

covered with white paper, on which a pen having a slow movement in the direction of the axis of the cylinder describes a continuous spiral. This pen is deflected through the agency of an electromagnet every second, and thus the seconds of the clock are recorded on the chronograph by offsets from the spiral curve. An observer having his hand on a contact key in the same circuit can record in the same manner his observed times of transits of stars. The method of determination of difference of longitude is, therefore, virtually as follows. After the necessary observations for instrumental corrections, which are recorded only at the station of observation, the clock at A is put in connexion with the circuit so as to write on both chronographs, namely, that at A and that at B. Then the clock at B is made to write on both chronographs. It is clear that by this double operation one can eliminate the effect of the small interval of time consumed in the transmission of signals, for the difference of longitude obtained from the one chronograph will be in excess by as much as that obtained from the other will be in defect. The determination of the personal errors of the observers in this delicate operation is a matter of the greatest importance, as therein lies probably the chief source of residual error.

GEOFFREY OF MONMOUTH (1110?-1154), one of the most famous of the Latin chroniclers, was born at Monmouth early in the 12th century. Very little is known of his life. He became archdeacon of the church in Monmouth, and in 1152 was elected bishop of St Asaph. He died in 1154. Three works have been attributed to him—the *Chronicon sive Historia Britonum*; a metrical *Life and Prophecies of Merlin*; and the *Compendium Gaufrédi de Corpore Christi et Sacramento Eucharistiae*. Of these the first only is genuine; internal evidence is fatal to the claims of the second; and the *Compendium* is known to be written by Geoffrey of Auxerre. The *Historia Britonum* appeared in 1147, and created a great sensation. Geoffrey professed that the work was a translation of a Breton work he had got from his friend Walter Calenius, archdeacon of Oxford. It is highly probable that the Breton work never existed. The plea of translation was a literary fiction extremely common among writers in the Middle Ages, and was adopted to give a mysterious importance to the communications of the author and to deepen the interest of his readers. We may compare with this Sir Walter Scott's professed quotations from "Old Plays," which he wrote as headings for chapters in his novels. If Geoffrey consulted a Breton book at all, it would probably be one of the Arthurian romances then popular in Armorica. His history is a work of genius and imagination, in which the story is told with a Defoe-like minuteness of detail very likely to impose on a credulous age. It is founded largely on the previous histories of Gildas and the so-called Nennius; and many of the legends are taken direct from Virgil. The history of Merlin, as embodied in the *Historia*, is found in Persian and Indian books. Geoffrey's imagination may have been greatly stimulated by local English legends, especially in the numerous stories he gives in support of his fanciful derivations of names of places. Whatever hints Geoffrey may have got from popular tales, and whatever materials he may have accumulated in the course of his reading, the *Historia* is to be thought of as largely his own creation and as forming a splendid poetical whole. Geoffrey, at all events, gave these stories their permanent place in literature. We have sufficient evidence to prove that in Wales the work was considered purely fabulous. (See *Giraldus Cambrensis, Itinerarium Cambriae*, lib. i., c. 5, and *Cambria Descriptio*, c. vii.) And William of Newbury says

Since the article FIGURE OF THE EARTH was written, considerable additions to the data for the determination of the semiaxes of the earth have been obtained from India, viz., a new meridian arc of 20°, the southern point of which is at Mangalore, together with several arcs of longitude, the longest of which, between Bombay and Nizagapatam, extends over 10° 30'. The effect of the accession of these new measures is to alter the figure previously given to the following: the semiaxes of the spheroid best representing the large arcs now available are

$$a = 20926202; \quad c = 20854895; \quad c : a = 292.465 : 293.465.$$

This value of the major semiaxis exceeds that previously given by 140 feet, whereas the new polar semiaxis is less than the old by 226 feet. If we admit that the figure may possibly be an ellipsoid (not of revolution), then the investigation leads us, through the solution of 51 equations, to these values of the semiaxes—

$$a = 20926629, \\ b = 20925105, \\ c = 20854407.$$

The greater axis of the equator lies in longitude 8° 15' west of Greenwich, a meridian which passing through Ireland and Portugal cuts off a portion of the north-west corner of Africa, and in the opposite hemisphere cuts off the north-east corner of Asia. The apparent ellipticity of the equator is much reduced by the addition of the new data, and it would not be right to put too much confidence in the ellipsoidal figure until many more arcs of longitude shall have furnished the means of testing the theory more decisively than can be done at present. (See *Philosophical Magazine*, August 1878.) (A. R. C.)

