

presented by Mr. W. R. Temple; a Pinche Monkey (*Midas aedipus*) from Colombia, presented by Lady Moor; a West African Python (*Python sebae-natalensis*) from Natal, presented by Mr. Alex. Buchanan; a Spotted Ichneumon (*Herpestes auro-punctatus*), four Hamilton's Terrapins (*Damonia hamiltoni*), seven Bungoma River Turtles (*Emyda granosa*), eight Roofed Terrapins (*Kachuga tectum*) from India, a Common Boa (*Boa constrictor*) from South America, deposited; a Maguari Stork (*Dissura maguari*) from South America, four Gouldian Grass Finches (*Poephila gouldiae*) from Australia, purchased.

#### OUR ASTRONOMICAL COLUMN.

**NOVA PERSEI.**—Prof. H. C. Vogel describes, in the *Astronomische Nachrichten* (Bd. 154, No. 3693), the results of measures of photographs of the spectrum of Nova Persei, taken with the 80 cm. refractor and spectrograph of small dispersion. The spectra extend from  $\lambda$  3740 to  $\lambda$  5800. Wave-lengths have been determined by comparisons with the spectrum of  $\beta$  Orionis (Rigel). Tables of the wave-lengths of the deduced lines are given, the origins being traced to hydrogen, calcium, magnesium and silicon. The displacements of the lines is shown to indicate a velocity of some 700 kilometres per second relative to the earth; an exception to this occurs in the case of the two calcium lines at H and K, which are indicated as giving velocities of approach of only 45 kilometres per second.

**VARIABILITY OF EROS.**—At the Lyons Observatory MM. Guillaume, Le Cadet and Luizet have recently obtained a series of estimations of the variations in the brightness of Eros, observing with an equatorial coude of 0.32 metre aperture and a Brunner equatorial, 0.16 metre aperture. A diagram of the light curve is given. This is similar to that of  $\beta$  Lyræ, but the secondary minimum is almost equal to the principal one. The determinations gave

Principal minimum to secondary minimum	=	h. m.	=	2 51
Secondary " principal "	=	" "	=	2 24
Principal maximum to secondary maximum	=	" "	=	2 50

Details of estimates on seven nights during February are given (*Comptes rendus*, cxxxi. pp. 530-531).

In the same issue M. Luizet gives the elements for computing future minima as follows:—

		h. m.	h. m.
1901 Feb. 20. ...	7 57		
20. ...	10 48	+ 5	16.15 E.

The eccentricity of the orbit of the system would thus be about 0.0569, which is nearly equal to that of the moon's orbit (0.0549).

In the current issue of the *Comptes rendus*, M. L. Montangerand describes the photographic investigations which have been made with the astrographic refractor at the Toulouse Observatory. It is interesting to note that the measures so obtained agree very well with visual determinations. The planet was allowed to trail over the plate, and the points of equal brightness marked off at intervals. The period thus found is given as 2h. 38m. (2h. '63) (*Comptes rendus*, cxxxii. pp. 616-618).

In close agreement with this result is the determination of Prof. Deichmüller at Bonn, who gives 2h. 61 as the period of variation. This observer gives also, for the two evenings of February 21 and 22, a series of estimations of magnitude at intervals of ten minutes from 5.0 to 10.0 p.m. (*Astronomische Nachrichten*, Bd. 154, No. 3693).

**NEW VARIABLE, 2 1901 (CYGNI).**—Dr. T. D. Anderson announces, in the *Astronomische Nachrichten* (Bd. 154, No. 3692), the discovery of a new variable star. Its position is

R.A. =	h. m.	} (1855°)
	19 12.2	
Decl. = +	49 55'	

And the variations recorded are

1900 Dec. 26 ...	9.5
1901 Jan. 12 ...	9.8
Feb. 16 ...	10.4

**OBSERVATIONS OF CIRCUMPOLAR VARIABLE STARS.**—Vol. xxxvii. part 1 of the *Annals* of the Harvard College Obser-

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vatory contains the results and discussion of the observations of 17 circumpolar variables made at the institution during the period 1889-1899. The estimates of magnitude were made by Argelander's method, but differ from similar observations of other workers in two respects—first, the stars have been observed throughout the whole period of their variation of light; and second, all the observations have been reduced to a uniform photometric scale, that of the meridian photometer. This latter peculiarity is of great importance, as by its means the stars can not only be systematically compared *inter se*, but collateral comparisons made with stars of constant brightness in any part of the sky. Both the 15 inch and 6-inch equatorials have been employed in the work.

