the altitude of the star at emersion will be 7½°, and at Edinburgh 5½°.

Suppose, for the sake of an example of the application of the above formulæ, it is desired to know the Greenwich mean times of immersion and emersion of Antares as viewed from Brighton, which place we will assume to be in latitude 50° 50′ and longitude om. 32s. west of Greenwich. We have then L = + 0°·83, and M = − 0·53m; it will be sufficient to include the second decimal only in the factors for L and M in the formulæ:—

For the *immersion*—

(+ 0·83) × (+ 0·84) = + 0·70 (− 0·53) × (+ 0·26) = − 0·14	The sum + 0·56m., added to 9h. 36·86m., gives 9h. 37·4m. for G.M.T.

For the *emersion*—

(+ 0·83) × (− 2·51) = − 2·08 (− 0·53) × (+ 0·46) = − 0·24	The sum − 2·32m., added to 10h. 10·74m., gives 10h. 8·4m. for G.M.T.

Similarly the angles will be found to be 152° at immersion and 202° at emersion.

The companion of Antares preceding the principal star nearly on the parallel will emerge several seconds earlier.

THE GREAT COMET OF 1874.—Just five years since, as we write, the comet discovered by M. Coggia at the Observatory of Marseilles on April 17, 1874, was beginning to attract general attention as a naked-eye object in the evening sky. The orbit, the determination of which presented some difficulty at first, from the slow motion of the comet, had been ascertained with sufficient precision to enable astronomers to predict its conspicuous appearance in the first half of July, and the track it would follow when, descending below the horizon in Europe, it became a favourably-situated object for the observatories of the other hemisphere. It was observed in Europe until July 16, and about a week later was seen in Australia; observations were continued till October, the last being made at the Argentine Observatory, Cordoba, on the 18th of that month, when it had receded to a distance of 1·94 from the sun and 1·79 from the earth, and was situate about 12° from the south pole of the heavens.

The European observations during three months were found to indicate a sensible, though not very material deviation of the orbit from a parabola, and ellipses were calculated at the time by Tietjen, Schulhof, and Geelmuyden. In a late number of the *Astronomische Nachrichten* are elliptical elements founded by M. Seyboth, of Riga, upon the meridian observations made at Moscow, which appear to possess a very high degree of precision, though they extend over an interval of twenty-six days only. The periods of revolution assigned by these computers are:—

Tietjen	8,965 years.
Schulhof	12,184 ,,
Geelmuyden	10,445 ,,
Seyboth	5,711 ,,

The differences between these periods show that beyond establishing the fact that the comet was moving in an orbit with a period of revolution extending to several thousand years, no reliable approximation to its true length has yet been obtained, but the additional three months' observations in the southern hemisphere have not hitherto been brought to bear upon the determination of the elements. The last Cordoba observations give the following final position:—

1874, October 18, at 14h. 46m. 58s. G.M.T.

Apparent Right Ascension	99° 46′ 27″·0
,, Declination	− 77 42 36·6

If we compare the elements of Geelmuyden and Seyboth with this observation, taking aberration into account, we find the following differences:—

	Error in R.A.	Error in Decl.
Geelmuyden	+ 31″	+ 65″
Seyboth	+ 59	+ 99

so that while, as tested by this single observation, the longer period of revolution appears to have the advantage, it is sufficiently evident that ellipses with divergent periods may eventually be found to represent the observations with almost equal precision, or in other words the length of the revolution will remain open to considerable uncertainty. If the deviation of the form of the orbit from the parabola, which satisfies the motions of the majority of comets be due to planetary attraction, we might look to Venus as the agent, since at the descending node the comet in 1874 approached the orbit of that planet within 300,000 miles (0·00325 of the earth's mean distance); the opposite node falls at a radius-vector of 11·65. The aphelion distance, according to Geelmuyden's calculation would be 955·0, or the comet would have travelled to these parts of space from a distance exceeding by more than thirty times the mean distance of Neptune.