"that fabler (Geoffrey) with his fables shall be straightway spat out by us all." Geoffrey's *Historia* was the basis of a host of other works. It was abridged by Alfred of Beverley (1150), and translated into Anglo-Norman verse, first by Geoffrey Gaimar (1154), and then by Wace (1180), whose work, *Li Romans de Brut*, contained a good deal of new matter. Early in the 13th century was published Layamon's *Brut*; and in 1278 appeared Robert of Gloucester's rhymed *Chronicle of England*. These two works, being written in English, would make the legends popular with the common people. The same influence continued to show itself in the works of Roger of Wendover (1237), Matthew Paris (1259), Bartholomew Cotton (1300), Matthew of Westminster (1310), Peter Langtoft, Robert de Brunne, Ralph Higden, John Harding, Robert Fabyan (1512), Richard Grafton (1569), and Raphael Holinshed (1580), who is especially important as the immediate source of some of Shakespeare's dramas. A large part of the introduction of Milton's *History of England* consists of Geoffrey's legends, which are not accepted by him as historical. The stories, thus preserved and handed down, have had an enormous influence on literature generally, but especially on English literature. They became familiar to the Continental nations; and they even appeared in Greek, and were known to the Arabs. With the exception of the translation of the Bible, probably no book has furnished so large an amount of literary material to English writers. The germ of the popular nursery tale, *Jack the Giant-Killer*, is to be found in the adventures of his Corineus, the companion of Brutus, who settled in Cornwall, and had a desperate fight with giants there. Goemagot, one of these giants, is said to be the origin of Gog and Magog—two effigies formerly exhibited on the Lord Mayor's day in London, which are referred to in several of the English dramatists, and still have their well-known representatives in the Guildhall of the city. Chaucer gives Geoffrey a place in his "House of Fame," where he mentions "Englyssh Gaunfride" (Geoffrey) as being "besye for to here up Troye."

Meanwhile the Arthurian romances had assumed a unique place in literature. The Arthur of later poetry is a grand ideal personage, seemingly unconnected with either space or time, and performing feats of extraordinary and superhuman valour. The real Arthur—if his historical existence is to be conceded—was most probably a Cumbrian or

Strathclyde Briton; and Geoffrey is responsible for the blunder of transferring him to South Wales. So intimately is Geoffrey connected with Arthur's celebrity, that he is often called Galfridus Arturus. Although the wondrous cycle of Arthurian romances scarcely originated with Geoffrey, he made the existing legends radiant with poetic colouring. They thus became the common property of Europe; and, after being modified by the trouvères in France, the minnesingers in Germany, and by such writers as Gaimar, Wace, Mapes, Robert de Borron, Luces de Gast, and Hélie de Borron, they were converted into a magnificent prose poem by Sir Thomas Malory, in 1461. Malory's *Morte Darthur*, printed by Caxton in 1485, is as truly the epic of the English mind as the *Iliad* is the epic of the Greek mind.

The first English tragedy, *Gorboduc, or Ferrex and Porrex* (1565), which was written mainly by Sackville, is founded on the *Historia Britonum*. John Higgins, in *The Mirror for Magistrates* (1587), borrows largely from the old legends. This work was extremely popular in the Elizabethan period, and furnished dramatists with plots for their plays. Spenser's *Faerie Queene* is saturated with the ancient myths; and, in his *Arthur*, the poet gives us a noble spiritual conception of the character. In the tenth canto of Book ii. there is—

"A chronicle of Briton kings,
From Brut to Uther's rayne.

