OLBERS' COMET.—The following ephemeris for Berlin midnight is in continuation of that given in NATURE, vol. xxxvii. p. 234:—

1888.	R.A. h. m. s.	Decl. ° ′	Log r.	Log Δ.	Brightness.
Jan. 22...	17 18 29 ...	3 49·6 S. ...	0·2866 ...	0·3932 ...	0·36
24...	17 21 39 ...	4 5·3			
26...	17 24 44 ...	4 20·4 ...	0·2958 ...	0·3948 ...	0·34
28...	17 27 44 ...	4 35·0			
30...	17 30 40 ...	4 49·2 ...	0·3048 ...	0·3961 ...	0·33
Feb. 1...	17 33 31 ...	5 3·0			
3...	17 36 17 ...	5 16·3 ...	0·3137 ...	0·3969 ...	0·31
5...	17 38 59 ...	5 29·2			
7...	17 41 36 ...	5 41·7 S. ...	0·3224 ...	0·3974 ...	0·30

The brightness on 1887 August 27 is taken as unity.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1888 *JANUARY* 22–28.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on January 22

Sun rises, 7h. 55m.; souths, 12h. 11m. 46·3s.; sets, 16h. 28m.: right asc. on meridian, 20h. 16·9m.; decl. 19° 44′ S. Sidereal Time at Sunset, 0h. 34m.

Moon (Full on January 28, 23h.) rises, 11h. 58m.; souths, 19h. 8m.; sets, 2h. 29m.*: right asc. on meridian, 3h. 14·6m.; decl. 12° 39′ N.

Planet.	Rises. h. m.	Souths. h. m.	Sets. h. m.	Right asc. and declination on meridian. h. m.	° ′
Mercury..	8 16 ...	12 24 ...	16 32 ...	20 29·3 ...	21 11 S.
Venus.....	5 7 ...	9 15 ...	13 23 ...	17 19·6 ...	21 7 S.
Mars.....	23 47*...	5 19 ...	10 51 ...	13 22·8 ...	6 13 S.
Jupiter....	3 35 ...	7 53 ...	12 11 ...	15 57·2 ...	19 33 S.
Saturn....	16 26*...	0 19 ...	8 12 ...	8 22·5 ...	19 56 N.
Uranus ...	23 29*...	5 1 ...	10 33 ...	13 4·6 ...	6 9 S.
Neptune..	11 56 ...	19 35 ...	3 14*...	3 41·8 ...	17 54 N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich).

Jan.	Star.	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image. ° °
23 ...	*f* Tauri ...	4 ...	1 19	near approach	51 —
26 ...	χ^3 Orionis	6 ...	0 36 ...	1 20 ...	178 258
26 ...	68 Orionis	6 ...	4 57	near approach	215 —
28 ...	B.A.C. 2683	6 ...	5 10	near approach	209 —

Jan.	h.	
22 ...	1 ...	Uranus stationary.
23 ...	14 ...	Saturn in opposition to the Sun.
24 ...	23 ...	Jupiter in conjunction with and 0° 8′ south of β^1 Scorpii.
28 ...	14 ...	Saturn in conjunction with and 1° 10′ north of the Moon.

Variable Stars.

Star.	R.A. h. m.	Decl. ° ′		h. m.	
U Cephei	0 52·4 ...	81 16 N. ...	Jan. 25,	21 20	*m*
Algol	3 0·9 ...	40 31 N. ...	,, 23,	20 37	*m*
S Aurigæ	5 19·7 ...	34 3 N. ...	,, 28,		*M*
R Canis Majoris...	7 14·5 ...	16 12 S. ...	,, 27,	20 36	*m*
			,, 28,	23 52	*m*
S Cancri	8 37·6 ..	19 26 N. ...	,, 28,	22 28	*m*
W Virginis	13 20·3 ...	2 48 S. ...	,, 26,	5 0	*m*
R Camelopardalis..	14 26·1 ...	84 20 N. ...	,, 25,		*M*
S Libræ	14 55·0 ...	8 4 S. ...	,, 22,	19 51	*m*
			,, 25,	3 42	*m*
U Ophiuchi... ...	17 10·9 ...	1 20 N. ...	,, 24,	3 4	*m*
		and at intervals of		20 8	
β Lyræ...	18 46·0 ...	33 14 N. ...	Jan. 25,	23 0	*m*
V Cygni	20 37·7 ...	47 45 N. ...	,, 22,		*M*
S Delphini	20 37·9 ...	16 41 N. ...	,, 24,		*M*
Y Cygni	20 47·6 ...	34 14 N. ...	,, 22,	20 40	*m*
			,, 25,	20 33	*m*
δ Cephei	22 25·0 ...	57 51 N. ...	,, 28,	0 0	*m*

