

OUR ASTRONOMICAL COLUMN.

PHOTOGRAPHIC REALITY OF THE MARTIAN CANALS.—No. 4021 of the *Astronomische Nachrichten* contains a telegram dated May 28 from Mr. Lowell to Prof. Pickering in which the former states that several of the canals on Mars have been photographed by Mr. Lampland. Amongst others, Nilo Syrtis, Casius, Vexillum, Thoth, Cerberus, Helicon, Styx, Chaos, and Liedeus (? Libneus) are shown on the negatives, some appearing on more than twenty plates.

DISCOVERY OF SATURN'S TENTH SATELLITE.—A brief note in No. 4015 of the *Astronomische Nachrichten* states that Saturn's tenth satellite was discovered from an examination of several plates taken with the 24-inch Bruce telescope which were selected from those used in the determination of the orbit of Phœbe.

The new satellite appears on thirteen plates. The orbital motion is direct and the period is twenty-one days, therefore the satellite is apparently a little nearer to Saturn than is Hyperion.

JUPITER'S SIXTH AND SEVENTH SATELLITES.—An abstract from vol. xvii. of the *Publications of the Astronomical Society of the Pacific*, appearing in No. 4015 of the *Astronomische Nachrichten*, contains an account by Prof. Perrine of the observations so far made of Jupiter's sixth and seventh satellites.

The former can be photographed in ten minutes with the Crossley reflector, and thirty-six plates have been obtained. A preliminary investigation of the orbit shows that the inclination to the ecliptic and the planet's equator is about 30° , and that the satellite has a period of about 250 days, with a mean distance from the planet of 7,000,000 miles. The direction of the orbital motion still remains uncertain. The brightness of the satellite indicates a diameter of about 100 miles, or less.

On examining the plates taken for the sixth satellite on January 2, 3, and 4, a much fainter object, also apparently belonging to Jupiter, was discovered, which was then situated N. and W. of, and was moving towards, the planet. Subsequent observations, which, owing to the satellite's faintness, were much more difficult to make than in the case of the sixth satellite, confirmed its dependence upon Jupiter. This object was not shown on the negatives taken for the sixth satellite during December, being just outside their field, but altogether twenty observations have been made, the last on March 9.

Apparently the orbit of the seventh satellite is quite eccentric, with a mean distance from the planet of about 6,000,000 miles and a period of about 200 days. The inclination of the orbit to the plane of Jupiter's equator is about 30° , but the direction of the orbital motion is as yet undetermined. The photographic magnitude of the seventh satellite is not brighter than the sixteenth, and on comparing this with the magnitudes of other satellites and of asteroids a diameter of about 35 miles is deduced.

Prof. Perrine suggests that the large inclination of their orbits indicates that neither of these bodies were originally members of Jupiter's family, but have been "captured" by the planet.

STARS WITH SPECTRA OF THE ORION TYPE.—In No. 2, vol. lvi., of the *Annals of the Harvard College Observatory*, the distribution of stars having class B or Orion-type spectra is discussed, and all known stars of this type placed in a catalogue, in order of R.A., the position (1900-0), magnitude, exact type of spectrum, and the galactic longitude and latitude being given for each star. Considerably more than 30,000 spectra have been examined by Mrs. Fleming in connection with the Henry Draper memorial work, and of these 803 are included in the present catalogue.

As a distinctive feature of these stars is the helium indicated in their spectra, the allocation of them with regard to galactic longitude and latitude really indicates the distribution of helium in the universe. On thus classifying them, it is found that on dividing the sky into equal areas the galactic latitudes of which are included between $+90^\circ$ and $+30^\circ$, $+30^\circ$ and 0° , 0° and -30° , and -30° and -90° , the numbers of well marked helium stars in these divisions are 22, 219, 509, and 53, or 3, 27, 63,

and 7 per cent. of the total respectively, nine-tenths of them being within 30° of the galactic equator. A congregation in certain galactic longitudes is also indicated. Thus between 160° and 340° there are 613, or 78 per cent. of the total, of these stars. About one-quarter of the whole number are contained in four regions having a total area of 790 square degrees, or less than one-fiftieth of the sky. One of these four regions is near to the variable star I Carinæ, and lies almost wholly within the constellation Argus. As this Argus region contains nearly three times as many "Orion" stars as does the Orion region, Prof. Pickering suggests that "Argus" stars would have been a more suitable generic name for the class of stars having spectra of this (B) type. He states, however, that the nebula of Orion appears to be the starting point, or origin, of class B stars, twenty of which are situated within 1° of θ Orionis, that is to say, nearly as many as are contained in the region between galactic latitudes $+30^\circ$ and $+90^\circ$, although the area of the latter region is three thousand times as great.

Arranging them according to magnitude, it is found that most of this class are bright stars, only 1 in 20 being of the sixth or fainter magnitudes.

THE MOTION OF THE TAIL OF BORRELLY'S COMET (1903 iv).—From the examination of a number of photographs obtained by different observers during July, 1903, Prof. Jaegermann, Moscow, has compared the relative motions of the different sections of the tail of comet 1903 iv in regard to the movements of the comet's nucleus and to the sun. After analysing the velocities and movements determined, he has arrived at the conclusion that in this case light-pressure, acting in the sense of Arrhenius's hypothesis, was not the determining factor in the formation of the several tails, for a pressure sixty times greater than gravity would have to be assumed. If the light-pressure hypothesis be retained, the assumption must be made, according to Bredichin's idea, that the tail-matter consisted of gaseous molecules, and that its illumination was due to the fluorescence of highly illuminated gases, such as has been experimentally demonstrated by Lommel, Wiedemann, and Schmidt.

The existence of a repulsive force, other than light-pressure, was demonstrated by Bredichin in comet Rordame (1893 ii), by Prof. W. H. Pickering in comet Swift, and was confirmed by Prof. Jaegermann in a preliminary investigation concerning the denser parts of the tail of comet Swift, 1892 i.

DOUBLE STAR OBSERVATIONS.—The results of a series of observations of double stars made at Kirkwood (Indiana) Observatory are given in No. 4022 of the *Astronomische Nachrichten*. The observations were made by Mr. J. A. Miller and Prof. W. A. Cogshall with a 12-inch refractor, and the B.D. and A.G. numbers, the 1875 position, the magnitudes, and the measured position-angle and distance are given for each of 114 double stars.

The objects observed were selected from those noted as double by the Leipzig observers when preparing the A.G. catalogue for the zone $+10^\circ$ to $+15^\circ$, and, with few exceptions, they have not been measured elsewhere. Some few stars suspected by the Leipzig observers as duplicate could not be seen as such by the Kirkwood observers, and one or two of the sets of measures refer to newly discovered double stars.

THE ROYAL OBSERVATORY, GREENWICH.

ON Saturday last, June 3, the Board of Visitors made their annual inspection of the Royal Observatory, Greenwich, but unfortunately, through ill-health, the Astronomer Royal was not able to be present. The following is a brief abstract of the report which was submitted to the visitors.

Very great progress has been made in the observation of the reference stars for the Greenwich section of the Astrographic Catalogue, about 9500 observations of R.A. and N.P.D. having been added during the year. The comparatively few observations required to secure five observations of each of the reference stars (more than 10,000 in number) will easily be obtained by the end of the year, as there are only 5 stars requiring three observ-