Warner's lengthy poem entitled *Albion's England* (1586) is full of legendary British history. Drayton's *Polyolbion* (1613) is largely made up of stories from Geoffrey, beginning with *Britain-founding Brute*. Geoffrey's good faith and historic accuracy are warmly contended for by Drayton, in Song x. of his work.

In Shakespeare's time Geoffrey's legends were still implicitly believed by the great mass of the people, and were appealed to as historical documents by so great a lawyer as Sir Edward Coke. They had also figured largely in the disputes between the Edwards and Scotland. William Camden was the first to prove satisfactorily that the *Historia* was a romance. Shakespeare's *King Lear* was preceded by an earlier play entitled *The Chronicle History of King Lear and his Three Daughters, Gonorill, Ragan, and Cordelia, as it hath been divers and sundry times lately acted*. Shakespeare's immediate authority was Holinshed; but the later chronicles, in so far as they were legendary, were derived from Geoffrey. The story of *Cymbeline* is another illustration of the fascination these legends exercised over Shakespeare. An early play, ascribed by some to Shakespeare, on *Loqrine*, Brutus's eldest son, is a further example of how the dramatists ransacked Geoffrey's stores. The *Historia* was a favourite book with Milton; and he once thought of writing a long poem on King Arthur, whose qualities he would probably have idealized, as Spenser has done, but with still greater moral grandeur. In addition to the evidence afforded by the introduction to his *History of England*, Milton shows in many ways that he was profoundly indebted to early legendary history. His exquisite conception of Sabrina, in *Comus*, is an instance of how the original legends were not only appropriated but ennobled by many of our writers. In his Latin poems, too, there are some interesting passages pertinent to the subject.

Dryden once intended to write an epic on Arthur's exploits; and Pope planned an epic on Brutus. Mason's *Caractacus* bears witness to Geoffrey's charm for poetic minds. Wordsworth has embalmed the beautiful legend of *Pious Elidure* in his own magic verse. In chapter xxxvi. of the *Pickwick Papers* Dickens gives what he calls "The True Legend of Prince Bladud," which is stamped throughout with the impress of the author's peculiar genius, and

lit up with his sunny humour. Alexander Smith has a poem treating of *Edwin of Deira*, who figures towards the close of Geoffrey's history. And Tennyson's *Idylls of the King* furnish the most illustrious example of Geoffrey's influence; although the poet takes his stories, in the first instance, from Malory's *Morte Darthur*. The influence the legends have had in causing other legends to spring up, and in creating a love for narrative, is simply incalculable. In this way Geoffrey was really, for Englishmen, the inventor of a new literary form, which is represented by the romances and novels of later times.

There are several MSS. of Geoffrey's work in the old Royal Library of the British Museum, of which one formerly belonging to Margan Abbey is considered the best. The titles of the various editions of Geoffrey are given in Wright's *Biog. Brit. Lit.*, in the volume devoted to the Anglo-Norman period, which also contains an excellent notice of Geoffrey. The work compiled by Bale and Pits gives a mythical literary history, corresponding to Geoffrey's mythical political history. Of the *Life and Prophecies of Merlin*, falsely attributed to Geoffrey, 42 copies were printed for the Roxburge Club in 1830. The *Historia* was translated into English by Aaron Thompson (London, 1718); and a revised edition was issued by Dr Giles (London, 1842), which is to be found in the volume entitled *Six Old English Chronicles* in Bohn's Antiquarian Library. A discussion of Geoffrey's literary influence is given in "Legends of Pre-Roman Britain," an article in the *Dublin University Magazine* for April 1876. The latest instance of the interest in Geoffrey is the publication of the following work:—*Der Münchener Brut Gottfried von Monmouth in französischen Versen des zwölften Jahrhunderts*, herausgeg. von R. Hofmann und K. Vollmöller, Halle, 1877.

