Common, it would be premature to decide upon present data. The Brazilian Telegraph Company has cabled from Madeira two positions for September 12 and 13, obtained on H.M.S. *Triumph* by Capt. Markham, but taken in conjunction with the Rio message, they tend to throw a doubt upon the accuracy of some of the figures so far received.

Another comet discovered by Mr. Barnard is announced in a telegram from Boston, U.S., to Dunecht, it is described as circular, 2′ in diameter, with some central condensation. An observation at Harvard College gives the following position :— Sept. 14·8162 G.M.T. : R.A. 7h. 19m. 17·8s, Decl. + 16° 3′ 51″.

Daily motion in R.A. : + 1m. 44s. ; in Decl. : + 43′.

There is no possibility of identity of this comet with that of 1812.

THE TOTAL SOLAR ECLIPSES OF 1883 AND 1885.—Observers of the total solar eclipse on May 6, 1883, will have but very limited observing-room, and in fact will be confined for stations to one or two of the smaller islands or islets of the Marquesan group, the Roberts Islands of the Admiralty Chart. Wide separation of the parties to secure better chances of favourable weather will therefore be impracticable. The same contingency will occur in the case of the total eclipse next following, viz. that of September 8, 1885, where the course of the central zone is again almost wholly a sea-track. In this case observers will be limited to the southern parts of the north island of New Zealand, and to the extreme northern point of the southern island.

The following figures will indicate the precise conditions :—

| Long. E. | Latitude, N. limit of totality. | Latitude, Central Eclipse. | Latitude, S. limit of totality. |
|---|---|---|---|
| ° | ° | ° | ° |
| 171 ... | − 39 31·4 ... | − 40 20·2 ... | − 41 10·2 |
| 173 ... | 39 42·0 ... | 40 31·0 ... | 41 21·0 |
| 175 ... | 39 55·0 ... | 40 43·8 ... | 41 34·4 |
| 177 ... | − 40 9·5 ... | − 40 58·8 ... | − 41 49·2 |

The duration of totality on the central line in longitude 175° will be 1m. 52s.

## GEOGRAPHICAL NOTES

AT the Southampton meeting of the British Association Mr. Joseph Thomson read a paper *On the Geographical Evolution of the Tanganyika Basin*. The keynote of this paper is struck by a reference to a recent lecture of Dr. Archibald Geikie. to the Royal Geographical Society, in which he points out that the days are now over in which the scientific geographer is content with the simple description of the superficial aspects of the various regions of the globe. He must also know how they came to be, and what they have been in the past. This line of inquiry is applied by Mr. Thomson to the lake regions of Central Africa, but more particularly to the Tanganyika Basin. In the first place he presented a bird's-eye view of the lake regions from the Indian to the Atlantic Ocean, bringing into relief only the most prominent features of the geography, but describing more in detail the aspect of the Tanganyika Basin, round which the chief interest centres. From a description of these purely superficial matters he proceeded to describe what these have been in the remote past, and the manner in which they have been evolved, being of course compelled to call in the assistance of the sister science geology. The conclusions he arrived at as to the primary origin of the region are, from purely hypothetical considerations, based on the theory of a shrinking nucleus, and the necessary effects on the earth's crust arising therefrom. At a later stage, however, he is on safer grounds when he is able to appeal to the rocks themselves as to the aboriginal conditions of the African continent south of the Equator. These, according to Dr. Thomson, prove the existence of an immense central sea cut off from the ocean by the elevation of the continent, and which was almost coterminous with the present drainage area of the Congo. An elevated ridge was upheaved along the eastern boundary of this sea, the origin of the trough of Tanganyika, by the collapse of the centre of this ridge and the central sea, subsequently drained away to the west, leaving Tanganyika isolated. Mr. Thomson then proceeded to describe how its secondary characters arose, and its scenery was moulded, by the action of sub-aërial denudation on rocks of different powers of resisting the decomposing and eroding agents, and explained the curious marine-like type of its shells, the origin of its outlet, the Lukuga, the freshening of the water of the lake, and finally the curious intermittency of the outflow. The various stages in the evolution of the Tanganyika Basin were summarised as follows :—The first appearance of the future continent, we have been led to believe from various theoretical considerations, was the appearance of a fold of the earth's crust bounded by two lines of weakness converging towards the south, which fold gradually rose till it appeared above the ocean, first along these two lines of weakness, in the form of a series of islands, which finally join, inclosing in their centre a large part of the ocean. This inclosed water area formed a great central sea, and the inclosing land along the lines of weakness is now indicated by the east and west coast ranges. In the second stage the continent of Africa south of 5° N. lat. presented the outline of the continent of to-day. The third stage shows the central plateau with the great central sea very much diminished in size, and almost coinciding with the present Congo Basin. There is as yet no evidence of the existence of Tanganyika. After an enormous period of undisturbed deposition of sand in the sea, the fourth stage is ushered in by a period of great continental covulsions. On the line of the future Tanganyika a huge boss of rock is intruded into the throbbing crust, and the surrounding region elevated to a considerable extent, followed by the subsequent collapse of the body of the elevated area originating the great abyss of Tanganyika. The fifth great stage is marked by the formation of a channel through the western coast mountain, causing the draining of the great central sea, which immediately becomes the inner drainage area of the Congo. The sixth stage then sees Tanganyika isolated as a lake by itself, from which time dates the moulding of its present scenery, the formation of an outlet, the freshening of its waters, and the lowering of its level, and finally we have seen that the intermittency of the lake's outflow is explained by the probable fact that the rainfall and evaporation nearly balance each other in ordinary seasons.

