needs an expert angler to succeed in it. The worm has to be cast up-stream rather like a fly, and the method is little inferior to fly-fishing in delicacy and difficulty. The other baits for trout, or rather the other baits which they will take sometimes, are legion. Wasp-grubs, maggots, caterpillars, small frogs, bread, there is very little the fish will not take. But except in rural districts little effort is made to catch trout by means less orthodox than the fly, minnow and worm, and the tendency nowadays both in England and America is to restrict anglers where possible to the use of the artificial fly only.

*Grayling.*—The only other member of the salmon family in England which gives much sport to the fly-fisher is the grayling, a fish which possesses the recommendation of rising well in winter. It can be caught with either wet or dry fly, and with the same tackle as trout, which generally inhabit the same stream. Grayling will take most small trout-flies, but there are many patterns of fly tied specially for them, most of them founded on the red tag or the green insect. Worms and maggots are also largely used in some waters for grayling, and there is a curious contrivance known as the "grasshopper," which is a sort of compromise between the fly and bait. It consists of a leaded hook round the shank of which is twisted bright-coloured wool. The point is tipped with maggots, and the lure, half artificial, half natural, is dropped into deep holes and worked up and down in the water. In some places the method is very killing. The grayling has been very prominent of late years owing to the controversy "grayling *versus* trout." Many people hold that grayling injure a trout stream by devouring trout-ova and trout-food, by increasing too rapidly and in other ways. Beyond, however, proving the self-evident fact that a stream can only support a given amount of fish-life, the grayling's opponents do not seem to have made out a very good case, for no real evidence of its injuring trout has been adduced.

*Char.*—The chars (*Sahelinus*) are a numerous family widely distributed over the world, but in Great Britain are not very important to the angler. One well-defined species (*Sahelinus alpinus*) is found in some lakes of Wales and Scotland, but principally in Westmorland and Cumberland. It sometimes takes a small fly but is more often caught with small artificial spinning-baits. The fish seldom exceeds 1½ lb in Great Britain, though in Scandinavia it is caught up to 5 lb or more. There are some important chars in America, *fontinalis* being one of the most esteemed. Some

members of the genus occasionally attain a size scarcely excelled by the salmon. Among them are the Great Lake trout of America, *Cristinomer namaycush*, and the Danubian "salmon" or huchen, *Salmo hucho*. Both of these fish are caught principally with spinning-baits, but both will on occasion take a salmon-fly, though not with any freedom after they have reached a certain size. An attempt has been made to introduce huchen into the Thames but at the time of writing the result cannot yet be estimated.

*Pike*.—The pike (*Esox lucius*), which after the *Salmonidae* is the most valued sporting fish in Great Britain, is a fish of prey pure and simple. Though it will occasionally take a large fly, a worm or other ground-bait, its systematic capture is only essayed with small fish or artificial spinning-baits. A live bait is supposed to be the most deadly lure for big pike, probably because it is the method employed by most anglers. But spinning is more artistic and has been found quite successful enough by those who give it a fair and full trial. Trolling, the method of "sink and draw" with a dead bait, referred to previously in this article, is not much practised nowadays, though at one time it was very popular. It was given up because the traditional form of trolling-tackle was such that the bait had to be swallowed by the pike before the hook would take hold, and that necessitated killing all fish caught, whether large or small. The same objection formerly applied to live-baiting with what was known as a gorge-hook. Now, however, what is called snap-tackle is almost invariably used in live-baiting, and the system is by some few anglers extended to the other method too. Pike are autumn and winter fish and are at their best in December. They grow to a very considerable size, fish of 20 lb being regarded as "specimens" and an occasional thirty-pounder rewarding the zealous and fortunate. The heaviest pike caught with a rod in recent years which is sufficiently authenticated, weighed 37 lb, but heavier specimens are said to have been taken in Irish lakes. River pike up to about 10 lb in weight are excellent eating.

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America has several species of pike, of which the muskelunge of the great lake region (*Esox masquinongy*) is the most important. It is a very fine fish, excelling *Esox lucius* both in size and looks. From the angler's point of view it may be considered simply as a large pike and may be caught by similar methods. It occasionally reaches the weight of 80 lb or perhaps more. The pickerel (*Esox reticulatus*) is the only other of the American pikes which gives any sport. It reaches a respectable size, but is as inferior to the pike as the pike is to the muskelunge.

*Perch*.—Next to the pikes come the perches, also predatory fishes. The European perch (*Perca fluviatilis*) has a place by itself in the affections of anglers. When young it is easy to catch by almost any method of fishing, and a large number of Walton's disciples have been initiated into the art with its help. Worms and small live-baits are the principal lures, but at times the fish will take small bright artificial spinning-baits well, and odd attractions such as boiled shrimps, caddis-grubs, small frogs, maggots, wasp-grubs, &c. are sometimes successful. The drop-minnow is one of the best methods of taking perch. Very occasionally, and principally in shallow pools, the fish will take an artificial fly greedily, a small salmon-fly being the best thing to use in such a case. A perch of 2 lb is a good fish, and a specimen of 4½ lb about the limit of angling expectation. There have been rare instances of perch over 5 lb, and there are legends of eight-pounders, which, however, need authentication.

*Black Bass*.—The yellow perch of America (*Perca flavescens*) is very much like its European cousin in appearance and habits, but it is not so highly esteemed by American anglers, because they are fortunate in being possessed of a better fish in the black bass, another member of the perch family. There are two kinds of black bass (*Micropterus salmoides* and *Micropterus dolomieu*), the large-mouthed and the small-mouthed. The first is more a lake and pond fish than the second, and they are seldom found in the same waters. As the black bass is a fly-taking fish and a strong fighter, it is as valuable to the angler as a trout and is highly esteemed. Bass-flies are *sui generis*, but incline more to the nature of salmon-flies than trout-flies. An artificial frog cast with a fly-rod or very light spinning-rod is also a favourite lure. For the rest the fish will take almost anything in the nature of worms or small fish, like its cousin the perch. A 4 lb bass is a good fish, but five-pounders are not uncommon. Black bass have to some extent been acclimatized in France.

The *ruffe* or *pope* (*Acerina vulgaris*) is a little fish common in the Thames and many other slow-flowing English rivers. It is very like the perch in shape but lacks the dusky bars which distinguish the other, and is spotted with dark brown spots on a golden olive background. It is not of much use to the angler as it seldom exceeds 3 oz. in weight. It takes small worms, maggots and similar baits greedily, and is often a nuisance when the angler is expecting better fish. Allied to the perches is the pike-perch, of which two species are of some importance to the angler, one the wall-eye of eastern America (*Stizostedion vitreum*) and the other the zander of Central Europe (*Sandrus lucioperca*). The last especially is a fine fighter, occasionally reaching a weight of 20 lb. It is usually caught by spinning, but will take live-baits, worms and other things of that nature. The Danube may be described as its headquarters. It is a fish whose sporting importance will be more realized as anglers on the continent become more numerous.

*Cyprinidae*.—The carp family (*Cyprinidae*) is a large one and its members constitute the majority of English sporting fishes. In America the various kinds of chub, sucker, dace, shiner, &c. are little esteemed and are regarded as spoils for the youthful angler only, or as baits for the better fish in which the continent is so rich. In England, however, the *Cyprinidae* have an honoured place in the affections of all who angle "at the bottom," while in Europe some of them have a commercial value as food-fishes. In India at least one member of the family, the mahseer, takes rank with the salmon as a "big game" fish.

*Carp, Tench, Barbel, Bream.*—The family as represented in England may be roughly divided into two groups, those which feed on the bottom purely and those which occasionally take flies. The first consists of carp, tench, barbel and bream. Of these carp, tench and bream are either river or pool fish, while the barbel is found only in rivers, principally in the Thames and Trent. The carp grows to a great size, 20 lb being not unknown; tench are big at 5 lb; barbel have been caught up to 14 lb or rather more; and bream occasionally reach 8 lb, while a fish of over 11 lb is on record. All these fish are capricious feeders, carp and barbel being particularly undependable. In some waters it seems to be impossible to catch the large specimens, and the angler who seeks to gain trophies in either branch of the sport needs both patience and perseverance. Tench and bream are not quite so difficult. The one fish can sometimes be caught in great quantities, and the other is generally to be enticed by the man who knows how to set about it. Two main principles have to be observed in attacking all these fish, ground-baiting and early rising. Ground-baiting consists in casting food into the water so as to attract the fish to a certain spot and to induce them to feed. Without it very little can be done with shy and large fish of these species. Early rising is necessary because they only feed freely, as a rule, from daybreak till about three hours after sunrise. The heat of a summer or early autumn day makes them sluggish, but an hour or two in the evening is sometimes remunerative. The bait for them all should usually lie on the bottom, and it consists mainly of worms, wasp and other grubs, pastes of various kinds; and for carp, and sometimes bream, of vegetable baits such as small boiled potatoes, beans, peas, stewed wheat, pieces of banana, &c. None of these fish feed well in winter.

*Roach, Rudd, Dace, Chub.*—The next group of *Cyprinidae* consists of fish which will take a bait similar to those already mentioned and also a fly. The sizes which limit the ordinary angler's aspirations are roach about 2 lb, rudd about 2½ lb, dace about 1 lb and chub about 5 lb. There are instances of individuals heavier than this, one or two roach and many rudd of over 3 lb being on record, while dace have been caught up to 1 lb 6 oz., and chub of over 7 lb are not unknown. Roach only take a fly as a rule in very hot weather when they are near the surface, or early in the season when they are on the shallows; the others will take it freely all through the summer. Ordinary trout flies do well enough for all four species, but chub often prefer something larger, and big bushy lures called "palmers," which represent caterpillars, are generally used for them. The fly may be used either wet or dry for all these fish, and there is little to choose between the methods as regards effectiveness. Fly-fishing for these fish is a branch of angling which might be more practised than it is, as the sport is a very fair substitute for trout fishing. Roach, chub and dace feed on bottom food and give good sport all the winter.

*Gudgeon, Bleak, Minnow, &c.*—The small fry of European waters, gudgeon, bleak, minnow, loach, stickleback and bullhead, are principally of value as bait for other fish, though the first-named species gives pretty sport on fine tackle and makes a succulent dish. Small red worms are the best bait for gudgeon and minnows, a maggot or small fly for bleak, and the rest are most easily caught in a small-meshed net. The loach is used principally in Ireland as a trout bait, and the other two are of small account as hook-baits, though sticklebacks are a valuable form of food for trout in lakes and pools.

*Mahseer.*—Among the carps of India, several of which give good sport, special mention must be made of the mahseer (*Barbus mosal*), a fish which rivals the salmon both in size and strength. It reaches a weight of 60 lb and sometimes more and is fished for in much the same manner as salmon, with the difference that after about 10 lb it takes a spinning-bait, usually a heavy spoon-bait, better than a fly.

[v.02 p.0030]

*Cat-fish.*—None of the fresh-water cat-fishes (of which no example is found in England) are what may be called sporting fish, but several may be caught with rod and line. There are several kinds in North America, and some of them are as heavy as 150 lb, but the most important is the wels (*Silurus glanis*) of the Danube and neighbouring waters. This is the largest European fresh-water fish, and it is credited with a weight of 300 lb or more. It is a bottom feeder and will take a fish-bait either alive or dead; it is said occasionally to run at a spinning bait when used very deep.

*Burbot.*—The burbot (*Lota vulgaris*) is the only fresh-water member of the cod family in Great Britain, and it is found only in a few slow-flowing rivers such as the Trent, and there not often, probably because it is a fish of sluggish habits which feeds only at night. It reaches a weight of 3 lb or more, and will take most flesh or fish baits on the bottom. The burbot of America has similar characteristics.

*Sturgeon.*—The sturgeons, of which there are a good many species in Europe and America, are of no use to the angler. They are anadromous fishes of which little more can be said than that a specimen might take a bottom bait once in a way. In Russia they are sometimes caught on long lines armed with baited hooks, and occasionally an angler hooks one. Such a case was reported from California in *The Field* of the 19th of August 1905.

*Shad.*—Two other anadromous fish deserve notice. The first is the shad, a herring-like fish of which two species, allice and twaite (*Clupea alosa* and *C. finta*), ascend one or two British and several continental rivers in the spring. The twaite is the more common, and in the Severn, Wye and Teme it sometimes gives very fair sport to anglers, taking worm and occasionally fly or small spinning bait. It is a good fighter, and reaches a weight of about 3 lb. Its sheen when first caught is particularly beautiful. America also has shads.

*Flounder.*—The other is the flounder (*Pleuronectes flesus*), the only flat-fish which ascends British rivers. It is common a long way up such rivers as the Severn, far above tidal influence, and it will take almost any flesh-bait used on the bottom. A flounder of 1 lb is, in a river, a large

one, but heavier examples are sometimes caught.

*Eel.*—The eel (*Anguilla vulgaris*) is regarded by the angler more as a nuisance than a sporting fish, but when of considerable size (and it often reaches a weight of 8 lb or more) it is a splendid fighter and stronger than almost any fish that swims. Its life history has long been disputed, but it is now accepted that it breeds in the sea and ascends rivers in its youth. It is found practically everywhere, and its occurrence in isolated ponds to which it has never been introduced by human agency has given rise to a theory that it travels overland as well as by water. The best baits for eels are worms and small fish, and the best time to use them is at night or in thundery or very wet weather.

#### *Sea Angling.*

Sea angling is attended by almost as many refinements of tackle and method as fresh-water angling. The chief differences are differences of locality and the habits of the fish. To a certain extent sea angling may also be divided into three classes—fishing on the surface with the fly, at mid-water with spinning or other bait, and on the bottom; but the first method is only practicable at certain times and in certain places, and the others, from the great depths that often have to be sounded and the heavy weights that have to be used in searching them, necessitate shorter and stouter rods, larger reels and stronger tackle than fresh-water anglers employ. Also, of course, the sea-fisherman is liable to come into conflict with very large fish occasionally. In British waters the monster usually takes the form of a skate or halibut. A specimen of the former weighing 194 lb has been landed off the Irish coast with rod and line in recent years. In American waters there is a much greater opportunity of catching fish of this calibre.

*Great Game Fishes.*—There are several giants of the sea which are regularly pursued by American anglers, chief among them being the tarpon (*Tarpon atlanticus*) and the tuna or tunny (*Thunnus thynnus*), which have been taken on rod and line up to 223 lb and 251 lb respectively. Jew-fish and black sea-bass of over 400 lb have been taken on rod and line, and there are many other fine sporting fish of large size which give the angler exciting hours on the reefs of Florida, or the coasts of California, Texas or Mexico. Practically all of them are taken with a fish-bait either live or dead, and used stationary on the bottom or in mid-water trailed behind a boat.

*British Game Fishes.*—On a much smaller scale are the fishes most esteemed in British waters. The bass (*Labrax lupus*) heads the list as a plucky and rather difficult opponent. A fish of 10 lb is a large one, but fifteen-pounders have been taken. Small or "school" bass up to 3 lb or 4 lb may sometimes be caught with the fly (generally a roughly constructed thing with big wings), and when they are really taking the sport is magnificent. In some few localities it is possible to cast for them from rocks with a salmon rod, but usually a boat is required. In other places bass may be caught from the shore with fish bait used on the bottom in quite shallow water. They may again sometimes be caught in mid-water, and in fact there are few methods and few lures employed in sea angling which will not account for them at times. The pollack (*Gadus pollachius*) and coal-fish (*Gadus virens*) come next in esteem. Both in some places reach a weight of 20 lb or more, and both when young will take a fly. Usually, however, the best sport is obtained by trailing some spinning-bait, such as an artificial or natural sand-eel, behind a boat. Sometimes, and especially for pollack, the bait must be kept near the bottom and heavy weights on the line are necessary; the coal-fish are more prone to come to the surface for feeding. The larger grey mullet (*Mugil capito*) is a great favourite with many anglers, as it is extremely difficult to hook, and when hooked fights strongly. Fishing for mullet is more akin to fresh-water fishing than any branch of sea-angling, and indeed can be carried on in almost fresh water, for the fish frequent harbours, estuaries and tidal pools. They can be caught close to the surface, at mid-water and at the bottom, and as a rule vegetable baits, such as boiled macaroni, or ragworms are found to answer best. Usually ground-baiting is necessary, and the finer the tackle used the greater is the chance of sport. Not a few anglers fish with a float as if for river fish. The fish runs up to about 8 lb in weight. The cod (*Gadus morhua*) grows larger and fights less gamely than any of the fish already mentioned. It is generally caught with bait used on the bottom from a boat, but in places codling, or young cod, give some sport to anglers fishing from the shore. The mackerel (*Scomber scomber*) gives the best sport to a bait, usually a strip of fish skin, trailed behind a boat fairly close to the surface, but it will sometimes feed on the bottom. Mackerel on light tackle are game fighters, though they do not usually much exceed 2 lb. Whiting and whiting-pout (*Gadus merlangus* and *Gadus luscus*) both feed on or near the bottom, do not grow to any great size, and are best sought with fine tackle, usually an arrangement of three or four hooks at intervals above a lead which is called a "paternoster." If one or more of the hooks are on the bottom the tackle will do for different kinds of flat fish as well, flounders and dabs being the two species most often caught by anglers. The bream (*Pagellus centrodontus*) is another bottom-feeder which resembles the fresh-water bream both in appearance and habits. It is an early morning or rather a nocturnal fish, and grows to a weight of 3 lb or 4 lb. Occasionally it will feed in mid-water or even close to the surface. The conger eel (*Conger vulgaris*) is another night-feeder, which gives fine sport, as it grows to a great size, and is very powerful. Strong tackle is essential for conger fishing, as so powerful an opponent in the darkness cannot be given any law. The bait must be on or near the bottom. There are, of course, many other fish which come to the angler's rod at times, but the list given is fairly complete as representing the species which are especially sought. Beside them are occasional (in some waters too frequent) captures such as dog-fish and sharks, skates and rays. Many of them run to a great size and give plenty of sport on a rod, though they are not as a rule welcomed. Lastly, it must be mentioned that certain of the Salmonidae, smelts (*Osmerus*

*eperlanus*), sea-trout, occasionally brown trout, and still more occasionally salmon can be caught in salt water either in sea-lochs or at the mouths of rivers. Smelts are best fished for with tiny hooks tied on fine gut and baited with fragments of shrimp, ragworm, and other delicacies.

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*Scotland* (London, 1900, 4 vols.); *The Salmon Rivers of Ireland* (London, 1903); *The Salmon and Sea Trout Rivers of England and Wales* (London, 1904, 2 vols.), this fine series gives minute information as to salmon pools, flies, seasons, history, catches, &c.; W. M. Gallichan, *Fishing in Wales* (London, 1903); *Fishing in Derbyshire* (London, 1905); J. Watson, *English Lake District Fisheries* (London, 1899); C. Wade, *Exmoor Streams* (London, 1903); G. A. B. Dewar, *South Country Trout Streams* (London, 1899); "Hi Regan," *How and Where to Fish in Ireland* (London, 1900); E. S. Shrubsole, *The Land of Lakes* (London, 1906), a guide to fishing in County Donegal. Europe: "Palmer Hackle," *Hints on Angling* (London, 1846), contains "suggestions for angling excursions in France and Belgium," but they are too old to be of much service; W. M. Gallichan, *Fishing and Travel in Spain* (London, 1905); G. W. Hartley, *Wild Sport with Gun, Rifle and Salmon Rod* (Edinburgh, 1903), contains a chapter on huchen fishing; Max von dem Borne, *Wegweiser für Angler durch Deutschland, Oesterreich und die Schweiz* (Berlin, 1877), a book of good conception and arrangement, and still useful, though out of date in many particulars; *Illustrierte Angler-Schule (der deutschen Fischerei Zeitung)*, Stettin, contains good chapters on the wels and huchen; H. Storck, *Der Angelsport* (Munich, 1898), contains a certain amount of geographical information; E. B. Kennedy, *Thirty Seasons in Scandinavia* (London, 1904), contains useful information about fishing; General E. F. Burton, *Trouting in Norway* (London, 1897); Abel Chapman, *Wild Norway* (London, 1897); F. Sandeman, *Angling Travels in Norway* (London, 1895). America: C. F. Holder, *Big Game Fishes of the United States* (New York, 1903); J. A. Henshall, *Bass, Pike, Perch and Pickerel* (New York, 1903); Dean Sage and others, *Salmon and Trout* (New York, 1902); E. T. D. Chambers, *Angler's Guide to Eastern Canada* (Québec, 1899); Rowland Ward, *The English Angler in Florida* (London, 1898); J. Turner Turner, *The Giant Fish of Florida* (London, 1902). India: H. S. Thomas, *The Rod in India* (London, 1897); "Skene Dhu," *The Mighty Mahseer* (Madras, 1906), contains a chapter on the acclimatization of trout in India and Ceylon. New Zealand: W. H. Spackman, *Trout in New Zealand* (London, 1894); Capt. Hamilton, *Trout Fishing and Sport in Maoriland* (Wellington, 1905), contains a valuable section on fishing waters.

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[1] As to whether "angling" necessarily implies a rod as well as a line and hook, see the discussion in the law case of *Barnard v. Roberts* (*Times L. R.*, April 13, 1907), when the question arose as to the use of night-lines being angling; but the decision against night-lines went on the ground of the absence of the personal element rather than on the absence of a rod. The various dictionaries are blind guides on this point, and the authorities cited are inconclusive; but, broadly speaking, angling now implies three necessary factors—a personal angler, the sporting element, and the use of recognized fishing-tackle.

[2] Trolling is very commonly confused in angling writing and talk with *trailing*, which simply means drawing a spinning-bait along behind a boat in motion.

[3] The precise date when silkworm gut (now so important a feature of the angler's equipment) was introduced is obscure. Pepys, in his *Diary* (1667), mentions "a gut string varnished over" which "is beyond any hair for strength and smallness" as a new angling secret which he likes "mightily." In the third edition (1700) of Chetham's *Vade-Mecum*, already cited, appears an advertisement of the "East India weed, which is the only thing for trout, carp and bottom-fishing." Again, in the third edition of Nobbes's *Art of Trolling* (1805), in the supplementary matter, appears a letter signed by J. Eaton and G. Gimber, tackle-makers of Crooked Lane (July 20, 1801), in which it is stated that gut "is produced from the silkworm and not an Indian weed, as has hitherto been conjectured...." The word "gut" is employed before this date, but it seems obvious that silkworm gut was for a long time used under the impression that it was a weed, and that its introduction was a thing of the 17th century. It is probable, however, that vegetable fibre was used too; we believe that in some parts of India it is used by natives to this day. Pepys' "minikin" was probably cat-gut.

**ANGLO-ISRAELITE THEORY**, the contention that the British people in the United Kingdom, its colonies, and the United States, are the racial descendants of the "ten tribes" forming the kingdom of Israel, large numbers of whom were deported by Sargon king of Assyria on the fall of Samaria in 721 B.C. The theory (which is fully set forth in a book called *Philo-Israel*) rests on premises which are deemed by scholars—both theological and anthropological—to be utterly unsound.

**ANGLO-NORMAN LITERATURE**.—The French language (*q.v.*) came over to England with William the Conqueror. During the whole of the 12th century it shared with Latin the distinction of being the literary language of England, and it was in use at the court until the 14th century. It was not until the reign of Henry IV. that English became the native tongue of the kings of England. After the loss of the French provinces, schools for the teaching of French were established in England, among the most celebrated of which we may quote that of Marlborough. The language then underwent certain changes which gradually distinguished it from the French spoken in France; but, except for some graphical characteristics, from which certain rules of

pronunciation are to be inferred, the changes to which the language was subjected were the individual modifications of the various authors, so that, while we may still speak of Anglo-Norman writers, an Anglo-Norman language, properly so called, gradually ceased to exist. The prestige enjoyed by the French language, which, in the 14th century, the author of the *Manière de language* calls "le plus bel et le plus gracieux language et plus noble parler, apres latin d'escole, qui soit au monde et de touz genz mieulx prisée et amée que nul autre (quar Dieux le fist si douce et amiable principalement à l'oneur et loenge de luy mesmes. Et pour ce il peut comparer au parler des angels du ciel, pour la grand doulceur et biaulté d'icel)," was such that it was not till 1363 that the chancellor opened the parliamentary session with an English speech. And although the Hundred Years' War led to a decline in the study of French and the disappearance of Anglo-Norman literature, the French language continued, through some vicissitudes, to be the classical language of the courts of justice until the 17th century. It is still the language of the Channel Islands, though there too it tends more and more to give way before the advance of English.

