

that the most probable period is one of 1d. 11h. 59m., or if not that, 20h. 34m., or possibly 18h. 6m. The following table shows that the shorter the period of the variable, the higher is the ratio which the period of oscillation bears to it. In the present star the oscillation probably occupies about six hours; a period so great as three days or much shorter than one day would make it, therefore, an exception to the rule followed by the other seven stars of the same order.

Star	Period h.	Oscillation h.	Ratio
U Ophiuchi ...	20·13	5·0	0·248
δ Libræ ...	55·85	12·0	0·214
U Cephei ...	59·82	10·0	0·167
Algol ...	68·81	9·15	0·134
U Coronæ ...	82·85	9·75	0·118
λ Tauri ...	94·87	10·0	0·105
S Cancrī ...	227·63	21·5	0·094

The variable was discovered by Mr. Chandler and not by Dr. Gould as at first reported.

Mr. Espin, in Circular No. 12 of the Liverpool Astronomical Society, notes the variability of a star om. 35s. *p* and 0° 8' *n* of θ^r Tauri. It is probably a variable of long period ranging from 9 m. ± to below 12 m. Its place for 1885·0 is R.A. 4h. 21m. 25s., Decl. 15° 50'·7 N.

THE WASHINGTON OBSERVATORY.—The Annual Report of the U.S. Naval Observatory, dated October 30, 1886, has recently been issued. Commodore G. E. Belknap, who was Superintendent of the Observatory at the date of the last Report, retired from that post on June 7, and was succeeded by Commander Allan D. Brown, who therefore is the writer of the Report now before us. In connection with the Chronometer and Time-Service Department, under Lieut. S. C. Paine, it is remarked that the time-service continues to increase in popularity, and its usefulness is daily becoming more apparent to the public. The time-balls that have been established have been much appreciated, and are of great value to the shipping and commercial interests. Much attention appears also to have been given to the chronometer trials, it evidently being the desire of the Observatory to afford makers every assistance in its power in obtaining data that will tend to the improvement of chronometers. The 26-inch refractor, in charge of Prof. Asaph Hall, has been used in observations of satellites, of double stars, and of Saturn. Observations of stellar parallax have also been made. The reduction of the observations of Iapetus and of the six inner satellites of Saturn, as well as those for stellar parallax, have been completed, and the results published. The transit-circle has been employed in observations of stars of the American ephemeris, of the sun, moon, and planets, and such miscellaneous stars as were necessary to complete the data for the proposed transit-circle Catalogue. The whole number of observations since the last Report has been 5180. The reductions have also been proceeded with as rapidly as possible. The instrument remains in charge of Prof. J. R. Eastman. Photographs of the sun have been taken with the photo-heliographic apparatus lately belonging to the Transit of Venus Commission, whenever practicable. The work was commenced on January 11, 1886; and up to and including September 30, 1886, there have been obtained ninety-eight negatives showing spots on the sun's surface. Hitherto no photographs have been taken, except when the sun showed spots on his disk, and then one only near noon. This work has been intrusted to Ensign A. G. Winterhalter, who hopes that in the future the number of photographs in a given period will be considerably increased, better arrangements having been made for securing them between 10 a.m. and 2 p.m.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 JANUARY 30—FEBRUARY 5

(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 30

Sun rises, 7h. 44m.; souths, 12h. 13m. 31·8s.; sets, 16h. 43m.; decl. on meridian, 17° 39' S.: Sidereal Time at Sunset, 1h. 21m.

Moon (at First Quarter on February 1) rises, 10h. 23m.; souths, 16h. 50m.; sets, 23h. 27m.; decl. on meridian, 4° 40' N.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian
Mercury ...	7 46	11 55	16 4	20 56 S.
Venus ...	8 25	13 11	17 57	14 51 S.
Mars ...	8 31	13 29	18 27	12 40 S.
Jupiter... ..	0 35	5 37	10 39	12 3 S.
Saturn... ..	14 29	22 36	6 43*	22 11 N.