THE Geneva correspondent of the *Times* sends some notes on an interesting paper recently read by Prof. Calladon :—"So far back as 1880 M. de Saussure suggested the probability of the level of Lake Leman being much lower than it had been a few centuries previously, and that there had been a time when the upper part of Geneva formed a peninsula, washed on every side except that of Champel, by the waters of the lake. This theory has lately been comfirmed by the observations of Prof. Calladon, who, at the recent meeting of the Association of Swiss Geographical Societies, read a paper on the subject that attracted much attention. It results from the Professor's investigations that the Plateau of the Tranchée, to the south-east of the city, and the hill once crowned by the temple of Diana, and now by the cathedral, are parts of the same lacustrine terrace, both being composed of regular beds of sand and gravel, having an inclination of 30 to 37 degrees, and dipping in a north-westerly direction. Superimposed on these beds is a horizontal layer of pebbles of an average thickness, much exceeding the thickness of the oblique layers underneath. The height of this layer, Prof. Calladon contends, corresponds with the former *maximum* level of the lake, which was 28 to 30 metres higher than the present level. The excavations for the foundation of the new theatre which were laid in 'drift,' had to be carried to a great depth, and included 3000 square metres of ground. It was quite evident from the nature of the deposits, which had not been previously disturbed, that hereabouts the Arve, once upon a time, joined the Rhone, and other excavations have indicated the old course of the former river to the point at which it now takes its departure. Underneath the inclined bed of pebbles and gravel comes glacial clay, identical in every respect with the glacial clay that now underlays the bed of the Rhone. It is from the depth of drift resting upon this platform of gravel clay that Prof. Calladon calculates his estimate of the lowering of the level of Lake Leman in modern times. He is confirmed in his conclusion by the fact that the deposits in the ancient bed of the Arve are not alone similar in kind to the deposits still brought down by the river, but identical with them in chemical composition. In the opinion of Prof. Calladon, Geneva, at a period not many centuries before the Christian era, occupied a strategic position analogous to that of many other cities of antiquity in being built upon a promontory almost surrounded by water. The uncovering of the platform of glacial clay enables Prof. Calladon further to ascertain the minimum level of the lake at the time when the superincumbent layers of Alpine sand and gravel were brought down by the Arve. It follows, from the geometric measurements which have been