It will be seen from the above that the most flourishing period of Anglo-Norman literature was from the beginning of the 12th century to the end of the first quarter of the 13th. The end of this period is generally said to coincide with the loss of the French provinces to Philip Augustus, but literary and political history do not correspond quite so precisely, and the end of the first period would be more accurately denoted by the appearance of the history of William the Marshal in 1225 (published for the *Societe de l'histoire de France*, by Paul Meyer, 3 vols., 1891-1901). It owes its brilliancy largely to the protection accorded by Henry II. of England to the men of letters of his day. "He could speak French and Latin well, and is said to have known something of every tongue between the Bay of Biscay and the Jordan." He was probably the most highly educated sovereign of his day, and amid all his busy active life he never lost his interest in literature and intellectual discussion; his hands were never empty, they always had either a bow or a book" (*Dict. of Nat. Biog.*). Wace and Benoît de Sainte-More compiled their histories at his bidding, and it was in his reign that Marie de France composed her poems. An event with which he was closely connected, viz. the murder of Thomas Becket, gave rise to a whole series of writings, some of which are purely Anglo-Norman. In his time appeared the works of Bérout and Thomas respectively, as well as some of the most celebrated of the Anglo-Norman *romans d'aventure*. It is important to keep this fact in mind when studying the different works which Anglo-Norman literature has left us. We will examine these works briefly, grouping them into narrative, didactic, hagiographic, lyric, satiric and dramatic literature.

*Narrative Literature: (a) Epic and Romance.*—The French epic came over to England at an early date. We know that the *Chanson de Roland* was sung at the battle of Hastings, and we possess Anglo-Norman MSS. of a few *chansons de geste*. The *Pèlerinage de Charlemagne* (Koschwitz, *Altfranzösische Bibliothek*, 1883) was, for instance, only preserved in an Anglo-Norman manuscript of the British Museum (now lost), although the author was certainly a Parisian. The oldest manuscript of the *Chanson de Roland* that we possess is also a manuscript written in England, and amongst the others of less importance we may mention *La Chançon de Willame*, the MS. of which has (June 1903) been published in facsimile at Chiswick (cf. Paul Meyer, *Romania*, xxxii. 597-618). Although the diffusion of epic poetry in England did not actually inspire any new *chansons de geste*, it developed the taste for this class of literature, and the epic style in which the tales of *Horn*, of *Bovon de Hampton*, of *Guy of Warwick* (still unpublished), of *Waldef* (still unpublished), and of *Fulk Fitz Warine* are treated, is certainly partly due to this circumstance. Although the last of these works has come down to us only in a prose version, it contains unmistakable signs of a previous poetic form, and what we possess is really only a rendering into prose similar to the transformations undergone by many of the *chansons de geste* (cf. L. Brandin, *Introduction to Fulk Fitz Warine*, London, 1904).

The interinfluence of French and English literature can be studied in the Breton romances and the *romans d'aventure* even better than in the epic poetry of the period. The *Lay of Orpheus* is known to us only through an English imitation; the *Lai du cor* was composed by Robert Biket, an Anglo-Norman poet of the 12th century (Wulff, Lund, 1888). The *lais* of Marie de France were written in England, and the greater number of the romances composing the *matière de Bretagne* seem to have passed from England to France through the medium of Anglo-Norman. The legends of Merlin and Arthur, collected in the *Historia Regum Britanniae* by Geoffrey of Monmouth († 1154), passed into French literature, bearing the character which the bishop of St. Asaph had stamped upon them. Chrétien de Troye's *Perceval* (c. 1175) is doubtless based on an Anglo-Norman poem. Robert de Boron (c. 1215) took the subject of his Merlin (published by G. Paris and J. Ulrich, 1886, 2 vols., *Société des Anciens Textes*) from Geoffrey of Monmouth. Finally, the most celebrated love-legend of the middle ages, and one of the most beautiful inventions of world-literature, the story of Tristan and Iseult, tempted two authors, Bérout and Thomas, the first of whom is probably, and the second certainly, Anglo-Norman (see ARTHURIAN LEGEND; GRAIL, THE HOLY; TRISTAN). One *Folie Tristan* was composed in England in the last years of the 12th century. (For all these questions see *Soc. des Anc. Textes*, Muret's ed. 1903; Bédier's ed. 1902-1905). Less fascinating than the story of Tristan and Iseult, but nevertheless of considerable interest, are the two *romans d'aventure* of Hugh of Rutland, *Ipomedon* (published by Kölbing and Koschwitz, Breslau, 1889) and *Protesilaus* (still unpublished) written about 1185. The first relates the adventures of a knight who married the young duchess of Calabria, niece of King Meleager of Sicily, but was loved by Medea, the king's wife. The second poem is the sequel to *Ipomedon*, and deals with the wars and subsequent reconciliation between Ipomedon's sons, Daunus, the elder, lord of Apulia, and Protesilaus, the younger, lord of Calabria. Protesilaus defeats Daunus, who had expelled him from Calabria. He saves his brother's life, is reinvested with the dukedom of Calabria, and, after the death of Daunus, succeeds to Apulia. He



subsequently marries Medea, King Meleager's widow, who had helped him to seize Apulia, having transferred her affection for Ipomedon to his younger son (cf. Ward, *Cat. of Rom.*, i. 728). To these two romances by an Anglo-Norman author, *Amadas et Idoine*, of which we only possess a continental version, is to be added. Gaston Paris has proved indeed that the original was composed in England in the 12th century (*An English Miscellany presented to Dr. Furnivall in Honour of his Seventy-fifth Birthday*, Oxford, 1901, 386-394). The Anglo-Norman poem on the *Life of Richard Coeur de Lion* is lost, and an English version only has been preserved. About 1250 Eustace of Kent introduced into England the *roman d'Alexandre* in his *Roman de toute chevalerie*, many passages of which have been imitated in one of the oldest English poems on Alexander, namely, *King Alisaunder* (P. Meyer, *Alexandre le grand*, Paris, 1886, ii. 273, and Weber, *Metrical Romances*, Edinburgh).

(b) *Fableaux, Fables and Religious Tales*.—In spite of the incontestable popularity enjoyed by this class of literature, we have only some half-dozen *fableaux* written in England, viz. *Le chevalier à la corbeille*, *Le chevalier qui faisait parler les muets*, *Le chevalier, sa dame et un clerc*, *Les trois dames*, *La gageure*, *Le prêtre d'Alison*, *La bourgeoise d'Orléans* (Bédier, *Les Fabliaux*, 1895). As to fables, one of the most popular collections in the middle ages was that written by Marie de France, which she claimed to have translated from *King Alfred*. In the *Contes moralisés*, written by Nicole Bozon shortly before 1320 (*Soc. Anc. Textes*, 1889), a few fables bear a strong resemblance to those of Marie de France.

The religious tales deal mostly with the Mary Legends, and have been handed down to us in three collections:

(i.) The Adgar's collection. Most of these were translated from William of Malmesbury († 1143?) by Adgar in the 12th century ("Adgar's Marien-Legenden," *Altfr. Biblioth.* ix.; J. A. Herbert, *Rom.* xxxii. 394).

(ii.) The collection of Everard of Gateley, a monk of St. Edmund at Bury, who wrote c. 1250 three Mary Legends (*Rom.* xxix. 27).

(iii.) An anonymous collection of sixty Mary Legends composed c. 1250 (Brit. Museum Old Roy. 20 B, xiv.), some of which have been published in Suchier's *Bibliotheca Normannica*; in the *Altfr. Bibl.* See also Mussafia, "Studien zu den mittelalterlichen Marien-legenden" in *Sitzungsh. der Wien. Akademie* (t. cxiii., cxv., cxix., cxxiii., cxxix.).

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Another set of religious and moralizing tales is to be found in Chardri's *Set dormans* and *Josaphat*, c. 1216 (Koch, *Altfr. Bibl.*, 1880; G. Paris, *Poèmes et légendes du moyen âge*).

(c) *History*.—Of far greater importance, however, are the works which constitute Anglo-Norman historiography. The first Anglo-Norman historiographer is Geoffrey Gaimar, who wrote his *Estonie des Angles* (between 1147 and 1151) for Dame Constance, wife of Robert Fitz-Gislebert (*The Anglo-Norman Metrical Chronicle*, Hardy and Martin, i. ii., London, 1888). This history comprised a first part (now lost), which was merely a translation of Geoffrey of Monmouth's *Historia regum Britanniae*, preceded by a history of the Trojan War, and a second part which carries us as far as the death of William Rufus. For this second part he has consulted historical documents, but he stops at the year 1087, just when he has reached the period about which he might have been able to give us some first-hand information. Similarly, Wace in his *Roman de Rou et des dues de Normandie* (ed. Andresen, Heilbronn, 1877-1879, 2 vols.), written 1160-1174, stops at the battle of Tinchebray in 1107 just before the period for which he would have been so useful. His *Brut* or *Geste des Bretons* (Le Roux de Lincy, 1836-1838, 2 vols.), written in 1155, is merely a translation of Geoffrey of Monmouth. "Wace," says Gaston Paris, speaking of the *Roman de Rou*, "traduit en les abrégant des historiens latins que nous possédons; mais çà et là il ajoute soit des contes populaires, par exemple sur Richard 1<sup>er</sup>, sur Robert 1<sup>er</sup>, soit des particularités qu'il savait par tradition (sur ce même Robert le magnifique, sur l'expédition de Guillaume, &c.) et qui donnent à son oeuvre un réel intérêt historique. Sa langue est excellente; son style clair, serré, simple, d'ordinaire assez monotone, vous plaît par sa saveur archaïque et quelquefois par une certaine grâce et une certaine malice."

The *History of the Dukes of Normandy* by Benoît de Sainte-More is based on the work of Wace. It was composed at the request of Henry II. about 1170, and takes us as far as the year 1135 (ed. by Francisque Michel, 1836-1844, *Collection de documents inédits*, 3 vols.). The 43,000 lines which it contains are of but little interest to the historian; they are too evidently the work of a *romancier courtois*, who takes pleasure in recounting love-adventures such as those he has described in his romance of Troy. Other works, however, give us more trustworthy information, for example, the anonymous poem on Henry II.'s *Conquest of Ireland* in 1172 (ed. Francisque Michel, London, 1837), which, together with the *Expugnatio hibernica* of Giraud de Barri, constitutes our chief authority on this subject. The *Conquest of Ireland* was republished in 1892 by Goddard Henry Orpen, under the title of *The Song of Dermot and the Earl* (Oxford, Clarendon Press). Similarly, Jourdain Fantosme, who was in the north of England in 1174, wrote an account of the wars between Henry II., his sons, William the Lion of Scotland and Louis VII., in 1173 and 1174 (*Chronicle of the reigns of Stephen ... III.*, ed. by Joseph Stevenson and Fr. Michel, London, 1886, pp. 202-307). Not one of these histories, however, is to be compared in value with *The History of William the Marshal, Count of Striguil and Pembroke*, regent of England from 1216-1219, which was found and subsequently edited by Paul Meyer (*Société de l'histoire de France*, 3 vols., 1891-1901). This masterpiece of historiography was composed in 1225 or 1226 by a professional poet of talent at the request of William, son of the marshal. It was compiled from the notes of the marshal's squire, John d'Early († 1230 or 1231), who shared all the vicissitudes of his

master's life and was one of the executors of his will. This work is of great value for the history of the period 1186-1219, as the information furnished by John d'Early is either personal or obtained at first hand. In the part which deals with the period before 1186, it is true, there are various mistakes, due to the author's ignorance of contemporary history, but these slight blemishes are amply atoned for by the literary value of the work. The style is concise, the anecdotes are well told, the descriptions short and picturesque; the whole constitutes one of the most living pictures of medieval society. Very pale by the side of this work appear the *Chronique* of Peter of Langtoft, written between 1311 and 1320, and mainly of interest for the period 1294-1307 (ed. by T. Wright, London, 1866-1868); the *Chronique* of Nicholas Trevet (1258?-1328?), dedicated to Princess Mary, daughter of Edward I. (Duffus Hardy, *Descr. Catal.* III., 349-350); the *Scala Chronica* compiled by Thomas Gray of Heaton († c. 1369), which carries us to the year 1362-1363 (ed. by J. Stevenson, Maitland Club, Edinburgh, 1836); the *Black Prince*, a poem by the poet Chandos, composed about 1386, and relating the life of the Black Prince from 1346-1376 (re-edited by Francisque Michel, London and Paris, 1883); and, lastly, the different versions of the *Brutes*, the form and historical importance of which have been indicated by Paul Meyer (*Bulletin de la Société des Anciens Textes*, 1878, pp. 104-145), and by F. W. D. Brie (*Geschichte und Quellen der mittelhochdeutschen Prosachronik, The Brute of England or The Chronicles of England*, Marburg, 1905).

Finally we may mention, as ancient history, the translation of Eutropius and Dares, by Geoffrey of Waterford (13th century), who gave also the *Secret des Secrets*, a translation from a work wrongly attributed to Aristotle, which belongs to the next division (*Rom.* xxiii. 314).

*Didactic Literature.*—This is the most considerable, if not the most interesting, branch of Anglo-Norman literature: it comprises a large number of works written chiefly with the object of giving both religious and profane instruction to Anglo-Norman lords and ladies. The following list gives the most important productions arranged in chronological order:—

Philippe de Thau, *Comput*, c. 1119 (edited by E. Mall, Strassburg, 1873), poem on the calendar; *Bestiaire*, c. 1130 (ed. by E. Walberg, Paris, 1900; cf. G. Paris, *Rom.* xxxi. 175); *Lois de Guillaume le Conquérant* (redaction between 1150 and 1170, ed. by J. E. Matzke, Paris, 1899); *Oxford Psalter*, c. 1150 (Fr. Michel, *Libri Psalmorum versio antiqua gallica*, Oxford, 1860); *Cambridge Psalter*, c. 1160 (Fr. Michel, *Le Livre des Psaumes*, Paris, 1877); *London Psalter*, same as Oxford Psalter (cf. Beyer, *Zt. f. rom. Phil.* xi. 513-534; xii. 1-56); *Disticha Catonis*, translated by Everard de Kirkham and Elie de Winchester (Stengel, *Ausg. u. Abhandlungen*); *Le Roman de fortune*, summary of Boetius' *De consolatione philosophiae*, by Simon de Fresne (*Hist. lit.* xxviii. 408); *Quatre livres des rois*, translated into French in the 12th century, and imitated in England soon after (P. Schlösser, *Die Lautverhältnisse der quatre livres des rois*, Bonn, 1886; *Romania*, xvii. 124); *Donnei des Amanz*, the conversation of two lovers, overheard and carefully noted by the poet, of a purely didactic character, in which are included three interesting pieces, the first being an episode of the story of Tristram, the second a fable, *L'homme et le serpent*, the third a tale, *L'homme et l'oiseau*, which is the basis of the celebrated *Lai de l'oiselet* (*Rom.* xxv. 497); *Livre des Sibiles* (1160); *Enseignements Trebor*, by Robert de Ho (=Hoo, Kent, on the left bank of the Medway) [edited by Mary Vance Young, Paris; Picard, 101; cf. G. Paris, *Rom.* xxxii. 141]; *Lapidaire de Cambridge* (Pannier, *Les Lapidaires français*); Frère Angier de Ste. Frideswide, *Dialogues*, 29th of November 1212 (*Rom.* xii. 145-208, and xxix.; M. K. Pope, *Étude sur la langue de Frère Angier*, Paris, 1903); *Li dialogue Grégoire le pape*, ed. by Foerster, 1876; *Petit Plet*, by Chardri, c. 1216 (Koch, *Altfr. Bibliothek* i., and Mussafia, *Z. f. r. P.* iii. 591); *Petite philosophie*, c. 1225 (*Rom.* xv. 356; xxix. 72); *Histoire de Marie et de Jésus* (*Rom.* xvi. 248-262); *Poème sur l'Ancien Testament* (*Not. et Extr.* xxxiv. 1, 210; *Soc. Anc. Textes*, 1880, p. 73 and *Romania* xxxii. 68); *Dialogue de l'évêque Saint Julien et son disciple* (*Rom.* xxix. 211); *Poème sur l'antichrist et le jugement dernier*, by Henri d'Arci (*Rom.* xxix. 78; *Not. et Extr.* 35, i. 137). Wilham de Waddington produced at the end of the 13th century his *Manuel des péchés*, which was adapted in England by Robert of Brunne in his *Handlyng Sinne* (1303) [*Hist. lit.* xxviii. 179-207; *Rom.* xxix. 5, 47-53]; see Furnivall, *Robert of Brunne's Handlyng Synne* (Roxb. Club, 1862); in the 14th century we find Nicole Bozon's *Contes moralisés* (see above); *Traité de naturese* (*Rom.* xiii. 508); *Sermons* in verse (P. Meyer, op. cit. xlv.); *Proverbes de bon enseignement* (op. cit. xlvi.). We have also a few handbooks on the teaching of French. Gautier de Bibleworth wrote such a treatise à *Madame Dyonise de Mountchensi pur aprise de langage* (Wright, *A Volume of Vocabularies*; P. Meyer, *Rec. d'anc. textes*, p. 360 and *Romania* xxxii. 22); *Orthographia gallica* (Sturzingger, *Altfr. Bibl.* 1884); *La manière de langage*, written in 1396 (P. Meyer, *Rev. crit. d'hist. et de litt.* nos. compl. de 1870); *Un petit livre pour enseigner les enfants de leur entreparler comun François*, c. 1399 (Stengel, *Z. für n.f. Spr. u. Litt.* i. 11). The important *Mirour de l'omme*, by John Gower, contains about 30,000 lines written in very good French at the end of the 14th century (Macaulay, *The Complete Works of John Gower*, i., Oxford, 1899).

*Hagiography.*—Among the numerous lives of saints written in Anglo-Norman the most important ones are the following, the list of which is given in chronological order:—*Voyage de Saint Brandan* (or *Brandain*), written in 1121, by an ecclesiastic for Queen Aelis of Louvain (*Rom. St. i.* 553-588; *Z. f. r. P. ii.* 438-459; *Rom. xviii.* 203. C. Wahlund, *Die altfr. Prosaübersetz. von Brendan's Meerfahrt*, Upsala, 1901); life of St. Catherine by Clemence of Barking (*Rom. xiii.* 400, Jarnik, 1894); life of St. Giles, c. 1170, by Guillaume de Berneville (*Soc. Anc. Textes fr.*, 1881; *Rom. xi.* and *xxiii.* 94); life of St. Nicholas, life of Our Lady, by Wace (Delius, 1850; Stengel, *Cod. Digby*, 66); Uhlemann, *Gram. Krit. Studien zu Wace's Conception und Nicolas*, 1878; life of St. George by Simon de Fresne (*Rom. x.* 319; J. E. Matzke, *Public. of the Mod. Lang. Ass. of Amer.* xvii. 1902; *Rom. xxxiv.* 148); *Expurgatoire de Ste. Patrice*, by Marie de France (Jenkins, 1894; Eckleben, *Aelteste Schilderung vom Fegefeuer d.H. Patricius*, 1851; Ph. de Felice, 1906); *La vie de St. Edmund le Rei*, by Denis Pyramus, end of 12th century (*Memorials of St. Edmund's Abbey*, edited by T. Arnold, ii. 1892; *Rom. xxii.* 170); Henri d'Archi's life of St. Thais, poem on the Antichrist, *Visio S. Pauli* (P. Meyer, *Not. et Extr.* xxxv. 137-158); life of St. Gregory the Great by Frère Angier, 30th of April 1214 (*Rom. viii.* 509-544; ix. 176; xviii. 201); life of St. Modwenna, between 1225 and 1250 (Suchier, *Die dem Matthäus Paris zugeschriebene Vie de St. Auban*, 1873, pp. 54-58); Fragments of a life of St. Thomas Becket, c. 1230 (P. Meyer, *Soc. Anc. Text. fr.*, 1885); and another life of the same by Benoit of St. Alban, 13th century (Michel, *Chron. des ducs de Normandie; Hist. Lit.* xxiii. 383); a life of Edward the Confessor, written before 1245 (Luard, *Lives of Edward the Confessor*, 1858; *Hist. Lit.* xxvii. 1), by an anonymous monk of Westminster; life of St. Auban, c. 1250 (Suchier, op. cit.; Uhlemann, "Über die vie de St. Auban in Bezug auf Quelle," &c. *Rom. St. iv.* 543-626; ed. by Atkinson, 1876). *The Vision of Tnudgal*, an Anglo-Norman fragment, is preserved in MS. 312, Trinity College, Dublin; the MS. is of the 14th century; the author seems to belong to the 13th (*La vision de Tondale*, ed. by Friedel and Kuno Meyer, 1906). In this category we may add the life of Hugh of Lincoln, 13th century (*Hist. Lit.* xxiii. 436; Child, *The English and Scottish Popular Ballads*, 1888, p. v; Wolter, *Bibl. Anglo-Norm.*, ii. 115). Other lives of saints were recognized to be Anglo-Norman by Paul Meyer when examining the MSS. of the Welbeck library (*Rom. xxxii.* 637 and *Hist. Lit.* xxxiii. 338-378).

*Lyrical Poetry.*—The only extant songs of any importance are the seventy-one *Ballads* of Gower (Stengel, *Gower's Minnesang*, 1886). The remaining songs are mostly of a religious character. Most of them have been discovered and published by Paul Meyer (*Bulletin de la Soc. Anc. Textes*, 1889; *Not. et Extr.* xxxiv; *Rom. xiii.* 518, t. xiv. 370; xv. p. 254, &c.). Although so few have come down to us such songs must have been numerous at one time, owing to the constant intercourse between English, French and Provençals of all classes. An interesting passage in *Piers Plowman* furnishes us with a proof of the extent to which these songs penetrated into England. We read of:

"... dykers and deluers that doth here dedes ille,  
And dryuen forth the longe day with 'Deu, vous saue,  
Dame Emme!'" (*Prologue*, 223 f.)

One of the finest productions of Anglo-Norman lyric poetry written in the end of the 13th century, is the *Plainte d'amour* (Vising, Göteborg, 1905; *Romania* xiii. 507, xv. 292 and xxix. 4), and we may mention, merely as literary curiosities, various works of a lyrical character written in two languages, Latin and French, or English and French, or even in three languages, Latin, English and French. In *Early English Lyrics* (Oxford, 1907) we have a poem in which a lover sends to his mistress a love-greeting composed in three languages, and his learned friend replies in the same style (*De amico ad amicam, Responcio*, viii and ix).

*Satire.*—The popularity enjoyed by the *Roman de Renart* and the Anglo-Norman version of the *Riote du Monde* (*Z. f. rom. Phil.* viii. 275-289) in England is proof enough that the French spirit of satire was keenly appreciated. The clergy and the fair sex presented the most attractive target for the shots of the satirists. However, an Englishman raised his voice in favour of the ladies in a poem entitled *La Bonté des dames* (Meyer, *Rom.* xv. 315-339), and Nicole Bozon, after having represented "Pride" as a feminine being whom he supposes to be the daughter of Lucifer, and after having fiercely attacked the women of his day in the *Char d'Orgueil* (*Rom.* xiii. 516), also composed a *Bounté des femmes* (P. Meyer, op. cit. 33) in which he covers them with praise, commending their courtesy, their humility, their openness and the care with which they bring up their children. A few pieces of political satire show us French and English exchanging amenities on their mutual shortcomings. The *Roman des Français*, by André de Coutances, was written on the continent, and cannot be quoted as Anglo-Norman although it was composed before 1204 (cf. Gaston Paris: *Trois versions rimées de l'évangile de Nicodème, Soc. Anc. Textes*, 1885), it is a very spirited reply to French authors who had attacked the English.

*Dramatic Literature.*—This must have had a considerable influence on the development of the sacred drama in England, but none of the French plays acted in England in the 12th and 13th centuries has been preserved. *Adam*, which is generally considered to be an Anglo-Norman mystery of the 12th century, was probably written in France at the beginning of the 13th century (*Romania* xxxii. 637), and the so-called Anglo-Norman *Resurrection* belongs also to continental French. It is necessary to state that the earliest English moralities seem to have been imitations of the French ones.

**BIBLIOGRAPHY.**—Apart from the works already mentioned see generally: Scheibner, "Über die Herrschaft der frz. Sprache in England" (Annaberg, Progr. der Königlichen Realschule, 1880, 38 f.); Groeber, *Grundr. der romanischen Philologie*, ii. iii. (Strassburg, 1902); G. Paris, *La Litt. fr. au moyen âge* (1905); *Esquisse historique de la litt. fr. au moyen âge* (1907); *La Litt. norm. avani*

*l'annexion 912-1204* (Paris, 1899); "L'Esprit normand en Angleterre," *La Poésie au moyen âge* (2nd series 45-74, Paris, 1906); Thomas Wright, *Biographia britannica literaria* (Anglo-Norman period, London, 1846); Ten Brink, *Geschichte der englischen Litteratur* (Berlin, 1877, i. 2); J. J. Jusserand, *Hist. litt. du peuple anglais* (2nd ed. 1895, vol. i.); W. H. Schofield, *English Literature from the Norman Conquest to Chaucer* (London, 1906); Johan Vising, *Franska Språket i England* (Göteborg, 1900, 1901, 1902).

