The Royal Observatory, Greenwich.

ANNUAL VISITATION.

THE visitation of the Royal Observatory was held on Saturday afternoon, June 6. A large number of guests were present, and took part in the inspection of the instruments and other exhibits.

The report of the Astronomer Royal to the Board of Visitors begins with the very welcome announcement that Mr. William Johnston Yapp has made the generous donation of £15,000 for the purpose of providing a 36-inch reflector, with a spectroscope and a 34-foot dome. This magnificent gift has been gratefully accepted by the Lords Commissioners of the Admiralty, and the order for the erection of the instrument will be placed with Messrs. Sir Howard Grubb, Parsons and Co.

Another satisfactory announcement is that the Lords Commissioners have sanctioned the purchase of a new transit-circle; the present one has been in use for eighty years; the object-glass has become so thin that it will not bear further repolishing, and many of the divisions on the circle are almost obliterated; attempts at recutting these have not proved permanent. A model of the proposed new instrument was on view. It will be, in general, similar to the reversible transit-circle at the Cape, and will be entrusted to Messrs. Cooke, Troughton and Simms, who made that instrument; it will be somewhat smaller than the present instrument; an aperture of seven inches and a focal length of eight feet are proposed, also a motor-driven micrometer for recording transits. The roof will be in the form of two semi-cylinders, with axes running east and west, and sliding apart so as to give a wide central aperture. The design is to give free circulation of air, and avoid abnormal refraction; with this aim the transit-room will be put at some distance from other buildings. It is recognised that the opening in the roof of the present instrument is too narrow, and that the shutters, when open, impede the free circulation of air. The collimators of the new instrument will be outside the main building.

More than eleven thousand transits and circle-readings were obtained with the transit-circle during the year, the sun being observed on 131 days and the moon on 79. The report gives the errors of the sun in longitude since 1901, when Newcomb's tables were introduced; the error gradually rose from zero to 1.65" in 1922 (observed greater than tabular); since then it has remained nearly stationary. The errors of Brown's tables of the moon have steadily diminished from 7.1" in 1922 (observed greater than tabular) to 5.2" in 1930.

The observations for the catalogue of 10,800 stars between N. Decl. 32° and 64° were completed last December. The new catalogue will cover the regions 0° to 24°, and 64° to the pole. The Astronomer Royal notes that this will probably be the last considerable undertaking with the present transit-circle. It is now considered unnecessary to observe stars fainter than magnitude 7.5 or 8 on the meridian; fainter stars are observed photographically on plates of large area, on the plan initiated by Prof. Schlesinger.

The 28-inch equatorial was used for observing 258 double stars, 52 of which were less than $\frac{1}{2}$ " apart. An electric motor has been installed for rotating the dome; this enables one observer to work the instrument without assistance. The determination of stellar parallaxes with the 26-inch refractor has been continued; 1140 good plates were secured during the year, and 950 plates were measured, leading to the determination of 34 new parallaxes. During Novem-

ber, December, and January 110 plates of Eros were obtained on 19 nights.

With the 30-inch reflector the determination of the colour temperature of stars has been continued. A Kodak standard acetylene burner (colour temperature 2360° K.) is now used as standard instead of a carbon arc; a colour filter is inserted in the beam from the burner. Each plate contains images of a high star, of two low stars for determination of atmospheric absorption, and of the burner. The results indicate 13,000° to 14,000° for the temperature of a star of type A₀. When the new 36-inch reflector is ready it will be used for this work. As the 30-inch is on the same mounting as the 26-inch, observations of parallax and colour temperature cannot at present be made simultaneously.

Photographs of the sun were obtained on 260 days; the record has been completed by plates from the Cape, Kodaikanal, and Tortosa. Solar activity has diminished considerably, but large spots were seen in October, February, and March. With the spectrohelioscope considerable solar eruptions were observed on Aug. 12 and Nov. 25; the latter gave an outward velocity of 450 km./sec., which is near the parabolic value.

The following are the mean magnetic elements obtained at Abinger in 1930: Decl. 12° 24.6' W.; Hor. force 0.18542; Vert. force 0.42924; Dip 66° 38.2'. The decl. is diminishing at the rate of 11½" annually, so that it should vanish a little before the end of the century. Magnetic observations are occasionally made at Greenwich in the early morning, when electric trains are not running; these will be continued, as there is an unexpectedly large range in the determinations of decl. as compared with the Abinger ones.

The following weather records refer to the year ended on April 30, 1931: temperature 50.0°, being 0.5° above the average; highest 92.2° on Aug. 28 and 29; lowest 21.0° on Mar. 10. There were 55 days when temperatures of 32.0° or lower were recorded; the mean daily movement of air was 289 miles, being 5 miles above the average; the greatest value was 713 miles on Jan. 17. There were 1320 hours of bright sunshine, or 29.6 per cent of the possible amount. The rainfall was 27.94 inches, which is 3.70 inches above the average; on June 18, 2.66 inches fell in 2 hours.

Time determinations are now made with a small reversible transit instrument fitted with a travelling micrometer; two Shortt clocks (No. 3 and No. 11) are used as standards of sidereal time; the progressive increase of losing rate of No. 11 still continues. The mean time signals are controlled by Shortt No. 16. Wireless signals from Paris, Nauen, Annapolis, and Bordeaux are registered automatically; they all agree in being apparently late on Greenwich, the amounts being 0.016 sec., 0.044 sec., 0.039 sec., and 0.033 sec. respectively. The Annapolis one is corrected for time-lag. The difference is unquestionably systematic, for out of the 48 monthly means that are printed in the report there are only three that are earlier than Greenwich.

Several photographs were exhibited of Eros and neighbouring stars; these were measured for three different purposes. The principal research was the solar parallax and the mass of the moon; the second was the light-variation, which was plainly visible in the series of images on some of the plates. The third was the determination of mean wave-length of Eros and the comparison stars, which was effected by placing a grating before the object-glass.

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