made, that the surface of the bed of glacial clay is only 85 centimetres below the present level of the lake, and 4 metres above its bottom at Geneva. Hence the level of the lake at the time in question must have been at least 3 metres above its present level, for otherwise the Lower Rhone could not have existed. As regards these estimates, it should be remembered that the difference in time between the maximum and minimum levels of the lake has to be reckoned by centuries, and that the volume of rivers and lakes fed by Alpine snows varies with the seasons."

M. LESSAR, who made last year an interesting journey to Saraks, has returned from a second journey in the same country, as far as Herat, and publishes an account of it in the *Golos*. All the route, from Askabad to Saraks, 185 miles, goes along the foot of mountains through a completely flat country, which is usually called Attek. This name, however, which signifies "the foot of the mountains," is unknown in Persia and Afghanistan. That part of this oasis, which was occupied by the Tekke-Turcomans, was usually known as Akhal, whilst the south-eastern part of the oasis was known as Arakadj. Only two places of the Attek, Luftabad and Shilghyan, are occupied by Persian Shiites, the remainder are Turcomans, having immigrated from Merv after a bloody struggle with the former inhabitants, at the beginning of this century. The population live mostly in clay-houses, the number of felt tents diminishing very rapidly, and the clay-houses which formerly were built within small earthen fortifications, are now mostly erected outside of them. Water is scarce in the Attek, the streams coming down from mountains being few, and in the hands of Persians, who often take the water for their fields. The population of the Attek, between Askabad and Saraks, is estimated by M. Lessar, at about 7000 Turcoman inhabitants. They carry on agriculture, and have good orchards, as well as good gardens in the neighbourhood of the Persian settlements. But altogether they are very poor.

A TELEGRAM, dated Isefjord, September 5, has been received in Stockholm, *viâ* Tromsö, from the Swedish Geological Expedition dispatched to Spitzbergen, according to which snow covered the island as early as August 30, and the members were thus compelled to discontinue their researches, and intended to sail for Beeren Island. The results of their labours are very important. All was well with the Meteorological Expedition at Smith's Observatory.

ANOTHER message, similarly conveyed, but dated August 24, has also been received from the Swedish Meteorological Expedition, from which it appears that observations commenced at Smith's Observatory on August 15, with the exception of the magnetical, which were delayed until the 21st, in consequence of the difficulty in firmly fixing the instruments. From August 15 to 21 the mean temperature and the readings of the barometer were respectively as follows:—15th, temp. +3·1° C., bar. 748; 16th, temp. +1·5° C., bar. 749; 17th, temp. +3·9° C., bar. 749; 18th, temp. +3·6° C., bar. 752; 19th, temp. +3·7° C., bar. 754; 20th, temp. +4·5° C., bar. 751; 21st, temp. +3·9° C., bar. 752. At mid-day of the 16th snow fell, while pools became covered with ice; the minimum temperature was +0·1° C. The weather had up to that date been dull with little rain. Wind being generally from west to east, with an average force of 1 (Beaufort's scale). There was little ice at sea, but the fact that four smacks had been frozen in in Storfjord caused the members some anxiety, as they were not quite prepared, as yet, to face the winter. As these four vessels have since got away, this will probably be the last message we shall obtain from the expedition this year.

OWING to the enormous quantities of drift-ice in the Kara Sea the steamer *A. E. Nordenskjöld*, bound for the Jenisei, has put back to Vardö. Capt. Johannesen states that he attempted four times—August 31, September 1, 7, 8—to penetrate Matoschkin Schar, and was compelled to turn back. He went up alongside Waigats Island into the Kara Strait, where he saw ice as far as 54° long., and would have been frozen in here, if the vessel had not possessed such powerful machinery.