(L. Br.)

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**ANGLO-SAXON CHRONICLE.** It is usual to speak of "the Anglo-Saxon Chronicle"; it would be more correct to say that there are four Anglo-Saxon Chronicles. It is true that these all grow out of a common stock, that in some even of their later entries two or more of them use common materials; but the same may be said of several groups of medieval chronicles, which no one dreams of treating as single chronicles. Of this fourfold Chronicle there are seven MSS. in existence; *C. C. C. Cant.* 173 (A); *Cott. Tib.* A vi. (B); *Cott. Tib.* B i. (C); *Cott. Tib.* B iv. (D); *Bodl. Laud. Misc.* 636 (E); *Cott. Domitian* A viii. (F); *Cott. Otho* B xi. (G). Of these G is now a mere fragment, and it is known to have been a transcript of A. F is bilingual, the entries being given both in Saxon and Latin. It is interesting as a stage in the transition from the vernacular to the Latin chronicle; but it has little independent value, being a mere epitome, made at Canterbury in the 11th or 12th century, of a chronicle akin to E. B, as far as it goes (to 977), is identical with C, both having been copied from a common original, but A, C, D, E have every right to be treated as independent chronicles. The relations between the four vary very greatly in different parts, and the neglect of this consideration has led to much error and confusion. The common stock, out of which all grow, extends to 892. The present writer sees no reason to doubt that the idea of a national, as opposed to earlier local chronicles, was inspired by Alfred, who may even have dictated, or at least revised, the entries relating to his own campaigns; while for the earlier parts pre-existing materials, both oral and written, were utilized. Among the latter the chronological epitome appended to Bede's *Ecclesiastical History* may be specially mentioned. But even this common stock exists in two different recensions, in A, B, C, on the one hand, and D, E on the other. The main points of difference are that in D, E (1) a series of northern annals have been incorporated; (2) the Bede entries are taken, not from the brief epitome, but from the main body of the *Eccl. Hist.* The inference is that, shortly after the compiling of this Alfredian chronicle, a copy of it was sent to some northern monastery, probably Ripon, where it was expanded in the way indicated. Copies of this northernized Chronicle afterwards found their way to the south. The impulse given by Alfred was continued under Edward, and we have what may be called an official continuation of the history of the Danish wars, which, in B, C, D extends to 915, and in A to 924. After 915 B, C insert as a separate document a short register of Mercian affairs during the same period (902-924), which might be called the acts of Æthelflaed, the famous "Lady of the Mercians," while D has incorporated it, not very skilfully, with the official continuation. Neither of these documents exists in E. From 925 to 975 all the chronicles are very fragmentary; a few obits, three or four poems, among them the famous ballad on the battle of Brunanburh, make up the meagre tale of their common materials, which each has tried to supplement in its own way. A has inserted a number of Winchester entries, which prove that A is a Winchester book. And this local and scrappy character it retains to 1001, where it practically ends. At some subsequent time it was transferred bodily to Canterbury, where it received numerous interpolations in the earlier part, and a few later local entries which finally tail off into the Latin acts of Lanfranc. A may therefore be dismissed. C has added to the common stock one or two Abingdon entries, with which place the history of C is closely connected; while D and E have a second group of northern annals 901-966, E being however much more fragmentary than D, omitting, or not having access to, much both of the common and of the northern material which is found in D. From 983 to 1018 C, D and E are practically identical, and give a connected history of the Danish struggles under Æthelred II. This section was probably composed at Canterbury. From 1018 the relations of C, D, E become too complicated to be expressed by any formula; sometimes all three agree together, sometimes all three are independent; in other places each pair in turn agree against the third. It may be noted that C is strongly anti-Godwinist, while E is equally pro-Godwinist, D occupying an intermediate position. C extends to 1066, where it ends abruptly, and probably mutilated. D ends at 1079 and is certainly mutilated. In its later history D is associated with some place in the diocese of Worcester, probably Evesham. In its present form D is a comparatively late MS., none of it probably much earlier, and some of it later, than 1100. In the case of entries in the earlier part of the chronicles, which are peculiar to D, we cannot exclude the possibility that they may be late interpolations. E is continued to 1154. In its present form it is unquestionably a Peterborough book. The earlier part is full of Peterborough interpolations, to which place many of the later entries also refer. But (apart from the interpolations) it is only the entries after 1121, where the first hand in the MS. ends, which were actually composed at Peterborough. The section 1023-1067 certainly, and possibly also the section 1068-1121, was composed at St. Augustine's, Canterbury; and the former is of extreme interest and value, the writer being in close contact with the events which he describes. The later parts of E show a great degeneration in language, and a querulous tone due to the sufferings of the native population under the harsh Norman rule; "but our debt to it is inestimable; and we can hardly measure what the loss to English history would have been, if it had not been written; or if, having been written, it had, like so many another English chronicle, been lost."

**BIBLIOGRAPHY.**—The above account is based on the introduction in vol. ii. of the Rev. C. Plummer's edition of *Two of the Saxon Chronicles Parallel* (Clarendon Press, 1892, 1899); to

which the student may be referred for detailed arguments. The *editio princeps* of the Anglo-Saxon Chronicle was by Abraham Wheloc, professor of Arabic at Cambridge, where the work was printed (1643-1644). It was based mainly on the MS. called G above, and is the chief source of our knowledge of that MS. which perished, all but three leaves, in the Cottonian fire of 1723. Edmund Gibson of Queen's College, Oxford, afterwards bishop of London, published an edition in 1692. He used Wheloc's edition, and E, with collations or transcripts of B and F. Both Wheloc and Gibson give Latin translations. In 1823 appeared an edition by Dr. Ingram, of Trinity College, Oxford, with an English translation. Besides A, B, E, F, Ingram used C and D for the first time. But both he and Gibson made the fatal error of trying to combine the disparate materials contained in the various chronicles in a single text. An improvement in this respect is seen in the edition made by Richard Price (d. 1833) for the first (and only) volume of *Monumenta Historica Britannica* (folio 1848). There is still, however, too much conflation, and owing to the plan of the volume, the edition only extends to 1066. A translation is appended. In 1861 appeared Benjamin Thorpe's six-text edition in the Rolls Series. Though not free from defects, this edition is absolutely indispensable for the study of the chronicles and the mutual relations of the different MSS. A second volume contains the translation. In 1865 the Clarendon Press published *Two Saxon Chronicles (A and E) Parallel, with supplementary extracts from the others*, by the Rev. John Earle. This edition has no translation, but in the notes and introduction a very considerable advance was made. On this edition is partly based the later edition by the Rev. C. Plummer, already cited above. In addition to the translations contained in the editions already mentioned, the following have been issued separately. The first translation into modern English was by Miss Anna Gurney, privately printed in 1819. This was largely based on Gibson's edition, and was in turn the basis of Dr. Giles' translation, published in 1847, and often reprinted. The best translation is that by the Rev. Joseph Stevenson, in his series of *Church Historians of England* (1853). Up to the Conquest it is a revision of the translation contained in *Mon. Hist. Brit.* From that point it is an independent translation.

(C. Pl.)

**ANGLO-SAXON LAW.** 1. The body of legal rules and customs which obtained in England before the Norman conquest constitutes, with the Scandinavian laws, the most genuine expression of Teutonic legal thought. While the so-called "barbaric laws" (*leges barbarorum*) of the continent, not excepting those compiled in the territory now called Germany, were largely the product of Roman influence, the continuity of Roman life was almost completely broken in the island, and even the Church, the direct heir of Roman tradition, did not carry on a continuous existence: Canterbury was not a see formed in a Roman province in the same sense as Tours or Reims. One of the striking expressions of this Teutonism is presented by the language in which the Anglo-Saxon laws were written. They are uniformly worded in English, while continental laws, apart from the Scandinavian, are all in Latin. The English dialect in which the Anglo-Saxon laws have been handed down to us is in most cases a common speech derived from West Saxon—naturally enough as Wessex became the predominant English state, and the court of its kings the principal literary centre from which most of the compilers and scribes derived their dialect and spelling. Traces of Kentish speech may be detected, however, in the *Textus Roffensis*, the MS. of the Kentish laws, and Northumbrian dialectical peculiarities are also noticeable on some occasions, while Danish words occur only as technical terms. At the conquest, Latin takes the place of English in the compilations made to meet the demand for Anglo-Saxon law texts as still applied in practice.

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2. It is easy to group the Anglo-Saxon laws according to the manner of their publication. They would fall into three divisions: (1) laws and collections of laws promulgated by public authority; (2) statements of custom; (3) private compilations of legal rules and enactments. To the first division belong the laws of the Kentish kings, Æthelberht, Hlothhere and Eadric, Withraed; those of Ine of Wessex, of Alfred, Edward the Elder, Æthelstan,<sup>[1]</sup> Edmund, Edgar, Æthelred and Canute; the treaty between Alfred and Guthrum and the so-called treaty between Edward and Guthrum. The second division is formed by the convention between the English and the Welsh *Dunsaetas*, the law of the Northumbrian priests, the customs of the North people, the fragments of local customs entered in Domesday Book. The third division would consist of the collections of the so-called *Pseudo-leges Canuti*, the laws of Edward the Confessor, of Henry I., and the great compilation of the *Quadripartitus*, then of a number of short notices and extracts like the fragments on the "wedding of a wife," on oaths, on ordeals, on the king's peace, on rural customs (*Rectitudines singularum personarum*), the treatises on the reeve (*gerefa*) and on the judge (*dema*), formulae of oaths, notions as to wergeld, &c. A fourth group might be made of the charters, as they are based on Old English private and public law and supply us with most important materials in regard to it. Looking somewhat deeper at the sources from which Old English law was derived, we shall have to modify our classification to some extent, as the external forms of publication, although important from the point of view of historical criticism, are not sufficient standards as to the juridical character of the various kinds of material. Direct statements of law would fall under the following heads, from the point of view of their legal origins: i. customary rules followed by divers communities capable of formulating law; ii. enactments of authorities, especially of kings; iii. private arrangements made under recognized legal rules. The first would comprise, besides most of the statements of custom included in the second division according to the first classification, a great many of the rules entered in collections promulgated by kings; most of the paragraphs of Æthelberht's, Hlothhere's, and Eadric's and Ine's laws, are popular legal customs that have received the stamp of royal authority

by their insertion in official codes. On the other hand, from Withraed's and Alfred's laws downwards, the element of enactment by central authority becomes more and more prominent. The kings endeavour, with the help of secular and clerical witan, to introduce new rules and to break the power of long-standing customs (e.g. the precepts about the keeping of holidays, the enactments of Edmund restricting private vengeance, and the solidarity of kindreds as to feuds, and the like). There are, however, no outward signs enabling us to distinguish conclusively between both categories of laws in the codes, nor is it possible to draw a line between permanent laws and personal ordinances of single sovereigns, as has been attempted in the case of Frankish legislation.

3. Even in the course of a general survey of the legal lore at our disposal, one cannot help being struck by peculiarities in the distribution of legal subjects. Matters which seem to us of primary importance and occupy a wide place in our law-books are almost entirely absent in Anglo-Saxon laws or relegated to the background. While it is impossible to give here anything like a complete or exact survey of the field—a task rendered almost impossible by the arbitrary manner in which paragraphs are divided, by the difficulty of making Old English enactments fit into modern rubrics, and by the necessity of counting several times certain paragraphs bearing on different subjects—a brief statistical analysis of the contents of royal codes and laws may be found instructive.

We find roughly 419 paragraphs devoted to criminal law and procedure as against 91 concerned with questions of private law and civil procedure. Of the criminal law clauses, as many as 238 are taken up with tariffs of fines, while 80 treat of capital and corporal punishment, outlawry and confiscation, and 101 include rules of procedure. On the private law side 18 clauses apply to rights of property and possession, 13 to succession and family law, 37 to contracts, including marriage when treated as an act of sale; 18 touch on civil procedure. A subject which attracted special attention was the law of status, and no less than 107 paragraphs contain disposition dictated by the wish to discriminate between the classes of society. Questions of public law and administration are discussed in 217 clauses, while 197 concern the Church in one way or another, apart from purely ecclesiastical collections. In the public law division it is chiefly the power, interests and privileges of the king that are dealt with, in roughly 93 paragraphs, while local administration comes in for 39 and purely economic and fiscal matter for 13 clauses. Police regulations are very much to the fore and occupy no less than 72 clauses of the royal legislation. As to church matters, the most prolific group is formed by general precepts based on religious and moral considerations, roughly 115, while secular privileges conferred on the Church hold about 62, and questions of organization some 20 clauses.

The statistical contrasts are especially sharp and characteristic when we take into account the chronological sequence in the elaboration of laws. Practically the entire code of Æthelberht, for instance, is a tariff of fines for crimes, and the same subject continues to occupy a great place in the laws of Hlothhere and Eadric, Ine and Alfred, whereas it appears only occasionally in the treaties with the Danes, the laws of Withraed, Edward the Elder, Æthelstan, Edgar, Edmund and Æthelred. It reappears in some strength in the code of Canute, but the latter is chiefly a recapitulation of former enactments. The system of "compositions" or fines, paid in many cases with the help of kinsmen, finds its natural place in the ancient, tribal period of English history and loses its vitality later on in consequence of the growth of central power and of the scattering of maegths. Royalty and the Church, when they acquire the lead in social life, work out a new penal system based on outlawry, death penalties and corporal punishments, which make their first appearance in the legislation of Withraed and culminate in that of Æthelred and Canute.

As regards status, the most elaborate enactments fall into the period preceding the Danish settlements. After the treaties with the Danes, the tendency is to simplify distinctions on the lines of an opposition between twelvehynd-men and twyhynd-men, paving the way towards the feudal distinction between the free and the unfree. In the arrangements of the commonwealth the clauses treating of royal privileges are more or less evenly distributed over all reigns, but the systematic development of police functions, especially in regard to responsibility for crimes, the catching of thieves, the suppression of lawlessness, is mainly the object of 10th and 11th century legislation. The reign of Æthelred, which witnessed the greatest national humiliation and the greatest crime in English history, is also marked by the most lavish expressions of religious feeling and the most frequent appeals to morality. This sketch would, of course, have to be modified in many ways if we attempted to treat the unofficial fragments of customary law in the same way as the paragraphs of royal codes, and even more so if we were able to tabulate the indirect evidence as to legal rules. But, imperfect as such statistics may be, they give us at any rate some insight into the direction of governmental legislation.

4. The next question to be approached concerns the pedigree of Anglo-Saxon law and the latter's natural affinities. What is its position in the legal history of Germanic nations? How far has it been influenced by non-Germanic elements, especially by Roman and Canon law? The oldest Anglo-Saxon codes, especially the Kentish and the West Saxon ones, disclose a close relationship to the barbaric laws of Lower Germany—those of Saxons, Frisians, Thuringians. We find a division of social ranks which reminds us of the threefold gradation of Lower Germany (edelings, frilings, lazzen-eorls, ceorls, laets), and not of the twofold Frankish one (*ingenii Franci, Romani*), nor of the minute differentiation of the Upper Germans and Lombards. In subsequent history there is a good deal of resemblance between the capitularies' legislation of Charlemagne and his successors on one hand, the acts of Alfred, Edward the Elder, Æthelstan and Edgar on the other, a resemblance called forth less by direct borrowing of Frankish institutions than by the similarity

of political problems and condition. Frankish law becomes a powerful modifying element in English legal history after the Conquest, when it was introduced wholesale in royal and in feudal courts. The Scandinavian invasions brought in many northern legal customs, especially in the districts thickly populated with Danes. The Domesday survey of Lincolnshire, Nottinghamshire, Yorkshire, Norfolk, &c., shows remarkable deviations in local organization and justice (lagmen, sokes), and great peculiarities as to status (socmen, freemen), while from laws and a few charters we can perceive some influence on criminal law (*nidings-vaerk*), special usages as to fines (*lahslit*), the keeping of peace, attestation and sureties of acts (*faestermen*), &c. But, on the whole, the introduction of Danish and Norse elements, apart from local cases, was more important owing to the conflicts and compromises it called forth and its social results,—than on account of any distinct trail of Scandinavian views in English law. The Scandinavian newcomers coalesced easily and quickly with the native population.

The direct influence of Roman law was not great during the Saxon period: we notice neither the transmission of important legal doctrines, chiefly through the medium of Visigothic codes, nor the continuous stream of Roman tradition in local usage. But indirectly Roman law did exert a by no means insignificant influence through the medium of the Church, which, for all its insular character, was still permeated with Roman ideas and forms of culture. The Old English "books" are derived in a roundabout way from Roman models, and the tribal law of real property was deeply modified by the introduction of individualistic notions as to ownership, donations, wills, rights of women, &c. Yet in this respect also the Norman Conquest increased the store of Roman conceptions by breaking the national isolation of the English Church and opening the way for closer intercourse with France and Italy.

5. It would be useless to attempt to trace in a brief sketch the history of the legal principles embodied in the documents of Anglo-Saxon law. But it may be of some value to give an outline of a few particularly characteristic subjects.

(a) The Anglo-Saxon legal system cannot be understood unless one realizes the fundamental opposition between folk-right and privilege. Folk-right is the aggregate of rules, formulated or latent but susceptible of formulation, which can be appealed to as the expression of the juridical consciousness of the people at large or of the communities of which it is composed. It is tribal in its origin, and differentiated, not according to boundaries between states, but on national and provincial lines. There may be the folk-right of West and East Saxons, of East Angles, of Kentish men, Mercians, Northumbrians, Danes, Welshmen, and these main folk-right divisions remain even when tribal kingdoms disappear and the people is concentrated in one or two realms. The chief centres for the formulation and application of folk-right were in the 10th and 11th centuries the shire-moots, while the witan of the realm generally placed themselves on the higher ground of State expediency, although occasionally using folk-right ideas. The older law of real property, of succession, of contracts, the customary tariffs of fines, were mainly regulated by folk-right; the reeves employed by the king and great men were supposed to take care of local and rural affairs according to folk-right. The law had to be declared and applied by the people itself in its communities, while the spokesmen of the people were neither democratic majorities nor individual experts, but a few leading men—the twelve eldest thanes or some similar quorum. Folk-right could, however, be broken or modified by special law or special grant, and the fountain of such privileges was the royal power. Alterations and exceptions were, as a matter of fact, suggested by the interested parties themselves, and chiefly by the Church. Thus a privileged land-tenure was created—bookland; the rules as to the succession of kinsmen were set at nought by concession of testamentary power and confirmations of grants and wills; special exemptions from the jurisdiction of the hundreds and special privileges as to levying fines were conferred. In process of time the rights originating in royal grants of privilege overbalanced, as it were, folk-right in many respects, and became themselves the starting-point of a new legal system—the feudal one.

(b) Another feature of vital importance in the history of Anglo-Saxon law is its tendency towards the preservation of peace. Society is constantly struggling to ensure the main condition of its existence—peace. Already in Æthelberht's legislation we find characteristic fines inflicted for breach of the peace of householders of different ranks—the ceorl, the eorl, and the king himself appearing as the most exalted among them. Peace is considered not so much a state of equilibrium and friendly relations between parties, but rather as the rule of a third within a certain region—a house, an estate, a kingdom. This leads on one side to the recognition of private authorities—the father's in his family, the master's as to servants, the lord's as to his personal or territorial dependents. On the other hand, the tendency to maintain peace naturally takes its course towards the strongest ruler, the king, and we witness in Anglo-Saxon law the gradual evolution of more and more stringent and complete rules in respect of the king's peace and its infringements.

(c) The more ancient documents of Anglo-Saxon law show us the individual not merely as the subject and citizen of a certain commonwealth, but also as a member of some group, all the fellows of which are closely allied in claims and responsibilities. The most elementary of these groups is the *maegth*, the association of agnatic and cognatic relations. Personal protection and revenge, oaths, marriage, wardship, succession, supervision over settlement, and good behaviour, are regulated by the law of kinship. A man's actions are considered not as exertions of his individual will, but as acts of the kindred, and all the fellows of the *maegth* are held responsible for them. What began as a natural alliance was used later as a means of enforcing responsibility and keeping lawless individuals in order. When the association of kinsmen failed,

the voluntary associations—guilds—appeared as substitutes. The gild brothers associated in mutual defence and support, and they had to share in the payment of fines. The township and the hundred came also in for certain forms of collective responsibility, because they presented groups of people associated in their economic and legal interests.

(d) In course of time the natural associations get loosened and intermixed, and this calls forth the elaborate police legislation of the later Anglo-Saxon kings. Regulations are issued about the sale of cattle in the presence of witnesses. Enactments about the pursuit of thieves, and the calling in of warrantors to justify sales of chattels, are other expressions of the difficulties attending peaceful intercourse. Personal surety appears as a complement of and substitute for collective responsibility. The *hlaforð* and his *hiredmen* are an institution not only of private patronage, but also of police supervision for the sake of laying hands on malefactors and suspected persons. The *landrica* assumes the same part in a territorial district. Ultimately the laws of the 10th and 11th centuries show the beginnings of the frankpledge associations, which came to act so important a part in the local police and administration of the feudal age.

The points mentioned are not many, but, apart from their intrinsic importance in any system of law, they are, as it were, made prominent by the documents themselves, as they are constantly referred to in the latter.

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(P. Vi.)

[1] The *Judicia civitatis Lundoniae* are a gild statute confirmed by King Æthelstan.

**ANGLO-SAXONS.** The term "Anglo-Saxon" is commonly applied to that period of English history, language and literature which preceded the Norman Conquest. It goes back to the time of King Alfred, who seems to have frequently used the title *rex Anglorum Saxonum* or *rex Angul-Saxonum*. The origin of this title is not quite clear. It is generally believed to have arisen from the final union of the various kingdoms under Alfred in 886. Bede (*Hist. Eccl.* i. 15) states that the people of the more northern kingdoms (East Anglia, Mercia, Northumbria, &c.) belonged to the Angli, while those of Essex, Sussex and Wessex were sprung from the Saxons (*q.v.*), and those of Kent and southern Hampshire from the Jutes (*q.v.*). Other early writers, however, do not observe these distinctions, and neither in language nor in custom do we find evidence of any appreciable differences between the two former groups, though in custom Kent presents most remarkable contrasts with the other kingdoms. Still more curious is the fact that West Saxon writers regularly speak of their own nation as a part of the *Angelcyn* and of their language as *Englisc*, while the West Saxon royal family claimed to be of the same stock as that of Bernicia. On the other hand, it is by no means impossible that the distinction drawn by Bede was based solely on the names Essex (East Seaxan), East Anglia, &c. We need not doubt that the Angli and the Saxons were different nations originally; but from the evidence at our disposal it seems likely that they had practically coalesced in very early times, perhaps even before the invasion. At all events the term *Angli Saxones* seems to have first come into use on the continent, where we find it, nearly a century before Alfred's time, in the writings of Paulus Diaconus (Paul the Deacon). There can be little doubt, however, that there it was used to distinguish the Teutonic inhabitants of Britain from the Old Saxons of the continent.

See W. H. Stevenson, *Asser's Life of King Alfred* (Oxford, 1904, pp. 148 ff.); H. Munro Chadwick, *The Origin of the English Nation* (Cambridge, 1907); also BRITAIN, *Anglo-Saxon*.

(H. M. C.)



**ANGOLA**, the general name of the Portuguese possessions on the west coast of Africa south of the equator. With the exception of the enclave of Kabinda (*q.v.*) the province lies wholly south of the river Congo. Bounded on the W. by the Atlantic Ocean, it extends along the coast from the southern bank of the Congo (6° S., 12° E.) to the mouth of the Kunene river (17° 18' S., 11° 50' E.). The coast-line is some 900 m. long. On the north the Congo forms for 80 m. the boundary separating Angola from the Congo Free State. The frontier thence (in 5° 52' S.) goes due east to the Kwango river. The eastern boundary—dividing the Portuguese possessions from the Congo State and Barotseland (N. W. Rhodesia)—is a highly irregular line. On the south Angola borders German South-West Africa, the frontier being drawn somewhat S. of the 17th degree of S. latitude. The area of the province is about 480,000 sq. m. The population is estimated (1906) at 4,119,000.

The name Angola (a Portuguese corruption of the Bantu word *Ngola*) is sometimes confined to the 105 m. of coast, with its hinterland, between the mouths of the rivers Dande and Kwanza, forming the central portion of the Portuguese dominions in West Africa; in a looser manner Angola is used to designate all the western coast of Africa south of the Congo in the possession of Portugal; but the name is now officially applied to the whole of the province. Angola is divided into five districts: four on the coast, the fifth, Lunda, wholly inland, being the N.E. part of the province. Lunda is part of the old Bantu kingdom of Muata Yanvo, divided by international agreement between Portugal and the Congo Free State.

