shorter than the preceding one by 0·0004s. The corrected elements of the star will therefore be as follows :—

1884 January 1, oh. 54m. 43·6s. Paris M.T. + 20h. 7m. 41·6s. (E − 1070) − 0·0002s. E.

THE NEW ALGOL-VARIABLE, Y CYGNI.—In the same number of *Gould's Astronomical Journal* Mr. Sawyer states that he has obtained observations of this star which render it probable that the true period is 1d. 12h. ±, or half the period which Mr. Chandler had adopted for it (see NATURE, vol. xxxvi. p. 377).

OLBERS' COMET, 1887.—The following ephemeris is in continuation of that given in NATURE, vol. xxxvi. p. 588 :—

Ephemeris for Berlin Midnight.

1887.	R.A. h. m. s.	Decl. ° ′	Log r.	Log Δ.	Brightness.
Nov. 11	14 24 15	13 59·0 N.	0·1152	0·3037	1·20
13	14 31 8	13 15·0			
15	14 37 51	12 31·6	0·1232	0·3098	1·12
17	14 44 25	11 48·9			
19	14 50 51	11 6·7	0·1317	0·3162	1·05
21	14 57 9	10 25·3			
23	15 3 18	9 44·7	0·1406	0·3226	0·98
25	15 9 20	9 5·0·0			
27	15 15 12	8 26·0 N.	0·1499	0·3291	0·91

The brightness on August 27 is taken as unity.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 *NOVEMBER* 13–19.

(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 November 13

Sun rises, 7h. 16m. ; souths, 11h. 44m. 23·6s. ; sets, 16h. 12m. : right asc. on meridian, 15h. 13·5m. ; decl. 17° 58′ S. Sidereal Time at Sunset, 19h. 42m.

Moon (New on November 15, 8h.) rises, 4h. 13m. ; souths, 10h. 6m. ; sets, 15h. 46m. : right asc. on meridian, 13h. 34·4m. ; decl. 4° 48′ S.

Planet.	Rises. h. m.	Souths. h. m.	Sets. h. m.	Right asc. and declination on meridian. h. m.	° ′
Mercury..	8 16 ...	12 23 ...	16 30 ...	15 52·4 ...	21 13 S.
Venus.....	2 56 ...	8 52 ...	14 48 ...	12 20·9 ...	1 39 S.
Mars.....	1 12 ...	7 48 ...	14 24 ...	11 16·3 ...	6 30 N.
Jupiter....	6 52 ...	11 31 ...	16 10 ...	15 0·5 ...	16 10 S.
Saturn....	21 21*...	5 8 ...	12 55 ...	8 36·0 ...	18 59 N.
Uranus ...	3 52 ...	9 28 ...	15 4 ...	12 56·8 ...	5 23 S.
Neptune..	16 40*...	0 21 ..	8 2 ...	3 48·3 ...	18 13 N.

* Indicates that the rising is that of the preceding evening.

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

Nov.	Star.	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image. ° °
18 ...	33 Sagittarii	... 5	... 16 23	... 16 50	... 38 1
18 ...	ξ^2 Sagittarii	... 4	... 18 2	... 19 5	... 103 330

Nov.	h.	
17	19	... Mercury in inferior conjunction with the Sun.
18	7	... Saturn stationary.

Variable Stars.

Star.	R.A. h. m.	Decl. ° ′		h. m.	
U Cephei	0 52·3	81 16 N.	... Nov. 17,	2 8	*m*
Algol	3 0·8	40 31 N.	... ,, 16,	1 3	*m*
			,, 18,	21 52	*m*
S Cancri	8 37·5	19 26 N.	... ,, 14,	1 26	*m*
R Virginis	12 32·8	7 37 N.	... ,, 14,		*M*
U Ophiuchi... ...	17 10·8	1 20 N.	... ,, 13,	0 3	*m*
		and at intervals of		20 8	
β Lyræ...	18 45·9	33 14 N.	... Nov. 15,	19 0	m_2
			,, 19,	0 0	*M*
R Lyræ	18 51·9	43 48 N.	... ,, 16,		*m*
δ Cephei	22 25·0	57 50 N.	... ,, 13,	21 0	*m*

M signifies maximum ; *m* minimum ; m_2 secondary minimum.