HERR KARL PETTERSEN, of Tromsöe, has given the name of "Arktis" to a great land-mass which he maintains at one time extended between Norway, Novaya Zemlya, and Spitzbergen. His theory is based mainly on the existence of a submarine plateau which recent Norwegian expeditions have found in the region referred to. He also maintains that such a land-mass would account for the present geological and biological conditions of Norway and Spitzbergen, and that it extended to the conclusion of the Quaternary period.

PARTS 6 to 10 of the new edition of Balbi's "Allgemeine Erdbeschreibung" have been sent us by Hartleben of Vienna. The recasting of the work by Dr. Chavanne continues to be thoroughly carried out, and the illustrations and maps are very good.

DR. OTTO FINSCH, who for the last two and a half years has been travelling in Polynesia and Australia, under the auspices of the Berlin Academy of Sciences, may soon be expected home. A large part of his rich collections in all departments of natural science and ethnography, has already arrived in Berlin, and the rest is on the way. He has visited the Sandwich Islands, the Marshall group, where he stayed a long time, the Carolines and New Britain, New Zealand, Australia, and Tasmania. He stayed for a considerable time among the islands in Torres Straits, as well as on the south coast of New Guinea.

THE permanent Commission of the "Association Geodesque Européene," the object of which is to promote the measurement of the earth by General Bayer's system, has been meeting at the Hague under the presidency of the Spanish General Hanez. Representatives of France, Austria, Germany, Italy, Spain, Switzerland, Norway, Roumania, and Holland attended the first meeting, and were welcomed by the Dutch Foreign Minister, Mr. Rochussen. Prof. Oppolzer (Austria), who is the secretary of the deputation, gave the annual report of the Association. Several other members presented communications upon the geodesic work in their respective countries.

AN edition for 1882 of the "Handbook of Jamaica," the first issue of which we noticed at length, has been published. Several important alterations and additions have been made. Stanford is the London agent.

THE new number of the *Deutsche Geographische Blätter* of the Bremen Geographical Society, contains some long communications from the Brothers Krause, who have been wintering at Chilkoot, in North-west America. They give details concerning journeys which they made during the past winter and spring, in which, among other things, they obtained much information concerning the Chilkoot Indians. The number also contains an interesting lecture by Prof. Karl Möbius, on the influence of food supplies on the spread and migration of animals. Dr. Fr. Hirth has two communications:—On the Walls of the Towns of Kwang-tung, and on the Chinese Coast from the boundary of Annan to Tien-pai, from Chinese sources.

IN consequence of the very hot and dry weather experienced in Russia during this summer, the water has become very shallow in all rivers, so that navigation meets with great difficulties on the Volga and Northern Dwina.

WE regret to learn from a telegram received at Copenhagen from Vardöe that it is feared the Danish North Polar Expedition under Lieut. Hovgaard is already ice-bound on the coast of Novaya Zemlya. The Kara Sea was closed by ice in the middle of August. It will be remembered that Lieut. Hovgaard intended to make for Cape Chelzuskin, from which he was to make an attempt to force his way northwards.

## *UNWRITTEN HISTORY, AND HOW TO READ IT*[1]

IT has now for some years been the custom at the meetings of the British Association for the Advancement of Science, for one of its members to be deputed to deliver a lecture, not to his fellow-members, for whom in the ordinary programme an amply sufficient supply of mental food has been provided, but to the operative classes, in the town where the annual meeting happens to be held. Such a custom has much to commend it, for all alike—the rich and the poor, the worker with the head and the worker with the hand—are interested in the advancement of that science, or "natural knowledge," for the promotion of which this association, like its elder brother the Royal Society, was founded.

An occasion like the present, moreover, gives a good

[1] A lecture to the working classes, delivered at the meeting of the British Association for the advancement of science, held at Southampton, *August*, 1882, by John Evans, D.C.L., LL.D., F.R.S., &c. Revised by the Author.