For further information about Geoffrey, consult Warton's *English Poetry*; Morley's *English Writers*; Skene's *Four Ancient Books of Wales*; and a valuable paper on "Geoffrey of Monmouth's History of the Britons," in the 1st vol. of Mr Thomas Wright's *Essays on Archaeological Subjects* (London, 1861). (T. G.)

GEOFFROY SAINT-HILAIRE, ÉTIENNE (1772-1844), a celebrated French naturalist, was the son of Jean Gérard Geoffroy, procurator and magistrate of Étampes, Seine-et-Oise, where he was born, April 15, 1772. His early education was carefully superintended by his mother and paternal grandmother, and when still a boy he had already become acquainted with the masterpieces of the literature of the ancients, and of the age of Louis XIV. Destined by his friends for the church, he entered, as an exhibitioner, the college of Navarre, in Paris, where he studied natural philosophy under Brisson; and in 1788 he obtained one of the canonicates of the chapter of Sainte Croix at Étampes, and also a benefice. Science, however, offered to him a career more congenial to his tastes than that of an ecclesiastic, and, after some persuasion, he gained from his father permission to remain in Paris, and to attend the lectures at the Collège de France and the Jardin des Plantes, on the condition that he should likewise read law. He accordingly took up his residence at Cardinal Lemoine's college, and there became the pupil and soon the esteemed associate of Brisson's friend, Haüy, the eminent mineralogist, under whose guiding influence his passion for the natural sciences daily deepened. Having, before the close of the year 1790, taken the degree of bachelor in law, he became a student of medicine, but the lectures of Fourcroy at the Jardin des Plantes, and of Daubenton at the Collège de France, and his favourite scientific pursuits gradually came to occupy his almost exclusive attention. His studies at Paris were at length suddenly interrupted, for, on the 12th or 13th of August 1792, Haüy and the other professors of Lemoine's college, as also those of the college of Navarre, were arrested by the revolutionists as priests, and confined in the prison of St Firmin. Through Daubenton and other persons of distinction with whom he was acquainted, Geoffroy on the 14th August obtained an order for the release of Haüy in the name of the Academy; still the other professors of the two colleges, save Lhomond, who had been rescued by his pupil Tallien, remained in confinement. Geoffroy, foreseeing their certain destruction,

if they remained in the hands of the revolutionists, determined if possible to secure their liberty by stratagem. By bribing one of the officials at St Firmin, and disguising himself as a commissioner of prisons, he gained admission to his friends, and entreated them to effect their escape by following him. All, however, dreading lest their deliverance should render the doom of their fellow-captives the more certain, refused the offer, and one priest only, who was unknown to Geoffroy, left the prison. Already on the night of the 2d of September the massacre of the proscribed had begun, when Geoffroy, yet intent on saving the life of his friends and teachers, repaired to St Firmin. At 4 o'clock on the morning of the 3d Sept., after 8 hours' waiting, he by means of a ladder assisted the escape of twelve ecclesiastics, not of the number of his acquaintance, and then the approach of dawn and the discharge of a gun directed at him warned him, his chief purpose unaccomplished, to return to his lodgings. Leaving Paris he retired to Étampes, where, in consequence of the anxieties of which he had lately been the prey, and the horrors which he had witnessed, he was for some time seriously ill. At the beginning of the winter of 1792 he returned to his studies in Paris, and in March of the following year Daubenton, through the interest of Bernardin de Saint Pierre, procured him the office of sub-keeper and assistant demonstrator of the cabinet of natural history, vacant by the resignation of Lacépède. By a law passed June 10th, 1793, Geoffroy was appointed one of the twelve professors of the newly constituted museum of natural history, being assigned the chair of zoology. In the same year he busied himself with the formation of a menagerie at that institution. On the 6th May 1794 commenced his opening course of lectures, and on December 1st he read to the society of natural history his first paper, on the subject of the Aye-aye. It was in 1794, also, that through the introduction of Tessier he entered into correspondence with Georges Cuvier, to whom, after the perusal of some of his manuscripts, he wrote: "Venez jouer parmi nous le rôle de Linné, d'un autre législateur de l'histoire naturelle." Shortly after the appointment of Cuvier as Mertrud's assistant (see vol. vi. p. 740), Geoffroy received him into his house. The two friends wrote together five memoirs on natural history, one of which, on the classification of mammals, puts forward the idea of the subordination of characters upon which Cuvier based his zoological system. It was in a paper entitled "Histoire des Makis, ou singes de Madagascar," written in 1795, that Geoffroy first gave expression to his views on "the unity of organic composition," the influence of which is perceptible in all his subsequent writings: nature, he observes, presents us with only one plan of construction, the same in principle, but varied in its accessory parts.