Meteor-Showers.

	R.A.	Decl.	
	°	°	
From Lynx	125	40 N.	... Swift ; streaks.
Near κ Leonis	142	27 N.	... Very swift.
Near θ Ursæ Majoris.	143	49 N.	... Very swift.
The Leonids	149	22 N.	... Swift ; streaks.
Near ξ Ursæ Majoris.	166	32 N.	... Swift ; streaks.

GEOGRAPHICAL NOTES.

THE November number of the *Scottish Geographical Magazine* contains an admirable paper by Mr. John Murray, on "Some Recent Deep-sea Observations in the Indian Ocean." Mr. W. W. Blair, C.E., contributes a useful paper on the "Cold Lakes of New Zealand." Prof. Mohn sends a list of the highest peaks in Northern Europe, with their heights from the latest determinations. They are, with heights in feet :—Galdhoppigen, South Norway, 8399 ; Glitter Tind, 8379 ; Snehætten, 7566 ; Oræfajökull, 6427 ; Sulitelma, Northern Norway, 6178 ; Petermann's Spitze, East Greenland, 11,418 ; Beerenberg, Jan Mayen, 8350 ; Mount Misery, Bear Island, 1785 ; Hornsund Tind, Spitzbergen, 4560 ; Richthofen Mount, Franz Josef Land, 5184. Of these mountains two are volcanic, Oræfajökull and Beerenberg.

THE new number (9) of the *Mittheilungen* of the Vienna Geographical Society contains a summary of our knowledge of the physical geography of the East Asiatic waters (the Western Pacific and its offshoots)—currents, temperatures, &c.—by Lieut. Adolf Glockner.

IN the September number of the *Bulletin* of the American Geographical Society, Mr. R. E. Peary gives a detailed account of his journey, in the summer and autumn of last year, into the interior of Greenland. He entered in the neighbourhood of Disco Island, considerably further north than the starting-point chosen by Nordenskjöld for his expedition. Mr. Peary's experiences were somewhat similar to those of Nordenskjöld. His course throughout the journey was due east. He only reached 100 miles from the edge of the ice-blink or interior ice, his highest elevation being 7525 feet. Mr. Peary sums up his observations of the character of the interior ice. The coast-line shows a great diversity of features, dependent upon the altitude, the season, and the elevation and configuration of the adjacent mountains. Whenever the ice projects down a valley in a long tongue or stream, the edges contract and shrink away from the warmer rocks on each side, leaving a deep cañon between, usually occupied by a glacier ; and the upper surfaces, disintegrated by the reflected heat from the mountains above, and shattered by the daily change of temperature more perhaps than by the forward flow, presents a chaotic labyrinth of crevasses, gullies, and rugged pinnacles, increasing in magnitude in direct proportion to the length of the tongue and its approach to the sea-level. As to the features of the interior beyond the coast-line, the surface of the "ice-blink" near the margin is a succession of rounded hummocks, steepest and highest on their landward sides, which are sometimes precipitous. Further in these hummocks merge into long flat swells, which in turn decrease in height towards the interior, until at last a flat gently rising plain is reached, which doubtless becomes ultimately level. In passing from the margin of the ice-blink to the remote interior, from one to five distinct zones may be noted, the number and width varying with the season, the latitude, and the elevation. In winter the entire surface is undoubtedly covered with a deep unbroken layer of fine dry snow. Late in the spring the warmth of the sun at midday softens the surface of the snow, along the land borders of the ice, and this freezes at night, forming a light crust. Gradually this crust extends up the interior, and with the advance of the season the snow along the border of the "ice-blink" becomes saturated with water. A little later the zone of slush follows the zone of crust into the interior, the snow along the border of the ice-blink melts entirely, forming pools in the depressions, and streams which cut deep gullies in the ice ; water-cavities form ; old crevasses open, and new ones appear. This zone rapidly widens, and extends into the interior in the footsteps of the others, and behind it the immediate border of the ice gets ragged and soiled ; pebbles, boulders, and moraines crop out of its melting surface, and by the end of the Arctic summer it is disintegrated and shattered by the heat, and eroded by the streams, into impassable roughness. Mr. Peary

gives some useful hints as to the best modes of travel over the ice, which, if followed, he believes would without any difficulty take the explorer to the east coast.