M signifies maximum; *m* minimum.

Meteor-Showers.

	R.A. °	Decl. °	
Near ι Ursæ Majoris ...	133 ...	48 N.	
,, σ Leonis	167 ...	5 N. ...	Very swift.
,, α Coronæ Borealis	236 ...	25 N. ...	January 28. Very swift.

GEOGRAPHICAL NOTES.

DR. MEYER has been giving an account of his ascent of Kilimanjaro to the Berlin Geographical Society, and from the brief abstract which has appeared his statements are not quite consistent with those made in his letter already referred to. For one thing, Alpinists are doubtful if Dr. Meyer got so close to the summit by a thousand feet as he himself thinks he did; and moreover, from his own statements, his aneroid was quite untrustworthy.

A SPECIAL meeting of the Paris Geographical Society was held on Saturday, to welcome MM. Bonvalot, Capus, and Pepin, who have been journeying in Central Asia. We have already on several occasions referred to this journey, during which the travellers crossed the Pamir, but not for the first time, as they themselves seem to believe. So far it would appear as if the original results of this expedition were of no great value.

THE paper at Monday's meeting of the Royal Geographical Society was by a young engineer, Mr. W. J. Steains, on an exploration of the Rio Dôce and its northern tributaries (Brazil). The Rio Dôce has been in past years a classical region for research in natural history, but for many years it has been neglected. It flows through a region that has scarcely been touched by the influences of civilization, a region which is the home of the Botocudos, one of the most primitive people on the face of the earth. The Rio Dôce lies between parallels 19°–21° S. latitude, and is formed by several small streams springing from the eastern slope of an important range of mountains known by the name of the Serra da Mantiqueira. This range, running in a north-easterly direction, forms a portion of the irregular "coast-range" of Brazil, and forms, so to speak, the "retaining wall" of the series of elevated, undulating tablelands composing the greater portion of Central and Southern Brazil. The total length of the Rio Dôce is a little over 450 miles. That portion of the Rio Dôce basin lying east of the Serra dos Aymôres is a densely wooded lowland, sloping gradually towards the coast from an elevation of about 900 feet. Near the coast this plain resolves itself into a long stretch of low alluvial ground, studded for the most part with small shallow lakes that communicate with each other by means of long, narrow, winding streams, called "vallões." The largest of these lakes is the Lagôa Juparaná, which communicates with the Dôce some 30 miles above its mouth by means of a narrow, tortuous, deep channel 7 miles long. The lake is 18 miles long, and about 2½ miles broad at its southern extremity. It is very deep, and with the exception of some low alluvial ground at its northern and southern ends, is surrounded by high wooded bluffs, composed for the most part of reddish clay overlying a stratum of coarse red sandstone. At the head of the lake is a river—the S. José, which rises in the Serra dos Aymôres, and flows through an unexplored district, inhabited by wandering hordes of wild Botocudo Indians. Throughout the whole of its course, the S. José flows through dense forest abounding in the much sought-after "Jacarandá," or rosewood tree (*Bignonia cærulea*, Will.) The Botocudos number about 7000 people, and among some of the more savage tribes cannibalism still prevails. Mr. Steains stayed several weeks among these people, and is therefore able to add something to our knowledge of them. In appearance Mr. Steains states, the Botocudos can scarcely be called prepossessing. The average height is 5 feet 4 inches. Their chests are very broad, and this accounts for the facility with which they can bend their bows, which are exceedingly strong, being made out of the tough springy wood of the Ayri or Brijaubá palm (*Astrocaryum Ayri*, Mart.). The feet and hands of the Botocudos are small rather than delicate, and these are in fair proportion to their legs and arms, which are lean but muscular. Concerning the colour of their skin, these Indians are of all shades, some being of a dark reddish-brown, whilst others, and especially the women, are quite light. With regard to features, the Botocudos struck Mr. Steains, as they have done

