character given to the part on voltaic electricity. Under magnetism a brief account has been included of tubes of force, magnetic flux, permeability, and reluctance.

NEW editions of three standard works on botany have just reached us from Germany. One volume is the third edition of Prof. G. Haberlandt's "Physiologische Pflanzenanatomie" (Leipzig: W. Engelmann), the second edition of which was reviewed in NATURE of March 18, 1897 (vol. lv. p. 457). About sixty pages have been added to the work, and the number of figures has been increased from 235 to 264. Mr. Engelmann has also published the twelfth edition of Prantl's "Lehrbuch der Botanik," revised by Prof. F. Pax. The additional matter has enlarged the book by twenty-two pages, and twenty-five new figures have been included. The fourth revised edition of Prof. A. Engler's "Syllabus der Pflanzenfamilien" has been issued by the firm of Borntraeger Bros., Berlin. The work is a summary of systematic botany, with special reference to medicinal and useful plants, and a survey of kingdoms and regions of flowering plants; it is of particular value to students of special and pharmaceutical botany.

OUR ASTRONOMICAL COLUMN.

A NEW VARIABLE STAR.—A telegram received at the Kiel Centralstelle from Prof. E. C. Pickering, on October 7, states that the object discovered by Mr. Stanley Williams on September 20 is, according to its spectrum, a long period variable star.

On a plate obtained by Herr P. Gotz at Heidelberg on August 8·4 the star was fainter than B.D.+29°·4653, which has a magnitude of 9·2 (*Astronomische Nachrichten*, No. 3971).

EPHEMERIS FOR TEMPEL'S SECOND COMET.—In No. 3971 of the *Astronomische Nachrichten* M. J. Coniel publishes a continuation of his daily ephemeris for Tempel's second comet, extending from October 25 to January 1.

Abstracts of the previous portions have already appeared in these columns, and the following is from the present publication:—

Ephemeris 12h. (*M.T. Paris*).

1904	α app. h. m. s.	δ app. ° ′	log. Δ	1 : r²Δ²
Oct. 25 ...	17 25 44 ...	−22 11 ...	0·2584 ...	0·156
,, 29 ...	17 39 37 ...	−22 50 ...	0·2608 ...	0·155
,, 31 ...	17 46 40 ...	−23 8 ...	0·2621 ...	—
Nov. 2 ...	17 53 46 ...	−23 25 ...	0·2634 ...	0·154
,, 4 ...	18 0 57 ...	−23 40 ...	0·2648 ...	—
,, 6 ...	18 8 11 ...	−23 54 ...	0·2662 ...	0·152
,, 8 ...	18 15 29 ...	−24 6 ...	0·2677 ...	—
,, 10 ...	18 22 49 ...	−24 17 ...	0·2692 ...	0·150

Although the comet was unsuccessfully sought during August and September, and, theoretically, its light should commence to diminish towards the end of the present month, the fact that at previous apparitions the light has been sensibly stronger after perihelion than before leads M. Coniel to hope that the object may yet be observed during its present return. As before mentioned in these columns, the feeble light of the comet, combined with its southerly declination, will render it a difficult object for observers in the northern hemisphere.

PHŒBE: SATURN'S NINTH SATELLITE.—The promised extended discussion of the observations of Phœbe by Prof. W. H. Pickering appears in No. 3, vol. liii., of the Harvard College Observatory *Annals*.

The discoverer of the satellite therein describes the first discovery of, and the subsequent searchings for, the object, explaining in detail the examination of the plates and the difficulties experienced in recognising the satellite's image.

Sixty photographs of Saturn have, so far, been obtained with the Bruce telescope, and of these twelve were taken when the planet was moving rapidly, and were therefore useless in locating the satellite's position. Several others were, for various reasons, useless, but the object sought is to be seen on forty-two plates, which are used in the discussion.

After preparing the description of the observations and results for the press, Prof. Pickering received information from Arequipa which considerably modified his ideas of the satellite's orbit. An approximate ephemeris had been sent to Prof. Bailey, at Arequipa, in March of this year, but he was unable to find the image of the satellite in the computed positions. Subsequent research has shown that the motion of this body in its orbit is probably retrograde, an unlooked-for possibility, since the other eight of Saturn's satellites all have direct motions. Consequently Prof. Pickering gives the details of the reductions for both retrograde and direct motion.

The elements, as determined for the case of retrograde motion, are as follow:—

Semi-major axis at a distance of 10 units measures 29′·62. This corresponds to a distance of 0·0862 astronomical unit, or 7,996,000 miles.

Eccentricity ... ... =0·22
Inclination to ecliptic ... ... =5°·1
Longitude of ascending node =220°
,, ,, perisaturnium.. =289°·7
Epoch of perisaturnium ... =1900 Mar. 28·0 (G.M.T.)
Period ... ... =546·5 days.

The inclination of the orbit of Phœbe to that of Saturn is, therefore, 6°·0, and the longitude of the ascending node is 170°·0.

The eccentricity is remarkable as being greater than that of any other satellite or major planet in the solar system.

The brightness of Phœbe is judged as two magnitudes fainter than that of Hyperion, which is assumed to be of the fourteenth magnitude. From photometric considerations the diameter of the satellite is thought to be about 200 miles.

In conclusion, Prof. Pickering gives a table showing the differences between the computed and the observed places of the satellite, and then discusses the deviations and gives an ephemeris for 1904.

FAINT STARS NEAR THE TRAPEZIUM IN THE ORION NEBULA.—The lists of stars in the Orion nebula recently published by Profs. Wolf and Pickering included none of the stars near the Trapezium, because, with the short-focus cameras used in obtaining their plates, the images of the stars in that region were blotted out by the bright nebula.

On the plates obtained by Prof. Ritchey in 1900 and 1901, using the Yerkes 40-inch telescope with a yellow screen placed immediately in front of the plate, these fainter stars are easily seen, therefore Mr. J. A. Parkhurst has measured their coordinates from θ' Orionis, and gives these, together with the magnitudes of the stars, in a list published in the September number of the *Astrophysical Journal*. The list contains forty-two stars, all within two minutes of arc of the trapezium star θ' Orionis, of which twenty-three were observed visually by Bond—these include ten observed photographically by Prof. Pickering—whilst nineteen are presumably catalogued for the first time.

PHOTOGRAPHIC DETERMINATION OF PARALLAX.—Encouraged by the successful photographs obtained by Prof. Ritchey with the Yerkes 40-inch telescope, Mr. Frank Schlesinger tried several exposures with the same instrument for the determination of several stellar parallaxes. The yellow screen used in the former work was found to be unnecessary, and, as it introduced several troublesome errors, it was dispensed with.

The great focal length of the instrument renders errors in measuring the plates much less important than when smaller instruments, such as those used in the production of the astrographic chart, are used, and Mr. Schlesinger computes the probable error for one exposure to be only ±0″·030.

Among the results obtained there occurs the parallax of the star *Krueger* 60 (R.A.=22h. 24m., dec.=+57° 10′), which was placed on the working list because Prof. Barnard suggested that it has a large parallax. The result shows that the suggestion is probably correct, and, if confirmed by other measures, it places the star as one of our nearest neighbours, its parallax being +0″·278. This value was obtained as the result of measuring eight plates, containing twenty exposures, and using five comparison stars (*Astrophysical Journal*, No. 2, vol. xx.).

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