In Heft 3 of this year's *Deutsche Geographische Blätter* will be found the first part of a detailed study of the Schwarzwald by Prof. Platz, of Carlsruhe. It deals with the orography and geology.

The Portuguese explorer, Jose Anchieta, is at present in the Quinsumbo region of the Portuguese West African territory, on his way to Bihe. He intends to investigate the flora of the region, which has never been adequately studied.

In the Danish Budget for 1888–89 a sum of 68,000 kroner has been allotted for research in Icelandic waters. Several large fjords of great commercial importance are entirely unexplored, and are therefore full of danger to navigation. The fishery grounds around the various islands will also be investigated. This exploration will have great interest for science, as it is likely to accumulate much valuable information in oceanography, as well as zoology and meteorology. The work will be carried on freely from May to August, and it is hoped will be completed in five or six years.

The Roman Catholic missionaries on Yule Island have been exploring the region of New Guinea opposite their station. They found that the Ethel and Helida are insignificant streams; but they discovered a new river, the St. Joseph, which rises at the foot of Mount Yule in 8° 15′ S. lat. and 146° 40′ E., and which flows in a southerly direction. The land on both sides is highly fertile and the natives peaceful. They visited fifteen villages, several with a population of over 2000.

In a paper in the last-issued *Bulletin* (vol. ii. No. 6) of the Californian Academy of Sciences, Mr. George Davidson gives some interesting information on submarine valleys off the Pacific coast of the United States. He points out that within 40 or 50 miles of the coast to the south of Cape Mendocino the plateau of the Pacific reaches a depth of 2000 to 2400 fathoms. Generally there is a marginal plateau for 10 miles out to the 100-fathom curve, and then the descent is sharp to 500 or 600 fathoms. In this marginal plateau there has been discovered by the Coast Survey several remarkable submarine valleys. Notably that in Monterey Bay, heading to the low lands at the great bend of Salinas River; and that off Point Hueneme at the eastern entrance of the Santa Barbara Channel, and heading into the low coast at the wide opening of the Santa Clara Valley. Then there are one or two off the southern point of Carmel Bay, while the deepest one enters far into the bay. The latest discovered submarine valleys are near the high bold coast under Cape Mendocino. Just north of a submarine ridge extending from Point Delgada to Shelter Cove is a deep valley which breaks through the marginal plateau and runs sharply into the immediate coast-line under the culminating point of the crest-line of mountains. The head of this submarine valley is 100 fathoms deep at 1¼ mile from shore; when it breaks through the 100-fathom line of the marginal plateau it reaches a depth of 400 fathoms. The slopes of the valley are very steep. Midway between this and Point Garda there is another valley 300 to 150 fathoms deep. The opening of this valley through the outer edge of the 100-fathom plateau is 520 fathoms deep. Between Point Garda and Cape Mendocino is another valley, which, 6½ miles south-west by south from the cape, is 450 fathoms deep. This is a wide valley, the bottom of which is green mud, though in two places, at depths of 320 fathoms, broken shells were brought up with gravel.

By the latest communication from Mr. Stanley's expedition it is evident that, unless some unexpected disaster has happened, he reached Emin Pasha some time in August. He found the Mabodi country, through which the Aruwimi flows, densely inhabited, while that river on the borders of the Mabodi country bends south, and again becomes navigable. This seems clearly to show that the Aruwimi can have no connection with the Wellé system.