In 1798 Geoffroy was chosen a member of the great scientific expedition to Egypt. With Delile and Larrey, on the capitulation of Alexandria in August 1801, he resisted the claim made by the British general Hutchinson to the collections of the expedition, sending him word that, were his demand persisted in, history would have to record of him that he also had burnt a library in Alexandria. Early in January 1802 Geoffroy returned to his accustomed labours in Paris. He was elected a member of the academy of sciences of that city in September 1807. In March of the following year the emperor, who had already recognized his national services by the award of the cross of the legion of honour, selected him to visit the museums of Portugal, for the purpose of procuring from them collections, and these, though in the face of considerable opposition from the British, he eventually was successful in retaining as a permanent possession for his country. In 1809, the year after his return to France, he was made professor of zoology of the faculty of sciences at Paris, and from that period he

devoted himself more exclusively than before to the study of anatomical philosophy. In 1815 he was elected political representative for his native town. Three years later he gave to the world the first part of his celebrated *Philosophie Anatomique*, the second volume of which, published in 1822, and memoirs subsequently written account for the formation of monstrosities on the principle of arrest of development, and of the attraction of similar parts. When, in 1830, Geoffroy proceeded to apply to the invertebrata his views as to the unity of animal composition, he found a vigorous opponent in Georges Cuvier, and the discussion between them, continued up to the time of the death of the latter, soon attracted the attention of the scientific throughout Europe. Geoffroy, a synthesist, contended, in accordance with his theory of unity of plan in organic composition, that all animals are formed of the same elements, in the same number, and with the same connexions: homologous parts, however they differ in form and size, must remain associated in the same invariable order. With Goethe he held that there is in nature a law of compensation or balancing of growth, so that if one organ take on an excess of development, it is at the expense of some other part (cf. Darwin, *Origin of Species*, 5th ed., p. 182); and he maintained that, since nature takes no sudden leaps, even organs which are superfluous in any given species, if they have played an important part in other species of the same family, are retained as rudiments, which testify to the permanence of the general plan of creation. It was his conviction that, owing to the conditions of life, the same forms had not been perpetuated since the origin of all things, although it was not his belief that existing species are becoming modified (see Darwin, *op. cit.*, p. xvi.). Cuvier, who was an analytical observer of facts, admitted only the prevalence of "laws of coexistence" or "harmony" in animal organs, and maintained the absolute invariability of species, which he declared had been created with a regard to the circumstances in which they were placed, each organ contrived with a view to the function it had to fulfil, thus putting, in Geoffroy's consideration, the effect for the cause. In July 1840 Geoffroy became blind, and some months later he had a paralytic attack. From that time his strength gradually failed him. He resigned his chair at the museum in 1841, and on the 19th June 1844, at the age of 72, he died.

