

OUR ASTRONOMICAL COLUMN

THE TOTAL SOLAR ECLIPSE OF 1914, AUGUST 20-21.— There have been given in this column, at various times, particulars of the track of the central line in a number of the total eclipses of the sun that will occur during the next thirty years. To these may be added similar notes on the eclipse of August 20-21, 1914, which is a return of that of July 29, 1878, so extensively observed in the United States. The elements of this eclipse are very approximately as follow :—

G.M.T. of Conjunction in R.A. 1914, August 20, 23h. 55m. 3s.

R.A.	149 45 36.1
Moon's hourly motion in R.A. ...	33 7.5
Sun's " " " " " " " " " "	2 18.9
Moon's declination	13 9 42.2 N.
Sun's " " " " " " " " " "	12 19 29.1 N.
Moon's hourly motion in declination	15 16.0 S.
Sun's " " " " " " " " " "	49.7 S.
Moon's horizontal parallax	59 17.6
Sun's " " " " " " " " " "	8.7
Moon's geocentric semi-diameter ...	16 11.0
Sun's " " " " " " " " " "	15 51.1

Hence it will be found that the

Total eclipse begins in long.	120 42 W.,	lat. 71 21 N.
" " " " " " " " " "	2 0 E.,	" 70 42 N.
" " " " " " " " " "	70 26 E.,	" 23 52 N.

In traversing the European continent, the central line runs through the points

Long.	Lat.	Long.	Lat.
12 33 E.	65 48 N.	30 33 E.	50 35 N.
14 39 " "	64 32 " "	32 53 " "	48 2 " "
22 44 " "	58 23 " "	39 12 " "	41 23 " "
27 30 " "	53 48 " "	46 28 " "	34 52 " "

The first of these points is close upon the coast of Norway, at the Island of Alstahoug, and on making a direct calculation for it, the totality is found to commence at oh. 54m. 19s. local mean time, continuing 1m. 59s., with the sun at an altitude of 37°, and this will be about the most favourable position for observation.

THE MINOR PLANETS.—That part of the *Berliner Astronomisches Jahrbuch* for 1887, containing its speciality, the ephemerides of the small planets for 1885, has been issued in advance of the publication of the volume. There are approximate places for every twentieth day of 237 out of the 244 now known, with accurately calculated opposition-ephemerides of 19. The most reliable elements of the orbits of these bodies to No. 237 inclusive are appended. *Ethra* continues at a distance of less than 1.0 from the earth until February 11, and if the orbit had been more closely determined, would have afforded a favourable opportunity of applying the method of finding the solar parallax suggested by Prof. Galle, as the planet has been a ninth magnitude at this opposition. *Eva*, *Stephania*, and *Agathe*, also approach the earth during the present year, within her mean distance from the sun; on August 10 *Stephania* will be at a distance of only 0.76, magnitude 11½.

Ethra has the least perihelion distance of the group, 1.604, while *Andromache*, with a considerable excentricity, has the greatest aphelion distance, 4.726, so that the orbits of the 244 planets extend over a space of 3.122, the earth's mean distance from the sun being taken as unity. The longest period of revolution occurs in the case of *Hilda*; it is yet doubtful which has the shortest period; No. 149 *Medusa* is credited with it at present, but until this member of the group has been re-observed, the point is perhaps doubtful. The most recently detected planet appears to have the shortest revolution next to *Medusa*, judging from the elements in the last circular of the *Berliner Jahrbuch*.

THE BRIGHTNESS OF SATURN.—Dr. G. Müller, of the Observatory at Potsdam, notifies in a recent number of the *Astronomische Nachrichten*, that since the year 1878 he has made regular photometric observations on Saturn, the main result of which he states to be, that when the earth is at an elevation of 26° above the plane of the ring, the planet's light is 2.4 times greater than when the earth is in that plane, or, in other words, that the brightness of Saturn's rings, when the earth is 26° from

their plane, amounts to 58.3 per cent. of the brightness of the whole Saturnian system.

ENCKE'S COMET.—This comet appears to have been re-observed both in Europe and the United States; a somewhat doubtful observation by Dr. Tempel at Florence shows that the predicted elements will require probably but small correction. Taking aberration into account, the calculated position on December 13 differed from that observed, + 1.1 in right ascension, and + 1.2 in declination; the theoretical intensity of light on this date was 0.193. In 1852, when the perihelion passage occurred a week only later than in the present year, the comet was first observed on January 9, the intensity of light being 0.228.

GEOGRAPHICAL NOTES

THE lectures given under the auspices of the Paris Geographical Society last spring were so successful, that they are to be resumed this year. The first will be given by M. Janssen, on January 13, on the universal meridian. The others will be, by Prof. de Lapparent, on January 27, on the formation and development of the earth's crust; February 3, M. Bouquet de la Grye, the oceans; February 10, Dr. Hamy, man; March 3, M. Himly, the conquest of the globe; March 10, M. Lefasseur, the riches of the globe; March 24, M. Louis Simonin, the great lines of navigation; March 31, M. Michel, railways and their relation to geography. These lectures are not free even to members, the charge for the course to such being fifteen francs, and twenty francs to outsiders. Some of the lectures will be illustrated with projections on the screen, and the success of the enterprise is so assured that a third series has already been arranged for in 1886.

MR. H. H. JOHNSTON writes as follows to the *Times* :— "The Kilimanjaro Expedition which I have just undertaken has resulted in a pleasant and healthy sojourn in one of the most beautiful and interesting regions in the world. I arrived at the mountain in the beginning of June, and settled first in Mandara's territory, on the southern slopes. Here I built a small town of about twenty houses and passed four months in collecting and making numberless excursions right and left. The climate was that of a Devonshire summer, provisions were abundant, cheap, and of great variety, and I was only fearful lest this delightful region might become to me a Capua, and deter me from the more important work that awaited me at a higher level than could be attained within the limits of Mandara's kingdom. Accordingly, when I had received from the coast a reinforcement of hardier men, I established myself at a height of 11,000 feet, and here built an even larger village than my settlement at Moshi. This was on a splendid site. A mountain torrent dashed past our circle of pretty thatched cottages, which surmounted a grassy knoll above the stream; to the south of us spread a wondrous prospect of sun-lit plains and distant rivers—a veritable map of Eastern Africa—and to the north rose the unspeakably grand summits of the mountain mass—Kibö, a dazzling dome of virgin white, and Kimawenzi, a piebald peak of black, jagged rocks, seamed and flecked with snow. From this settlement I constantly ascended as far as I was able in one day's journey, but the difficulties which lay in the way of a complete ascent of either peak arose from the impossibility of inducing any of my followers to accompany me beyond 14,000 feet, for above this altitude they suffered so keenly from cold and mountain sickness that no persuasion or bribes would induce them to ascend any higher, far less to carry any of my impedimenta. Consequently, I could never get beyond a certain distance from the settlement, the cold not permitting me to risk the chance of being benighted in the snow. I reached, however, an altitude of 16,200 feet, a little more than 2000 feet from the summit of Kibö, (18,800 feet high). I found warm springs at 14,400 feet, detected no signs of glacial action, and was somewhat disappointed with the paucity of plants growing at the snow line. Birds were very rare above 10,000 feet, and very abundant below. Lizards and chameleons existed (and frogs also) up to the very snow. Hyraxes (the hyrax is the coney of Scripture) were common between 8000 and 13,000 feet, and I fancy are represented by a new species. Buffaloes and elephants ascended to 14,000 feet. The thunderstorms that frequently rage round the upper slopes of the mountain are terrific, and the wind at times is so violent that no one can keep their feet. The natives who