The coast divisions of Angola are Congo on the N. (from the river Congo to the river Loje), corresponding roughly with the limits of the "kingdom of Congo" (see *History* below); Loanda, which includes Angola in the most restricted sense mentioned above; Benguella and Mossamedes to the south. Mossamedes is again divided into two portions—the coast region and the hinterland, known as Huilla.

*Physical Features.*—The coast is for the most part flat, with occasional low cliffs and bluffs of red sandstone. There is but one deep inlet of the sea—Great Fish Bay (or Bahia dos Tigres), a little north of the Portuguese-German frontier. Farther north are Port Alexander, Little Fish Bay and Lobito Bay, while shallower bays are numerous. Lobito Bay has water sufficient to allow large ships to unload close inshore. The coast plain extends inland for a distance varying from 30 to 100 m. This region is in general sparsely watered and somewhat sterile. The approach to the great central plateau of Africa is marked by a series of irregular terraces. This intermediate mountain belt is covered with luxuriant vegetation. Water is fairly abundant, though in the dry season obtainable only by digging in the sandy beds of the rivers. The plateau has an altitude ranging from 4000 to 6000 ft. It consists of well-watered, wide, rolling plains, and low hills with scanty vegetation. In the east the tableland falls away to the basins of the Congo and Zambezi, to the south it merges into a barren sandy desert. A large number of rivers make their way westward to the sea; they rise, mostly, in the mountain belt, and are unimportant, the only two of any size being the Kwanza and the Kunene, separately noticed. The mountain chains which form the edge of the plateau, or diversify its surface, run generally parallel to the coast, as Tala Mugongo (4400 ft.), Chella and Vissecua (5250 ft. to 6500 ft.). In the district of Benguella are the highest points of the province, viz. Loviti (7780 ft.), in 12° 5' S., and Mt. Elonga (7550 ft.). South of the Kwanza is the volcanic mountain Caculo-Cabaza (3300 ft.). From the tableland the Kwango and many other streams flow north to join the Kasai (one of the largest affluents of the Congo), which in its upper course forms for fully 300 m. the boundary between Angola and the Congo State. In the south-east part of the province the rivers belong either to the Zambezi system, or, like the Okavango, drain to Lake Ngami.

*Geology.*—The rock formations of Angola are met with in three distinct regions: (1) the littoral zone, (2) the median zone formed by a series of hills more or less parallel with the coast, (3) the central plateau. The central plateau consists of ancient crystalline rocks with granites overlain by unfossiliferous sandstones and conglomerates considered to be of Palaeozoic age. The outcrops are largely hidden under laterite. The median zone is composed largely of crystalline rocks with granites and some Palaeozoic unfossiliferous rocks. The littoral zone contains the only fossiliferous strata. These are of Tertiary and Cretaceous ages, the latter rocks resting on a reddish sandstone of older date. The Cretaceous rocks of the Dombe Grande region (near Benguella) are of Albian age and belong to the *Acanthoceras mamillari* zone. The beds containing *Schloenbachia inflata* are referable to the Gault. Rocks of Tertiary age are met with at Dombe Grande, Mossamedes and near Loanda. The sandstones with gypsum, copper and sulphur of Dombe are doubtfully considered to be of Triassic age. Recent eruptive rocks, mainly basalts, form a line of hills almost bare of vegetation between Benguella and Mossamedes. Nepheline basalts and liparites occur at Dombe Grande. The presence of gum copal in considerable quantities in the superficial rocks is characteristic of certain regions.

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*Climate.*—With the exception of the district of Mossamedes, the coast plains are unsuited to Europeans. In the interior, above 3300 ft., the temperature and rainfall, together with malaria, decrease. The plateau climate is healthy and invigorating. The mean annual temperature at Sao Salvador do Congo is 72.5° F.; at Loanda, 74.3°; and at Caconda, 67.2°. The climate is greatly influenced by the prevailing winds, which arc W., S.W. and S.S.W. Two seasons are distinguished—the cool, from June to September; and the rainy, from October to May. The heaviest rainfall occurs in April, and is accompanied by violent storms.

*Flora and Fauna.*—Both flora and fauna are those characteristic of the greater part of tropical

Africa. As far south as Benguella the coast region is rich in oil-palms and mangroves. In the northern part of the province are dense forests. In the south towards the Kunene are regions of dense thorn scrub. Rubber vines and trees are abundant, but in some districts their number has been considerably reduced by the ruthless methods adopted by native collectors of rubber. The species most common are various root rubbers, notably the *Carpodinus chylorrhiza*. This species and other varieties of carpodinus are very widely distributed. Landolphias are also found. The coffee, cotton and Guinea pepper plants are indigenous, and the tobacco plant flourishes in several districts. Among the trees are several which yield excellent timber, such as the tacula (*Pterocarpus tinctorius*), which grows to an immense size, its wood being blood-red in colour, and the Angola mahogany. The bark of the musuemba (*Albizzia coriaria*) is largely used in the tanning of leather. The mulundo bears a fruit about the size of a cricket ball covered with a hard green shell and containing scarlet pips like a pomegranate. The fauna includes the lion, leopard, cheetah, elephant, giraffe, rhinoceros, hippopotamus, buffalo, zebra, kudu and many other kinds of antelope, wild pig, ostrich and crocodile. Among fish are the barbel, bream and African yellow fish.

*Inhabitants.*—The great majority of the inhabitants are of Bantu-Negro stock with some admixture in the Congo district with the pure negro type. In the south-east are various tribes of Bushmen. The best-known of the Bantu-Negro tribes are the Ba-Kongo (Ba-Fiot), who dwell chiefly in the north, and the Abunda (Mbunda, Ba-Bundo), who occupy the central part of the province, which takes its name from the Ngola tribe of Abunda. Another of these tribes, the Bangala, living on the west bank of the upper Kwango, must not be confounded with the Bangala of the middle Congo. In the Abunda is a considerable strain of Portuguese blood. The Ba-Lunda inhabit the Lunda district. Along the upper Kunene and in other districts of the plateau are settlements of Boers, the Boer population being about 2000. In the coast towns the majority of the white inhabitants are Portuguese. The Mushi-Kongo and other divisions of the Ba-Kongo retain curious traces of the Christianity professed by them in the 16th and 17th centuries and possibly later. Crucifixes are used as potent fetish charms or as symbols of power passing down from chief to chief; whilst every native has a "Santu" or Christian name and is dubbed dom or dona. Fetishism is the prevailing religion throughout the province. The dwelling-places of the natives are usually small huts of the simplest construction, used chiefly as sleeping apartments; the day is spent in an open space in front of the hut protected from the sun by a roof of palm or other leaves.

*Chief Towns.*—The chief towns are Sao Paulo de Loanda, the capital, Kabinda, Benguella and Mossamedes (*q.v.*). Lobito, a little north of Benguella, is a town which dates from 1905 and owes its existence to the bay of the same name having been chosen as the sea terminus of a railway to the far interior. Noki is on the southern bank of the Congo at the head of navigation from the sea, and close to the Congo Free State frontier. It is available for ships of large tonnage, and through it passes the Portuguese portion of the trade of the lower Congo. Ambriz—the only seaport of consequence in the Congo district of the province—is at the mouth of the Loje river, about 70 m. N. of Loanda. Novo Redondo and Egito are small ports between Loanda and Benguella. Port Alexander is in the district of Mossamedes and S. of the town of that name.

In the interior Humpata, about 95 m. from Mossamedes, is the chief centre of the Boer settlers; otherwise there are none but native towns containing from 1000 to 3000 inhabitants and often enclosed by a ring of sycamore trees. Ambaca and Malanje are the chief places in the fertile agricultural district of the middle Kwanza, S.E. of Loanda, with which they are in railway communication. Sao Salvador (pop. 1500) is the name given by the Portuguese to Bonza Congo, the chief town of the "kingdom of Congo." It stands 1840 ft. above sea-level and is about 160 m. inland and 100 S.E. of the river port of Noki, in 6° 15' S. Of the cathedral and other stone buildings erected in the 16th century, there exist but scanty ruins. The city walls were destroyed in the closing years of the 19th century and the stone used to build government offices. There is a fort, built about 1850, and a small military force is at the disposal of the Portuguese resident. Bembe and Encoje are smaller towns in the Congo district south of Sao Salvador. Bihe, the capital of the plateau district of the same name forming the hinterland of Benguella, is a large caravan centre. Kangomba, the residence of the king of Bihe, is a large town. Caconda is in the hill country S.E. of Benguella.

*Agriculture and Trade.*—Angola is rich in both agricultural and mineral resources. Amongst the cultivated products are mealies and manioc, the sugar-cane and cotton, coffee and tobacco plants. The chief exports are coffee, rubber, wax, palm kernels and palm-oil, cattle and hides and dried or salt fish. Gold dust, cotton, ivory and gum are also exported. The chief imports are food-stuffs, cotton and woollen goods and hardware. Considerable quantities of coal come from South Wales. Oxen, introduced from Europe and from South Africa, flourish. There are sugar factories, where rum is also distilled and a few other manufactures, but the prosperity of the province depends on the "jungle" products obtained through the natives and from the plantations owned by Portuguese and worked by indentured labour, the labourers being generally "recruited" from the far interior. The trade of the province, which had grown from about £800,000 in 1870 to about £3,000,000 in 1905, is largely with Portugal and in Portuguese bottoms. Between 1893 and 1904 the percentage of Portuguese as compared with foreign goods entering the province increased from 43 to 201%, a result due to the preferential duties in force.

The minerals found include thick beds of copper at Bembe, and deposits on the M'Brije and the Cuvo and in various places in the southern part of the province; iron at Ociras (on the Lucalla affluent of the Kwanza) and in Bailundo; petroleum and asphalt in Dande and Quinzao; gold in

Lombije and Cassinga; and mineral salt in Quissama. The native blacksmiths are held in great repute.

*Communications.*—There is a regular steamship communication between Portugal, England and Germany, and Loanda, which port is within sixteen days' steam of Lisbon. There is also a regular service between Cape Town, Lobito and Lisbon and Southampton. The Portuguese line is subsidized by the government. The railway from Loanda to Ambaca and Malanje is known as the Royal Trans-African railway. It is of metre gauge, was begun in 1887 and is some 300 m. long. It was intended to carry the line across the continent to Mozambique, but when the line reached Ambaca (225 m.) in 1894 that scheme was abandoned. The railway had created a record in being the most expensive built in tropical Africa—£8942 per mile. A railway from Lobito Bay, 25 m.N. of Benguella, begun in 1904, runs towards the Congo-Rhodesia frontier. It is of standard African gauge (3 ft. 6 in.) and is worked by an English company. It is intended to serve the Katanga copper mines. Besides these two main railways, there are other short lines linking the seaports to their hinterland. Apart from the railways, communication is by ancient caravan routes and by ox-wagon tracks in the southern district. Riding-oxen are also used. The province is well supplied with telegraphic communication and is connected with Europe by submarine cables.

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*Government and Revenue.*—The administration of the province is carried on under a governor-general, resident at Loanda, who acts under the direction of the ministry of the colonies at Lisbon. At the head of each district is a local governor. Legislative powers, save those delegated to the governor-general, are exercised by the home government. Revenue is raised chiefly from customs, excise duties and direct taxation. The revenue (in 1904-1905 about £350,000) is generally insufficient to meet expenditure (in 1904-1905 over £490,000)—the balance being met by a grant from the mother country. Part of the extra expenditure is, however, on railways and other reproductive works.

*History.*—The Portuguese established themselves on the west coast of Africa towards the close of the 15th century. The river Congo was discovered by Diogo Cam or Cao in 1482. He erected a stone pillar at the mouth of the river, which accordingly took the title of Rio de Padrao, and established friendly relations with the natives, who reported that the country was subject to a great monarch, Mwani Congo or lord of Congo, resident at Bonza Congo. The Portuguese were not long in making themselves influential in the country. Gonçalo de Sousa was despatched on a formal embassy in 1490; and the first missionaries entered the country in his train. The king was soon afterwards baptized and Christianity was nominally established as the national religion. In 1534 a cathedral was founded at Bonza Congo (renamed Sao Salvador), and in 1560 the Jesuits arrived with Paulo Diaz de Novaes. Of the prosperity of the country the Portuguese have left the most glowing and indeed incredible accounts. It was, however, about this time ravaged by cannibal invaders (Bangala) from the interior, and Portuguese influence gradually declined. The attention of the Portuguese was, moreover, now turned more particularly to the southern districts of Angola. In 1627 the bishop's seat was removed to Sao Paulo de Loanda and Sao Salvador declined in importance. In the 18th century, in spite of hindrances from Holland and France, steps were taken towards re-establishing Portuguese authority in the northern regions; in 1758 a settlement was formed at Encoje; from 1784 to 1789 the Portuguese carried on a war against the natives of Mussolo (the district immediately south of Ambriz); in 1791 they built a fort at Quincollo on the Loje, and for a time they worked the mines of Bembe. Until, however, the "scramble for Africa" began in 1884, they possessed no fort or settlement on the coast to the north of Ambriz, which was first occupied in 1855. At Sao Salvador, however, the Portuguese continued to exercise influence. The last of the native princes who had real authority was a potentate known as Dom Pedro V. He was placed on the throne in 1855 with the help of a Portuguese force, and reigned over thirty years. In 1888 a Portuguese resident was stationed at Salvador, and the kings of Congo became pensioners of the government.

Angola proper, and the whole coast-line of what now constitutes the province of that name, was discovered by Diogo Cam during 1482 and the three following years. The first governor sent to Angola was Paulo Diaz, a grandson of Bartholomew Diaz, who reduced to submission the region south of the Kwanza nearly as far as Benguella. The city of Loanda was founded in 1576, Benguella in 1617. From that date the sovereignty of Portugal over the coast-line, from its present southern limit as far north as Ambriz (7° 50' S.) has been undisputed save between 1640 and 1648, during which time the Dutch attempted to expel the Portuguese and held possession of the ports. Whilst the economic development of the country was not entirely neglected and many useful food products were introduced, the prosperity of the province was very largely dependent on the slave trade with Brazil, which was not legally abolished until 1830 and in fact continued for many years subsequently.

In 1884 Great Britain, which up to that time had steadily refused to acknowledge that Portugal possessed territorial rights north of Ambriz, concluded a treaty recognizing Portuguese sovereignty over both banks of the lower Congo; but the treaty, meeting with opposition in England and Germany, was not ratified. Agreements concluded with the Congo Free State, Germany and France in 1885-1886 (modified in details by subsequent arrangements) fixed the limits of the province, except in the S.E., where the frontier between Barotseland (N.W. Rhodesia) and Angola was determined by an Anglo-Portuguese agreement of 1891 and the arbitration award of the king of Italy in 1905 (see AFRICA: *History*). Up to the end of the 19th century the hold of Portugal over the interior of the province was slight, though its influence extended to the Congo and Zambezi basins. The abolition of the external slave trade proved very injurious to the trade of the seaports, but from 1860 onward the agricultural resources of the

country were developed with increasing energy, a work in which Brazilian merchants took the lead. After the definite partition of Africa among the European powers, Portugal applied herself with some seriousness to exploit Angola and her other African possessions. Nevertheless, in comparison with its natural wealth the development of the country has been slow. Slavery and the slave trade continued to flourish in the interior in the early years of the 20th century, despite the prohibitions of the Portuguese government. The extension of authority over the inland tribes proceeded very slowly and was not accomplished without occasional reverses. Thus in September 1904 a Portuguese column lost over 300 men killed, including 114 Europeans, in an encounter with the Kunahamas on the Kunene, not far from the German frontier. The Kunahamas are a wild, raiding tribe and were probably largely influenced by the revolt of their southern neighbours, the Hereros, against the Germans. In 1905 and again in 1907 there was renewed fighting in the same region.

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**ANGORA**, or **ENGURI**. (1) A city of Turkey (anc. *Ancyra*) in Asia, capital of the vilayet of the same name, situated upon a steep, rocky hill, which rises 500 ft. above the plain, on the left bank of the Enguri Su, a tributary of the Sakaria (Sangarius), about 220 m. E.S.E. of Constantinople. The hill is crowned by the ruins of the old citadel, which add to the picturesqueness of the view; but the town is not well built, its streets being narrow and many of its houses constructed of sun-dried mud bricks; there are, however, many fine remains of Graeco-Roman and Byzantine architecture, the most remarkable being the temple of Rome and Augustus, on the walls of which is the famous *Monumentum Ancyranum* (see ANCYRA). Ancyra was the centre of the Tectosages, one of the three Gaulish tribes which settled in Galatia in the 3rd century B.C., and became the capital of the Roman province of Galatia when it was formally constituted in 25 B.C. During the Byzantine period, throughout which it occupied a position of great importance, it was captured by Persians and Arabs; then it fell into the hands of the Seljuk Turks, was held for eighteen years by the Latin Crusaders, and finally passed to the Ottoman Turks in 1360. In 1402 a great battle was fought in the vicinity of Angora, in which the Turkish sultan Bayezid was defeated and made prisoner by the Tatar conqueror Timur. In 1415 it was recovered by the Turks under Mahommed I., and since that period has belonged to the Ottoman empire. In 1832 it was taken by the Egyptians under Ibrahim Pasha. Angora is connected with Constantinople by railway, and exports wool, mohair, grain and yellow berries. Mohair cloth is manufactured, and the town is noted for its honey and fruit. From 1639 to 1768 there was an agency of the Levant Company here; there is now a British consul. Pop. estimated at 28,000 (Moslems, 18,000; Christians, largely Roman Catholic Armenians, about 9400; Jews, 400).

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(2) A Turkish vilayet in north-central Asia Minor, which includes most of the ancient Galatia. It is an agricultural country, depending for its prosperity on its grain, wool (average annual export, 4,400,000 ft), and the mohair obtained from the beautiful Angora goats (average annual clip, 3,300,000 lb). The fineness of the hair may perhaps be ascribed to some peculiarity in the atmosphere, for it is remarkable that the cats, dogs and other animals of the country are to a certain extent affected in the same way, and that they all lose much of their distinctive beauty when taken from their native districts. The only important industry is carpet-weaving at Kirsheher and Kaisarieh. There are mines of silver, copper, lignite and salt, and many hot springs, including some of great repute medicinally. Average annual exports 1896-1898, £920,762; imports, £411,836. Pop. about 900,000 (Moslems, 765,000 to 800,000, the rest being Christians, with a few hundred Jews).

(J. G. C. A.)

See C. Ritter, *Erdkunde van Asien* (vol. xviii., 1837-1839); V. Cuinet, *La Turquie d'Asie*, t. i. (1891); Murray's *Handbook to Asia Minor* (1895); and other works mentioned under ANCYRA.

**ANGOULÊME, CHARLES DE VALOIS, DUKE OF** (1573-1650), the natural son of Charles IX. of France and Marie Touchet, was born on the 28th of April 1573, at the castle of Fayet in Dauphiné. His father dying in the following year, commended him to the care and favour of his brother and successor, Henry III., who faithfully fulfilled the charge. His mother married François de Balzac, marquis d'Entragues, and one of her daughters, Henriette, marchioness of

Verneuil, afterwards became the mistress of Henry IV. Charles of Valois, was carefully educated, and was destined for the order of Malta. At the early age of sixteen he attained one of the highest dignities of the order, being made grand prior of France. Shortly after he came into possession of large estates left by Catherine de' Medici, from one of which he took his title of count of Auvergne. In 1591 he obtained a dispensation from the vows of the order of Malta, and married Charlotte, daughter of Henry, Marshal d'Amville, afterwards duke of Montmorency. In 1589 Henry III. was assassinated, but on his deathbed he commended Charles to the good-will of his successor Henry IV. By that monarch he was made colonel of horse, and in that capacity served in the campaigns during the early part of the reign. But the connexion between the king and the marchioness of Verneuil appears to have been very displeasing to Auvergne, and in 1601 he engaged in the conspiracy formed by the dukes of Savoy, Biron and Bouillon, one of the objects of which was to force Henry to repudiate his wife and marry the marchioness. The conspiracy was discovered; Biron and Auvergne were arrested and Biron was executed. Auvergne after a few months' imprisonment was released, chiefly through the influence of his half-sister, his aunt, the duchess of Angoulême and his father-in-law. He then entered into fresh intrigues with the court of Spain, acting in concert with the marchioness of Verneuil and her father d'Entragues. In 1604 d'Entragues and he were arrested and condemned to death; at the same time the marchioness was condemned to perpetual imprisonment in a convent. She easily obtained pardon, and the sentence of death against the other two was commuted into perpetual imprisonment. Auvergne remained in the Bastille for eleven years, from 1605 to 1616. A decree of the parlement (1606), obtained by Marguerite de Valois, deprived him of nearly all his possessions, including Auvergne, though he still retained the title. In 1616 he was released, was restored to his rank of colonel-general of horse, and despatched against one of the disaffected nobles, the duke of Longueville, who had taken Péronne. Next year he commanded the forces collected in the Île de France, and obtained some successes. In 1619 he received by bequest, ratified in 1620 by royal grant, the duchy of Angoulême. Soon after he was engaged on an important embassy to Germany, the result of which was the treaty of Ulm, signed July 1620. In 1627 he commanded the large forces assembled at the siege of La Rochelle; and some years after in 1635, during the Thirty Years' War, he was general of the French army in Lorraine. In 1636 he was made lieutenant-general of the army. He appears to have retired from public life shortly after the death of Richelieu in 1643. His first wife died in 1636, and in 1644 he married Françoise de Narbonne, daughter of Charles, baron of Mareuil. She had no children and survived her husband until 1713. Angoulême himself died on the 24th of September 1650. By his first wife he had three children: Henri, who became insane; Louis Emmanuel, who succeeded his father as duke of Angoulême and was colonel-general of light cavalry and governor of Provence; and Françoise, who died in 1622.

The duke was the author of the following works:—(i) *Mémoires*, from the assassination of Henri III. to the battle of Arques (1589-1593) published at Paris by Boneau, and reprinted by Buchon in his *Choix de chroniques* (1836) and by Petitot in his *Mémoires* (1st series, vol. xlv.); (2) *Les Harangues, prononcés en assemblée de MM. les princes protestants d'Allemagne*, par Monseigneur le duc d' Angoulême (1620); (3) a translation of a Spanish work by Diego de Torres. To him has also been ascribed the work, *La générale et fidèle Relation de tout ce qui s'est passé en l'isle de Ré, envoyée par le roi à la royne sa mère* (Paris, 1627).

**ANGOULÊME**, a city of south-western France, capital of the department of Charente, 83 m. N.N.E. of Bordeaux on the railway between Bordeaux and Poitiers. Pop. (1906) 30,040. The town proper occupies an elevated promontory, washed on the north by the Charente and on the south and west by the Anguienne, a small tributary of that river. The more important of the suburbs lie towards the east, where the promontory joins the main plateau, of which it forms the north-western extremity.

The main line of the Orleans railway passes through a tunnel beneath the town. In place of its ancient fortifications Angoulême is encircled by boulevards known as the *Remparts*, from which fine views may be obtained in all directions. Within the town the streets are often dark and narrow, and, apart from the cathedral and the hôtel de ville, the architecture is of little interest. The cathedral of St. Pierre (see CATHEDRAL), a church in the Byzantine-Romanesque style, dates from the 11th and 12th centuries, but has undergone frequent restoration, and was partly rebuilt in the latter half of the 19th century by the architect Paul Abadie. The façade, flanked by two towers with cupolas, is decorated with arcades filled in with statuary and sculpture, the whole representing the Last Judgment. The crossing is surmounted by a dome, and the extremity of the north transept by a fine square tower over 160 ft. high. The hôtel de ville, also by Abadie, is a handsome modern structure, but preserves two towers of the chateau of the counts of Angoulême, on the site of which it is built. It contains museums of paintings and archaeology. Angoulême is the seat of a bishop, a prefect, and a court of assizes. Its public institutions include tribunals of first instance and of commerce, a council of trade-arbitrators, a chamber of commerce and a branch of the Bank of France. It also has a lycée, training-colleges, a school of artillery, a library and several learned societies. It is a centre of the paper-making industry, with which the town has been connected since the 14th century. Most of the mills are situated on the banks of the watercourses in the neighbourhood of the town. The subsidiary industries, such as the manufacture of machinery and wire fabric, are of considerable importance. Iron and copper founding, brewing, tanning, and the manufacture of gunpowder, confectionery, heavy iron goods, gloves, boots and shoes and cotton goods are also carried on. Commerce is carried on in wine, brandy and building-stone.

Angoulême (*Jculisma*) was taken by Clovis from the Visigoths in 507, and plundered by the Normans in the 9th century. In 1360 it was surrendered by the peace of Bretigny to the English; they were, however, expelled in 1373 by the troops of Charles V., who granted the town numerous privileges. It suffered much during the Wars of Religion, especially in 1568 after its capture by the Protestants under Coligny.

