

biographies of famous living Austrians, Frenchmen, Englishmen, and celebrities of other nationalities. The Englishmen noticed in the volume appear to be politicians as a rule, and, so far as we have tested the book, the men of science and of letters selected for inclusion are neither numerous nor particularly representative.

We have received from Messrs. W. M. J. Brooks and Co., Letchworth, Herts, a set of five templates, or curves, accurately cut in celluloid, representing respectively the parabola, ellipse, hyperbola, cycloid, and cubical parabola. When such curves are required it seems better that a student should make them for himself, but failing this Mr. Brooks's curves may prove useful in special cases. The price is 1s. each curve.

OUR ASTRONOMICAL COLUMN.

FURTHER RESULTS OBTAINED BY THE FRENCH ECLIPSE EXPEDITIONS.—In No. 12 (September 18) of the *Comptes rendus* MM. Deslandres and Andoyer give brief summaries of the results obtained by them on their respective expeditions to observe the recent total solar eclipse.

M. Deslandres directed the Bureau des Longitudes mission to Burgos, where the actual duration of visible "totality" was curtailed by clouds to one minute, which did not include either the second or the third contacts. The proposed photographing of the chromosphere spectrum was therefore impossible. Photometric observations of the corona were obtained, and M. d'Azambuja was able to measure the coronal radiation, obtaining figures which were decidedly lower than those obtained by M. Charbonneau in 1900. M. Kannappell obtained four photographs of the corona polarised by reflection. M. Blum obtained two photographs of the corona through coloured screens so arranged as to transmit only the gaseous radiation of the prominences. By comparing these with the ordinary photographs it will, probably, be possible to determine whether or not the prominences emit a more intense continuous spectrum than that emitted by the surrounding regions.

At El-Arrouch, 32 km. from Philippeville, M. Andoyer simply attempted to obtain as many direct photographs of the phenomena as possible. His instrumental equipment consisted of a photographic objective of 14 cm. (5.6-inch) aperture and 60 cm. (24-inch) focal length, mounted with two enlarging cameras which increased the diameter of the image by three and eight times respectively.

Altogether forty-four plates were exposed, eleven of them during totality. A negative exposed two minutes before totality shows a reversed image, due to over-exposure, and a silhouette of the corona.

ELEMENTS OF COMET 1886 VIII.—From eighty-six observations of comet 1886 viii., made by various observers between January 24 and May 20, 1887, Herr E. Fagerholm, of Upsala, has calculated a set of elements for the orbit of that object. These, as given below, appear in No. 4047 of the *Astronomische Nachrichten*, together with the details of the computation and of the planetary perturbations taken into account:—

$$\begin{aligned} T &= 1886 \text{ Nov. } 28 \text{ } 44284 \pm 0.00267 \text{ (M.T. Berlin).} \\ \infty &= 31^\circ 55' 34'' 53 \pm 18'' 25 \\ \varpi &= 258^\circ 13' 1'' 35 \pm 4'' 43 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} 1887.0 \\ i &= 85^\circ 35' 17'' 33 \pm 3'' 84 \\ \log q &= 0.1704712 \pm 0.0000214 \end{aligned}$$

THE FIGURE OF THE SUN.—In No. 2, vol. xxii., of the *Astrophysical Journal*, Mr. C. Lane Poor publishes the results of an investigation, carried out by him at the Columbia University Observatory, which seem to indicate a periodical variation in the figure of the sun agreeing in phase with the sun-spot curve. On measuring the equatorial and the polar diameters of the solar images on twenty-one plates taken by Mr. Rutherford in 1870, 1871, and 1872, he found indications that during this period the equatorial diameter was first increasing and then decreasing with regard to the polar diameter. To check this result he re-investigated the measures made by the German observers whilst adjusting, and determining the constants

of, their heliometers for the transits of Venus in 1874 and 1882. The 1873-5 results showed a progressive change similar to that indicated by the measures of the Rutherford photographs taken in 1871-2, whilst the 1880-3 heliometer measures confirmed the photographic results of 1870-1. Yet another confirmation was found on measuring five solar negatives taken at Northfield (Minn., U.S.A.) during the years 1893-4, the change in figure being the same as in 1871-2 and 1873-5.

Plotting the differences between the polar and equatorial diameters in conjunction with the sun-spot curve, it is seen that the two agree, not only in point of time, but also of intensity, the excess of the equatorial diameter occurring at sun-spot maximum.

From these results it appears that the sun is usually an oblate spheroid, but at times of sun-spot minima the length of the polar axis increases in regard to that of the equatorial diameter, and the solar figure becomes prolate.

Mr. Lane Poor incidentally suggests that this variation of the solar figure may explain the anomalies in the motions of Mercury, Venus, and Mars.

BIBLIOGRAPHY OF HALLEY.—No. 14 of the Bulletin of Bibliography Pamphlets, issued by The Boston Book Company, contains the material for a bibliography of Dr. Edmond Halley, the second Astronomer Royal, and will be found a useful adjunct to any astronomical library. Reading through the numerous items, one is struck anew by the range and number of Halley's writings. The pamphlet is an extract from No. 4 (July), vol. iv., of the Bulletin of Bibliography published by The Boston Book Company, and costs 25 cents.

OBSERVATIONS OF JUPITER'S SATELLITES.—In No. 4045 of the *Astronomische Nachrichten* Prof. A. A. Nijland and J. van d. Bilt publish the results obtained from a large number of observations of Jupiter's satellites.

These observations were made with the 26 cm. Utrecht refractor during the period June 30, 1904-February 17, 1905, and in the tabulated results the time of the eclipse, transit or occultation of the particular moon is given, together with the difference between these and the calculated times.

A LOST DOUBLE STAR.—A remarkable chapter of coincidences is recorded in No. 7, vol. xiii., of *Popular Astronomy* by Prof. Doolittle, of the Flower Observatory, U.S.A. In Sir John Herschel's first catalogue of double stars, No. 165 was described as a 3rd pair with a position angle of 330°, its position being given as R.A.=10h. 26.8m., dec.=+12° 32' (1825). In 1878 Prof. Burnham directed his attention to the pair, and recorded its position angle as 205°.3, and its distance as 2".59. Again in 1901 he observed the double with the 40-inch refractor, and obtained a measure agreeing with Herschel's record; but in 1902 he could find no trace of the pair observed in the previous year, nor of the star measured by him in 1878. Observations made this year with the 18-inch refractor of the Flower Observatory failed to reveal the double given by Herschel, but showed a very wide faint pair in the exact position given by him.

Thinking that Prof. Burnham in 1901 might have confused the sign of the declination, Prof. Doolittle turned his telescope to the same R.A. in declination minus 12°, and there apparently found exactly the pair that was wanted. This seemed to have cleared up the mystery; Prof. Burnham had in 1901 observed the wrong star.

A letter from that observer showed, however, that this is not the correct explanation.

The truth is that Herschel made a mistake of exactly one hour in recording the right ascension of H. 165, and Prof. Burnham had, unwittingly, made precisely the same mistake in 1901. Thus the latest observation of Herschel's No. 165 shows its position to be R.A.=0h. 31m. 13s., dec.=+12° 25' (1880), and its position angle and distance, at the epoch 1905.38, were 333°.1 and 2".04 respectively.

In 1878 Prof. Burnham, observing in the position given by Herschel, saw a pair which was not identical with H. 165, and in the year 1902 was too faint for him to see. In 1901, repeating Herschel's mistake in the R.A., he observed the true H. 165, whilst in 1905 Prof. Doolittle found a similar pair to H. 165 in the same declination south and in the R.A. given in mistake by Herschel.