

issued by Messrs. Palmer and Howe, of Manchester. It is called the *Chemical Trade Journal*, and is edited by Mr. George E. Davis. Two numbers have already appeared.

THE additions to the Zoological Society's Gardens during the past week include two Egyptian Jerboas (*Dipus aegyptius*) from Egypt, a Moorish Toad (*Bufo mauritanica*) from Tunis, presented by the Hon. Terence Bourke; a White-crowned Pigeon (*Columba leucocephala*) from the West Indies, presented by Lieut.-Colonel W. G. Dawkins; a Common Trumpeter (*Psophia crepitans*) from Demerara, presented by Mr. G. H. Hawtayne; a Crowned Horned Lizard (*Phrynosoma coronatum*) from Texas, presented by Mr. Claude A. Millard; two Egyptian Jerboas (*Dipus aegyptius*) from Egypt, deposited; two Cape Sparrows (*Passer arcuatus*), four Alario Finches (*Alario alario*), from South Africa, purchased; a Wapiti Deer (*Cervus canadensis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

COMET 1887 *ε* (BARNARD, MAY 12).—Dr. H. Oppenheim supplies the following improved elements for this comet in Dun Echt Circular No. 147:—

T = 1887 June 17^h 22^m 09^s Berlin M. T.

$$\left. \begin{aligned} \pi - \Omega &= 15^\circ 40' 19'' \\ \Omega &= 245^\circ 13' 1'' \\ i &= 17^\circ 31' 52'' \end{aligned} \right\} \text{Mean Eq. 1887 } \circ.$$

log q = 0.14288

Ephemeris for Berlin Midnight.

1887.	R.A.	Decl.	Log Δ.	Log r.	Bright-ness.
June 13	16 13 43	7 50' 3 S.	9.6006	0.1432	1.5
15	16 18 17	6 20' 5			
17	16 22 51	4 53' 9	9.6077	0.1429	1.5
19	16 27 26	3 30' 8			
21	16 32 1	2 11' 4 S.	9.6182	0.1433	1.4

The brightness on May 14 has been taken as unity.

MINOR PLANET NO. 266.—This object has received the name of Aline.

THE PARALLAX OF α TAURI.—Prof. Asaph Hall has published in the *Astronomical Journal*, No. 156, a determination of the parallax of this star deduced from measures of the position-angle and distance of the eleventh magnitude companion made with the Washington 26-inch refractor between October 2, 1886, and March 15, 1887. The resulting values of the relative parallax are: from measures of angle, $\pi = + 0''.163 \pm 0''.0409$, and from measures of distance, $\pi = + 0''.035 \pm 0''.0431$. The mean value of the parallax of α Tauri from these observations is therefore $\pi = + 0''.102 \pm 0''.0296$. It will be remembered that M. O. Struve recently published a determination of the parallax of this star, referred to the same comparison-star, and found $\pi = + 0''.516 \pm 0''.057$.

MADRAS MERIDIAN OBSERVATIONS.—A volume of Madras astronomical observations at last! In 1887 Mr. Pogson publishes the results of the meridian circle work during 1852, 1863, and 1864. A prefatory epistle addressed to Sir M. E. Grant-Duff, late Governor of Madras, speaks of "the removal of certain arbitrary and suppressive restrictions which have prevented me and my predecessors from attempting anything of the kind for considerably more than thirty years past," but gives the reader no more definite information as to the reason of this unparalleled delay in publication, nor why the Madras Observatory should have thus fallen from the high position which it formerly held. The instrument with which the observations now published were made is a transit-circle constructed by Messrs. Troughton and Simms, in consultation with the late Mr. Carrington. The object-glass is of 5½-inches aperture, and the circle of 42-inches diameter. It was brought into use in May 1862, and was devoted to the observation of stars down to the fifth magnitude, the moon and accompanying stars, Mars and comparison stars at successive oppositions, minor planets, and as many stars of more than 120° N.P.D. as could be found, not less than the eighth magnitude. The present volume contains star places only.

The ledgers and catalogues of mean places for each year are given separately and take up much more space in printing than is necessary for mere annual results. Altogether 227 stars were observed in 1862, 782 in 1863, and 1000 in 1864. A comparison between the Madras places of time-stars and those of the Nautical Almanac (on the R. A.'s of which those of Madras depend) shows a good agreement in R. A., but in N. P. D. a mean excess of the former of + 0''.7, which "renders it certain that the Polar Distances will require some further small correction before being formed into a final general Catalogue."

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 JUNE 12-18.

(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 June 12.

Sun rises, 3h. 45m.; souths, 11h. 59m. 29.5s.; sets, 20h. 14m.; decl. on meridian, 23° 9' N.; Sidereal Time at Sunset, 13h. 37m.

Moon (at Last Quarter on June 13) rises, 0h. 5m.; souths, 5h. 13m.; sets, 10h. 30m.; decl. on meridian, 10° 32' S.