Geoffroy wrote—*Catalogue des Mammifères du Muséum national d'Histoire naturelle*, 1813, not quite completed; *Philosophie anatomique*,—t. i., *Des organes respiratoires*, 1818, & t. ii., *Des Monstrosités humaines*, 1822; *Système dentaire des Mammifères et des Oiseaux*, 1st pt., 1824; *Sur le Principe de l'Unité de Composition organique*, 1828; *Cours de l'Histoire naturelle des Mammifères*, 1829; *Principes de Philosophie zoologique*, 1830; *Études progressives d'un Naturaliste*, 1835; *Fragments biographiques*, 1832; *Notions synthétiques, historiques, et physiologiques de Philosophie naturelle*, 1838; and other works; also part of the *Description de l'Égypte par la Commission des Sciences*, 1821-30; and, with F. Cuvier, *Histoire naturelle des Mammifères*, 4 vols., 1820-42; besides very numerous papers published in the *Annales du Muséum*, the *Ann. des Sci. nat.*, the *Bulletin philomatique*, *La Décade égyptienne*, *La Décade philosophique*, the *Rev. encyclopédique*, *Mém. de l'Acad. des Sciences*, and elsewhere, among the subjects of which are the anatomy of marsupials, ruminants, and electrical fishes, the vertebrate theory of the skull, the opercula of fishes, teratology, palaeontology, and the influence of surrounding conditions in modifying animal forms.

See *Vie, Travaux, et Doctrine Scientifique d'Etienne Geoffroy Saint-Hilaire*, par son fils M. Isidore Geoffroy Saint-Hilaire, Paris and Strasburg, 1847, to which is appended a list of Geoffroy's works; and July, in *Biog. Universelle*, t. xvi., 1856. (F. H. B.)

GEOFFROY SAINT-HILAIRE, ISIDORE (1805-61), a French zoologist, son of the preceding, was born at the Jardin des Plantes, Paris, December 16, 1805. In his earlier years he showed an aptitude for mathematics, but eventually he devoted himself to the study of natural history and of medicine, and in 1824 he was appointed assistant naturalist to his father. On the occasion of his taking the degree of doctor of medicine. September 8, 1829, he

read a thesis entitled *Propositions sur la monstruosité, considérée chez l'homme et les animaux*; and in 1832-37 was published his great teratological work, *Histoire générale et particulière des anomalies de l'organisation chez l'homme et les animaux*, 3 vols. 8vo, with 20 plates. In 1829 he delivered for his father the second part of a course of lectures on ornithology, and during the three following years he taught zoology at the Athénée, and teratology at the École pratique. He was elected a member of the academy of sciences at Paris on April 15, 1833, was in 1837 appointed to act as deputy for his father at the faculty of sciences in Paris, and in the following year was sent to Bordeaux to organize a similar faculty there. He became successively inspector of the academy of Paris (1840), professor of the museum on the retirement of his

father, inspector general of the university (1844), a member of the royal council for public instruction (1845), and, on the death of Blainville, professor of zoology at the faculty of sciences (1850). In 1854 he founded the Acclimatization Society of Paris, of which he was president. He died at Paris, November 10, 1861.

Besides the above-mentioned works, he wrote—*Essai de Zoologie générale*, 1841; *Vie . . . d'Etienne Geoffroy Saint-Hilaire*, 1847; *Acclimatation et Domestication des Animaux utiles*, 1849, 4th ed., 1861; *Lettres sur les substances alimentaires et particulièrement sur la viande de cheval*, 1856; and *Histoire naturelle générale des règnes organiques*, 3 vols., 1854-62, which was not completed, chap. xx. of tome iii. being unfinished. He was the author also of various papers on zoology, comparative anatomy, and palaeontology, published for the most part in the *Annales du Muséum*, the *Mémoires des Savants étrangers*, the *Comptes rendus*, and the *Dict. des Sciences naturelles*.

G E O G R A P H Y

INTRODUCTION.

GEOGRAPHY is the science which describes the earth, the term being derived from two Greek words γῆ, the earth, and γράφω, to write. By means of geography the surface of the earth is delineated and described, boundaries are defined, areas are exactly measured, and the relative positions of places are determined. Geography thus embraces a wide range of subjects, and it has been found necessary to divide its study into several distinct sections.

I. Comparative Geography traces the history of discovery, and records the changes which have taken place in land and sea in historic times.

II. Mathematical Geography explains the figure, magnitude, and motion of the earth, teaches how to determine the positions of places on its surface, and shows how the whole or any portion of the earth may, on the principles of projection, be delineated on a map or chart.