* Indicates that the setting is that of the following morning.

Ocultations of Stars by the Moon (visible at Greenwich)

Jan.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image
30 ...	ν Piscium	4½	21 24	22 15	185 289°
Feb.					
3 ...	48 Tauri	6	1 15	2 9	150 300
3 ...	B.A.C. 1526	6	18 26	19 24	122 233

Variable Stars

Star	R.A.	Decl.	h. m.
R Andromedæ ...	0 18·1	37 57 N.	Jan. 31, 0 0 <i>m</i>
U Cephei ...	0 52·3	81 16 N.	„ 31, 22 0 <i>m</i>
			Feb. 5, 21 39 <i>m</i>
Algol ...	3 0·8	40 31 N.	„ 5, 4 23 <i>m</i>
ζ Geminorum ...	6 57·4	20 44 N.	„ 3, 0 0 <i>M</i>
δ Libræ ...	14 54·9	8 4 S.	„ 3, 1 49 <i>m</i>
S Serpentis ...	15 16·4	14 43 N.	„ 4, 1 0 <i>M</i>
U Ophiuchi... ..	17 10·8	1 20 N.	Jan. 30, 4 16 <i>m</i>
			and at intervals of 20 8
β Lyræ... ..	18 45·9	33 14 N.	Feb. 4, 19 0 <i>m</i> ₂
δ Cephei ...	22 25·0	57 50 N.	„ 4, 1 0 <i>M</i>

M signifies maximum; *m* minimum; *m*₂ secondary minimum.

GEOGRAPHICAL NOTES

IN connection with Major Macgregor's paper on his journey from Upper Assam to the Irrawadi, read at a recent meeting of the Royal Geographical Society, and printed in the new number of the Proceedings, Dr. G. Watt made some valuable remarks on his own observations in the Manipur district. Manipur is a small valley surrounded by mountain-ranges, and in this valley the rainfall was found to be only about 39 inches, but seventeen miles off, in the mountains which formed the north-east ranges, the rainfall was as much as 120 inches, and towards the Naga country to the north it became greater and greater in certain limited tracts. In the Khasia Hills 600 inches might fall in one place, and twenty miles off only 50 inches. Nothing in Manipur struck Dr. Watt so much, as a botanist, as the remarkable transitions of vegetation in that small region. Dr. Watt gathered twelve or more species of oaks, many of which were new to science, and ten or twelve species of rhododendrons, in Manipur alone. The *Rhododendron Falconeri*, found in the Naga Hills by Sir Joseph Hooker, is nowhere met with in the immense tract between the Naga Hills and Sikkim. This and the epiphytic *R. Dalhousie*, which grows on a hill thirty miles north of Darjeeling, Dr. Watt found in the Naga Hills at an altitude of 6000 to 8000 feet, and these rhododendrons never occur in Sikkim below 10,000 to 13,000 feet. There were many instances of plants falling in their altitude as the traveller passed to the east and south-east from Sikkim, until at Moulmein a rhododendron was found growing near the sea, a circumstance which was not met with in any other part of Asia. There is something in that region which, apart from pure geography, is of vital interest. Sarameti, which is under 13,000 feet high, the natives said, had snow all the year round, whereas on the Himalayas the lowest point at which snow occurs is 17,000 feet. In Manipur, the whole valley, 3000 feet high, was covered with hoar-frost in December. Dr. Watt thought this was a point that should be thoroughly investigated: what is the cause of this falling in altitude in the vegetation? General Strachey, who was in the chair, considered that the peculiarities of the vegetation of Manipur compared with Assam were connected with the evident lowering of temperature indicated by the low snow-line. There could be no doubt that the warm currents of air coming up the valleys of the Irrawadi and the Salween and meeting the snowy mountains to the north produced an enormous precipitation of rain, which during winter fell as snow. The consequence seemed to be that there was snow there at a very much lower level than in the mountains further to the north. That an immense quantity of rain fell in the upper portions of the valley of the

Irrawadi there could be no question. Such a rainfall seemed in itself quite sufficient to account for the large volume of water that was drained off by the lower portions of the Irrawadi; and anybody who knew what Tibet was, General Strachey stated, must be aware that, even with a course of several hundred miles, the river would pick up but a small quantity of water in comparison with the enormous volumes which were collected from the rain which fell in Upper Burmah. General Strachey had roughly calculated that a monthly fall of rain of 18 inches over a square degree would mean 65,000 cubic feet per second for the whole month.