GEOGRAPHICAL NOTES

THE Abbé Debaize, who by previous accounts was at Igonda on March 20, seven days' journey from Ujiji, has written under date of April 2 from the latter place to the director of the Paris Observatory and others, giving a brief sketch of his immediate plans. He proposes to take all his porters and merchandise by water to the Uzighé country at the north end of Lake Tanganyika, and to form a depôt there, which he will leave in charge of some of his best men; he will then establish a second depôt at the mouth of the Aruwimi, the great northern tributary of the Congo. Afterwards, starting in light marching order, he hopes to be able to explore the western slopes of the Blue Mountains, the countries situated between the southern end of Albert Nyanza and Lake Tanganyika, and especially Unyambongu, Mpororo, and Ruanda. He will then return to his depôt in Uzighé, whence he will send home an account of his discoveries, as well as a statement of his future plans.

AN interesting and extremely well written pamphlet has just appeared in the "Sammlung gemeinverständlicher wissenschaftlicher Vorträge," edited by Prof. Virchow and Herr von Holtzendorff. Its title is "Die Tiefsee und ihre Boden und Temperatur Verhältnisse," its author Dr. Georg von Boguslawski, the well-known editor of the *Annalen der Hydrographie* at the Imperial Admiralty of Berlin. The writer first gives a clear and concise account of all expeditions sent out by various countries for the investigation of the depths of the sea, particularly those of the *Gazelle*, the *Challenger*, and the *Tuscarora*. He then enters at greater length upon a discussion of the results obtained hitherto, treating first of the depths themselves, then of the outlines and physical condition of the sea-bottom, and finally of the distribution of temperatures and the inter-oceanic currents, with their causes and effects. Our space does not permit us to enter into details at greater length, suffice it to say that the little work is a welcome and valuable addition to scientific literature.

THE Geographical Department of the Japanese Government, which is displaying considerable activity in many directions, has commenced the publication in sheets of a large plan of the city of Yedo, showing the various divisions, streets, bridges, &c., and giving the names in Japanese and Roman characters.

UNDER the title of "Voyage d'Exploration dans l'Intérieur des Guyanes," the *Tour du Monde* has commenced the publication of Dr. Jules Crevaux' account of his journey in 1876-7 through French Guiana and across the Tumac Humac range to the Amazons. The illustrations are very interesting and well executed, and there is also a sketch map of the region.

THE *Annalen der Hydrographie*, Heft v., contains an important article on the Movement of Water in Rivers, based on river observations at various depths of water, made at the lightship station on the Genius Bank, in the Jade, from October 17 to December 10, 1878.

M. GUSTAVE MOYNIER, as Director, and M. Ch. Faure, as Editor, announce the publication of a new geographical journal—*L'Afrique*—entirely devoted to Africa. It is proposed to embrace in it the gist of all that is important published anywhere relating to the continent with which the journal deals. It will be published monthly by M. Jules Sandoz, Geneva, the size being sixteen pages octavo.

AN *Annuaire des Sociétés de Geographie* will shortly be published in Paris.

WE learn from *Vanity Fair* that a party, of which Lady Florence Dixie was the only lady, has just returned from South America, where they "crossed many hundreds of miles of the wild and unexplored pampas of Patagonia, penetrating amidst the Cordilleras into splendid scenes hitherto unexplored and unseen by man."

THE *Bulletins* of a number of foreign societies are to hand The new number of the *Bulletin* of the Lyons Geographical Society contains, besides the annual report, the conclusion of M. Luciano Cordeiro's chapters on the first explorations of Central Africa and the Portuguese doctrine of African hydrography in the fifteenth century, and the first part of an essay on Central Asia, by Col. Debize. In this number he deals with Eastern Turkestan, illustrating his remarks with a sketch map of North-Western China and Kashgaria.—The last number of the *Bulletin* of the Société de Géographie Commerciale of Bordeaux contains a second paper on the subject of the commercial exploration of Ferlo, an almost wholly unknown region of Senegambia.—The May number of the *Bolletino* of the Italian Geographical Society contains a learned and able lecture by Prof. Marinelli, on Scientific Geography, in which he traces the progress of this department, and shows how comprehensive and important it is.—The last number of the *Bulletin* of the American Geographical Society (No. 2 of 1879) contains a paper by Major A. G. Constable on Afghanistan. Major Constable served in the English army in the former Afghan war.—The May number of the *Bulletin* of the Paris Geographical Society contains a full report of the proceedings at the recent Cook Centenary in Paris, including a descriptive catalogue, by Dr. Hamy, of the articles exhibited during the celebration, and the cartography and bibliography of Cook's voyages, by Mr. James Jackson. An accompanying map shows the routes followed by the English navigator in his various voyages.