Planet.	Rises.		Souths.		Sets.		Decl. on meridian.
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	
Mercury ...	4 46	13 16	21 46	25 12	25 12	N.	
Venus ...	7 4	15 6	23 8	21 21	21 21	N.	
Mars ...	3 2	11 9	19 16	22 7	22 7	N.	
Jupiter ...	14 57	20 16	1 35*	8 51	8 51	S.	
Saturn... ..	6 6	14 11	22 16	21 49	21 49	N.	

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

Variable Stars.

Star.	R.A.		Decl.		h. m.
	h. m.	h. m.	h. m.	h. m.	
U Cephei ...	0 52.3	8 16	16 N.	June 13,	0 55 m
R Crateris ...	10 55.0	17 43	S.	" 15,	0 35 m
U Virginis ...	12 45.4	6 10	N.	" 13,	M
R Hydræ ...	13 23.6	22 42	S.	" 12,	m
R Bootis ...	14 32.2	27 14	N.	" 18,	m
δ Libræ ...	14 54.9	8 4	S.	" 18,	1 26 m
U Coronæ ...	15 13.6	32 4	N.	" 14,	21 31 m
U Ophiuchi... ..	17 10.8	1 20	N.	" 15,	1 0 m
W Sagittarii ...	17 57.8	29 35	S.	" 13,	1 0 M
R Scuti ...	18 41.5	5 50	S.	" 18,	m
β Lyræ... ..	18 45.9	33 14	N.	" 17,	2 0 M
R Delphini ...	20 9.5	8 45	N.	" 18,	M

M signifies maximum; m minimum.

Meteor-Showers.

	R.A.	Decl.
Near β Lyræ ...	282	32° N.
ζ Cygni ...	320	32 N.
β Piscium ...	345	0 Very swift.

GEOGRAPHICAL NOTES.

It may interest our readers to know that a full account of Baron Nordenskjöld's narrative of his very interesting journey across Greenland has been published in German by Brockhaus, of Leipzig, with numerous maps and illustrations. Doubtless, like the same explorer's previous narratives, it will soon appear in an English dress. We are assured that Nordenskjöld will not undertake any Antarctic expedition before 1888 or 1889, if, indeed, he undertakes it at all, which is highly doubtful. He has much to do still before the publications connected with the *Vega* Expedition are complete, and he has a variety of other work in hand which must be finished before he enters on any new undertaking.

THE paper read at Monday's meeting of the Royal Geographical Society was one of unusual novelty and interest. It described the exploration which Mr. H. E. M. James, of the Bombay Civil Service, in company with two friends, made last spring and summer in Manchuria. The region explored extends from the Yellow Sea to beyond 45° N., and between 122° and 130° E. long. A considerable section of the journey was over virtually new ground, and as Mr. James is a careful observer, and, we believe, a botanist, and an accurate describer, his paper is of some scientific value. He has at least been able to add some precise features to our maps of the region. The paper contains

a useful general account of Manchuria and its history. Mr. James calls it the Manitoba of Asia. What with the depletion of the country for military service and the influx of immigrants from China, there is little of the old Manchu population left. Nearly all special Manchu customs have disappeared, and the language itself is now only spoken in a few remote valleys. Mr. James's party started from Newchang and went north to Mukden. Thence they went due east up the beautiful and well-wooded valley of the Hun. This is a particularly rich region, and is being rapidly colonized. The first day Mr. James began to collect he found no less than five kinds of lilies of the valley, and it was common to see whole hill-sides covered with masses of that flower. On account of the flooded state of the rivers, it took them a month to reach Mau-erh-shan, the furthest Chinese outpost on the Yalu, at the south foot of the Lao-ling Mountains. Thence they struck northwards across the mountains to the junction of the Sungari and Tang-ho, four days march. Here they looked in vain for the snowy peaks of 10,000 to 12,000 feet high, reported by previous writers on Manchuria; they were assured no such peaks existed in all the region. An official guided them back south-east to the Pei-shan Mountains, a sort of knot in which the Yalu, the Tumen, and the Sungari take their rise. For a long distance the route was over a succession of ranges covered with dense forests, with only at long intervals a hut of a ginseng cultivator, sometimes in the crater of an old volcano. Bogs also were frequent, and gave much trouble. It was the ninth day before they actually began to ascend the mountain itself. The lower slopes are covered with birch and pine, leading to a delightful grassy plateau dotted with trees, and rich open meadows bright with flowers of every imaginable colour. As they approached the needle-like peaks of Old White Mountain, the noise of underground streams was frequently heard. The steep sides of the two-peaked upper ridges shines white with disintegrated pumice-stone. On reaching the saddle and looking over the edge, the party found themselves looking down into a crater, at the bottom of which, about 350 feet below, was a beautiful lake, of the deepest and most pellucid blue. The lake was about 6 miles in circumference. The height of the mountain is not more than 8000 feet. The party then proceeded north to Kirin and Tsitsikar, through forests and swamps, and, lastly, across Mongolian steppes. Then, proceeding eastwards and southwards, the country to the east of the previous route was explored, Mr. James learning much by the way of the country and the people. Altogether the journey has been a fruitful one, and shows how much can be done for science by our Indian officials when they have the inclination and are properly trained.

