Here n is the normal or radius of curvature perpendicular to the meridian; both n and ρ correspond to latitude ϕ_1, and ρ_0 to latitude $\frac{1}{2}(\phi+\phi')$. For calculations of latitude and longitude, tables of the logarithmic values of $\rho \sin 1''$, $n \sin 1''$, and $2n\rho \sin 1''$ are necessary. The following table contains these logarithms for every ten minutes of latitude from 52° to 53° computed with the elements $a=20926060$ and $a:c=295:294$:—

Lat.	Log. $\frac{1}{\rho \sin 1''}$.	Log. $\frac{1}{n \sin 1''}$.	Log. $\frac{1}{2\rho n \sin 1''}$.
° ′			
52 0	7·9939434	7·9928231	0·37131
10	9309	8190	29
20	9185	81	28
30	9060	810	26
40	8936	8065	24
50	8812	8024	23
53 0	8688	7982	22

The logarithm in the last column is that required also for the calculation of spherical excesses, the spherical excess of a triangle being expressed by $\frac{ab \sin C}{2\rho n \sin 1''}$.

It is frequently necessary to obtain the coordinates of one point with reference to another point; that is, let a perpendicular arc be drawn from B to the meridian of A meeting it in P, then, α being the azimuth of B at A, the coordinates of B with reference to A are

$$AP = s \cos(\alpha - \tfrac{2}{3}\epsilon),$$
$$BP = s \sin(\alpha - \tfrac{1}{3}\epsilon),$$

where ϵ is the spherical excess of APB, viz., $s^2 \sin\alpha \cos\alpha$ multiplied by the quantity whose logarithm is in the fourth column of the above table.

Irregularities of the Earth's Surface.

In considering the effect of unequal distribution of matter in the earth's crust on the form of the surface, we may simplify the matter by disregarding the considerations of rotation and excentricity. In the first place, supposing the earth a sphere covered with a film of water, let the density ρ be a function of the distance from the centre so that surfaces of equal density are concentric spheres. Let now a disturbance of the arrangement of matter take place, so that the density is no longer to be expressed by ρ, a function of r only, but is expressed by $\rho+\rho'$, where ρ' is a function of three coordinates θ, ϕ, r. Then ρ' is the density of what may be designated disturbing matter; it is positive in some places and negative in others, and the whole quantity of matter whose density is ρ' is zero. The previously spherical surface of the sea of radius a now takes a new form. Let P be a point on the disturbed surface, P′ the corresponding point vertically below it on the undisturbed surface, $PP'=u$. The knowledge of u over the whole surface gives us the form of the disturbed or actual surface of the sea; it is an equipotential surface, and if V be the potential at P of the disturbing matter ρ', M the mass of the earth,

$$\frac{M}{a+u} + V = C = \frac{M}{a} - \frac{M}{a^2}u + V.$$

As far as we know, u is always a very small quantity, and we have with sufficient approximation $u=\frac{3V}{4\pi\delta a}$, where δ is the mean density of the earth. Thus we have the disturbance in elevation of the sea-level expressed in terms of the potential of the disturbing matter. If at any point P the value of u remain constant when we pass to any adjacent point, then the actual surface is there parallel to the ideal spherical surface; as a rule, however, the normal at P is inclined to that at P′, and astronomical observations have shown that this inclination, amounting ordinarily to one or two seconds, may in some cases exceed 10, or, as at the foot of the Himalayas, even 30 seconds. By the expression "mathematical figure of the earth" we mean the surface of the sea produced in imagination so as to percolate the continents. We see then that the effect of the uneven distribution of matter in the crust of the earth is to produce small elevations and depressions on the mathematical surface which would be otherwise spheroidal. No geodesist can proceed far in his work without encountering the irregularities of the mathematical surface, and it is necessary that he know how they affect his astronomical observations. The whole of this subject is dealt with in his usual elegant manner by Bessel in the *Astronomische Nachrichten*, Nos. 329, 330, 331, in a paper entitled "Ueber den Einfluss der Unregelmässigkeiten der Figur der Erde auf geodätische Arbeiten, &c." But without entering into further details it is not difficult to see how local attraction at any station affects the determinations of latitude, longitude, and azimuth there.

Let there be at the station an attraction to the north-east throwing the zenith to the south-west, so that it takes in the celestial sphere a position Z′, its undisturbed position being Z. Let the rectangular components of the displacement ZZ′ be ξ measured southwards and η measured westwards. Now the great circle joining Z′ with the pole of the heavens P makes there an angle with the meridian $PZ = \eta \operatorname{cosec} PZ' = \eta \sec\phi$, where ϕ is the latitude of the station. Also this great circle meets the horizon in a point whose distance from the great circle PZ is $\eta \sec\phi \sin\phi = \eta \tan\phi$. That is, a meridian mark, fixed by observations of the pole star, will be placed that amount to the east of north. Hence the observed latitude requires the correction ξ; the observed longitude a correction $\eta \sec\phi$; and any observed azimuth a correction $\eta \tan\phi$. Here it is supposed that azimuths are measured from north by east, and longitudes eastwards.