Three of the stars, T Persei, S Persei and R Ursæ Minoris appear to be irregularly variable. With the exception of these, mean light curves have been deduced for the variables, and tables are given showing the phases obtained by this means. An examination of the curves shows that the principal maximum is in several cases preceded, and in a few cases followed, by a more or less marked secondary maximum.

Treating these variables as a class, it is noted that the

mean of all the periods ...	=	363.4 days
mean magnitude at maximum	=	7.81
" " " minimum	=	12.64
So that the range is therefore	=	4.83 magnitudes.

Drawings are given of the mean light curves of 14 of the variables, and 16 small charts showing their positions with respect to the surrounding stars.

#### EROS AND THE SOLAR PARALLAX.

**F**EW projects involving long continued observation and laborious calculations have received a more ready assent or commanded a wider co-operation than that which has for its aim the determination of the solar parallax from observations of the planet Eros. This readiness to adopt a general programme was materially assisted by the meeting of the International Astrophotographic Congress at Paris, in July 1900, whereby the directors of many of the best equipped observatories were able to rapidly mature their plans and to complete the necessary organisation. The representatives of some twenty observatories gave in their adhesion to the proposal, which contemplates the collection of measures, either photographic, micrometric or heliometric, and the necessary meridian observation of a large number of comparison stars. The general scheme follows the well-known lines of utilising observations made at considerable hour angles east and west of the meridian at any one observatory, of combining the observations made in the north and south hemispheres, and adds the somewhat novel feature of making available simultaneous observations of the planet at stations in America and Europe, a suggestion which, among other advantages, has the effect of eliminating errors arising from an imperfect knowledge of the planet's motion.

Under date, Paris, January 31, M. Loewy gives an interim report of the progress of the observations up to the end of the year 1900. M. Loewy and those responsible for the inception of the scheme are to be congratulated on the energy exhibited and the hopeful results obtained. The report states that, notwithstanding the bad weather that has generally prevailed in the northern regions of our hemisphere, not one day has passed in which the planet has not been observed by one or other of the several methods adopted. The number of coincidences of observation between the three contributing American observatories and those in Europe is shown by the following figures:—

#### Number of Coincidences up to December 31, 1900.

	Madison.	Washington.	Williams Bay	Total.
			(Yerkes).	
Micrometric	... 40	... 49	... 106	... 195
Photographic	... 15	... 30	... 66	... 111

The English observatories of Oxford and Cambridge (Greenwich is not reported) are in the least favourable position, since the arc of the Great Circle intercepted between them and the average American station is only about 55°; but seeing that the parallax of the sun can be determined quite independently of the motion of the planet, and that the stars of comparison will be the same in the two cases, a very small error can be anticipated under the least favourable conditions. Considerable attention has been given to the amount of this error, and one

can only hope that the favourable presage will be realised. The probable limit of error is based upon a preliminary inquiry due to M. Hermann Struve, of Königsberg, who has found that the probable error of a single complete micrometrical measurement is  $\pm 0''\cdot 077$ , and such an error would introduce no greater uncertainty into the parallax than  $0''\cdot 03$ , a most satisfactory result for one night's determination. Such a favourable result, however, implies (1) that we are in possession of the accurate diurnal motion of the planet; (2) that no error exists in the relative position of the stars of comparison, and (3) that every source of systematic error has been eliminated. It is not unimportant to observe in this connection that the motion of the planet itself in one second of time can amount to, and even exceed,  $0''\cdot 03$  in the arc of a great circle, no inconsiderable fraction of the total error found by M. Struve. The actual epoch of exposure, with a rapidly moving shutter, would probably be known to much less than a second of time, but the proper moment to assign to the formation of the image seems to be open to more doubt. A question of very similar import has been discussed at Paris by M. Henry, and has been reported upon. This has reference to the formation of the trace of the planet on the sensitised film, when the equatorial is driven to sidereal time by means of a star. M. Henry photographed a region of the sky with an exposure of three minutes, in which an acceleration and retardation of three seconds was alternately given to the driving clock. Two other exposures were made on the same plate in the reversed order, and the differences of right ascension of the centres of the traces were measured. The mean of the differences of the measured distance with clock accelerating was compared with the mean of the distances clock retarding, in groups according to magnitude, with the following result:—