WE have already referred to the remarkable journey of Mr. Carey in Central Asia. Information has now been received from him showing how the second year of his journey was passed. In May 1886 he started from Châklik, with the object of exploring some of the northern regions of Tibet. He passed south, across the Altyn and Chinan Mountains, and reached the foot of a high chain, which is probably the true Kuen-lun. Here he had to travel a considerable distance eastwards, through barren and difficult country, until an opening was found leading to the valley of the Ma-chu, the head source of the Yang-tse-kiang. After falling down the river some distance, Mr. Carey had to turn northwards again, and recross the Kuen-lun. He now found himself in the Tsaidam region, and made an interesting round journey from a place called Golmo and back to the same point, during which he saw a good deal of the nomadic Kalmucks and Mongols who inhabit the comparatively low valleys of Tsaidam. In the autumn, Mr. Carey made a second journey across the Kuen-lun, and then, again turning northward, struck straight across the Tsaidam country and the Gobi, to Sâchan and Hami, whence he travelled to Urumtsi in the Tian-shan. Thence the party left for Yarkand, whence a start was made on March 7 for Ladak. A great part of the ground traversed by Mr. Carey is new, and he and his assistant, Mr. Dalgleish, are the only Englishmen who have ever travelled through the entire length of Chinese or Eastern Turkestan.

M. CONSTANTIN NOSILOFF writes to the Royal Geographical Society of his intention to undertake this year a summer expedition to Nova Zembla. His object will be (1) to prepare a detailed map of the coasts and interior of the island; (2) to study the hydrography of the coast, and make observations regarding the movements of the ice in the Kara Sea, and in the straits leading to it; (3) to make meteorological observations, and to collect zoological and botanical specimens; (4) to study the ethnography of the Samoïedes.

THE ANNUAL VISITATION OF THE ROYAL OBSERVATORY.

THE Report of the Astronomer-Royal to the Board of Visitors, read at the annual visitation of the Royal Observatory on Saturday last, refers to the period of twelve months from 1886 May 21, to 1887 May 20, and exhibits the state of the Observatory on the last-named day.

The following are among the points of most general interest:—

I. Buildings and Grounds.

Above the extended portion of the upper computing-room, a dome 18 feet in diameter is to be erected, in which it is proposed to mount a Cooke 6-inch equatorial, a photo heliograph tube being attached to the same mounting. The combined instrument will command a complete view of the sun throughout the day—an important consideration, as the work of the present photoheliograph is seriously interfered with by trees and the Lassell dome. The new instrument will be available for occultations, phenomena of Jupiter's satellites, and other occasional observations.

II. Astronomical Observations.

Transit-Circle.—The regular subjects of observation with the transit-circle are the sun, moon, planets, and fundamental stars, with other stars from a working Catalogue. On the conclusion of the observations for the Ten-Year Catalogue at the end of 1886, a new list of some 3000 stars was prepared, to include all the stars in Groombridge's Catalogue and in the Harvard Photometry, which had not been observed at Greenwich since 1867. The Annual Catalogue of stars observed in 1886 contains about 1665 stars.

The observations for the Ten-Year Catalogue, epoch 1880, were concluded at the end of 1886, special efforts being made in the latter part of the year to make the Catalogue as far as possible complete to the sixth magnitude inclusive. It is estimated that the Catalogue will contain about 4000 stars, all of which, with very few accidental exceptions, have been observed at least three times in R.A. and N.P.D., the total number of observations being about 40,000 in each element.

The following statement shows the number of observations made with the transit-circle in the twelve months ending 1887 May 20:—

Transits, the separate limbs being counted as separate observations	6366
Determinations of collimation error	304
Determinations of level error	410
Circle-observations	5983
Determinations of nadir point (included in the number of circle-observations)	385
Reflexion-observations of stars (similarly included)	602

About 400 transits (included in the above number) have been observed with the reversion-prism, to determine personality depending on the direction of motion.

The value found for the colatitude from the observations of 1886 is 38° 31' 22".03, differing by 0".13 from the assumed value; the correction to the tabular obliquity of the ecliptic is +0".65, and the discordance between the results from the summer and winter solstices is -0".25, indicating that the mean of the observed distances from the Pole to the ecliptic is too great by +0".12.

The mean error of the moon's tabular place (computed from Hansen's lunar tables, with Prof. Newcomb's corrections) is +0".029s. in R.A. and +0".34 in longitude as deduced from ninety-seven meridian-observations in 1886. The mean error in tabular N.P.D. is -0".66, which would appear to agree with the observations of the sun in indicating that the mean of the observed N.P.D.'s is too great.

As regards the computations for the Ten-Year Catalogue, a large amount of preparatory work has been done in the application of corrections to the observations as printed to reduce them to a homogeneous system, and some progress has been made in the formation of the Catalogue results. The proper motions actually used have been thoroughly revised for every observation in the period 1877-86, and corrections applied where, as occasionally happened, different proper motions had been used in the same year. A comparison has been made of the R.A.'s of clock-stars as observed in the last ten years and as computed from the Nine-Year Catalogue, epoch 1872, with Auwers' recently published proper motions, the result of which is to show that the Greenwich observations are better represented by these than by the proper motions in use hitherto, and it has therefore been