The last number of the *Izvestia* of the Russian Geographical Society (1887, 3rd fascicule) will be most welcome to geographers. It contains a preliminary map (70 miles to an inch) of the eastern parts of East Turkestan, Tsaidam, and the upper parts of the Yellow and Blue Rivers, embodying the results of the fourth journey of General Przewalski in Central Asia. The most interesting feature of the map is that it shows that the depression of the Lob-nor must not be confounded with the Eastern Gobi. This last is more elevated, and falls by a steep terrace towards the depression of the Lob nor, which has in the east of the lake a width of only 80 miles, and terminates at Lake Tchin-jen-he, where the desert reaches altitudes of 3700 and 4800 feet above the sea. The Tarim depression is thus well limited in the east, and the doubts which arose among geographers as to the possibility of embodying the Eastern Gobi and the Tarim depression under the same denomination of Hang-hai, as proposed by Richthofen, are thus settled. The well-known difference of characters of the two regions depends upon the differences of their orographical structures, and the Tarim region appears as a depression of the high plateau of East Asia, limited in the east as well as in the north, the west, and the south. Geographers will find on the map the series of chains named after Colombus, Marco Polo, Humboldt, and Ritter, discovered by General Przewalski; the high range to which the Russian Geographical Society gave the name of its Russian discoverer; the Burkhanbuda range; the lakes Jarin and Orin, 14,000 feet high, of the upper Hoang-ho; and all those minor features which, when mentioned in M. Przewalski's letters, excited so much interest among geographers. A list of sixteen places, the latitudes and partly the longitudes of which have been determined, and a list of ninety-five altitudes, accompany the map.

In a short note accompanying the above map, General Przewalski mentions certain facts brought to light during the last three months of his journey. The Khotan-daria of East Turkestan does not make a bend towards the west, as shown on several recent maps. It flows due north through a sandy desert, and its course on Klaproth's and D'Anville's maps was more in accordance with reality than the indications on more modern maps. Its water reaches the Tarim only during the summer. A new oasis, Tavek-kel, grew up some fifty years ago on the Yurun-kash; its population numbers about 500 families. The lake Yashil-kul does not exist where it is shown on our maps. The most important statement is, however, the following. By *the beginning of October 1885*—that is, at low water—the Tarim had, at the confluence of the Yarkand and Khotan Rivers, a depth of 3 to 5 feet, and a width of about 185 yards. In the summer, according to information obtained from the natives, and confirmed by the state of the river-bed, the depth and width of the Tarim are thrice the above. Taking into consideration the fact that the lower Tarim, followed by M. Przewalski in 1876 and 1877, has throughout a depth of no less than 14 feet, it may be maintained, M. Przewalski writes, that the Tarim is navigable for steamers on its whole length from the above junction to the Lob-nor. It seems probable also that steamers may be able to ascend a short distance up the Aksu River and further up the Yarkand-daria.

The same number of the *Izvestia* contains an elaborate paper by M. A. Eliséeff embodying the ethnological results of his journeys in Asia Minor since 1881. In this paper there are able descriptions of the various populations of Asia Minor—the Turks, the Armenians, the Kurds, the Kurmanjis, the Greeks, the Arabs, the Chaldæans, the Tsiganes, and the Jews. The numerous anthropological measurements and other observations which the author made during his journeys in the interior of the country will be published separately in full. Two papers, on the Manych and the steppes of Northern Caucasus, by D. Ivanoff, and on the vegetation and geology of the same, by W. Fausek, are valuable contributions towards a better knowledge of the nature of this interesting region.

METEOROLOGICAL NOTES.

Symons's Monthly Meteorological Magazine for October contains a fifth annual table of the climate of the British Empire, giving a summary of the daily observations at sixteen stations, distributed over the globe, for the year 1886. The extremes show some very interesting facts, from which we select the following:—Adelaide has the highest maximum temperature in the shade, viz. 112°·4; the highest temperature in the sun, 174°·5; the least rainfall, 14·42 inches; and the lowest humidity, 56 per cent. Winnipeg has the lowest shade temperature, −44°·6; the greatest annual range, 147°·6; and the lowest mean daily temperature, 33°·2. Colombo (Ceylon) has the highest mean daily temperature, 81°·0. Bombay has the greatest rainfall, 99·74 inches. London occupies the unenviable position of the dampest station, 80 per cent. The same magazine contains a discussion of the severe thunderstorm which visited London on