The expression given for u enables one to form an approximate estimate of the effect of a compact mountain in raising the sea-level. Take, for instance, Ben Nevis, which contains about a couple of cubic miles; a simple calculation shows that the elevation produced would only amount to about 3 inches. In the case of a mountain mass like the Himalayas, stretching over some 1500 miles of country with a breadth of 300 and an average height of 3 miles, although it is difficult or impossible to find an expression for V, yet we may ascertain that an elevation amounting to several hundred feet may exist near their base. The geodetical operations, however, rather negative this idea, for it is shown in a paper in the *Philosophical Magazine* for August 1878 by Colonel Clarke that the form of the sea-level along the Indian arc departs but slightly from that of the mean figure of the earth. If this be so, the action of the Himalayas must be counteracted by subterranean tenuity.

Suppose now that A, B, C, ... are the stations of a network of triangulation projected on or lying on a spheroid of semiaxis major and excentricity a, e, this spheroid having its axis parallel to the axis of rotation of the earth, and its surface coinciding with the mathematical surface of the earth at A. Then basing the calculations on the observed elements at A, the calculated latitudes, longitudes, and directions of the meridian at the other points will be the true latitudes, &c., of the points as projected on the spheroid. On comparing these geodetic elements with the corresponding astronomical determinations, there will appear a system of differences which represent the inclinations, at the various points, of the actual irregular surface to the surface of the spheroid of reference. These differences will suggest two things,—first, that we may improve the agreement of the two surfaces, by not restricting the spheroid of reference by the condition of making its surface coincide with the mathematical surface of the earth at A; and secondly, by altering the form and dimensions of the spheroid. With respect to the first circumstance, we may allow the spheroid two degrees of freedom, that is, the normals of the surfaces at A may be allowed to separate a small quantity, compounded of a meridional difference and a difference perpendicular to the same. Let the spheroid be so placed that its normal at A lies to the north of the normal to the earth's surface by the small quantity ξ and to the east by the quantity η. Then in starting the calculation of geodetic latitudes, longitudes, and azimuths from A, we must take, not the observed elements ϕ, α, but for ϕ, $\phi+\xi$, and for α, $\alpha+\eta\tan\phi$, and zero longitude must be replaced by $\eta \sec\phi$. At the same time suppose the elements of the spheroid to be altered from a, e to $a+da, e+de$. Confining our attention at first to the two points A, B, let (ϕ'), (α'), (ω) be the numerical elements at B as obtained in the first calculation, viz., before the shifting and alteration of the spheroid; they will now take the form

$$(\phi') + f\xi + g\eta + h\,da + k\,de,$$
$$(\alpha') + f'\xi + g'\eta + h'da + k'de,$$
$$(\omega) + f''\xi + g''\eta + h''da + k''de,$$

where the coefficients $f, g, \ldots$ &c. can be numerically calculated. Now these elements, corresponding to the projection of B on the spheroid of reference, must be equal severally to the astronomically determined elements at B, corrected for the inclination of the surfaces there. If ξ', η' be the components of the inclination at that point, then we have

$$\xi' = (\phi') - \phi' + f\xi + g\eta + h\,da + k\,de,$$
$$\eta' \tan\phi' = (\alpha') - \alpha' + f'\xi + g'\eta + h'da + k'de,$$
$$\eta' \sec\phi' = (\omega) - \omega + f''\xi + g''\eta + h''da + k''de,$$

where ϕ', α', ω are the observed elements at B. Here it appears that the observation of longitude gives no additional information, but is available as a check upon the azimuthal observations.

If now there be a number of astronomical stations in the triangulation, and we form equations such as the above for each point, then we can from them determine those values of ξ, η, da, de, which make the quantity $\xi^2+\eta^2+\xi'^2+\eta'^2+\ldots$ a minimum. Thus we obtain that spheroid which best represents the surface covered by the triangulation.

In the *Account of the Principal Triangulation of Great Britain and Ireland* will be found the determination, from 75 equations, of the spheroid best representing the surface of the British Isles. Its elements are $a = 20927005 \pm 295$ feet, $b : a-b = 280 \pm 8$; and it is so placed that at Greenwich Observatory $\xi = 1''{\cdot}864$, $\eta = -0''{\cdot}546$.

