Proceedings of Observatories.

The following reports of the proceedings of Observatories during the past year have been received from the Directors of the several Observatories, who are alone responsible for the same.

Royal Observatory, Greenwich.

(Director, Sir Frank Dyson, K.B.E., Astronomer Royal.)

Transit-Circle.—The number of transits during the year 1928 was 9310, including 158 of the Sun and 103 of the Moon. The observations are reduced to epoch 1925° as far as 1928 August. The ledgers of clock and azimuth stars are complete to the end of 1927 and those of zone stars to the end of 1926. In addition to the observations of stars down to magnitude 8° and between declinations +32° and +64°, commenced in 1922, observations are being carried out on a selected list of 493 stars, north of declination −15° which will be used as reference stars for the observation of Eros in the opposition of 1930–31. The observation of these stars during 1928 has suffered from cloudy weather.

Comparisons of the observed and tabular longitudes of the Sun and of the planets Jupiter, Saturn, Uranus, and Neptune have been made since the introduction by the Nautical Almanac in 1901 of ephemerides based on the tables of Newcomb and Hill. The results of these comparisons up to the end of 1927 are given in the Monthly Notices for 1929 January.

Altazimuth.—The Altazimuth has been used for the observation of the Eros reference stars and also for the purpose of checking clock errors. 646 observations of R.A. and 563 observations of declination were obtained during the year, of which 398 and 419 respectively appertained to the Eros stars.

Cookson Floating Zenith Telescope.—During the year 243 plates for variation of latitude have been taken, and 5 plates for determination of scale. They are fairly well distributed throughout the year, but there was a deficiency of plates in June and December owing to cloudy weather. The measurement and reduction are in hand. The final reduction for the period 1919–27 was distributed during the year. The value found for the aberration constant was 20°.447.

28-inch Refractor.—During the year 375 observations of 267 double stars were made. Arranged according to separation they are:

| Under 0°.5 | 63 observations |
| 0°.5–1°.0 | 41 |
| 1°.0–2°.0 | 77 |
| Over 2°.0 | 194 |

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A further list of measures of stars in the catalogue prepared in 1919, and which have been observed on at least three nights up to early in 1928, will be published in the 1927 volume. Previous observations of stars from this catalogue have been published in the Greenwich volumes for 1920 and 1925.

An additional working catalogue of about 2000 stars whose separation does not exceed 3" is being prepared from Mr. Aitkin's various catalogues of double stars.

On Sunday nights and on other nights in which the instrument is not in use for double star observations it is employed by Dr. Steavenson for the observation of faint variable stars and of planetary detail.

Thompson Equatorial.—During the year 1050 plates have been taken for stellar parallax observations with the 26-inch refractor, and 700 plates have been measured. The parallaxes of 30 stars were published in the Monthly Notices for 1928 November. The breech end of the instrument has been modified so as to facilitate the work.

With the 30-inch reflector the work on colour-temperatures of stars has been continued. Utilising the material already obtained, a list of 24 early type stars (B2–A5) has been selected for the purpose of obtaining a set of colour standards. Additional observations of these stars, taken in pairs at equal altitudes, are being made with the object of determining their relative colour temperatures on a common basis. When this scheme of work has been completed these stars will be available as reference stars with which any other star may be compared, the reference stars having been so chosen that it will always be possible and convenient to compare any other star with one of them at an equal altitude. In this way it is proposed to determine the colours of the brighter stars of all types. The colour scale thus obtained will be an absolute one, that is to say it will be independent both of the plates and of the optical train employed.

During the year 95 comparisons of pairs of reference stars were obtained, and this part of the work should be completed in the present year. In addition 141 comparisons of 34 other stars of types Bo–Go with one or more of the reference stars have been obtained. The measurement and reduction of the photographs is practically up-to-date. Notes have been published on stars of type Bo–B2 of abnormally low colour temperature in Monthly Notices 1928 June and November.

In the spectrograph as originally constructed, a lens was used in the camera. This lens being photographically corrected, it was not possible to focus the red simultaneously with the blue. It was replaced early last year by a concave mirror used in Newtonian form. The spectra are now in sharp focus throughout, admitting of measurement in the extreme red with a consequent extension of the base line.

Astrographic Equatorial.—During the year 86 fields were photographed through the glass for determination of proper motions of stars in the Greenwich Astrographic Zone. The copy for press for Zones 64° to 70° inclusive (comprising vol. i. of the Astrographic Catalogue) has been prepared, and Zone 73° has been completely rephotographed.
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In addition to the above, 5 plates of the Pleiades have been taken at the request of Professor Hertzsprung, and a number of plates have been taken of the fields which will be utilised for the purpose of observing the gravitational deflection of light at the Solar Eclipse of 1929 May 9.