others, as bearing a wonderful resemblance to the Chinese, and if, instead of wearing their hair cut round their heads so as to form a kind of mop, they wore pigtails, the casual observer would scarcely be able to tell where the difference lay. The hideous custom for which the Botocudos have always been so famous, viz. that of wearing huge lip- and ear-ornaments of wood, is fast dying out, and at the present time is only to be met with among some of the older members of the tribes, who retain all the habits and manners of their primitive forefathers intact.

THE January number of *Petermann's Mitteilungen* contains a paper by Count Pfeil, describing his journey last summer in East Africa, from Pangani along the Pangani River, south through Useguha to the Kingani River, and north to Bagamoyo. Dr. Henry Lange briefly describes the region watered by the Rio Tubarao and Rio Ararangua in Brazil. Dr. H. Fritsche contributes a series of astronomico-geographical and magnetic observations at thirty-one places in North-West Russia and North Germany in 1885-6-7, and Mr. S. Brooke gives a short acount of an excursion he made into the West Australian desert, starting from Israelite Bay on the south coast.

IN the January number of the *Scottish Geographical Magazine*, Mr. John Murray publishes the final results of his long research on the height of the land and the depth of the ocean. The paper consists mainly of a series of elaborate measurements giving the detailed data on which he founds his general conclusions. The conclusions to which Mr. Murray comes are of great interest, but they are too important to be stated in a note. The mean height of the land of the globe he estimates at 2252 feet. He finds that 84 per cent. of the land of the globe lies between the sea-level and a height of 6000 feet. The mean depth of the ocean again is 14,640 feet. In contrast with the land, only 42 per cent. of the waters of the ocean lie between the surface and a depth of 6000 feet; while 56 per cent. of the ocean waters are situated between depths of 6000 and 18,000 feet. The total area of the dry land Mr. Murray makes to be 55,000,000 square miles, while that of the ocean is 137,200,000 square miles. The bulk of the dry land above the sea is 23,450,000 cubic miles, and the volume of the waters of the ocean 323,800,000 cubic miles. The amount of matter carried from the land each year in suspension and solution, he estimates at 3·7 cubic miles; it would thus take 6,340,000 years to transport the whole of the solid land down to the sea. Should the whole of the solid land be reduced to one level under the ocean, then the surface of the earth would be covered by an ocean with a uniform depth of about two miles. The volume of the whole sphere, Mr. Murray estimates at 259,850,117,778 cubic miles. With the data now published should be compared Mr. Murray's Aberdeen lecture (NATURE, vol. xxxii. p. 581).

IN the last number of the *Comptes rendus* of the Paris Geographical Society, M. Chaffaujon gives a detailed narrative of his recent journey up the Orinoco. The section of greatest interest is that which relates to the upper course of the river, which M. Chaffaujon found to be all wrong on existing maps. This he has traced with much care. He examined also with care the outlet of the Casiquiare, by which the river is connected with the Rio Negro and the Amazons. He finds the bank of the river here to be mostly gravel, and in the rainy season the river coming down from the mountains with considerable force impinges against the bank, and forces a passage out. He states that the place of outlet seems to be shifting downwards every year.

THE TOTAL ECLIPSE OF THE MOON, JANUARY 28.