[v.02 p.0042] The countship of Angoulême dated from the 9th century, the most important of the early counts being William Taillefer, whose descendants held the title till the end of the 12th century. Withdrawn from them on more than one occasion by Richard Coeur-de-Lion, it passed to King John of England on his marriage with Isabel, daughter of Count Adhémar, and by her subsequent marriage in 1220 to Hugh X. passed to the Lusignan family, counts of Marche. On the death of Hugh XIII. in 1302 without issue, his possessions passed to the crown. In 1394 the countship came to the house of Orleans, a member of which, Francis I., became king of France in 1515 and raised it to the rank of duchy in favour of his mother Louise of Savoy. The duchy afterwards changed hands several times, one of its holders being Charles of Valois, natural son of Charles IX. The last duke was Louis-Antoine, eldest son of Charles X., who died in 1844.

See A. F. Lièvre, *Angoulême: histoire, institutions et monuments* (Angoulême, 1885).

**ANGOUMOIS**, an old province of France, nearly corresponding to-day to the department of Charente. Its capital was Angoulême.

See *Essai d'une bibliothèque historique de l'Angoumois*, by E. Castaigne (1845).

**ANGRA**, or ANGRA DO HEROISMO ("Bay of Heroism," a name given it in 1829, to commemorate its successful defence against the Miguelist party), the former capital of the Portuguese archipelago of the Azores, and chief town of an administrative district, comprising the islands of Terceira, St. George and Graciosa. Pop. (1900) 10,788. Angra is built on the south coast of Terceira in 38° 38' N. and in 27° 13' W. It is the headquarters of a military command, and the residence of a Roman Catholic bishop; its principal buildings are the cathedral, military college, arsenal and observatory. The harbour, now of little commercial or strategic importance, but formerly a celebrated naval station, is sheltered on the west and south-west by the promontory of Mt. Brazil; but it is inferior to the neighbouring ports of Ponta Delgada and Horta. The foreign trade is not large, and consists chiefly in the exportation of pineapples and other fruit. Angra served as a refuge for Queen Maria II. of Portugal from 1830 to 1833.

**ANGRA PEQUENA**, a bay in German South-West Africa, in 26° 38' S., 15° E., discovered by Bartholomew Diaz in 1487. F. A. E. Lüderitz, of Bremen, established a trading station here in 1883, and his agent concluded treaties with the neighbouring chiefs, who ceded large tracts of country to the newcomers. On the 24th of April 1884 Lüderitz transferred his rights to the German imperial government, and on the following 7th of August a German protectorate over the district was proclaimed. (See AFRICA, §5, and GERMAN SOUTH-WEST AFRICA.) Angra Pequena has been renamed by the Germans Lüderitz Bay, and the adjacent country is sometimes called Lüderitzland. The harbour is poor. At the head of the bay is a small town, whence a railway, begun in 1906, runs east in the direction of Bechuanaland. The surrounding country for many miles is absolute desert, except after rare but terrible thunderstorms, when the dry bed of the Little Fish river is suddenly filled with a turbulent stream, the water finding its way into the bay.

The islands off the coast of Angra Pequena, together with others north and south, were annexed to Great Britain in 1867 and added to Cape Colony in 1874. Seal Island and Penguin Island are in the bay; Ichaboe, Mercury, and Hollam's Bird islands are to the north; Halifax, Long, Possession, Albatross, Pomona, Plumpudding, and Roastbeef islands are to the south. On these islands are guano deposits; the most valuable is on Ichaboe Island.

**ANGSTRÖM, ANDERS JONAS** (1814-1874), Swedish physicist, was born on the 13th of August 1814 at Lögdö, Medelpad, Sweden. He was educated at Upsala University, where in 1839 he became *privat docent* in physics. In 1842 he went to Stockholm Observatory in order to gain experience in practical astronomical work, and in the following year he became observer at Upsala Observatory. Becoming interested in terrestrial magnetism he made many observations of magnetic intensity and declination in various parts of Sweden, and was charged by the Stockholm Academy of Sciences with the task, not completed till shortly before his death, of working out the magnetic data obtained by the Swedish frigate "Eugénie" on her voyage round the world in 1851-1853. In 1858 he succeeded Adolph Ferdinand Svanberg (1806-1857) in the chair of physics at Upsala, and there he died on the 21st of June 1874. His most important work was concerned with the conduction of heat and with spectroscopy. In his optical researches, *Optiska Undersökningar*, presented to the Stockholm Academy in 1853, he not only pointed out that the electric spark yields two superposed spectra, one from the metal of the electrode and the other from the gas in which it passes, but deduced from Euler's theory of resonance that an incandescent gas emits luminous rays of the same refrangibility as those which it can absorb. This statement, as Sir E. Sabine remarked when awarding him the Rumford medal of the Royal Society in 1872, contains a fundamental principle of spectrum analysis, and though for a number of years it was overlooked

it entitles him to rank as one of the founders of spectroscopy. From 1861 onwards he paid special attention to the solar spectrum. He announced the existence of hydrogen, among other elements, in the sun's atmosphere in 1862, and in 1868 published his great map of the normal solar spectrum which long remained authoritative in questions of wave-length, although his measurements were inexact to the extent of one part in 7000 or 8000 owing to the metre which he used as his standard having been slightly too short. He was the first, in 1867, to examine the spectrum of the aurora borealis, and detected and measured the characteristic bright line in its yellow green region; but he was mistaken in supposing that this same line, which is often called by his name, is also to be seen in the zodiacal light.

His son, KNUT JOHAN ÅNGSTRÖM, was born at Upsala on the 12th of January 1857, and studied at the university of that town from 1877 to 1884. After spending a short time in Strassburg he was appointed lecturer in physics at Stockholm University in 1885, but in 1891 returned to Upsala, where in 1896 he became professor of physics. He especially devoted himself to investigations of the radiation of heat from the sun and its absorption by the earth's atmosphere, and to that end devised various delicate methods and instruments, including his electric compensation pyrheliometer, invented in 1893, and apparatus for obtaining a photographic representation of the infra-red spectrum (1895).

**ANGUIER, FRANÇOIS** (c. 1604-1669), and MICHEL (1612-1686), French sculptors, were two brothers, natives of Eu in Normandy. Their apprenticeship was served in the studio of Simon Guillain. The chief works of François are the monument to Cardinal de Bérulle, founder of the Carmelite order, in the chapel of the oratory at Paris, of which all but the bust has been destroyed, and the mausoleum of Henri II., last duc de Montmorency, at Moulins. To Michel are due the sculptures of the triumphal arch at the Porte St. Denis, begun in 1674, to serve as a memorial for the conquests of Louis XIV. A marble group of the Nativity in the church of Val de Grâce was reckoned his masterpiece. From 1662 to 1667 he directed the progress of the sculpture and decoration in this church, and it was he who superintended the decoration of the apartments of Anne of Austria in the old Louvre. F. Fouquet also employed him for his chateau in Vaux.

See Henri Stein, *Les frères Anguier* (1889), with catalogue of works, and many references to original sources; Armand Sanson, *Deux sculpteurs Normands: les frères Anguier* (1889).

**ANGUILLA**, or SNAKE, a small island in the British Indies, part of the presidency of St. Kitts-Nevis, in the colony of the Leeward Islands. Pop. (1901) 3890, mostly negroes. It is situated in 18° 12' N. and 63° 5' W., about 60 m. N.W. of St Kitts, is 16 m. long and has an area of 35 sq. m. The destruction of trees by charcoal-burners has resulted in the almost complete deforestation of the island. Nearly all the land is in the hands of peasant proprietors, who cultivate sweet potatoes, peas, beans, corn, &c., and rear sheep and goats. Cattle, phosphate of lime and salt, manufactured from a lake in the interior, are the principal exports, the market for these being the neighbouring island of St. Thomas.

[v.02 p.0043]

**ANGULATE** (Lat. *angulus*, an angle), shaped with corners or angles; an adjective used in botany and zoology for the shape of stems, leaves and wings.

**ANGUS, EARLS OF.** Angus was one of the seven original earldoms of the Pictish kingdom of Scotland, said to have been occupied by seven brothers of whom Angus was the eldest. The Celtic line ended with Matilda (*fl.* 1240), countess of Angus in her own right, who married in 1243 Gilbert de Umfravill and founded the Norman line of three earls, which ended in 1381, the then holder of the title being summoned to the English parliament. Meanwhile John Stewart of Bonkyl, co. Berwick, had been created earl of Angus in a new line. This third creation ended with Margaret Stewart, countess of Angus in her own right, and widow of Thomas, 13th earl of Mar. By an irregular connexion with William, 1st earl of Douglas, who had married Mar's sister, she became the mother of George Douglas, 1st earl of Angus (c. 1380-1403), and secured a charter of her estates for her son, to whom in 1389 the title was granted by King Robert II. He was taken prisoner at Homildon Hill and died in England. The 5th earl was his great-grandson.

ARCHIBALD DOUGLAS, 5th earl of Angus (c. 1450-c. 1514), the famous "Bell the Cat," was born about 1450 and succeeded his father, George the 4th earl, in 1462 or 1463. In 1481 he was made warden of the east marches, but the next year he joined the league against James III. and his favourite Robert Cochrane at Lauder, where he earned his nickname by offering to bell the cat, *i.e.* to deal with the latter, beginning the attack upon him by pulling his gold chain off his neck and causing him with others of the king's favourites to be hanged. Subsequently he joined Alexander Stewart, duke of Albany, in league with Edward IV. of England on the 11th of February 1483, signing the convention at Westminster which acknowledged the overlordship of the English king. In March however they returned, outwardly at least, to their allegiance, and received pardons for their treason. Later Angus was one of the leaders in the rebellion against James in 1487 and 1488, which ended in the latter's death. He was made one of the guardians of the young king James IV. but soon lost influence, being superseded by the Homes and Hepburns, and

the wardenship of the marches was given to Alexander Home. Though outwardly on good terms with James, he treacherously made a treaty with Henry VII. about 1489 or 1491, by which he undertook to govern his relations with James according to instructions from England, and to hand over Hermitage Castle, commanding the pass through Liddesdale into Scotland, on the condition of receiving English estates in compensation. In October 1491 he fortified his castle of Tantallon against James, but was obliged to submit and exchange his Liddesdale estate and Hermitage Castle for the lordship of Bothwell. In 1493 he was again in favour, received various grants of lands, and was made chancellor, which office he retained till 1498. In 1501 he was once more in disgrace and confined to Dumbarton Castle. After the disaster at Flodden in 1513, at which he was not present, but at which he lost his two eldest sons, Angus was appointed one of the counsellors of the queen regent. He died at the close of this year, or in 1514. He was married three times, and by his first wife had four sons and several daughters. His third son, Gavin Douglas, bishop of Dunkeld, is separately noticed.

ARCHIBALD DOUGLAS, the 6th earl (c. 1489-1557), son of George, master of Douglas, who was killed at Flodden, succeeded on his grandfather's death. In 1509 he had married Margaret (d. 1513), daughter of Patrick Hepburn, 1st earl of Bothwell; and in 1514 he married the queen dowager Margaret of Scotland, widow of James IV., and eldest sister of Henry VIII. By this latter act he stirred up the jealousy of the nobles and the opposition of the French party, and civil war broke out. He was superseded in the government on the arrival of John Stewart, duke of Albany, who was made regent. Angus withdrew to his estates in Forfarshire, while Albany besieged the queen at Stirling and got possession of the royal children; then he joined Margaret after her flight at Morpeth, and on her departure for London returned and made his peace with Albany in 1516. He met her once more at Berwick in June 1517, when Margaret returned to Scotland on Albany's departure in vain hopes of regaining the regency. Meanwhile, during Margaret's absence, Angus had formed a connexion with a daughter of the laird of Traquair. Margaret avenged his neglect of her by refusing to support his claims for power and by secretly trying through Albany to get a divorce. In Edinburgh Angus held his own against the attempts of James Hamilton, 1st earl of Arran, to dislodge him. But the return of Albany in 1521, with whom Margaret now sided against her husband, deprived him of power. The regent took the government into his own hands; Angus was charged with high treason in December, and in March 1522 was sent practically a prisoner to France, whence he succeeded in escaping to London in 1524. He returned to Scotland in November with promises of support from Henry VIII., with whom he made a close alliance. Margaret, however, refused to have anything to do with her husband. On the 23rd, therefore, Angus forced his way into Edinburgh, but was fired upon by Margaret and retreated to Tantallon. He now organized a large party of nobles against Margaret with the support of Henry VIII., and in February 1525 they entered Edinburgh and called a parliament. Angus was made a lord of the articles, was included in the council of regency, bore the king's crown on the opening of the session, and with Archbishop Beaton held the chief power. In March he was appointed lieutenant of the marches, and suppressed the disorder and anarchy on the border. In July the guardianship of the king was entrusted to him for a fixed period till the 1st of November, but he refused at its close to retire, and advancing to Linlithgow put to flight Margaret and his opponents. He now with his followers engrossed all the power, succeeded in gaining over some of his antagonists, including Arran and the Hamiltons, and filled the public offices with Douglasses, he himself becoming chancellor. "None that time durst strive against a Douglas nor Douglas's man."<sup>[1]</sup> The young king James, now fourteen, was far from content under the tutelage of Angus, but he was closely guarded, and several attempts to effect his liberation were prevented, Angus completely defeating Lennox, who had advanced towards Edinburgh with 10,000 men in August, and subsequently taking Stirling. His successes were consummated by a pacification with Beaton, and in 1527 and 1528 he was busy in restoring order through the country. In the latter year, on the 11th of March, Margaret succeeded in obtaining her divorce from Angus, and about the end of the month she and her lover, Henry Stewart, were besieged at Stirling. A few weeks later, however, James succeeded in escaping from Angus's custody, took refuge with Margaret and Arran at Stirling, and immediately proscribed Angus and all the Douglasses, forbidding them to come within seven miles of his person. Angus, having fortified himself in Tantallon, was attainted and his lands confiscated. Repeated attempts of James to subdue the fortress failed, and on one occasion Angus captured the royal artillery, but at length it was given up as a condition of the truce between England and Scotland, and in May 1529 Angus took refuge with Henry, obtained a pension and took an oath of allegiance, Henry engaging to make his restoration a condition of peace. Angus had been chiefly guided in his intrigues with England by his brother, Sir George Douglas of Pittendriech (d. 1552), master of Angus, a far cleverer diplomatist than himself. His life and lands were also declared forfeit, as were those of his uncle, Archibald Douglas of Kilspindie (d. 1535), who had been a friend of James and was known by the nickname of "Greysteel." These took refuge in exile. James avenged himself on such Douglasses as lay within his power. Angus's third sister Janet, Lady Glamis, was summoned to answer the charge of communicating with her brothers, and on her failure to appear her estates were forfeited. In 1537 she was tried for conspiring against the king's life. She was found guilty and burnt on the Castle Hill, Edinburgh, on the 17th of July 1537. Her innocence has been generally assumed, but Tytler (*Hist. of Scotland*, iv. pp. 433, 434) considered her guilty. Angus remained in England till 1542, joining in the attacks upon his countrymen on the border, while James refused all demands from Henry VIII. for his restoration, and kept firm to his policy of suppressing and extirpating the Douglas faction. On James V.'s death in 1542 Angus returned to Scotland, with instructions from Henry to accomplish the marriage between Mary and Edward. His forfeiture was rescinded, his estates restored, and he was made a privy councillor and lieutenant-general. In 1543 he negotiated the treaty of peace and marriage, and the same year he



himself married Margaret, daughter of Robert, Lord Maxwell. Shortly afterwards strife between Angus and the regent Arran broke out, and in April 1544 Angus was taken prisoner. The same year Lord Hertford's marauding expedition, which did not spare the lands of Angus, made him join the anti-English party. He entered into a bond with Arran and others to maintain their allegiance to Mary, and gave his support to the mission sent to France to offer the latter's hand. In July 1544 he was appointed lieutenant of the south of Scotland, and distinguished himself on the 27th of February 1545 in the victory over the English at Ancrum Moor. He still corresponded with Henry VIII., but nevertheless signed in 1546 the act cancelling the marriage and peace treaty, and on the 10th of September commanded the van in the great defeat of Pinkie, when he again won fame. In 1548 the attempt by Lennox and Wharton to capture him and punish him for his duplicity failed, Angus escaping after his defeat to Edinburgh by sea, and Wharton being driven back to Carlisle. Under the regency of Mary of Lorraine his restless and ambitious character and the number of his retainers gave cause for frequent alarms to the government. On the 31st of August 1547 he resigned his earldom, obtaining a regrant *sibi et suis haeredibus masculis et suis assignatis quibuscumque*. His career was a long struggle for power and for the interests of his family, to which national considerations were completely subordinate. He died in January 1557. By Margaret Tudor he had Margaret, his only surviving legitimate child, who married Matthew, 4th earl of Lennox, and was mother of Lord Darnley. He was succeeded by his nephew David, son of Sir George Douglas of Pittendriech.

ARCHIBALD DOUGLAS, 8th earl, and earl of Morton (1555-1588), was the son of David, 7th earl. He succeeded to the title and estates in 1558, being brought up by his uncle, the 4th earl of Morton, a Presbyterian. In 1573 he was made a privy councillor and sheriff of Berwick, in 1574 lieutenant-general of Scotland, in 1577 warden of the west marches and steward of Fife, and in 1578 lieutenant-general of the realm. He gave a strong support to Morton during the attack upon the latter, made a vain attempt to rescue him, and was declared guilty of high treason on the 2nd of June 1581. He now entered into correspondence with the English government for an invasion of Scotland to rescue Morton, and on the latter's execution in June went to London, where he was welcomed by Elizabeth. After the raid of Ruthven in 1582 Angus returned to Scotland and was reconciled to James, but soon afterwards the king shook off the control of the earls of Mar and Gowrie, and Angus was again banished from the court. In 1584 he joined the rebellion of Mar and Glamis, but the movement failed, and the insurgents fled to Berwick. Later they took up their residence at Newcastle, which became a centre of Presbyterianism and of projects against the Scottish government, encouraged by Elizabeth, who regarded the banished lords as friends of the English and antagonists of the French interest. In February 1585 they came to London, and cleared themselves of the accusation of plotting against James's life; a plan was prepared for their restoration and for the overthrow of James Stewart, earl of Arran. In October they invaded Scotland and gained an easy victory over Arran, captured Stirling Castle with the king in November, and secured from James the restoration of their estates and the control of the government. In 1586 Angus was appointed warden of the marches and lieutenant-general on the border, and performed good services in restoring order; but he was unable to overcome the king's hostility to the establishment of Presbyterian government. In January 1586 he was granted the earldom of Morton with the lands entailed upon him by his uncle. He died on the 4th of August 1588. He was succeeded in the earldom by his cousin William, a descendant of the 5th earl. (For the Morton title, see MORTON, JAMES DOUGLAS, 4th EARL OF.)

WILLIAM DOUGLAS, 10th earl (c. 1554-1611), was the son of William, the 9th earl (1533-1591). He studied at St. Andrews University and joined the household of the earl of Morton. Subsequently, while visiting the French court, he became a Roman Catholic, and was in consequence, on his return, disinherited and placed under restraint. Nevertheless he succeeded to his father's titles and estates in 1591, and though in 1592 he was disgraced for his complicity in Lord Bothwell's plot, he was soon liberated and performed useful services as the king's lieutenant in the north of Scotland. In July 1592, however, he was asking for help from Elizabeth in a plot with Erroll and other lords against Sir John Maitland, the chancellor, and protesting his absolute rejection of Spanish offers, while in October he signed the Spanish Blanks (see ERROLL, FRANCIS HAY, 9th EARL OF) and was imprisoned (on the discovery of the treason) in Edinburgh Castle on his return in January 1593. He succeeded on the 13th in escaping by the help of his countess, joining the earls of Huntly and Erroll in the north. They were offered an act of "oblivion" or "abolition" provided they renounced their religion or quitted Scotland. Declining these conditions they were declared traitors and "forfeited." They remained in rebellion, and in July 1594 an attack made by them on Aberdeen roused James's anger. Huntly and Erroll were subdued by James himself in the north, and Angus failed in an attempt upon Edinburgh in concert with the earl of Bothwell. Subsequently in 1597 they all renounced their religion, declared themselves Presbyterians, and were restored to their estates and honours. Angus was again included in the privy council, and in June 1598 was appointed the king's lieutenant in southern Scotland, in which capacity he showed great zeal and conducted the "Raid of Dumfries," as the campaign against the Johnstones was called. Not long afterwards, Angus, offended at the advancement of Huntly to a marquisate, recanted, resisted all the arguments of the ministers to bring him to a "better mind," and was again excommunicated in 1608. In 1609 he withdrew to France, and died in Paris on the 3rd of March 1611. He was succeeded by his son William, as 11th earl of Angus, afterwards 1st marquis of Douglas (1580-1660). The title is now held by the dukes of Hamilton.

AUTHORITIES.—*The Douglas Book*, by Sir W. Fraser (1885); *History of the House of Douglas and Angus*, by D. Hume of Godscroft (1748, legendary in some respects); *History of the House of Douglas*, by Sir H. Maxwell (1902).

**ANGUSSOLA** or **ANGUSSCIOLA**, **SOPHONISBA**, Italian portrait painter of the latter half of the 16th century, was born at Cremona about 1535, and died at Palermo in 1626. In 1560, at the invitation of Philip II., she visited the court of Madrid, where her portraits elicited great commendation. Vandyck is said to have declared that he had derived more knowledge of the true principles of his art from her conversation than from any other source. She painted several fine portraits of herself, one of which is at Althorp. A few specimens of her painting are to be seen at Florence and Madrid. She had three sisters, who were also celebrated artists.

[v.02 p.0045]

**ANHALT**, a duchy of Germany, and a constituent state of the German empire, formed, in 1863, by the amalgamation of the two duchies Anhalt-Dessau-Cöthen and Anhalt-Bernburg, and comprising all the various Anhalt territories which were sundered apart in 1603. The country now known as Anhalt consists of two larger portions—Eastern and Western Anhalt, separated by the interposition of a part of Prussian Saxony—and of five enclaves surrounded by Prussian territory, viz. Alsleben, Mühligen, Dornburg, Gödnitz and Tilkerode-Abberode. The eastern and larger portion of the duchy is enclosed by the Prussian government district of Potsdam (in the Prussian province of Brandenburg), and Magdeburg and Merseburg (belonging to the Prussian province of Saxony). The western or smaller portion (the so-called Upper Duchy or Ballenstedt) is also enclosed by the two latter districts and, for a distance of 5 m. on the west, by the duchy of Brunswick. The western portion of the territory is undulating and in the extreme south-west, where it forms part of the Harz range, mountainous, the Ramberg peak attaining a height of 1900 ft. From the Harz the country gently shelves down to the Saale; and between this river and the Elbe there lies a fine tract of fertile country. The portion of the duchy lying east of the Elbe is mostly a flat sandy plain, with extensive pine forests, though interspersed, at intervals, by bog-land and rich pastures. The Elbe is the chief river, and intersecting the eastern portion of the duchy, from east to west, receives at Rosslau the waters of the Mulde. The navigable Saale takes a northerly direction through the western portion of the eastern part of the territory and receives, on the right, the Fuhne and, on the left, the Wipper and the Bode. The climate is on the whole mild, though somewhat inclement in the higher regions to the south-west. The area of the duchy is 906 sq. m., and the population in 1905 amounted to 328,007, a ratio of about 351 to the square mile. The country is divided into the districts of Dessau, Cöthen, Zerbst, Bernburg and Ballenstedt, of which that of Bernburg is the most, and that of Ballenstedt the least, populated. Of the towns, four, viz. Dessau, Bernburg, Cöthen and Zerbst, have populations exceeding 20,000. The inhabitants of the duchy, who mainly belong to the upper Saxon race, are, with the exception of about 12,000 Roman Catholics and 1700 Jews, members of the Evangelical (Union) Church. The supreme ecclesiastical authority is the consistory in Dessau; while a synod of 39 members, elected for six years, assembles at periods to deliberate on internal matters touching the organization of the church. The Roman Catholics are under the bishop of Paderborn. There are within the duchy four grammar schools (gymnasias), five semi-classical and modern schools, a teachers' seminary and four high-grade girls' schools. Of the whole surface, land under tillage amounts to about 60, meadowland to 7 and forest to 25%. The chief crops are corn (especially wheat), fruit, vegetables, potatoes, beet, tobacco, flax, linseed and hops. The land is well cultivated, and the husbandry on the royal domains and the large estates especially so. The pastures on the banks of the Elbe yield cattle of excellent quality. The forests are well stocked with game, such as deer and wild boar, and the open country is well supplied with partridges. The rivers yield abundant fish, salmon (in the Elbe), sturgeon and lampreys. The country is rich in lignite, and salt works are abundant. Of the manufactures of Anhalt, the chief are its sugar factories, distilleries, breweries and chemical works. Commerce is brisk, especially in raw products—corn, cattle, timber or wool. Coal (lignite), guano, oil and bricks are also articles of export. The trade of the country is furthered by its excellent roads, its navigable rivers and its railways (165 m.), which are worked in connexion with the Prussian system. There is a chamber of commerce in Dessau.

