

ANNUAL REPORT OF THE UNION OBSERVATORY

1926

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The staff was increased by the appointment of Mr. C. Jackson in December. During the year, joint colloquiums of the staffs of the Yale Southern Station and the Union Observatory were held on thirty-seven occasions, twenty-five here and twelve at the Yale Telescope. Several of these were attended by Professor G. Struve of the Neubabelsberg Observatory, Dr. C.G. Abbot of the Smithsonian Institution, and Dr. Perez of the Lourenco Marques Observatory. The visit of Dr. Abbot to South Africa was in connection with his search for a suitable location for an additional solar observatory; a site in South West Africa was ultimately selected. Dr. C. Horn d'Arturo of the Bologna Observatory also visited the Observatory.

26½-inch Grubb Visual Refractor. - This instrument has been in continuous use throughout the year. From the middle of March to the beginning of July the telescope was placed at the disposal of Professor G. Struve so that he could continue his series of observations of the inner satellites of Saturn, this planet now being too far south to allow of useful observations from Berlin. Professor Struve secured about 450 measures of pairs of the satellites during this period.

In conjunction with the Yale Southern Station, it has been arranged to continue the observations of the satellites until Saturn is again well observable from Berlin. The Union Observatory share of the work will be limited to visual measures of Enceladus and Mimas.

The work on Saturn naturally interfered somewhat with the double-star programme, but this was otherwise quite successful. Of the zones from -19° to the South Pole, it might be said that, over about one-fifth of the area, all stars to the 9th magnitude have been examined systematically. The work may be summarised as follows:-

1516 measures of known double stars
754 measures of new double stars.

In this connection, mention is pleasurably made of the great assistance rendered by Dr. W.H. van den Bos of Leiden Observatory. Amongst the discoveries made with the large refractor was that of ψ Sagittarii as a double star (by Dr. van den Bos) with a measured distance of $0''.21$. This discovery was communicated to Dr. Aitken, who

confirmed it with the 36-inch Lick refractor and measured the distance as O".18. This discovery, which is only one of many, shows that the dividing power of the telescope is equal to its theoretical limit and is a testimony to the work of Sir. Howard Grubb and Mr. Armstrong.

Occultations of Stars. - The programme of the last few years was maintained, i.e. to observe during each lunation about 4 or 5 disappearances of stars at the dark limb when the Moon is about 7 days old, and the dark edge is still easily visible. In addition to these a few occultations of N.A. stars were observed. In all 90 occultations were observed by one or more observers.

The occultation results since the introduction of Brown's Tables, roughly grouped, give:-

	Time Error.	Error of Moon's Mean Longitude
	s	"
1923.4	+14.6	+8.0
1923.6	13.9	7.6
1923.9	13.6	7.5
1924.1	14.9	8.2
1924.4	16.3	9.0
1925.4	14.4	7.9
1925.6	13.1	7.2
1925.8	13.0	7.1
1926.2	13.3	7.3
1926.5	13.4	7.4
1926.8	13.2	7.3

The accuracy of these results is limited by the weakness of the star positions, but Dr. Guthnick of the of the Neubabelsberg Observatory has kindly undertaken to have the places of most of the stars concerned redetermined there.

9-inch Grubb Refractor. - This telescope has been in constant use for occultations, eclipses of Jupiter's satellites, Comets Ensor and Blathwayt, measures of the wider double-stars, and, on one night a week, for visitors.

Franklin-Adams Star-Camera. - During the year 407 plates were taken with this instrument ~ith a total exposure time of 141.8 hours. The distribution of the plates was as follows:-

Minor planets and star maps	104 plates
Variable star regions	270 "
Cluster regions	27 "
Miscellaneous	6 "

150 photographic observations were secured of 40 minor planets, of which 7 were new planets. With the 6-inch guiding telescope attached to the Star-Camera, the following visual observations were made:-

- 33 occultations of stars by the Moon
- 23 eclipses of Jupiter's satellites
- 5 miscellaneous satellite observations.

Union Observatory Circulars. - During the year, Circulars Nos. 65 to 70 were issued. No. 65 gave proofs of the variability of the rotation of the Earth as disclosed by the Transits of Mercury, the motion of the Moon, eclipses of the satellites of Jupiter and the motion of the Sun; No.66 contained, amongst other matter, drawings of Mars made at the opposition of 1924; No. 68 contained a discussion of the observations of α Centauri as a double star with a new orbit; No. 69 contained a paper on the dichotomy of Venus, which is shown to occur at the geometric epoch; and No.70 illustrated the application of Cowell's Method to the movement of the Pons-Winnecke Comet at the time of its close approach to the Earth in 1927. A paper on Cowell's Method was published also in *Astronomische Nachrichten*, 5463-546. It makes the revolutionary but strictly scientific and economical suggestion that the planetary and lunar ephemerides should be computed by Cowell's Method instead of from the present tables. Circular No. 71 is in the hands of the Government printer: it will have as an appendix tables of X and Y corresponding to each degree of the mean anomaly and every 0.01 of the eccentricity from 0.00 to 1.00. The whole of the MS. of these tables is ready, but a little checking by differences remains to be done.

The present state of the work of issuing Star Maps of the southern sky is as follows:-

Maps already issued	239
Maps in Government printer's hands	35
Maps still to be made	<u>282</u>
TOTAL	<u>556</u>

Loose-leaf Catalogue of Southern Double-Stars. A start has at last been made on this work, and the Catalogue is being issued in hourly sections as run off.

The whole work of producing the Catalogue is done at the Observatory, using a typewriter and a rotary mimeograph. By this means quickest publication is secured and there is also very great economy.

The hours so far distributed are 0^h-3^h, and 16^h. The MS. for the whole is complete, but the work with the 26½-inch telescope makes changes every day, and already some of the leaves issued require replacing, but this will not be undertaken until all the hours are issued. A sort of finality cannot be attained until the surveys with the 27-inch Lamont Refractor now being erected at Bloemfontein, and with the 26½-inch refractor here have been completed.