NOTES

FOR the fine plate of tubes in this week's number, illustrating the paper by Messrs. De La Rue and Müller, as well as for the numerous woodcuts, we are indebted to the liberality of Dr. De La Rue.

IT is gratifying to find foreign governments and societies so ready to show their appreciation of our eminent scientific workers. Last week we announced the election of Prof. Huxley as a Corresponding Member of the Paris Academy of Sciences, and now we have to chronicle a double honour just received by Prof. Stokes of Cambridge: the Emperor of Germany has conferred upon him the Order "Pour le Mérite," and the Paris Academy have elected him a Corresponding Member in the section of Physics in place of the late Prof. Ångström.

DR. DONDERS has been elected in the section of Medicine and Surgery in the same Academy, to succeed the late Prof. Ehrmann.

THE candidates whose names we have already given were elected Fellows at last Thursday's meeting of the Royal Society.

PROF. SIR C. WYVILLE THOMSON was last week compelled, from sudden indisposition, to relinquish his course of lectures at the University of Edinburgh. We are glad to be able to announce that he is now completely recovered. His medical attendants, however, deem it prudent that he should abstain from lecturing again this session. His large class of between 400 and 500 students has accordingly been entrusted to Prof. Alleyne Nicholson, of St. Andrews, who will conduct it during the remainder of the session. Though dissuaded from undertaking the heavy duties of his college work, Sir Wyville, we hope, will find strength to resume his labours amid the *Challenger* materials, so that this great work, for which the world is very patiently waiting, may suffer no serious delay.

PROF. WURTZ, the eminent French chemist, has been appointed a Member of the Council of the Legion of Honour.

THE arrangements for the annual meetings of the principal foreign associations are announced. The German Anthropological Society holds its yearly meeting at Strassburg on August 11, 12, and 13, and the fifty-second meeting of the German Association of Naturalists and Physicians will be held at Baden-Baden from September 18 to 24. The French Association for the Advancement of Science will hold its eighth session at Montpellier, commencing on August 28. The president is M. Bardoux, late Minister of Public Instruction. Applications are to be addressed to 76, Rue de Rennes, Paris. The American Association meets this year at Saratoga, on August 27, the President being Mr. George F. Barker, of Philadelphia.

EARTHQUAKES would seem to be plentiful and wide-spread at present. A Reuter's telegram, of date Messina, June 17, states that continual shocks of earthquake, attributed to the volcanic action of Mount Etna, have occurred in the neighbourhood of Santa Venere and Guardia, causing serious damage and considerable loss of life. Vesuvius is stated to be showing signs of activity. A distinct shock of earthquake is reported to have been felt on Monday at Tobermory, and other places in Mull, in the Hebrides. The shock passed from north-east to south-west. On the 7th inst. an earthquake of short duration was observed at Versailles at 10·55 P.M. There was a severe shock of earthquake in Costa Rica on the night of May 29. The cathedral and many of the principal buildings of San José were shattered, and much damage was done in other parts of the republic.

DR. J. C. DRAPER is at present in this country. He has been extending his researches on oxygen in the sun (see NATURE, vol. xix. p. 352), and has read papers on the subject at the Astronomical and Physical Societies.

WE regret to announce the death of Dr. Karl Neubauer, the eminent German chemist. Dr. Neubauer died on the night of June 1–2 at Wiesbaden, where for many years he had been working in the laboratory of Dr. Fresenius. The death is also announced of Dr. Justus Ulrich, Professor of Mathematics at Göttingen University, who died on May 30.

THE Committee on Electric Lighting, recently appointed by the House of Commons, have finished hearing evidence, and issued their Report, which is in substance as follows:—"That sufficient progress has been made with electricity as a means of lighting to encourage the belief that it has an important future before it, and not only for illuminating purposes, but as a source of power which may be wisely distributed and applied to mechanical purposes. The committee are of opinion that the electric light, even in its present state of development, can be advantageously used in large areas, open or inclosed, such as large halls, squares, or railway stations; but they do not think it has been so far matured as to be able to compete with gas for