THE latest news from Dr. Bunge, chief of the Russian Polar Station at the mouth of the Lena, is encouraging. Telegraphing from Orkinga, a telegraph-station on the road to Yakutsk, Dr. Bunge informs the Academy of Sciences at St. Petersburg that his expedition has had a successful issue. They passed the summer in two islands of the New Siberia Archipelago; Bunge on Great Liakovsky, and Toll on Kotelnoy Island. During spring all the five islands of the group were explored, New Siberia especially by Toll. The mainland was reached at the end of October. The scientific results are very considerable, and, as we know so little about these islands, are likely to be novel.

MM. POTANIN, SKASSY, AND BÉRÉSOFSKY have lately returned from their expedition to China and Mongolia, bringing numerous collections in anthropology, zoology, and botany, besides maps of the country which they have traversed during their three years' journey (1884-86). The Russian Geographical Society has nominated a committee, consisting of MM. Stebnitsky, Tillo, Mushketoff, and Schmidt, to make inquiries as to the desiccation of Siberian lakes. It is expected that an expedition will be despatched to investigate the subject on the spot.

WE learn that the geographical results achieved by the Survey officers on the Afghan Frontier Commission extend over 100,000 square miles of country. The Indian Survey officers have been very busy in Upper Burmah. Captain Hobson's map, prepared from all available sources, in 14 sheets, is all published already. A reduction therefrom, on the scale of 16 miles to an inch, has been prepared in the Surveyer-General's Office, Calcutta, and published also. The Survey party, which has lately completed the Andaman Islands survey, left Calcutta on November 19, under the charge of Major G. Strahan, R.E., to undertake the survey of the Nicobar Islands.

THE ESKIMO

SPECIAL interest attaches to a paper on "The East Greenlanders in their relations to the other Eskimo Tribes," contributed by Dr. H. Rink to the current number of the *Deutsche Geographische Blätter* (Bremen, 1886). Hitherto these hyperboreans have been studied by independent observers, chiefly in Alaska at the eastern, and in Greenland and Labrador at the western extremity of their domain, while through lack of sufficient materials the intermediate branches thinly scattered round the Arctic shores from the Mackenzie to Baffin Bay have been mostly neglected. Here, however, we have for the first time a comprehensive ethnological survey of the whole field; by perhaps the greatest living authority on the subject, based on the rich collections recently brought to Europe by Capt. Holm from East Greenland, by the brothers Krause and A. Jakobsen from Alaska, and by F. Boas from the central region of Baffin Land.

With these materials before him, and keeping in view the facts already determined by previous students, Dr. Rink is able to throw much light, if not on the origin, at least on the general line of dispersion, and still more on the social evolution and art history, of the Eskimo race. He makes it sufficiently evident that their primeval home must be placed in the extreme north-west, on the Alaskan shores of the Bering Sea, where they probably acquired a knowledge of some of the useful industries connected with navigation, fishing, and hunting from the neighbouring Indian tribes of Athabascan stock. From this point the migratory movement appears to have been partly across the neck of the Alaskan Peninsula to the Copper River, where their further progress in this direction was arrested by the Thlinkit Indians on the coast and by the Athabascans in the interior. But their wanderings were chiefly directed towards the north and east, that is, along "the line of least resistance" around