A TOTAL eclipse of the Moon offers some special advantages for the exact determination of the diameter and distance of our satellite. Observations of the bright limbs are exposed to considerable errors from the effect of irradiation, and liable to be affected by personal habit in the observer. The method of occultations has, under ordinary circumstances, proved scarcely more successful, owing chiefly to the fact that immersion and emersion so seldom take place under similar conditions. But in a total eclipse of the Moon, the disappearances and reappearances occur at limbs under similar illumination, and since the diminution of the Moon's light allows much fainter stars to be seen close to the Moon than can usually be observed, a much greater number of observations can be made than under ordinary conditions, and the effects of local irregularities of the Moon's circumference can be eliminated by observations made at a great number of points. If, then, as many Observatories as possible would combine to observe the occultations of the small stars passed over by the Moon during its eclipse, the labours of a few hours would give materials for a better determination of its diameter and parallax than could otherwise be obtained from the observations of many years. In view of these advantages, and noting too how hitherto they had been neglected by astronomers, Dr. Döllen, of Pulkowa, published a paper in the *Astronomische Nachrichten*, No. 2615, previous to the eclipse of October 4, 1884, in which he gave a catalogue of 116 stars which would be occulted during that eclipse, and begged for the co-operation of as many observers as possible. Unfortunately, the weather in many places was very unfavourable, and even where the sky was clear an unforeseen hindrance to observation was experienced in the unusual faintness of the eclipsed Moon. The part of the sky, too, through which it was passing was bare of stars above the 9th and 10th magnitudes. Still the results were sufficiently successful to encourage Prof. Struve and Dr. Döllen to repeat the attempt, especially as under several aspects the approaching eclipse of January 28 presents more favourable conditions than that of October 4, 1884: the magnitude of the eclipse will be somewhat larger, and the duration of the total phase a few minutes longer. Accordingly, Dr. Döllen has drawn up a catalogue of 300 stars which will be occulted, whilst Prof. Struve has computed by a graphical method the times of disappearance and reappearance, and the position-angles of the occulted stars, for 120 Observatories, which he has invited to co-operate with him in the work of observation. The experience gained during the 1884 eclipse has led Dr. Döllen to include only those stars occulted during the total phase or immediately before and after, but he has thought it well to give stars down to the 11th magnitude.

Of the 300 stars given in Dr. Döllen's catalogue, the majority of course will not be seen to be occulted from any part of this country. The following, however, may be observed here:—

No.	R.A.	Decl.	No.	R.A.	Decl.
87	130 25′·18	17 26′·95 N.	164	131 3′·87	17 26′·81 N.
91	27·98	35·12	165	3·96	25·64
93	28·70	35·57	166	4·48	32·90
97	29·14	45·66	172	6·26	17·96
98	29·53	37·64	180	10·35	32·80
100	30·08	38·14	181	12·61	38·34
102	30·18	23·95	190	16·58	12·54
108	34·21	44·27	192	18·52	44·17
110	35·90	30·12	194	19·26	38·34
112	36·51	47·21	197	21·11	19·06
114	130 37·43	17 19·16 N.	198	131 21·33	17 26·69 N.
115	37·44	47·07	201	23·15	37·63
116	37·89	48·54	207	24·96	26·65
124	40·69	49·34	209	25·71	22·85
125	40·76	18·56	210	26·11	30·07
126	41·76	30·46	212	28·48	17·66
128	43·50	34·10	216	30·76	17·96
130	45·17	45·27	219	31·77	8·64
134	48·24	42·16	221	32·45	35·77
136	49·50	45·96	223	32·58	26·14
138	130 50·10	17 26·35 N.	224	131 33·05	17 32·50 N.
142	54·18	18·36	225	33·65	22·31
144	54·71	35·17	226	33·71	13·84
148	56·91	38·34	233	37·74	9·24
150	57·53	22·75	236	39·74	21·26
152	57·97	28·93	237	40·51	30·82
153	59·04	22·95	242	43·43	17·36
155	59·88	15·96	247	48·32	24·55
156	131 0·48	36·32	248	48·44	11·24
157	0·75	39·91	251	49·29	9·44

The positions given are the apparent positions for January 28, 1888, and are expressed for R.A., as well as declination, in degrees, minutes of a degree, and hundredths of a minute.

The following are the times of disappearance and reappearance as furnished by Prof. Struve for the stars which will be occulted