*Constitution.*—The duchy, by virtue of a fundamental law, proclaimed on the 17th of September 1859 and subsequently modified by various decrees, is a constitutional monarchy. The duke, who bears the title of "Highness," wields the executive power while sharing the legislation with the estates. The diet (*Landtag*) is composed of thirty-six members, of whom two are appointed by the duke, eight are representatives of landowners paying the highest taxes, two of the highest assessed members of the commercial and manufacturing classes, fourteen of the other electors of the towns and ten of the rural districts. The representatives are chosen for six years by indirect vote and must have completed their twenty-fifth year. The duke governs through a minister of state, who is the praeses of all the departments—finance, home affairs, education, public worship and statistics. The budget estimates for the financial year 1905-1906 placed the expenditure of the estate at £1,323,437. The public debt amounted on the 30th of June 1904 to £226,300. By convention with Prussia of 1867 the Anhalt troops form a contingent of the Prussian army. Appeal from the lower courts of the duchy lies to the appeal court at Naumburg in Prussian Saxony.

*History.*—During the 11th century the greater part of Anhalt was included in the duchy of Saxony, and in the 12th century it came under the rule of Albert the Bear, margrave of Brandenburg. Albert was descended from Albert, count of Ballenstedt, whose son Esico (d. 1059 or 1060) appears to have been the first to bear the title of count of Anhalt. Esico's grandson, Otto

the Rich, count of Ballenstedt, was the father of Albert the Bear, by whom Anhalt was united with the mark of Brandenburg. When Albert died in 1170, his son Bernard, who received the title of duke of Saxony in 1180, became count of Anhalt. Bernard died in 1212, and Anhalt, separated from Saxony, passed to his son Henry, who in 1218 took the title of prince and was the real founder of the house of Anhalt. On Henry's death in 1252 his three sons partitioned the principality and founded respectively the lines of Aschersleben, Bernburg and Zerbst. The family ruling in Aschersleben became extinct in 1315, and this district was subsequently incorporated with the neighbouring bishopric of Halberstadt. The last prince of the line of Anhalt-Bernburg died in 1468 and his lands were inherited by the princes of the sole remaining line, that of Anhalt-Zerbst. The territory belonging to this branch of the family had been divided in 1396, and after the acquisition of Bernburg Prince George I. made a further partition of Zerbst. Early in the 16th century, however, owing to the death or abdication of several princes, the family had become narrowed down to the two branches of Anhalt-Cöthen and Anhalt-Dessau. Wolfgang, who became prince of Anhalt-Cöthen in 1508, was a stalwart adherent of the Reformation, and after the battle of Mühlberg in 1547 was placed under the ban and deprived of his lands by the emperor Charles V. After the peace of Passau in 1552 he bought back his principality, but as he was childless he surrendered it in 1562 to his kinsmen the princes of Anhalt-Dessau. Ernest I. of Anhalt-Dessau (d. 1516) left three sons, John II., George III., and Joachim, who ruled their lands together for many years, and who, like Prince Wolfgang, favoured the reformed doctrines, which thus became dominant in Anhalt. About 1546 the three brothers divided their principality and founded the lines of Zerbst, Plötzkau and Dessau. This division, however, was only temporary, as the acquisition of Cöthen, and a series of deaths among the ruling princes, enabled Joachim Ernest, a son of John II., to unite the whole of Anhalt under his rule in 1570.

Joachim Ernest died in 1586 and his five sons ruled the land in common until 1603, when Anhalt was again divided, and the lines of Dessau, Bernburg, Plötzkau, Zerbst and Cöthen were refounded. The principality was ravaged during the Thirty Years' War, and in the earlier part of this struggle Christian I. of Anhalt-Bernburg took an important part. In 1635 an arrangement was made by the various princes of Anhalt, which gave a certain authority to the eldest member of the family, who was thus able to represent the principality as a whole. This proceeding was probably due to the necessity of maintaining an appearance of unity in view of the disturbed state of European politics. In 1665 the branch of Anhalt-Cöthen became extinct, and according to a family compact this district was inherited by Lebrecht of Anhalt-Plötzkau, who surrendered Plötzkau to Bernburg, and took the title of prince of Anhalt-Cöthen. In the same year the princes of Anhalt decided that if any branch of the family became extinct its lands should be equally divided between the remaining branches. This arrangement was carried out after the death of Frederick Augustus of Anhalt-Zerbst in 1793, and Zerbst was divided between the three remaining princes. During these years the policy of the different princes was marked, perhaps intentionally, by considerable uniformity. Once or twice Calvinism was favoured by a prince, but in general the house was loyal to the doctrines of Luther. The growth of Prussia provided Anhalt with a formidable neighbour, and the establishment and practice of primogeniture by all branches of the family prevented further divisions of the principality. In 1806 Alexius of Anhalt-Bernburg was created a duke by the emperor Francis II., and after the dissolution of the Empire each of the three princes took this title. Joining the Confederation of the Rhine in 1807, they supported Napoleon until 1813, when they transferred their allegiance to the allies; in 1815 they became members of the Germanic Confederation, and in 1828 joined, somewhat reluctantly, the Prussian *Zollverein*.

[v.02 p.0046]

Anhalt-Cöthen was ruled without division by a succession of princes, prominent among whom was Louis (d. 1650), who was both a soldier and a scholar; and after the death of Prince Charles at the battle of Semlin in 1789 it passed to his son Augustus II. This prince sought to emulate the changes which had recently been made in France by dividing Cöthen into two departments and introducing the Code Napoléon. Owing to his extravagance he left a large amount of debt to his nephew and successor, Louis II., and on this account the control of the finances was transferred from the prince to the estates. Under Louis's successor Ferdinand, who was a Roman Catholic and brought the Jesuits into Anhalt, the state of the finances grew worse and led to the interference of the king of Prussia and to the appointment of a Prussian official. When the succeeding prince, Henry, died in 1847, this family became extinct, and according to an arrangement between the lines of Anhalt-Dessau and Anhalt-Bernburg, Cöthen was added to Dessau.

Anhalt-Bernburg had been weakened by partitions, but its princes had added several districts to their lands; and in 1812, on the extinction of a cadet branch, it was again united under a single ruler. The feeble rule of Alexander Charles, who became duke in 1834, and the disturbed state of Europe in the following decade, led to considerable unrest, and in 1849 Bernburg was occupied by Prussian troops. A number of abortive attempts were made to change the government, and as Alexander Charles was unlikely to leave any children, Leopold of Anhalt-Dessau took some part in the affairs of Bernburg. Eventually in 1859 a new constitution was established for Bernburg and Dessau jointly, and when Alexander Charles died in 1863 both were united under the rule of Leopold.

Anhalt-Dessau had been divided in 1632, but was quickly reunited; and in 1693 it came under the rule of Leopold I. (see ANHALT-DESSAU, LEOPOLD I., PRINCE OF), the famous soldier who was generally known as the "Old Dessauer." The sons of Leopold's eldest son were excluded from the succession on account of the marriage of their father being morganatic, and the principality passed in 1747 to his second son, Leopold II. The unrest of 1848 spread to Dessau, and led to the

interference of the Prussians and to the establishment of the new constitution in 1859. Leopold IV., who reigned from 1817 to 1871, had the satisfaction in 1863 of reuniting the whole of Anhalt under his rule. He took the title of duke of Anhalt, summoned one *Landtag* for the whole of the duchy, and in 1866 fought for Prussia against Austria. Subsequently a quarrel over the possession of the ducal estates between the duke and the *Landtag* broke the peace of the duchy, but this was settled in 1872. In 1871 Anhalt became a state of the German Empire. Leopold IV. was followed by his son Frederick I., and on the death of this prince in 1904 his son Frederick II. became duke of Anhalt.

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**ANHALT-DESSAU, LEOPOLD I.,** PRINCE OF (1676-1747), called the "Old Dessauer" (Alter Dessauer), general field marshal in the Prussian army, was the only surviving son of John George II., prince of Anhalt-Dessau, and was born on the 3rd of July 1676 at Dessau. From his earliest youth he was devoted to the profession of arms, for which he educated himself physically and mentally. He became colonel of a Prussian regiment in 1693, and in the same year his father's death placed him at the head of his own principality; thereafter, during the whole of his long life, he performed the duties of a sovereign prince and a Prussian officer. His first campaign was that of 1695 in the Netherlands, in which he was present at the siege of Namur. He remained in the field to the end of the war of 1697, the affairs of the principality being managed chiefly by his mother, Princess Henriette Catherine of Orange. In 1698 he married Anna Luise Föse, an apothecary's daughter of Dessau, in spite of his mother's long and earnest opposition, and subsequently he procured for her the rank of a princess from the emperor (1701). Their married life was long and happy, and the princess acquired an influence over the stern nature of her husband which she never ceased to exert on behalf of his subjects, and after the death of Leopold's mother she performed the duties of regent when he was absent on campaign. Often, too, she accompanied him into the field. Leopold's career as a soldier in important commands begins with the outbreak of the War of the Spanish Succession. He had made many improvements in the Prussian army, notably the introduction of the iron ramrod about 1700, and he now took the field at the head of a Prussian corps on the Rhine, serving at the sieges of Kaiserswerth and Venlo. In the following year (1703), having obtained the rank of lieutenant-general, Leopold took part in the siege of Bonn and distinguished himself very greatly in the battle of Höchstädt, in which the Austrians and their allies were defeated by the French under Marshal Villars (September 20, 1703). In the campaign of 1704 the Prussian contingent served under Prince Louis of Baden and subsequently under Eugene, and Leopold himself won great glory by his conduct at Blenheim. In 1705 he was sent with a Prussian corps to join Prince Eugene in Italy, and on the 16th of August he displayed his bravery at the hard-fought battle of Cassano. In the following year he added to his reputation in the battle of Turin, where he was the first to enter the hostile entrenchments (September 7, 1706). He served in one more campaign in Italy, and then went with Eugene to join Marlborough in the Netherlands, being present in 1709 at the siege of Tournay and the battle of Malplaquet. In 1710 he succeeded to the command of the whole Prussian contingent at the front, and in 1712, at the particular desire of the crown prince, Frederick William, who had served with him as a volunteer, he was made a general field marshal. Shortly before this he had executed a *coup de main* on the castle of Mörs, which was held by the Dutch in defiance of the claims of the king of Prussia to the possession. The operation was effected with absolute precision and the castle was seized without a shot being fired. In the earlier part of the reign of Frederick William I., the prince of Dessau was one of the most influential members of the Prussian governing circle. In the war with Sweden (1715) he accompanied the king to the front, commanded an army of 40,000 men, and met and defeated Charles XII. in a severe battle on the island of Rügen (November 16). His conduct of the siege of Stralsund which followed was equally skilful, and the great results of the war to Prussia were largely to be attributed to his leadership in the campaign. In the years of peace, and especially after a court quarrel (1725) and duel with General von Grumbkow, he devoted himself to the training of the Prussian army. The reputation it had gained in the wars of 1675 to 1715, though good, gave no hint of its coming glory, and it was even in 1740 accounted one of the minor armies of Europe. That it proved, when put to the test, to be by far the best military force existing, may be taken as the summary result of Leopold's work. The "Old Dessauer" was one of the sternest disciplinarians in an age of stern discipline, and the technical training of the infantry, under his hand, made them superior to all others in the proportion of five to three (see AUSTRIAN SUCCESSION, WAR OF THE). He was essentially an infantry soldier; in his time artillery did not decide battles, but he suffered the cavalry service, in which he felt little interest, to be comparatively neglected, with results which appeared at Mollwitz. Frederick the Great formed the cavalry of Hohenfriedberg and Leuthen himself, but had it not been for the incomparable infantry trained by the "Old Dessauer" he would never have had the opportunity of doing so. Thus Leopold, heartily supported by Frederick William, who was himself called the great drill-master of Europe, turned to good account the twenty years following the peace with Sweden. During this time two incidents in his career call for special mention: first, his intervention in the case of the crown prince Frederick, who was condemned to death for desertion, and his continued and finally successful efforts to secure Frederick's reinstatement in the Prussian army; and secondly, his part in the War of the Polish Succession on the Rhine,

where he served under his old chief Eugene and held the office of field marshal of the Empire.

With the death of Frederick William in 1740, Frederick succeeded to the Prussian throne, and a few months later took place the invasion and conquest of Silesia, the first act in the long Silesian wars and the test of the work of the "Old Dessauer's" lifetime. The prince himself was not often employed in the king's own army, though his sons held high commands under Frederick. The king, indeed, found Leopold, who was reputed, since the death of Eugene, the greatest of living soldiers, somewhat difficult to manage, and the prince spent most of the campaigning years up to 1745 in command of an army of observation on the Saxon frontier. Early in that year his wife died. He was now over seventy, but his last campaign was destined to be the most brilliant of his long career. A combined effort of the Austrians and Saxons to retrieve the disasters of the summer by a winter campaign towards Berlin itself led to a hurried concentration of the Prussians. Frederick from Silesia checked the Austrian main army and hastened towards Dresden. But before he had arrived, Leopold, no longer in observation, had decided the war by his overwhelming victory of Kesselsdorf (December 14, 1745). It was his habit to pray before battle, for he was a devout Lutheran. On this last field his words were, "O Lord God, let me not be disgraced in my old days. Or if Thou wilt not help me, do not help these scoundrels, but leave us to try it ourselves." With this great victory Leopold's career ended. He retired from active service, and the short remainder of his life was spent at Dessau, where he died on the 7th of April 1747.

He was succeeded by his son, LEOPOLD II., MAXIMILIAN, PRINCE OF ANHALT-DESSAU (1700-1751), who was one of the best of Frederick's subordinate generals, and especially distinguished himself by the capture of Glogau in 1741, and his generalship at Mollwitz, Chotusitz (where he was made general field marshal on the field of battle), Hohenfriedberg and Soor.

Another son, PRINCE DIETRICH OF ANHALT-DESSAU (d. 1769), was also a distinguished Prussian general.

But the most famous of the sons was PRINCE MORITZ OF ANHALT-DESSAU (1712-1760), who entered the Prussian army in 1725, saw his first service as a volunteer in the War of the Polish Succession (1734-35), and in the latter years of the reign of Frederick William held important commands. In the Silesian wars of Frederick II., Moritz, the ablest of the old Leopold's sons, greatly distinguished himself, especially at the battle of Hohenfriedberg (Striegau), 1745. At Kesselsdorf it was the wing led by the young Prince Moritz that carried the Austrian lines and won the "Old Dessauer's" last fight. In the years of peace preceding the Seven Years' War, Moritz was employed by Frederick the Great in the colonizing of the waste lands of Pomerania and the Oder Valley. When the king took the field again in 1756, Moritz was in command of one of the columns which hemmed in the Saxon army in the lines of Pirna, and he received the surrender of Rutowski's force after the failure of the Austrian attempts at relief. Next year Moritz underwent changes of fortune. At the battle of Kolin he led the left wing, which, through a misunderstanding with the king, was prematurely drawn into action and failed hopelessly. In the disastrous days which followed, Moritz was under the cloud of Frederick's displeasure. But the glorious victory of Leuthen (December 5, 1757) put an end to this. At the close of that day, Frederick rode down the lines and called out to General Prince Moritz, "I congratulate you, Herr Feldmarschall!" At Zorndorf he again distinguished himself, but at the surprise of Hochkirch fell wounded into the hands of the Austrians. Two years later, soon after his release, his wound proved mortal.

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**ANHYDRITE**, a mineral, differing chemically from the more commonly occurring gypsum in containing no water of crystallization, being anhydrous calcium sulphate, CaSO<sub>4</sub>. It crystallizes in the orthorhombic system, and has three directions of perfect cleavage parallel to the three planes of symmetry. It is not isomorphous with the orthorhombic barium and strontium sulphates, as might be expected from the chemical formulae. Distinctly developed crystals are somewhat rare, the mineral usually presenting the form of cleavage masses. The hardness is 3½ and the specific gravity 2.9. The colour is white, sometimes greyish, bluish or reddish. On the best developed of the three cleavages the lustre is pearly, on other surfaces it is of the ordinary vitreous type.

Anhydrite is most frequently found in salt deposits with gypsum; it was, for instance, first discovered, in 1794, in a salt mine near Hall in Tirol. Other localities which produce typical specimens of the mineral, and where the mode of occurrence is the same, are Stassfurt in Germany, Aussee in Styria and Bex in Switzerland. At all these places it is only met with at some depth; nearer the surface of the ground it has been altered to gypsum owing to absorption of water.

From an aqueous solution calcium sulphate is deposited as crystals of gypsum, but when the solution contains an excess of sodium or potassium chloride anhydrite is deposited. This is one of

the several methods by which the mineral has been prepared artificially, and is identical with its mode of origin in nature, the mineral having crystallized out in salt basins.

The name anhydrite was given by A. G. Werner in 1804, because of the absence of water, as contrasted with the presence of water in gypsum. Other names for the species are muriacite and karstenite; the former, an earlier name, being given under the impression that the substance was a chloride (muriate). A peculiar variety occurring as contorted concretionary masses is known as tripe-stone, and a scaly granular variety, from Vulpino, near Bergamo, in Lombardy, as vulpinite; the latter is cut and polished for ornamental purposes.

(L. J. S.)

**ANI** (anc. *Abnicum*), an ancient and ruined Armenian city, in Russian Transcaucasia, government Erivan, situated at an altitude of 4390 ft., between the Arpa-chai (*Harpasus*) and a deep ravine. In 961 it became the capital of the Bagratid kings of Armenia, and when yielded to the Byzantine emperor (1046) it was a populous city, known traditionally as the "city with the 1001 churches." It was taken eighteen years later by the Seljuk Turks, five times by the Georgians between 1125 and 1209, in 1239 by the Mongols, and its ruin was completed by an earthquake in 1319. It is still surrounded by a double wall partly in ruins, and amongst the remains are a "patriarchal" church finished in 1010, two other churches, both of the 11th century, a fourth built in 1215, and a palace of large size.

See Brosset, *Les Ruines d'Ani* (1860-1861).

**ANICETUS**, pope c. 154-167. It was during his pontificate that St. Polycarp visited the Roman Church.

**ANICHINI, LUIGI**, Italian engraver of seals and medals, a native of Ferrara, lived at Venice about 1550. Michelangelo pronounced his "Interview of Alexander the Great with the high-priest at Jerusalem," "the perfection of the art." His medals of Henry II. of France and Pope Paul III. are greatly valued.

**ANILINE, PHENYLAMINE, or AMINOBENZENE, (C<sub>6</sub>H<sub>5</sub>NH<sub>2</sub>)**, an organic base first obtained from the destructive distillation of indigo in 1826 by O. Unverdorben (*Pogg. Ann.*, 1826, 8, p. 397), who named it crystalline. In 1834, F. Runge (*Pogg. Ann.*, 1834, 31, p. 65; 32, p. 331) isolated from coal-tar a substance which produced a beautiful blue colour on treatment with chloride of lime; this he named kyanol or cyanol. In 1841, C. J. Fritzsche showed that by treating indigo with caustic potash it yielded an oil, which he named aniline, from the specific name of one of the indigo-yielding plants, *Indigofera anil*, *anil* being derived from the Sanskrit *nīla*, dark-blue, and *nīlā*, the indigo plant. About the same time N.N. Zinin found that on reducing nitrobenzene, a base was formed which he named benzidam. A. W. von Hofmann investigated these variously prepared substances, and proved them to be identical, and thenceforth they took their place as one body, under the name aniline or phenylamine. Pure aniline is a basic substance of an oily consistence, colourless, melting at -8° and boiling at 184° C. On exposure to air it absorbs oxygen and resinifies, becoming deep brown in colour; it ignites readily, burning with a large smoky flame. It possesses a somewhat pleasant vinous odour and a burning aromatic taste; it is a highly acrid poison.

[v.02 p.0048]

Aniline is a weak base and forms salts with the mineral acids. Aniline hydrochloride forms large colourless tables, which become greenish on exposure; it is the "aniline salt" of commerce. The sulphate forms beautiful white plates. Although aniline is but feebly basic, it precipitates zinc, aluminium and ferric salts, and on warming expels ammonia from its salts. Aniline combines directly with alkyl iodides to form secondary and tertiary amines; boiled with carbon disulphide it gives sulphocarbaniide (diphenyl thio-urea), CS(NHC<sub>6</sub>H<sub>5</sub>)<sub>2</sub>, which may be decomposed into phenyl mustard-oil, C<sub>6</sub>H<sub>5</sub>CNS, and triphenyl guanidine, C<sub>6</sub>H<sub>5</sub>N: C(NHC<sub>6</sub>H<sub>5</sub>)<sub>2</sub>. Sulphuric acid at 180° gives sulphanilic acid, NH<sub>2</sub>.C<sub>6</sub>H<sub>4</sub>.SO<sub>3</sub>H. Anilides, compounds in which the amino group is substituted by an acid radical, are prepared by heating aniline with certain acids; antifebrin or acetanilide is thus obtained from acetic acid and aniline. The oxidation of aniline has been carefully investigated. In alkaline solution azobenzene results, while arsenic acid produces the violet-colouring matter violaniline. Chromic acid converts it into quinone, while chlorates, in the presence of certain metallic salts (especially of vanadium), give aniline black. Hydrochloric acid and potassium chlorate give chloranil. Potassium permanganate in neutral solution oxidizes it to nitrobenzene, in alkaline solution to azobenzene, ammonia and oxalic acid, in acid solution to aniline black. Hypochlorous acid gives para-amino phenol and para-amino diphenylamine (E. Bamberger, *Ber.*, 1898, 31, p. 1522).

The great commercial value of aniline is due to the readiness with which it yields, directly or indirectly, valuable dyestuffs. The discovery of mauve in 1858 by Sir W. H. Perkin was the first of a series of dyestuffs which are now to be numbered by hundreds. Reference should be made to the articles DYEING, FUCHSINE, SAFRANINE, INDULINES, for more details on this subject. In

addition to dyestuffs, it is a starting-product for the manufacture of many drugs, such as antipyrine, antifebrin, &c. Aniline is manufactured by reducing nitrobenzene with iron and hydrochloric acid and steam-distilling the product. The purity of the product depends upon the quality of the benzene from which the nitrobenzene was prepared. In commerce three brands of aniline are distinguished—aniline oil for blue, which is pure aniline; aniline oil for red, a mixture of equimolecular quantities of aniline and ortho- and para-toluidines; and aniline oil for safranine, which contains aniline and ortho-toluidine, and is obtained from the distillate (*échappés*) of the fuchsine fusion. Monomethyl and dimethyl aniline are colourless liquids prepared by heating aniline, aniline hydro-chloride and methyl alcohol in an autoclave at 220°. They are of great importance in the colour industry. Monomethyl aniline boils at 193-195°; dimethyl aniline at 192°.

**ANIMAL** (Lat. *animalis*, from *anima*, breath, soul), a term first used as a noun or adjective to denote a living thing, but now used to designate one branch of living things as opposed to the other branch known as plants. Until the discovery of protoplasm, and the series of investigations by which it was established that the cell was a fundamental structure essentially alike in both animals and plants (see CYTOLOGY), there was a vague belief that plants, if they could really be regarded as animated creatures, exhibited at the most a lower grade of life. We know now that in so far as life and living matter can be investigated by science, animals and plants cannot be described as being alive in different degrees. Animals and plants are extremely closely related organisms, alike in their fundamental characters, and each grading into organisms which possess some of the characters of both classes or kingdoms (see PROTISTA). The actual boundaries between animals and plants are artificial; they are rather due to the ingenious analysis of the systematist than actually resident in objective nature. The most obvious distinction is that the animal cell-wall is either absent or composed of a nitrogenous material, whereas the plant cell-wall is composed of a carbohydrate material—cellulose. The animal and the plant alike require food to repair waste, to build up new tissue and to provide material which, by chemical change, may liberate the energy which appears in the processes of life. The food is alike in both cases; it consists of water, certain inorganic salts, carbohydrate material and proteid material. Both animals and plants take their water and inorganic salts directly as such. The animal cell can absorb its carbohydrate and proteid food only in the form of carbohydrate and proteid; it is dependent, in fact, on the pre-existence of these organic substances, themselves the products of living matter, and in this respect the animal is essentially a parasite on existing animal and plant life. The plant, on the other hand, if it be a green plant, containing chlorophyll, is capable, in the presence of light, of building up both carbohydrate material and proteid material from inorganic salts; if it be a fungus, devoid of chlorophyll, whilst it is dependent on pre-existing carbohydrate material and is capable of absorbing, like an animal, proteid material as such, it is able to build up its proteid food from material chemically simpler than proteid. On these basal differences are founded most of the characters which make the higher forms of animal and plant life so different. The animal body, if it be composed of many cells, follows a different architectural plan; the compact nature of its food, and the yielding nature of its cell-walls, result in a form of structure consisting essentially of tubular or spherical masses of cells arranged concentrically round the food-cavity. The relatively rigid nature of the plant cell-wall, and the attenuated inorganic food-supply of plants, make possible and necessary a form of growth in which the greatest surface is exposed to the exterior, and thus the plant body is composed of flattened laminae and elongated branching growths. The distinctions between animals and plants are in fact obviously secondary and adaptive, and point clearly towards the conception of a common origin for the two forms of life, a conception which is made still more probable by the existence of many low forms in which the primary differences between animals and plants fade out.