III. Physical Geography is the description of the actual state of the earth's surface in its three great divisions—land, sea, and air.

IV. Political Geography describes the earth as divided into countries, occupied by various nations, and improved by human art and industry.

The following article is limited to a view of the progress of geographical discovery, an explanation of the principles of mathematical geography, and a synopsis of physical geography. For details relating to political geography the reader must consult the descriptive articles under their particular headings.

I. VIEW OF THE PROGRESS OF GEOGRAPHICAL DISCOVERY.

Four main causes have led to geographical discovery and exploration, namely, commercial intercourse between different countries, the operations of war, pilgrimages and missionary zeal, and in later times the pursuit of knowledge for its own sake, which is the highest of all motives.

The Phœnicians are the earliest commercial people of whose discoveries we have any correct accounts. They first explored the shores of the Mediterranean, and eventually extended their voyages through the Straits of Gibraltar, and visited the western shores of Spain and Africa, planting colonies and opening wider fields for their commerce by instructing the natives in their arts and improvements. They also monopolized the trade with India; and their chief emporium, the rich city of Tyre, was the centre whence the products of the East and West were distributed. The trade of the West was brought from the port called Tarshish in Scripture, which is probably identical with Carthage, where the ships arrived from Spain, Africa, and distant Britain. Concerning the far eastern land reached by the Phœnicians,

called Ophir in Scripture, there has been much dispute. The voyage to Ophir, we are told, occupied three years thither and homeward, and the cargo consisted of gold, ivory, apes, peacocks, and "algum" wood (1 Kings ix. 26, and x. 11). The following reasons lead to the conclusion that Ophir was the Malabar coast of India. In the Hebrew word for apes is *koph* (without any etymology in Semitic tongues), in Sanskrit *kāfi*. Ivory in Hebrew is *shen-habbim*; in Sanskrit *ibha* is an elephant. Peacocks is in Hebrew *tokki-im* from *toget*, the name still used on the Malabar coast, derived from the Sanskrit. Algum wood, or almug, is corrupted from *valgu* (ka), sandal wood from Malabar. Thus the Phœnicians were the first great carriers of the ancient world, extending their commercial operations from their central mart of Tyre on the Syrian coast to the tin-yielding isles of the Cassiterides in the far west, and to the ports of India in the east.

The great Phœnician colony of Carthage retained in full Carthage vigour the commercial spirit of the parent state. The Carthaginians traded on the coasts of Spain and Gaul, and extended their discoveries southwards along the coast of Africa, and to the Fortunate Islands, now known as the Canaries. Herodotus relates how the Phœnicians, setting sail from the Red Sea, made their way to the south, and when autumn approached they drew their vessels to land, sowed a crop, and waited till it was grown, when they reaped it and again put to sea. Having spent two years in this manner, in the third year they reached the pillars of Hercules and returned to Egypt. But the most celebrated voyage of antiquity, undertaken for the purpose of discovery, was the expedition under Hanno, fitted out by the senate of Carthage with the view of attempting the complete survey of the western coast of Africa. Hanno is said, in the *Periplus Hannonis*, to have set sail with a fleet of 60 vessels, and the extent of his voyage has been variously estimated as reaching to the river Nun, to a little beyond Sierra Leone, and even as far as the Gulf of Benin. Another famous navigator, who sailed from the Carthaginian colony of Massilia (Marseilles) in about 320 B.C., was Pytheas. He steered northwards along the coasts of Spain and Gaul, sailed round the island of Albion, and stretching still further to the north, he discovered an island known to the ancients as *Ultima Thule*, which may possibly have been the Shetland Isles.

The conquests of Alexander the Great, by making known the vast empire of Persia, materially enlarged the bounds of geographical knowledge. Although the course of his expedition was mainly by land, the mind of the conqueror was also intent on commerce and maritime discovery. In 327 B.C. Alexander led an army of Greeks down the valley of the Cabul river into the Punjab, and his expedition