The largest proper motion found during the year was that of Astrometric Catalogue 75 857, photographic magnitude 10 7, for which the proper motions in right ascension and declination were found to be respectively $+55''$ and $-16''$ per century.

*Miscellaneous Equatorial Observations.*—Six disappearances and one reappearance of stars occulted by the Moon were observed.

*Photoheliograph.*—Photographs of the Sun were obtained on 267 days at Greenwich and on 340 days at the Cape. On 4 days photographs were not taken at either Observatory, but on 3 of these days negatives are available at Kodaikanal.

For 1928 the mean daily spotted area, corrected for foreshortening, was approximately 1250 millionths of the Sun's hemisphere. The published values for the preceding four years, 1924-27, are 276, 830, 1262, and 1058 respectively. A comparison, based on Greenwich data 1874-1927, has been made between magnetic storms and Sunspots. The results obtained so far have been published in *Monthly Notices*, 88, 556, and 89, 84.

*Clock and Time-Service.*—The free pendulum clock, Shortt No. 3, has been used throughout the year as Standard Sidereal Clock, Shortt No. 11 being kept as reserve and compared regularly with No. 3. A discussion of the performance of the two clocks is given in *Monthly Notices*, 88, No. 5, and an extension of the discussion in *Monthly Notices*, 89, No. 3.

The mean time free-pendulum clock, Shortt No. 16, now controls all clocks used for mean time-signal distribution. This arrangement gives facility for the greater regularity of individual signals throughout the day. When necessary, the mean time installation is set to time by the usual electromagnetic method.

The transmission through the Rugby wireless station of a rhythmic series of time-signals at 10th and 18th, commenced on 1927 December 19, has been maintained throughout the year, and hourly signals have been transmitted as usual to the G.P.O. Since November 1 the control apparatus arranged to transmit six clock beats at every half-hour to the British Broadcasting Corporation has been modified to send the six beats at 15-minute intervals. Following a suggestion made, the British Broadcasting Corporation courteously agreed to transmit from the Experimental Station at Chelmsford twice daily at 13th and 21st (1 hour earlier during summer time) the six clock beats on the wavelength in use at that station, usually 24 metres.

Wireless time-signals from Rugby, Paris, Nauen, Annapolis, Bordeaux, and some B.B.C. transmissions are regularly received and automatically recorded.

By arrangement with the Hydrographer of the Navy, the errors of the Rugby time-signals derived from reception at Greenwich have
been published and circulated periodically in *Notices to Mariners* throughout the year. Since July 1 the errors of the signals received from Nauen, Annapolis, and Bordeaux have also been included in the same periodical publication.

*Observations with Transit B.*—Observations of clock error were made upon 64 nights.

*Eclipse of the Sun.*—During the latter part of the year much attention has been given to preparations for the Eclipse of 1929 May 9. Dr. Jackson will be observing at Alor Star in the Malay States, and Mr. Melotte at Pattani in Siam on the other side of the peninsula about 100 miles away. Their main problem is a re-determination of the gravitational deflection of light. Dr. Jackson will use a 7-inch lens of 21-feet focus fed by a pyrex celostat kindly lent by Mr. Evershed, and Mr. Melotte will use the Astrographic telescope mounted equatorially. Observations include large scale photographs with a 6-inch object-glass of 45-feet focus by Alvan Clark, kindly lent by Mr. Worrington and used in 1927 at Giggleswick, and small scale photographs of the corona in infra-red light.

*Printing.*—The volume of Greenwich observations for 1926 and its separate parts have been distributed, together with the volume of Declinations of Stars from Observations of Transits across the Prime Vertical made with the Altazimuth in the years 1923–26, referred to in the previous report. A volume of observations made with the Cookson Floating Zenith Telescope in the years 1919–27, for determination of Variation of Latitude and the Constant of Aberration, has also been distributed.

The printing of the Greenwich observations for the year 1927 is well advanced.

*Miscellaneous.*—Mr. A. H. Miller of the Dominion Observatory, Ottawa, visited the Observatory during the Summer and carried out a series of pendulum experiments for the determination of gravity. These experiments formed part of a series of comparisons of the value of gravity at American and European stations. Mr. Miller’s observations at Greenwich and Potsdam gave a difference in good agreement with previous determinations.

Dr. Öhman of the Observatory of Upsala, Mr. S. Plakidis of the Observatory of Athens, and Dr. Petersen of the Observatory of Upsala, each visited the Observatory for a period during the year.

Royal Observatory, Edinburgh.

*(Director, Prof. R. A. Sampson, F.R.S., Astronomer Royal for Scotland.)*

The activities of the observatory have been, generally speaking, the same as last year.

With the transit-circle, time has been determined on every occasion that permitted, and some material has been accumulated to elucidate the cause of erratic determinations. With the microchronograph the four principal clocks, Riefler No. 258, Leroy No. 1230, Shortt No. 0,