An animal may be defined as a living organism, the protoplasm of which does not secrete a cellulose cell-wall, and which requires for its existence proteid material obtained from the living or dead bodies of existing plants or animals. The common use of the word animal as the equivalent of mammal, as opposed to bird or reptile or fish, is erroneous.

The classification of the animal kingdom is dealt with in the article ZOOLOGY.

(P. C. M.)

**ANIMAL HEAT.** Under this heading is discussed the physiology of the temperature of the animal body.

The higher animals have within their bodies certain sources of heat, and also some mechanism by means of which both the production and loss of heat can be regulated. This is conclusively shown by the fact that both in summer and winter their mean temperature remains the same. But it was not until the introduction of thermometers that any exact data on the temperature of animals could be obtained. It was then found that local differences were present, since heat production and heat loss vary considerably in different parts of the body, although the circulation of the blood tends to bring about a mean temperature of the internal parts. Hence it is important to determine the temperature of those parts which most nearly approaches to that of the internal organs. Also for such results to be comparable they must be made in the same situation. The rectum gives most accurately the temperature of internal parts, or in women and some animals the vagina, uterus or bladder.

*Warm and Cold Blooded Animals.*—By numerous observations upon men and animals, John Hunter showed that the essential difference between the so-called warm-blooded and cold-blooded animals lies in the constancy of the temperature of the former, and the variability of the temperature of the latter. Those animals high in the scale of evolution, as birds and mammals, have a high temperature almost constant and independent of that of the surrounding air, whereas among the lower animals there is much variation of body temperature, dependent entirely on their surroundings. There are, however, certain mammals which are exceptions, being warm-blooded during the summer, but cold-blooded during the winter when they hibernate; such are the hedgehog, bat and dormouse. John Hunter suggested that two groups should be known as "animals of permanent heat at all atmospheres" and "animals of a heat variable with every atmosphere," but later Bergmann suggested that they should be known as "homiothermic" and "poikilothermic" animals. But it must be remembered there is no hard and fast line between the two groups. Also, from work recently done by J. O. Wakelin Barratt, it has been shown that under certain pathological conditions a warm-blooded (homiothermic) animal may become for a time cold-blooded (poikilothermic). He has shown conclusively that this condition exists in rabbits suffering from rabies during the last period of their life, the rectal temperature being then within a few degrees of the room temperature and varying with it. He explains this condition by the assumption that the nervous mechanism of heat regulation has become paralysed. The respiration and heart-rate being also retarded during this period, the resemblance to the condition of hibernation is considerable. Again, Sutherland Simpson has shown that during deep anaesthesia a warm-blooded animal tends to take the same temperature as that of its environment. He demonstrated that when a monkey is kept deeply anaesthetized with ether and is placed in a cold chamber, its temperature gradually falls, and that when it has reached a sufficiently low point (about 25° C. in the monkey), the employment of an anaesthetic is no longer necessary, the animal then being insensible to pain and incapable of being roused by any form of stimulus; it is, in fact, narcotized by cold, and is in a state of what may be called "artificial hibernation." Once again this is explained by the fact that the heat-regulating mechanism has been interfered with. Similar results have been obtained from experiments on cats. These facts—with many others—tend to show that the power of maintaining a constant temperature has been a gradual development, as Darwin's theory of evolution suggests, and that anything that interferes with the due working of the higher nerve-centres puts the animal back again, for the time being, on to a lower plane of evolution.

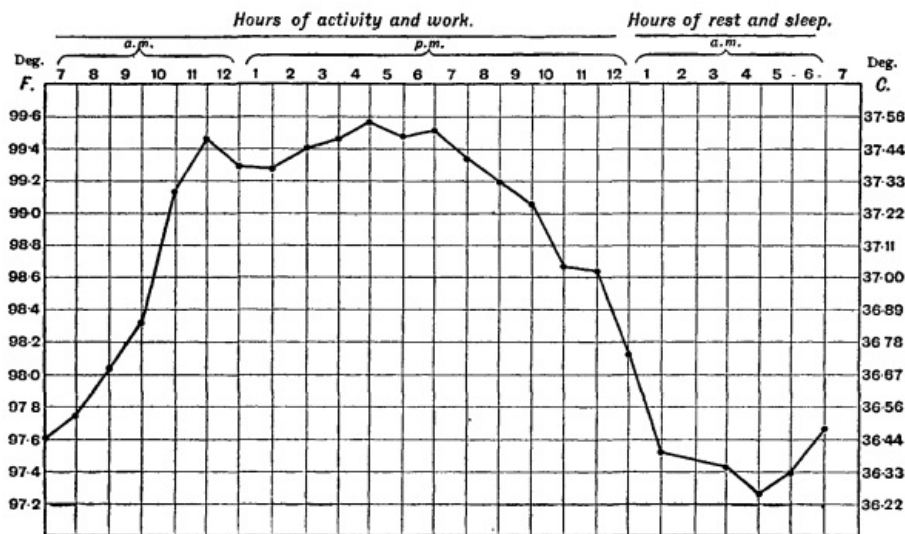


Chart showing diurnal variation in body temperature, ranging from about 37.5° C. from 10 A.M. to 6 P.M., and falling to about 36.3° C. from 2 A.M. to 6 A.M.

*Variations in the Temperature of Man and some other Animals.*—As stated above, the temperature of warm-blooded animals is maintained with but slight variation. In health under normal conditions the temperature of man varies between 36° C. and 38° C., or if the thermometer be placed in the axilla, between 36.25° C. and 37.5° C. In the mouth the reading would be from .25° C. to 1.5° C. higher than this; and in the rectum some .9° C. higher still. The temperature of infants and young children has a much greater range than this, and is susceptible of wide divergencies from comparatively slight causes.

Of the lower warm-blooded animals, there are some that appear to be cold-blooded at birth. Kittens, rabbits and puppies, if removed from their surroundings shortly after birth, lose their body heat until their temperature has fallen to within a few degrees of that of the surrounding air. But such animals are at birth blind, helpless and in some cases naked. Animals who are born when in a condition of greater development can maintain their temperature fairly constant. In strong, healthy infants a day or two old the temperature rises slightly, but in that of weakly, ill-developed children it either remains stationary or falls. The cause of the variable temperature in infants and young immature animals is the imperfect development of the nervous regulating mechanism.



The average temperature falls slightly from infancy to puberty and again from puberty to middle age, but after that stage is passed the temperature begins to rise again, and by about the eightieth year is as high as in infancy. A diurnal variation has been observed dependent on the periods of rest and activity, the maximum ranging from 10 A.M. to 6 P.M., the minimum from 11 P.M. to 3 A.M. Sutherland Simpson and J. J. Galbraith have recently done much work on this subject. In their first experiments they showed that in a monkey there is a well-marked and regular diurnal variation of the body temperature, and that by reversing the daily routine this diurnal variation is also reversed. The diurnal temperature curve follows the periods of rest and activity, and is not dependent on the incidence of day and night; in monkeys which are active during the night and resting during the day, the body temperature is highest at night and lowest through the day. They then made observations on the temperature of animals and birds of nocturnal habit, where the periods of rest and activity are naturally the reverse of the ordinary through habit and not from outside interference. They found that in nocturnal birds the temperature is highest during the natural period of activity (night) and lowest during the period of rest (day), but that the mean temperature is lower and the range less than in diurnal birds of the same size. That the temperature curve of diurnal birds is essentially similar to that of man and other homoiothermal animals, except that the maximum occurs earlier in the afternoon and the minimum earlier in the morning. Also that the curves obtained from rabbit, guinea-pig and dog were quite similar to those from man. The mean temperature of the female was higher than that of the male in all the species examined whose sex had been determined.

[v.02 p.0050]

Meals sometimes cause a slight elevation, sometimes a slight depression—alcohol seems always to produce a fall. Exercise and variations of external temperature within ordinary limits cause very slight change, as there are many compensating influences at work, which are discussed later. Even from very active exercise the temperature does not rise more than one degree, and if carried to exhaustion a fall is observed. In travelling from very cold to very hot regions a variation of less than one degree occurs, and the temperature of those living in the tropics is practically identical with those dwelling in the Arctic regions.

*Limits compatible with Life.*—There are limits both of heat and cold that a warm-blooded animal can bear, and other far wider limits that a cold-blooded animal may endure and yet live. The effect of too extreme a cold is to lessen metabolism, and hence to lessen the production of heat. Both katabolic and anabolic changes share in the depression, and though less energy is used up, still less energy is generated. This diminished metabolism tells first on the central nervous system, especially the brain and those parts concerned in consciousness. Both heart-beat and respiration-number become diminished, drowsiness supervenes, becoming steadily deeper until it passes into the sleep of death. Occasionally, however, convulsions may set in towards the end, and a death somewhat similar to that of asphyxia takes place. In some recent experiments on cats performed by Sutherland Simpson and Percy T. Herring, they found them unable to survive when the rectal temperature was reduced below 16° C. At this low temperature respiration became increasingly feeble, the heart-impulse usually continued after respiration had ceased, the beats becoming very irregular, apparently ceasing, then beginning again. Death appeared to be mainly due to asphyxia, and the only certain sign that it had taken place was the loss of knee jerks. On the other hand, too high a temperature hurries on the metabolism of the various tissues at such a rate that their capital is soon exhausted. Blood that is too warm produces dyspnoea and soon exhausts the metabolic capital of the respiratory centre. The rate of the heart is quickened, the beats then become irregular and finally cease. The central nervous system is also profoundly affected, consciousness may be lost, and the patient falls into a comatose condition, or delirium and convulsions may set in. All these changes can be watched in any patient suffering from an acute fever. The lower limit of temperature that man can endure depends on many things, but no one can survive a temperature of 45° C. (113° F.) or above for very long. Mammalian muscle becomes rigid with heat rigor at about 50° C., and obviously should this temperature be reached the sudden rigidity of the whole body would render life impossible. H. M. Vernon has recently done work on the death temperature and paralysis temperature (temperature of heat rigor) of various animals. He found that animals of the same class of the animal kingdom showed very similar temperature values, those from the Amphibia examined being 38.5° C., Fishes 39°, Reptilia 45°, and various Molluscs 46°. Also in the case of Pelagic animals he showed a relation between death temperature and the quantity of solid constituents of the body, *Cestus* having lowest death temperature and least amount of solids in its body. But in the higher animals his experiments tend to show that there is greater variation in both the chemical and physical characters of the protoplasm, and hence greater variation in the extreme temperature compatible with life.

*Regulation of Temperature.*—The heat of the body is generated by the chemical changes—those of oxidation—undergone not by any particular substance or in any one place, but by the tissues at large. Wherever destructive metabolism (katabolism) is going on, heat is being set free. When a muscle does work it also gives rise to heat, and if this is estimated it can be shown that the muscles alone during their contractions provide far more heat than the whole amount given out by the body. Also it must be remembered that the heart—also a muscle,—never resting, does in the 24 hours no inconsiderable amount of work, and hence must give rise to no inconsiderable amount of heat. From this it is clear that the larger proportion of total heat of the body is supplied by the muscles. These are essentially the "thermogenic tissues." Next to the muscles as heat generators come the various secretory glands, especially the liver, which appears never to rest in this respect. The brain also must be a source of heat, since its temperature is higher than that of the arterial blood with which it is supplied. Also a certain amount of heat is produced by the changes which the food undergoes in the alimentary canal before it really enters the body.

But heat while continually being produced is also continually being lost by the skin, lungs, urine and faeces. And it is by the constant modification of these two factors, (1) heat production and (2) heat loss, that the constant temperature of a warm-blooded animal is maintained. Heat is lost to the body through the faeces and urine, respiration, conduction and radiation from the skin, and by evaporation of perspiration. The following are approximately the relative amounts of heat lost through these various channels (different authorities give somewhat different figures):—faeces and urine about 3, respiration about 20, skin (conduction, radiation and evaporation) about 77. Hence it is clear the chief means of loss are the skin and the lungs. The more air that passes in and out of the lungs in a given time, the greater the loss of heat. And in such animals as the dog, who do not perspire easily by the skin, respiration becomes far more important.

But for man the great heat regulator is undoubtedly the skin, which regulates heat loss by its vasomotor mechanism, and also by the nervous mechanism of perspiration. Dilatation of the cutaneous vascular areas leads to a larger flow of blood through the skin, and so tends to cool the body, and *vice versa*. Also the special nerves of perspiration can increase or lessen heat loss by promoting or diminishing the secretions of the skin. There are greater difficulties in the exact determination in the amount of heat produced, but there are certain well-known facts in connexion with it. A larger living body naturally produces more heat than a smaller one of the same nature, but the surface of the smaller, being greater in proportion to its bulk than that of the larger, loses heat at a more rapid rate. Hence to maintain the same constant bodily temperature, the smaller animal must produce a relatively larger amount of heat. And in the struggle for existence this has become so.

Food temporarily increases the production of heat, the rate of production steadily rising after a meal until a maximum is reached from about the 6th to the 9th hour. If sugar be included in the meal the maximum is reached earlier; if mainly fat, later. Muscular work very largely increases the production of heat, and hence the more active the body the greater the production of heat.

But all the arrangements in the animal economy for the production and loss of heat are themselves probably regulated by the central nervous system, there being a thermogenic centre—situated above the spinal cord, and according to some observers in the optic thalamus.

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**ANIMAL WORSHIP**, an ill-defined term, covering facts ranging from the worship of the real divine animal, commonly conceived as a "god-body," at one end of the scale, to respect for the bones of a slain animal or even the use of a respectful name for the living animal at the other end. Added to this, in many works on the subject we find reliance placed, especially for the African facts, on reports of travellers who were merely visitors to the regions on which they wrote.

[v.02 p.0051] *Classification*.—Animal cults may be classified in two ways: (A) according to their outward form; (B) according to their inward meaning, which may of course undergo transformations.

(A) There are two broad divisions: (1) all animals of a given species are sacred, perhaps owing to the impossibility of distinguishing the sacred few from the profane crowd; (2) one or a fixed number of a species are sacred. It is probable that the first of these forms is the primary one and the second in most cases a development from it due to (i.) the influence of other individual cults, (ii.) anthropomorphic tendencies, (iii.) the influence of chieftainship, hereditary and otherwise, (iv.) annual sacrifice of the sacred animal and mystical ideas connected therewith, (v.) syncretism, due either to unity of function or to a philosophic unification, (vi.) the desire to do honour to the species in the person of one of its members, and possibly other less easily traceable causes.

(B) Treating cults according to their meaning, which is not necessarily identical with the cause which first led to the deification of the animal in question, we can classify them under ten specific heads: (i.) pastoral cults; (ii.) hunting cults; (iii.) cults of dangerous or noxious animals; (iv.) cults of animals regarded as human souls or their embodiment; (v.) totemistic cults; (vi.) cults of secret societies, and individual cults of tutelary animals; (vii.) cults of tree and vegetation spirits; (viii.) cults of ominous animals; (ix.) cults, probably derivative, of animals associated with certain deities; (x.) cults of animals used in magic.

(i.) The pastoral type falls into two sub-types, in which the species (*a*) is spared and (*b*) sometimes receives special honour at intervals in the person of an individual. (See *Cattle*, *Buffalo*, below.)

(ii.) In hunting cults the species is habitually killed, but (a) occasionally honoured in the person of a single individual, or (b) each slaughtered animal receives divine honours. (See *Bear*, below.)

(iii.) The cult of dangerous animals is due (a) to the fear that the soul of the slain beast may take vengeance on the hunter, (b) to a desire to placate the rest of the species. (See *Leopard*, below.)

(iv.) Animals are frequently regarded as the abode, temporary or permanent, of the souls of the dead, sometimes as the actual souls of the dead. Respect for them is due to two main reasons: (a) the kinsmen of the dead desire to preserve the goodwill of their dead relatives; (b) they wish at the same time to secure that their kinsmen are not molested and caused to undergo unnecessary suffering. (See *Serpent*, below.)

(v.) One of the most widely found modes of showing respect to animals is known as totemism (see TOTEM AND TOTEMISM), but except in decadent forms there is but little positive worship; in Central Australia, however, the rites of the Wollunqua totem group are directed towards placating this mythical animal, and cannot be termed anything but religious ceremonies.

(vi.) In secret societies we find bodies of men grouped together with a single tutelary animal; the individual, in the same way, acquires the nagual or individual totem, sometimes by ceremonies of the nature of the bloodbond.

(vii.) Spirits of vegetation in ancient and modern Europe and in China are conceived in animal form. (See *Goat*, below.)

(viii.) The ominous animal or bird may develop into a deity. (See *Hawk*, below.)

(ix.) It is commonly assumed that the animals associated with certain deities are sacred because the god was originally theriomorphic; this is doubtless the case in certain instances; but Apollo Smintheus, Dionysus Bassareus and other examples seem to show that the god may have been appealed to for help and thus become associated with the animals from whom he protected the crops, &c.

(x.) The use of animals in magic may sometimes give rise to a kind of respect for them, but this is of a negative nature. See, however, articles by Preuss in *Globus*, vol. lxxvii., in which he maintains that animals of magical influence are elevated into divinities.

*Bear*.—The bear enjoys a large measure of respect from all savage races that come in contact with it, which shows itself in apologies and in festivals *Animal Cults.* in its honour. The most important developments of the cult are in East Asia among the Siberian tribes; among the Ainu of Sakhalin a young bear is caught at the end of winter and fed for some nine months; then after receiving honours it is killed, and the people, who previously show marks of grief at its approaching fate, dance merrily and feast on its body. Among the Gilyaks a similar festival is found, but here it takes the form of a celebration in honour of a recently dead kinsman, to whom the spirit of the bear is sent. Whether this feature or a cult of the hunting type was the primary form, is so far an open question. There is a good deal of evidence to connect the Greek goddess Artemis with a cult of the bear; girls danced as "bears" in her honour, and might not marry before undergoing this ceremony. The bear is traditionally associated with Bern in Switzerland, and in 1832 a statue of Artio, a bear goddess, was dug up there.

*Buffalo*.—The Todas of S. India abstain from the flesh of their domestic animal, the buffalo; but once a year they sacrifice a bull calf, which is eaten in the forest by the adult males.

*Cattle*.—Cattle are respected by many pastoral peoples; they live on milk or game, and the killing of an ox is a sacrificial function. Conspicuous among Egyptian animal cults was that of the bull, Apis. It was distinguished by certain marks, and when the old Apis died a new one was sought; the finder was rewarded, and the bull underwent four months' education at Nilopolis. Its birthday was celebrated once a year; oxen, which had to be pure white, were sacrificed to it; women were forbidden to approach it when once its education was finished. Oracles were obtained from it in various ways. After death it was mummified and buried in a rock-tomb. Less widespread was the cult of the Mnevis, also consecrated to Osiris. Similar observances are found in our own day on the Upper Nile; the Nuba and Nuer worship the bull; the Angoni of Central Africa and the Sakalava of Madagascar keep sacred bulls. In India respect for the cow is widespread, but is of post-Vedic origin; there is little actual worship, but the products of the cow are important in magic.

*Crow*.—The crow is the chief deity of the Thlinkit Indians of N.W. America; and all over that region it is the chief figure in a group of myths, fulfilling the office of a culture hero who brings the light, gives fire to mankind, &c. Together with the eagle-hawk the crow plays a great part in the mythology of S.E. Australia.

*Dog*.—Actual dog-worship is uncommon; the Nosarii of western Asia are said to worship a dog; the Kalangs of Java had a cult of the red dog, each family keeping one in the house; according to one authority the dogs are images of wood which are worshipped after the death of a member of the family and burnt after a thousand days. In Nepal it is said that dogs are worshipped at the festival called Khicha Puja. Among the Harranians dogs were sacred, but this was rather as brothers of the mystae.

*Elephant*.—In Siam it is believed that a white elephant may contain the soul of a dead person, perhaps a Buddha; when one is taken the capturer is rewarded and the animal brought to the

king to be kept ever afterwards; it cannot be bought or sold. It is baptized and fêted and mourned for like a human being at its death. In some parts of Indo-China the belief is that the soul of the elephant may injure people after death; it is therefore fêted by a whole village. In Cambodia it is held to bring luck to the kingdom. In Sumatra the elephant is regarded as a tutelary spirit. The cult of the white elephant is also found at Ennarea, southern Abyssinia.

*Fish.*—Dagon seems to have been a fish-god with human head and hands; his worshippers wore fish-skins. In the temples of Apollo and Aphrodite were sacred fish, which may point to a fish cult. Atargatis is said to have had sacred fish at Askelon, and from Xenophon we read that the fish of the Chalus were regarded as gods.

*Goat.*—Dionysus was believed to take the form of a goat, probably as a divinity of vegetation. Pan, Silenus, the Satyrs and the Fauns were either capriform or had some part of their bodies shaped like that of a goat. In northern Europe the wood spirit, Ljesche, is believed to have a goat's horns, ears and legs. In Africa the Bijagos are said to have a goat as their principal divinity.

*Hare.*—In North America the Algonquin tribes had as their chief deity a "mighty great hare" to whom they went at death. According to one account he lived in the east, according to another in the north. In his anthropomorphized form he was known as Menabosho or Michabo.

[v.02 p.0052] *Hawk.*—In North Borneo we seem to see the evolution of a god in the three stages of the cult of the hawk among the Kenyahs, the Kayans and the sea Dyaks. The Kenyahs will not kill it, address to it thanks for assistance, and formally consult it before leaving home on an expedition; it seems, however, to be regarded as the messenger of the supreme god Balli Penyalong. The Kayans have a hawk-god, Laki Neho, but seem to regard the hawk as the servant of the chief god, Laki Tenangan. Singalang Burong, the hawk-god of the Dyaks, is completely anthropomorphized. He is god of omens and ruler of the omen birds; but the hawk is not his messenger, for he never leaves his house; stories are, however, told of his attending feasts in human form and flying away in hawk form when all was over.

*Horse.*—There is some reason to believe that Poseidon, like other water gods, was originally conceived under the form of a horse. In the cave of Phigalia Demeter was, according to popular tradition, represented with the head and mane of a horse, possibly a relic of the time when a non-specialized corn-spirit bore this form. Her priests were called Poloi (colts) in Laconia. In Gaul we find a horse-goddess, Epona; there are also traces of a horse-god, Rudiobus. The Gonds in India worship a horse-god, Koda Pen, in the form of a shapeless stone; but it is not clear that the horse is regarded as divine. The horse or mare is a common form of the corn-spirit in Europe.

*Leopard.*—The cult of the leopard is widely found in West Africa. Among the Ewe a man who kills one is liable to be put to death; no leopard skin may be exposed to view, but a stuffed leopard is worshipped. On the Gold Coast a leopard hunter who has killed his victim is carried round the town behind the body of the leopard; he may not speak, must besmear himself so as to look like a leopard and imitate its movements. In Loango a prince's cap is put upon the head of a dead leopard, and dances are held in its honour.

*Lion.*—The lion was associated with the Egyptian gods Rē and Horus; there was a lion-god at Baalbek and a lion-headed goddess Sekhet. The Arabs had a lion-god, Yaghuth. In modern Africa we find a lion-idol among the Balonda.

*Lizard.*—The cult of the lizard is most prominent in the Pacific, where it appears as an incarnation of Tangaloa. In Easter Island a form of the house-god is the lizard; it is also a tutelary deity in Madagascar.

*Mantis.*—Cagn is a prominent figure in Bushman mythology; the mantis and the caterpillar, Ngo, are his incarnations. It was called the "Hottentots' god" by early settlers.

*Monkey.*—In India the monkey-god, Hanuman, is a prominent figure; in orthodox villages monkeys are safe from harm. Monkeys are said to be worshipped in Togo. At Porto Novo, in French West Africa, twins have tutelary spirits in the shape of small monkeys.

