

being a tendency for the hydrocarbon and ammonia to be the chief products.

Globus for February 23 is a special number containing contributions by friends and admirers of Prof. R. Andree, who reached his seventieth birthday on February 26.

THE third part of the *British Journal of Psychology*, published by the Cambridge University Press, has been received. The number contains five papers in addition to a report of the proceedings of the Psychological Society. Mr. Norman Smith discusses Malebranche's theory of the perception of distance and magnitude; Mr. F. N. Hales considers the materials for the psychogenetic theory of comparison; Mr. W. G. Smith makes a comparison of some mental and physical tests in their application to epileptic and to normal subjects; Prof. Mary W. Calkins defines the limits of genetic and of comparative psychology, and Mr. C. Spearman makes an analysis of "localisation," illustrated by a Brown-Séquard case.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN MARCH:—

- March 5. 17h. Sun eclipsed; invisible at Greenwich.
 7. 13h. Juno in conjunction with Moon. Juno $1^{\circ} 27' S$.
 9. Jupiter in conjunction with Venus. Venus $5^{\circ} 30' S$.
 „ 11h. Jupiter in conjunction with Moon. Jupiter $3^{\circ} 15' N$.
 12. 10h. 11m. to 11h. 6m. Moon occults γ Tauri (mag. 3.9).
 17. 12h. 34m. Minimum of Algol (β Persei).
 20. 9h. 2m. to 9h. 49m. Moon occults β Virginis (mag. 3.8).
 „ 9h. 23m. Minimum of Algol (β Persei).
 21. 12h. Venus at maximum brilliancy.
 24. 7h. Mars in conjunction with Moon. Mars $3^{\circ} 40' S$.
 „ Vesta in opposition to Sun.

REPORTED DISCOVERY OF A SEVENTH SATELLITE TO JUPITER.

—A telegram received from the Kiel Centralstelle announces the discovery of a seventh satellite in the Jovian system. The description reads:—16 magnitude, position on February 25 62 degrees, distance 21 minutes, daily motion 60 seconds south-easterly.

PLANETARY TIDES IN THE SOLAR ATMOSPHERE.—In a communication published in the *Bulletin de la Société astronomique de France* (February, 1905), M. Émile Anceaux discusses the question as to whether the undecennial periodicity of sun-spots may not result from the fluctuations of tides set up in the solar atmosphere by the concerted action of Jupiter, the earth, Venus, and Mercury. He classifies the tides as binary, ternary, and quaternary, according to the number of planets acting in their production by being in, or near, opposition or conjunction. The ternary tide due to the combined action of Jupiter, Venus, and the earth is supposed to be the most important factor in regulating the appearance of spots, and a curve showing the fluctuations in the strength of this tide, as calculated from the knowledge of the planetary positions, agrees fairly well with the sun-spot curve for the years 1891 to 1905.

Finally, the author arrives at a number of conclusions of which the more important are:—(a) That sun-spots are the indirect consequences of such tides; (b) that the combined action of the three planets especially mentioned governs the fluctuations of the spot period; (c) that this ternary tide obeys an eleven-year period; (d) that the variation of the sun-spot period is due to the eccentricities of the planets, chiefly Jupiter.

THE BRUCE PHOTOGRAPHIC TELESCOPE.—The Bruce photographic telescope, with which a number of beautiful photographs of nebulae, Milky Way regions, &c., have already been obtained at the Yerkes Observatory, is described in

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detail in an illustrated article by Prof. Barnard published in No. 1., vol. xxi., of the *Astrophysical Journal*.

The telescope was erected, at the cost of Miss Catharine Bruce, at Yerkes in April, 1904, but has now been dismounted and shipped to Mount Wilson, Pasadena, where it is to be used for photographing those regions of the Milky Way not attainable at the former observatory.

It consists of a 5-inch guiding telescope firmly bolted to two other tubes, which carry photographic doublets of 10-inches and $6\frac{1}{2}$ -inches aperture respectively. The focal length of the 10-inch is only 50 inches, and the polar axis of the instrument has been formed by bending the upper part of the iron pier to the required inclination so that the camera may make a complete revolution about the axis without having to be "reversed." For use in different latitudes an iron wedge-shaped section may be introduced between the upper and lower parts of the pier in order to produce the required change of inclination, whilst a special arrangement, whereby the clock motion may be reversed in two minutes, has been introduced into the driving gear so that the same mounting may be used in the southern hemisphere.

The 10-inch doublet, by Brashear, gives excellent definition over a field 7° wide, and the scale is such that 1 inch = $1^{\circ}.14$, or $1'' = 0.88$ inch. The ratio aperture/focal length = $1/5.03$ is that which Prof. Barnard believes to be the best for the purpose for which this instrument was designed. The $6\frac{1}{2}$ -inch Voigtlander doublet has a focal length of 31 inches, and is used in conjunction with the 10-inch for the purpose of verification. Specimen photographs accompany the description, and these testify eloquently to the satisfactory performance of each of the doublets.

PHYSICAL CONDITIONS OF THE PLANETS.—In a communication to No. 3992 of the *Astronomische Nachrichten* Prof. T. J. See deals exhaustively with the methods that he has employed and the results he has obtained in a research on the internal densities, pressures and moments of inertia of the principal bodies in the planetary system. Some of the results obtained in the preliminary discussion of the available fundamental data are of great interest. For example, he arrives at the conclusion that the most probable values for the rotation period and for the oblateness of Uranus are 10h. 6m. 40.32s. and 1:25 respectively, whilst for Neptune the similar values are probably 12h. 50m. 53s. and 1:45.

In the case of the earth, Laplace's law of densities appears to be a natural law, for the value obtained for the oblateness of the outer stratum, or surface, of the globe agrees very well with that obtained as a mean of the most trustworthy of the determinations by more direct methods. The probable value obtained for the pressure acting at the earth's centre is 2383.152km. of mercury, a quantity so enormous that Prof. See attempts to render it more comprehensible by suggesting that it is 7838 times as great as a column of mercury equal in height to the Eiffel Tower.

The probable pressure at the sun's centre is nearly 212 billion atmospheres. A column of mercury acting solely under terrestrial gravitational acceleration would have to be high enough to extend beyond the sun in order that it might exert such a pressure.

Similar results for the density and pressure at different levels in the planets and satellites are given in two of the tables accompanying Prof. See's paper, and are also shown diagrammatically, whilst a third table shows the ratios of the actual moments of inertia to those of corresponding homogeneous spheres.

DISCUSSION OF CENTRAL EUROPEAN LONGITUDES.—In a series of tables published in Nos. 3993-4 of the *Astronomische Nachrichten*, Prof. Th. Albrecht brings together, weighs and tabulates all the longitude results, affecting central European observatories, hitherto obtained. In the first table the longitude differences between 176 pairs of observing stations, as determined since 1863, are thus dealt with, whilst in the second the longitude differences between Greenwich transit circle and numerous other important circles or observatories are brought together. In the third table the corrections to be applied to the differences given in table i., as determined from the discussion of the whole set, are shown.