Taking Durham Observatory as the origin, and the tangent plane to the surface (determined by $\xi = -0''{\cdot}664$, $\eta = -4''{\cdot}117$) as the plane of x and y, the former measured northwards, and z measured vertically downwards, the equation to the surface is

$$\cdot99524953x^2 + \cdot99288005y^2 + \cdot99763052z^2$$
$$- 0\cdot00671003xz - 41655070z = 0.$$

Altitudes.

The precise determination of the altitude of his station is a matter of secondary importance to the geodesist; nevertheless it is usual to observe the zenith distances of all trigonometrical points. The height of a station does indeed influence the observation of terrestrial angles, for a vertical line at B does not lie generally in the vertical plane of A, but the error (which is very easily investigated) involved in the neglect of this consideration is much smaller than the errors of observation. Again, in rising to the height h above the surface, the centrifugal force is increased and the magnitude and direction of the attraction of the earth are altered, and the effect upon the observation of latitude is a very small error expressed by the formula $\frac{h}{a} \cdot \frac{g'-g}{g} \sin 2\phi$, where g, g' are the values of gravity at the equator and at the pole. This is also a quantity which may be neglected, since for ordinary mountain heights it amounts to only a few hundreths of a second.

The uncertainties of terrestrial refraction render it impossible to determine accurately by vertical angles the heights of distant points. Generally speaking, refraction is greatest at about daybreak; from that time it diminishes, being at a minimum for a couple of hours before and after mid-day; later in the afternoon it again increases. This at least is the general march of the phenomenon, but it is by no means regular. The vertical angles measured at the station on Hart Fell showed on one occasion in the month of September a refraction of double the average amount, lasting from 1 P.M. to 5 P.M. The mean value of the coefficient of refraction k determined from a very large number of observations of terrestrial zenith distances in Great Britain is $\cdot0792 \pm \cdot0047$; and if we separate those rays which for a considerable portion of their length cross the sea from those which do not, the former give $k = \cdot0813$ and the latter $k = \cdot0753$. These values are determined from high stations and long distances; when the distance is short, and the rays graze the ground, the amount of refraction is extremely uncertain and variable. A case is noted in the Indian Survey where the zenith distance of a station 10·5 miles off varied from a depression of 4′ 52″·6 at 4.30 P.M. to an elevation of 2′ 24″·0 at 10.50 P.M.

If h, h' be the heights above the level of the sea of two stations, $90°+\delta$, $90°+\delta'$ their mutual zenith distances (δ being that observed at h), s their distance apart, the earth being regarded as a sphere of radius $=a$, then, with sufficient precision,

$$h' - h = s \tan\left(s\frac{1-2k}{2a} - \delta\right),$$
$$h - h' = s \tan\left(s\frac{1-2k}{2a} - \delta'\right)$$

If from a station whose height is h the horizon of the sea be observed to have a zenith distance $90°+\delta$, then the above formula gives for h the value

$$h = \frac{a}{2} \cdot \frac{\tan^2\delta}{1-2k}.$$

Suppose the depression δ to be n minutes, then $h = 1{\cdot}054n^2$ if the ray be for the greater part of its length crossing the sea; if otherwise, $h = 1{\cdot}040n^2$. To take an example: the mean of eight observations of the zenith distance of the sea horizon at the top of Ben Nevis is 91° 4′ 48″, or $\delta = 64{\cdot}8$; the ray is pretty equally disposed over land and water, and hence $h = 1{\cdot}047n^2 = 4396$ feet. The actual height of the hill by spirit-levelling is 4406 feet, so that the error of the height thus obtained is only 10 feet.

Longitude.

The determination of the difference of longitude between two stations A and B resolves itself into the determination of the local time at each of the stations, and the comparison by signals of the clocks at A and B. Whenever telegraphic lines are available these comparisons are made by electro-telegraphy. A small and delicately-made apparatus introduced into the mechanism of an astronomical clock or chronometer breaks or closes by the action of the clock a galvanic circuit every second. In order to record the minutes as well as seconds, one second in each minute, namely that numbered 0 or 60, is omitted. The seconds are recorded on a chronograph, which consists of a cylinder revolving uniformly at the rate of one revolution per minute 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.

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

$$a = 20926202; \quad c = 20854895; \quad c : a = 292{\cdot}465 : 293{\cdot}465.$$

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.)

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 Gaufredi de Corpore Christi et Sacramento Eucharistiæ*. 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 Cambriæ*, lib. i., c. 5, and *Cambriæ Descriptio*, c. VII.) And William of Newbury says "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. Goëmagot, 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 bere 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 *Faërie 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 *Locrine*, 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 Roxburghe 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 französ. 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 Archæological Subjects* (London, 1861). (T. GI.)

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 Collége 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 Collége 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