the unoccupied Arctic seaboard down to Baffin Bay, which seems to have formed a fresh point of dispersion, southwards to Labrador and eastwards to East and West Greenland. Dr. Rink is inclined to accept the view of Capt. Holm, that the Angmagsaliks, or East Greenlanders, found their way round the unexplored north coast of Greenland to their present homes, and that the West Greenlanders passed from Baffin Bay directly southwards, while a mixed race, most probably including old Norse elements, was developed at the southern extremity of the peninsula. In the extreme west there has also been a slight intermingling, with Thlinkits about the Copper River, and with Athabascans, back of Kotzebue Sound; but elsewhere the Innuitt and Karalik (Western and Eastern Eskimo) have kept entirely aloof, nowhere amalgamating with the Red Man, and keeping mainly to the seaboard throughout the whole extent of their domain, which, between the Copper River and Cape Farewell, Greenland, cannot be estimated at less than 7000 miles in extent, although scarcely anywhere exceeding 150 miles inland from the coast. This explains the curious fact that the social organisation of the Indian tribes in families, gentes, phratries, confederacies, and nations can nowhere be detected amongst the Eskimo, unless to it is to be attributed a certain restriction in the choice of a wife, and an obligation to lend each other mutual aid, universally recognised amongst all branches of the race. Even the general distribution into tribes, assumed by most writers, appears to be quite groundless, and the final syllable, *miüt*, *miüt*, of the so-called tribal names, meaning "dweller," "inhabitant of," shows that they are purely *topographical* terms without any ethnical significance whatsoever. Thus, Angmagsalingmiüt, Mahlemiüt, Aglemiüt = inhabitants of the *Angmagsalik*, *Mahle*, *Agle* districts, and so on; so much so, that a family migrating from one of these districts to another changes its name accordingly. Hence Dr. Rink considers it sufficient for all practical purposes to class the whole race into the following seven *geographical* groups:—(1) South Alaskan; (2) North Alaskan; (3) Mackenzie; (4) Central (Baffin Land, &c.); (5) Labrador; (6 and 7) West and East Greenland. Between these various groups there certainly exist differences, by which they may often be readily distinguished; but these are mainly of a social and linguistic, and to a less extent of a physical character; and such is the great uniformity even in the structure of the Eskimo tongue, that an East Greenland and an Alaskan, if fortuitously thrown together, would soon begin to understand one another. It is noteworthy that in Greenland, where the language has been most carefully studied, greater differences are observed between the eastern and western than between the northern and southern dialects—a circumstance doubtless due to the different routes followed by the two streams of immigration from the central region. Compared with the West Greenland dialect, taken as the written standard, the Labrador is found to contain 15, the Central 20, the Mackenzie 31, and the Alaskan 53 per cent. of different root-words—relations which correspond remarkably well with the conclusions arrived at, on other grounds, regarding the general migratory movement from Alaska, the assumed cradle of the race.

But here an important exception is formed by the Aleutian Islanders, who are treated by Dr. Rink as a branch of the Eskimo family, but whose language diverges profoundly from, or rather shows no perceptible affinity at all to, the Eskimo. The old question respecting the ethnical affinities of the Aleutians is thus again raised, but not further discussed by our author. To say that they must be regarded as "ein abnormer Seitenzweig," merely avoids the difficulty, while perhaps obscuring or misstating the true relations altogether. For these islanders should possibly be regarded, not as "an abnormal offshoot," but as the original stock from which the Eskimos themselves have diverged. It is remarkable that in his new work on "Alaska and the Seal Islands" Henry W. Elliott discovers a striking resemblance between the Aleutians and the Japanese. They constantly remind him of "Japanese faces and forms in another costume," so much so that in his opinion they form "a perfect link of gradation," not between the Eskimo and Red Man, nor between the Eskimo and Asiatic hyperboreans, but "between the Japanese and Eskimo" (p. 173). Mr. Elliott may have here unconsciously hit upon the solution of a very interesting ethnological problem, for in his "Classification of the Varieties of the Human Species" (*Journal of the Anthropological Institute*, May 1885), Prof. Flower also connects the Eskimo with the Japanese:—"Every special characteristic which distinguishes a Japanese from the average of mankind is seen in