Number of stars.	Mean magnitude.	Mean diff. of distance.	Prob. error of the mean.	Prob. error of a distance.
13	9.3	+0''10	$\pm 0''\cdot 02$	$\pm 0''\cdot 06$
20	11.3	-0''03	$\pm 0''\cdot 02$	$\pm 0''\cdot 09$
25	12+	-0''02	$\pm 0''\cdot 03$	$\pm 0''\cdot 13$

The large probable error in the third group is quite sufficiently explained by the faintness of the stars and the shortness of the exposure, but we seem to be in presence of errors of quite the same order of magnitude as those found by M. Struve. Certainly one of the most interesting of the results that will proceed from this elaborate programme will be the relative certainty and freedom from systematic errors of the various methods of observing.

This memoir or report also contains, besides an ephemeris of the planet supplied by M. Millosevich and a table of star constants applicable to the stars used in the discussion of the photographic plates, a memoir by Mr. Comstock on the computation of refraction in the direction of the diurnal motion of the planet. Other points which have been discussed are crowded out of the present number, but enough is given to assure us that the International Committee forms a centre of activity calculated to attract the energy and the enterprise of all the co-operating astronomers. But it is impossible to anticipate, as the result of so much labour, anything more than an academic interest. Based upon the constants employed in the reduction and an assumed figure of the earth, the resulting parallax will represent the best value procurable from an isolated inquiry; but in view of the solemn acceptance of the value  $8''\cdot 80$  for the solar parallax at the Paris Congress in 1896, it seems extremely improbable that the various national ephemerides will make any alteration in a value which has been so recently introduced.

#### FORTHCOMING BOOKS OF SCIENCE.

Mr. Edward Arnold announces:—"The Physiological Action of Drugs, an Introduction to Practical Pharmacology," by Dr. M. S. Pembrey and Dr. C. D. F. Phillips; "The Morphology of the Brain: an Introduction to the Study of the Comparative Anatomy of the Brain in the Vertebrata," by G. Elliott Smith; "A Text-book of Biology," by G. P. Mudge; "Applied Embryology and Morphology," by Dr. A. Keith; "Anthropology and its Practical Value," by E. W. Brabrook; "A School Botany: being an Introductory Text-book on the Study of Flowering Plants," by David Houston, illustrated; "Wood: a Manual of the Natural History and Industrial Applications of the Timbers of Commerce," by Prof. G. S. Boulger; "A Hand-

book on Fermentation and the Fermentation Industries," by Charles G. Matthews; "The Dressing of Minerals," by Prof. Henry Louis; "Traverse Tables for Surveyors and Engineers," by Prof. Henry Louis and G. W. Caunt; "Physical Calculus," by Rev. P. E. Bateman.

The announcements of Messrs. Baillière, Tindall and Cox include:—"Cerebral Science: Studies in Comparative Psychology," by Dr. Wallace Wood, illustrated; "Gold and Diamonds: South African Facts and Inferences," with coloured maps and thirteen plates, by W. H. Penning; "Suggested Standards of Purity for Foods and Drugs," by C. G. Moor, Cecil H. Cribb, and Martin Priest.

Mr. B. T. Batsford promises:—"Sanitary Engineering," by Colonel E. C. S. Moore, illustrated; and a new edition of "New Tables for the Complete Solution of Ganguillet and Kutter's Formula," by Colonel E. C. S. Moore.