*Serpent.*—The cult of the serpent is found in many parts of the Old World; it is also not unknown in America; in Australia, on the other hand, though many species of serpent are found, there does not appear to be any species of cult unless we include the Warramunga cult of the mythical Wollunqua totem animal, whom they seek to placate by rites. In Africa the chief centre of serpent worship was Dahomey; but the cult of the python seems to have been of exotic origin, dating back to the first quarter of the 17th century. By the conquest of Whydah the Dahomeyans were brought in contact with a people of serpent worshippers, and ended by adopting from them the cult which they at first despised. At Whydah, the chief centre, there is a serpent temple, tenanted by some fifty snakes; every python of the danh-gbi kind must be treated with respect, and death is the penalty for killing one, even by accident. Danh-gbi has numerous wives, who until 1857 took part in a public procession from which the profane crowd was excluded; a python was carried round the town in a hammock, perhaps as a ceremony for the expulsion of evils. The rainbow-god of the Ewe was also conceived to have the form of a snake; his messenger was said to be a small variety of boa; but only certain individuals, not the whole species, were sacred. In many parts of Africa the serpent is looked upon as the incarnation of deceased relatives; among the Amazulu, as among the Betsileo of Madagascar, certain species are assigned as the abode of certain classes; the Masai, on the other hand, regard each species as the habitat of a particular family of the tribe.

In America some of the Amerindian tribes reverence the rattlesnake as grandfather and king of snakes who is able to give fair winds or cause tempest. Among the Hopi (Moqui) of Arizona the serpent figures largely in one of the dances. The rattlesnake was worshipped in the Natchez temple of the sun; and the Aztec deity Quetzalcoatl was a serpent-god. The tribes of Peru are said to have adored great snakes in the pre-Inca days; and in Chile the Araucanians made a serpent figure in their deluge myth.

Over a large part of India there are carved representations of cobras (Nāgas) or stones as substitutes; to these human food and flowers are offered and lights are burned before the shrines. Among the Dravidians a cobra which is accidentally killed is burned like a human being; no one would kill one intentionally; the serpent-god's image is carried in an annual procession by a celibate priestess.

Serpent cults were well known in ancient Europe; there does not, it is true, appear to be much ground for supposing that Aesculapius was a serpent-god in spite of his connexion with serpents. On the other hand, we learn from Herodotus of the great serpent which defended the citadel of Athens; the Roman *genius loci* took the form of a serpent; a snake was kept and fed with milk in the temple of Potrimpos, an old Slavonic god. To this day there are numerous traces in popular belief, especially in Germany, of respect for the snake, which seems to be a survival of ancestor worship, such as still exists among the Zulus and other savage tribes; the "house-snake," as it is called, cares for the cows and the children, and its appearance is an omen of death, and the life of a pair of house-snakes is often held to be bound up with that of the master and mistress themselves. Tradition says that one of the Gnostic sects known as the Ophites caused a tame serpent to coil round the sacramental bread and worshipped it as the representative of the Saviour. See also SERPENT-WORSHIP.

*Sheep*.—Only in Africa do we find a sheep-god proper; Ammon was the god of Thebes; he was represented as ram-headed; his worshippers held the ram to be sacred; it was, however, sacrificed once a year, and its fleece formed the clothing of the idol.

*Tiger*.—The tiger is associated with Siva and Durga, but its cult is confined to the wilder tribes; in Nepal the tiger festival is known as Bagh Jatra, and the worshippers dance disguised as tigers. The Waralis worship Waghia the lord of tigers in the form of a shapeless stone. In Hanoi and Manchuria tiger-gods are also found.

*Wolf*.—Both Zeus and Apollo were associated with the wolf by the Greeks; but it is not clear that this implies a previous cult of the wolf. It is frequently found among the tutelary deities of North American dancing or secret societies. The Thlinkits had a god, Khanukh, whose name means "wolf," and worshipped a wolf-headed image.

AUTHORITIES.—For a fuller discussion and full references to these and other cults, that of the serpent excepted, see N. W. Thomas in Hastings' *Dictionary of Religions*; Frazer, *Golden Bough*; Campbell's *Spirit Basis of Belief and Custom*; MacLennan's *Studies* (series 2); V. Gennep, *Tabou et totémisme à Madagascar*. For the serpent, see Ellis, *Ewe-speaking Peoples*, p. 54; *Internat. Archiv*, xvii. 113; Tylor, *Primitive Culture*, ii. 239; Fergusson, *Tree and Serpent Worship*; Mähly, *Die Schlange im Mythos*; Staniland Wake, *Serpent Worship, &c.; 16th Annual Report of the American Bureau of Ethnology*, p. 273, and bibliography, p. 312. For the bull, &c., in Egypt, see EGYPT: *Religion*.

(N. W. T.)

**ANIMÉ**, an oleo-resin (said to be so called because in its natural state it is infested with insects) which is exuded from the locust tree, *Hymenaea coumaril*, and other species of *Hymenaea* growing in tropical South America. It is of a pale brown colour, transparent, brittle, and in consequence of its agreeable odour is used for fumigation and in perfumery. Its specific gravity varies from 1.054 to 1.057. It melts readily over the fire, and softens even with the heat of the mouth; it is insoluble in water, and nearly so in cold alcohol. It is allied to copal in its nature and appearance, and is much used by varnish-makers. The name is also given to Zanzibar copal (*q.v.*).

[v.02 p.0053]

**ANIMISM** (from *animus*, or *anima*, mind or soul), according to the definition of Dr. E. B. Tylor, the doctrine of spiritual beings, including human souls; in practice, however, the term is often extended to include pantheism or animatism, the doctrine that a great part, if not the whole, of the inanimate kingdom, as well as all animated beings, are endowed with reason, intelligence and volition, identical with that of man. This latter theory, which in many cases is equivalent to personification, though it may be, like animism, a feature of the philosophy of peoples of low culture, should not be confused with it. But it is difficult in practice to distinguish the two phases of thought and no clear account of animatism can yet be given, largely on the ground that no people has yet been discovered which has not already developed to a greater or less extent an animistic philosophy. On theoretical grounds it is probable that animatism preceded animism; but savage thought is no more consistent than that of civilized man; and it may well be that animistic and pantheistic doctrines are held simultaneously by the same person. In like manner one portion of the savage explanation of nature may have been originally animistic, another part animatistic.

*Origin*.—Animism may have arisen out of or simultaneously with animatism as a primitive

explanation of many different phenomena; if animatism was originally applied to non-human or inanimate objects, animism may from the outset have been in vogue as a theory of the nature of man. Lists of phenomena from the contemplation of which the savage was led to believe in animism have been given by Dr. Tylor, Herbert Spencer, Mr. Andrew Lang and others; an animated controversy arose between the former as to the priority of their respective lists. Among these phenomena are: trance (*q.v.*) and unconsciousness, sickness, death, clairvoyance (*q.v.*), dreams (*q.v.*), apparitions (*q.v.*) of the dead, wraiths, hallucinations (*q.v.*), echoes, shadows and reflections.

Primitive ideas on the subject of the soul, and at the same time the origin of them, are best illustrated by an analysis of the terms applied to it. Readers of Dante know the idea that the dead have no shadows; this was no invention of the poet's but a piece of traditionary lore; at the present day among the Basutos it is held that a man walking by the brink of a river may lose his life if his shadow falls on the water, for a crocodile may seize it and draw him in; in Tasmania, North and South America and classical Europe is found the conception that the soul—σκιά, *umbra*—is somehow identical with the shadow of a man. More familiar to the Anglo-Saxon race is the connexion between the soul and the breath; this identification is found both in Aryan and Semitic languages; in Latin we have *spiritus*, in Greek *pneuma*, in Hebrew *ruach*; and the idea is found extending downwards to the lowest planes of culture in Australia, America and Asia. For some of the Red Indians the Roman custom of receiving the breath of a dying man was no mere pious duty but a means of ensuring that his soul was transferred to a new body. Other familiar conceptions identify the soul with the liver (see OMEN) or the heart, with the reflected figure seen in the pupil of the eye, and with the blood. Although the soul is often distinguished from the vital principle, there are many cases in which a state of unconsciousness is explained as due to the absence of the soul; in South Australia *wilyamarraba* (without soul) is the word used for insensible. So too the autohypnotic trance of the magician or *shaman* is regarded as due to his visit to distant regions or the nether world, of which he brings back an account. Telepathy or clairvoyance (*q.v.*), with or without trance, must have operated powerfully to produce a conviction of the dual nature of man, for it seems probable that facts unknown to the automatist are sometimes discovered by means of crystal-gazing (*q.v.*), which is widely found among savages, as among civilized peoples. Sickness is often explained as due to the absence of the soul; and means are sometimes taken to lure back the wandering soul; when a Chinese is at the point of death and his soul is supposed to have already left his body, the patient's coat is held up on a long bamboo while a priest endeavours to bring the departed spirit back into the coat by means of incantations. If the bamboo begins to turn round in the hands of the relative who is deputed to hold it, it is regarded as a sign that the soul of the moribund has returned (see AUTOMATISM). More important perhaps than all these phenomena, because more regular and normal, was the daily period of sleep with its frequent concomitant of fitful and incoherent ideas and images. The mere immobility of the body was sufficient to show that its state was not identical with that of waking; when, in addition, the sleeper awoke to give an account of visits to distant lands, from which, as modern psychical investigations suggest, he may even have brought back veridical details, the conclusion must have been irresistible that in sleep something journeyed forth, which was not the body. In a minor degree revival of memory during sleep and similar phenomena of the sub-conscious life may have contributed to the same result. Dreams are sometimes explained by savages as journeys performed by the sleeper, sometimes as visits paid by other persons, by animals or objects to him; hallucinations, possibly more frequent in the lower stages of culture, must have contributed to fortify this interpretation, and the animistic theory in general. Seeing the phantasmic figures of friends at the moment when they were, whether at the point of death or in good health, many miles distant, must have led the savage irresistibly to the dualistic theory. But hallucinatory figures, both in dreams and waking life, are not necessarily those of the living; from the reappearance of dead friends or enemies primitive man was inevitably led to the belief that there existed an incorporeal part of man which survived the dissolution of the body. The soul was conceived to be a facsimile of the body, sometimes no less material, sometimes more subtle but yet material, sometimes altogether impalpable and intangible.

*Animism and Eschatology.*—The psychological side of animism has already been dealt with; almost equally important in primitive creeds is the eschatological aspect. In many parts of the world it is held that the human body is the seat of more than one soul; in the island of Nias four are distinguished, the shadow and the intelligence, which die with the body, a tutelary spirit, termed *begoe*, and a second which is carried on the head. Similar ideas are found among the Euahlayi of S.E. Australia, the Dakotas and many other tribes. Just as in Europe the ghost of a dead person is held to haunt the churchyard or the place of death, although more orthodox ideas may be held and enunciated by the same person as to the nature of a future life, so the savage, more consistently, assigns different abodes to the multiple souls with which he credits man. Of the four souls of a Dakota, one is held to stay with the corpse, another in the village, a third goes into the air, while the fourth goes to the land of souls, where its lot may depend on its rank in this life, its sex, mode of death or sepulture, on the due observance of funeral ritual, or many other points (see ESCHATOLOGY). From the belief in the survival of the dead arose the practice of offering food, lighting fires, &c., at the grave, at first, maybe, as an act of friendship or filial piety, later as an act of worship (see ANCESTOR WORSHIP). The simple offering of food or shedding of blood at the grave develops into an elaborate system of sacrifice; even where ancestor-worship is not found, the desire to provide the dead with comforts in the future life may lead to the sacrifice of wives, slaves, animals, &c., to the breaking or burning of objects at the grave or to the provision of the ferryman's toll, a coin put in the mouth of the corpse to pay the

travelling expenses of the soul. But all is not finished with the passage of the soul to the land of the dead; the soul may return to avenge its death by helping to discover the murderer, or to wreak vengeance for itself; there is a widespread belief that those who die a violent death become malignant spirits and endanger the lives of those who come near the haunted spot; the woman who dies in child-birth becomes a *pontianak*, and threatens the life of human beings; and man resorts to magical or religious means of repelling his spiritual dangers.

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*Development of Animism.*—If the phenomena of dreams were, as suggested above, of great importance for the development of animism, the belief, which must originally have been a doctrine of human psychology, cannot have failed to expand speedily into a general philosophy of nature. Not only human beings but animals and objects are seen in dreams; and the conclusion would be that they too have souls; the same conclusion may have been reached by another line of argument; primitive psychology posited a spirit in a man to account, amongst other things, for his actions; a natural explanation of the changes in the external world would be that they are due to the operations and volitions of spirits.

*Animal Souls.*—But apart from considerations of this sort, it is probable that animals must, early in the history of animistic beliefs, have been regarded as possessing souls. Education has brought with it a sense of the great gulf between man and animals; but in the lower stages of culture this distinction is not adequately recognized, if indeed it is recognized at all. The savage attributes to animals the same ideas, the same mental processes as himself, and at the same time vastly greater power and cunning. The dead animal is credited with a knowledge of how its remains are treated and sometimes with a power of taking vengeance on the fortunate hunter. Powers of reasoning are not denied to animals nor even speech; the silence of the brute creation may be put down to their superior cunning. We may assume that man attributed a soul to the beasts of the field almost as soon as he claimed one for himself. It is therefore not surprising to find that many peoples on the lower planes of culture respect and even worship animals (see TOTEM; ANIMAL WORSHIP); though we need not attribute an animistic origin to all the developments, it is clear that the widespread respect paid to animals as the abode of dead ancestors, and much of the cult of dangerous animals, is traceable to this principle. With the rise of species, deities and the cult of individual animals, the path towards anthropomorphization and polytheism is opened and the respect paid to animals tends to lose its strict animistic character.

*Plant Souls.*—Just as human souls are assigned to animals, so primitive man often credits trees and plants with souls in both human or animal form. All over the world agricultural peoples practise elaborate ceremonies explicable, as Mannhardt has shown, on animistic principles. In Europe the corn spirit sometimes immanent in the crop, sometimes a presiding deity whose life does not depend on that of the growing corn, is conceived in some districts in the form of an ox, hare or cock, in others as an old man or woman; in the East Indies and America the rice or maize mother is a corresponding figure; in classical Europe and the East we have in Ceres and Demeter, Adonis and Dionysus, and other deities, vegetation gods whose origin we can readily trace back to the rustic corn spirit. Forest trees, no less than cereals, have their indwelling spirits; the fauns and satyrs of classical literature were goat-footed and the tree spirit of the Russian peasantry takes the form of a goat; in Bengal and the East Indies wood-cutters endeavour to propitiate the spirit of the tree which they cut down; and in many parts of the world trees are regarded as the abode of the spirits of the dead. Just as a process of syncretism has given rise to cults of animal gods, tree spirits tend to become detached from the trees, which are thenceforward only their abodes; and here again animism has begun to pass into polytheism.

*Object Souls.*—We distinguish between animate and inanimate nature, but this classification has no meaning for the savage. The river speeding on its course to the sea, the sun and moon, if not the stars also, on their never-ceasing daily round, the lightning, fire, the wind, the sea, all are in motion and therefore animate; but the savage does not stop short here; mountains and lakes, stones and manufactured articles, are for him alike endowed with souls like his own; he deposits in the tomb weapons and food, clothes and implements, broken, it may be, in order to set free their souls; or he attains the same result by burning them, and thus sending them to the Other World for the use of the dead man. Here again, though to a less extent than in tree cults, the theriomorphic aspect recurs; in the north of Europe, in ancient Greece, in China, the water or river spirit is horse or bull-shaped; the water monster in serpent shape is even more widely found, but it is less strictly the spirit of the water. The spirit of syncretism manifests itself in this department of animism too; the immanent spirit of the earlier period becomes the presiding genius or local god of later times, and with the rise of the doctrine of separable souls we again reach the confines of animism pure and simple.

*Spirits in General.*—Side by side with the doctrine of separable souls with which we have so far been concerned, exists the belief in a great host of unattached spirits; these are not immanent souls which have become detached from their abodes, but have every appearance of independent spirits. Thus, animism is in some directions little developed, so far as we can see, among the Australian aborigines; but from those who know them best we learn that they believe in innumerable spirits and bush bogies, which wander, especially at night, and can be held at bay by means of fire; with this belief may be compared the ascription in European folk belief of prophylactic properties to iron. These spirits are at first mainly malevolent; and side by side with them we find the spirits of the dead as hostile beings. At a higher stage the spirits of dead kinsmen are no longer unfriendly, nor yet all non-human spirits; as fetishes (see FETISHISM), naguals (see TOTEM), familiars, gods or demi-gods (for which and the general question see DEMONOLOGY), they enter into relations with man. On the other hand there still subsists a

belief in innumerable evil spirits, which manifest themselves in the phenomena of possession (*q.v.*), lycanthropy (*q.v.*), disease, &c. The fear of evil spirits has given rise to ceremonies of expulsion of evils (see EXORCISM), designed to banish them from the community.

*Animism and Religion.*—Animism is commonly described as the most primitive form of religion; but properly speaking it is not a religion at all, for religion implies, at any rate, some form of emotion (see RELIGION), and animism is in the first instance an explanation of phenomena rather than an attitude of mind toward the cause of them, a philosophy rather than a religion. The term may, however, be conveniently used to describe the early stage of religion in which man endeavours to set up relations between himself and the unseen powers, conceived as spirits, but differing in many particulars from the gods of polytheism. As an example of this stage in one of its aspects may be taken the European belief in the corn spirit, which is, however, the object of magical rather than religious rites; Dr. Frazer has thus defined the character of the animistic pantheon, "they are restricted in their operations to definite departments of nature; their names are general, not proper; their attributes are generic rather than individual; in other words, there is an indefinite number of spirits of each class, and the individuals of a class are much alike; they have no definitely marked individuality; no accepted traditions are current as to their origin, life and character." This stage of religion is well illustrated by the Red Indian custom of offering sacrifice to certain rocks, or whirlpools, or to the indwelling spirits connected with them; the rite is only performed in the neighbourhood of the object, it is an incident of a canoe or other voyage, and is not intended to secure any benefits beyond a safe passage past the object in question; the spirit to be propitiated has a purely local sphere of influence, and powers of a very limited nature. Animistic in many of their features too are the temporary gods of fetishism (*q.v.*), naguals or familiars, genii and even the dead who receive a cult. With the rise of a belief in departmental gods comes the age of polytheism; the belief in elemental spirits may still persist, but they fall into the background and receive no cult.

*Animism and the Origin of Religion.*—Two animistic theories of the origin of religion have been put forward, the one, often termed the "ghost theory," mainly associated with the name of Herbert Spencer, but also maintained by Grant Allen, refers the beginning of religion to the cult of dead human beings; the other, put forward by Dr. E. B. Tylor, makes the foundation of all religion animistic, but recognizes the non-human character of polytheistic gods. Although ancestor-worship, or, more broadly, the cult of the dead, has in many cases overshadowed other cults or even extinguished them, we have no warrant, even in these cases, for asserting its priority, but rather the reverse; not only so, but in the majority of cases the pantheon is made up by a multitude of spirits in human, sometimes in animal form, which bear no signs of ever having been incarnate; sun gods and moon goddesses, gods of fire, wind and water, gods of the sea, and above all gods of the sky, show no signs of having been ghost gods at any period in their history. They may, it is true, be associated with ghost gods, but in Australia it cannot even be asserted that the gods are spirits at all, much less that they are the spirits of dead men; they are simply magnified magicians, super-men who have never died; we have no ground, therefore, for regarding the cult of the dead as the origin of religion in this area; this conclusion is the more probable, as ancestor-worship and the cult of the dead generally cannot be said to exist in Australia.

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The more general view that polytheistic and other gods are the elemental and other spirits of the later stages of animistic creeds, is equally inapplicable to Australia, where the belief seems to be neither animistic nor even animatistic in character. But we are hardly justified in arguing from the case of Australia to a general conclusion as to the origin of religious ideas in all other parts of the world. It is perhaps safest to say that the science of religions has no data on which to go, in formulating conclusions as to the original form of the objects of religious emotion; in this connexion it must be remembered that not only is it very difficult to get precise information of the subject of the religious ideas of people of low culture, perhaps for the simple reason that the ideas themselves are far from precise, but also that, as has been pointed out above, the conception of spiritual often approximates very closely to that of material. Where the soul is regarded as no more than a finer sort of matter, it will obviously be far from easy to decide whether the gods are spiritual or material. Even, therefore, if we can say that at the present day the gods are entirely spiritual, it is clearly possible to maintain that they have been spiritualized *pari passu* with the increasing importance of the animistic view of nature and of the greater prominence of eschatological beliefs. The animistic origin of religion is therefore not proven.

*Animism and Mythology.*—But little need be said on the relation of animism and mythology (*q.v.*). While a large part of mythology has an animistic basis, it is possible to believe, *e.g.* in a sky world, peopled by corporeal beings, as well as by spirits of the dead; the latter may even be entirely absent; the mythology of the Australians relates largely to corporeal, non-spiritual beings; stories of transformation, deluge and doom myths, or myths of the origin of death, have not necessarily any animistic basis. At the same time, with the rise of ideas as to a future life and spiritual beings, this field of mythology is immensely widened, though it cannot be said that a rich mythology is necessarily genetically associated with or combined with belief in many spiritual beings.

*Animism in Philosophy.*—The term "animism" has been applied to many different philosophical systems. It is used to describe Aristotle's view of the relation of soul and body held also by the Stoics and Scholastics. On the other hand monadology (Leibnitz) has also been termed animistic. The name is most commonly applied to vitalism, a view mainly associated with G. E. Stahl and revived by F. Bouillier (1813-1899), which makes life, or life and mind, the directive principle in



evolution and growth, holding that all cannot be traced back to chemical and mechanical processes, but that there is a directive force which guides energy without altering its amount. An entirely different class of ideas, also termed animistic, is the belief in the world soul, held by Plato, Schelling and others.

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(N. W. T.)

**ANIMUCCIA, GIOVANNI**, Italian musical composer, was born at Florence in the last years of the 15th century. At the request of St. Filippo Neri he composed a number of *Laudi*, or hymns of praise, to be sung after sermon time, which have given him an accidental prominence in musical history, since their performance in St. Filippo's Oratory eventually gave rise (on the disruption of 16th century schools of composition) to those early forms of "oratorio" that are not traceable to the Gregorian-polyphonic "Passions." St. Filippo admired Animuccia so warmly that he declared he had seen the soul of his friend fly upwards towards heaven. In 1555 Animuccia was appointed *maestro di capella* at St. Peter's, an office which he held until his death in 1571. He was succeeded by Palestrina, who had been his friend and probably his pupil. The manuscript of many of Animuccia's compositions is still preserved in the Vatican Library. His chief published works were *Madrigali e Motetti a quattro e cinque voci* (Ven. 1548) and *Il primo Libro di Messe* (Rom. 1567). From the latter Padre Martini has taken two specimens for his *Saggio di Contrapunto*. A mass from the *Primo Libro di Messe* on the *canto fermo* of the hymn *Conditor alme siderum* is published in modern notation in the *Anthologie des maîtres religieux primitifs* of the *Chanteurs de Saint Gervais*. It is solemn and noble in conception, and would be a great work but for a roughness which is more careless than archaic.

PAOLO ANIMUCCIA, a brother of Giovanni, was also celebrated as a composer; he is said by Fetis to have been *maestro di capella* at S. Giovanni in Laterano from the middle of January 1550 until 1552, and to have died in 1563.

**ANISE** (*Pimpinella Anisum*), an umbelliferous plant found in Egypt and the Levant, and cultivated on the continent of Europe for medicinal purposes. The officinal part of the plant is the fruit, which consists of two united carpels, called a cremocarp. It is known by the name of aniseed, and has a strong aromatic taste and a powerful odour. By distillation the fruit yields the volatile oil of anise, which is useful in the treatment of flatulence and colic in children. It may be given as *Aqua Anisi*, in doses of one or more ounces, or as the *Spiritus Anisi*, in doses of 5-20 minims. The main constituent of the oil (up to 90%) is anethol, C<sub>10</sub>H<sub>12</sub>O or C<sub>6</sub>H<sub>4</sub>[1.4](OCH<sub>3</sub>) (CH:CH.CH<sub>3</sub>.) It also contains methyl chavicol, anisic aldehyde, anisic acid, and a terpene. Most of the oil of commerce, however, of which anethol is also the chief constituent, comes from *Illicium verum* (order *Magnoliaceae*, sub-order *Winteraeae*), indigenous in N.E. China, the star-anise of *liqueur* makers. It receives its name from its flavour, and from its fruit spreading out like a star. The anise of the Bible (Matt. xxiii. 23) is *Anethum* or *Peucedanum graveolens*, *i.e.* dill (*q.v.*).

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