Messrs. A. and C. Black will publish:—"Encyclopædia Biblica," edited by Rev. Prof. Cheyne and Dr. J. Sutherland Black, vol. iii.; "Geography of South America," by L. W. Lyde; "World Pictures and Problems, an Elementary Pictorial Geography," by Joan B. Reynolds, illustrated; "New Descriptive Geography of Africa," edited by Dr. A. J. Herbertson and F. D. Herbertson; "Introduction to the Study of Physics," by A. F. Walden and J. J. Manley, vol. i., General Physical Measurements, illustrated; "A Treatise on Elementary Statics," by W. J. Dobbs.

The announcements of the Cambridge University Press include:—"Scientific Papers," by John William Strutt, Baron Rayleigh, F.R.S., vol. iii.; "Papers on Mechanical and Physical Subjects," by Prof. Osborne Reynolds, F.R.S., reprinted from various transactions and journals, vol. ii.; "Scientific Papers," by the late Dr. John Hopkinson, F.R.S., in 2 vols.; "A Treatise on Determinants," by R. F. Scott, a new edition by G. B. Mathews, F.R.S.; "A Treatise on Spherical Astronomy," by Prof. Sir Robert S. Ball, F.R.S.; "Zoological Results based on Material from New Britain, New Guinea, Loyalty Islands and Elsewhere, Collected during the Years 1895, 1896 and 1897," by Dr. Arthur Willey. Part v. An account of the Entozoa, by A. E. Shipley, with 3 plates; of the Nemertina, by R. C. Punnett, with 5 plates; the development of the Robber Crab (*Birgus*), by L. A. Borradaile, with 8 figures in the text; new genera and species of Entomostraca, by the Rev. T. R. R. Stebbing, F.R.S., with 5 or 6 plates; anatomy of *Neohelia porcellana* (Moseley), by Edith M. Pratt, with 2 plates. The entire work will be completed with the publication of part vi., which will be issued during 1901, and will contain Dr. Willey's monograph on *Nautilus* and other articles, including an account of the Ascidians, by Prof. W. A. Herdman, F.R.S.; "Reports of the Anthropological Expedition to Torres Straits by the Members of the Expedition," edited by Prof. A. C. Haddon, F.R.S., vol. ii., Physiology and Psychology; "Fauna Hawaiiensis, or the Zoology of the Sandwich Islands," being results of the explorations instituted by the Joint Committee appointed by the Royal Society of London for Promoting Natural Knowledge and the British Association for the Advancement of Science, and carried on with the assistance of those bodies and of the trustees of the Bernice Pauahi Bishop Museum, edited by Dr. David Sharp, F.R.S., Secretary of the Committee; "Zoology," by Prof. E. W. MacBride and A. E. Shipley; "Lectures on Great Physiologists," by Prof. Sir Michael Foster, Sec. R.S.; "Fossil Plants, a Manual for Students of Botany and Geology," by A. C. Seward, F.R.S., vol. ii.; "The Soluble Ferments and Fermentation," by Prof. J. Reynolds Green, F.R.S., new edition; "British Grasses," by Prof. H. Marshall Ward, F.R.S.; "Electricity and Magnetism," by R. T. Glazebrook, F.R.S.; "The Teacher's Manual of School Hygiene," by Dr. E. W. Hope and Edgar Browne; "An Introduction to Logic," by W. E. Johnson; "Euclid, Books I.-III., with Simple Exercises," by R. T. Wright; "An Introduction to Physiology," by W. N. Shaw, F.R.S.; "A Brief History of Geographical Discovery since 1400," by Dr. F. H. Guillemard; "A New Primer of Mechanics," by Prof. L. R. Wilberforce; "A New Primer of Physics," by the same author.

Messrs. Cassell and Co., Ltd., give notice of:—A cheap monthly re-issue of the Century Science Series, edited by Sir Henry Roscoe, F.R.S.; "The Herschels and Modern Astronomy," by Agnes M. Clerke; "Pasteur," by Prof. Percy Frankland, F.R.S., and Mrs. Percy Frankland; "James Clerk Maxwell and Modern Physics," by R. T. Glazebrook, F.R.S.;