

ANNUAL REPORT OF THE UNION OBSERVATORY

1925

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During the year Mrs. S. Human retired and Mr. W.S. Finsen succeeded her. Professor E. Hertzsprung who arrived in November 1925, left in May, and was succeeded by Dr. W. van den Bos (also seconded by the Leiden Observatory), who arrived in August.

26½-inch Visual Refractor. - The object-glass arrived here in January and by April the observations were begun. It cannot yet be said that the object-glass is finally adjusted to its best working position, but during the last six months it has been in use every clear night, mainly, if not entirely, for double-stars observations. This work is summarised as follows:-

887 measures of double stars.
303 new double stars discovered.

The great majority of these stars thus measured are under 1" in distance, and many are from 0".18 to 0".50. Naturally the telescope has been tested by looking at the most difficult known double stars in the northern sky, and in every case such stars have been duly seen - hence the expectation that if the object-glass could be somewhat improved, its useful field of work would be greatly enlarged.

Some interesting discoveries have naturally been made and will be reported in due course. At the moment it is worth recording that the chief star in the nucleus of the great looped nebula in the Large Magellanic Cloud is a close double star, and whilst sweeping a zone for new pairs, van den Bos and Finsen measured one which they could not identify in the C.P.D. Further search revealed that the "double star" thus measured was the planet Pallas. This recalled an observation made here some years ago that Eros was seen "double".

The micrometer by Repsold is most convenient to use: its screw value is about 9". The great telescope is convenient to handle - it can be manipulated by one person, the observer - but when going over a zone for new double stars the presence of three persons is desirable. The most noticeable feature, to the observers here who were previously accustomed to much smaller apertures, is the power of the telescope in bringing out the

colours of the stars. It would be ungracious not to mention our indebtedness to Sir Howard Grubb and his skilful staff.

Occultations of Stars. - A limited programme was undertaken. In all 68 occultations were observed, of which 5 were reappearances of ephemeris stars - all dark-edge phenomena. The simple and unweighted means of all for which star-places are available is:-

	Time Error.	Error of Moon's Mean Longitude.
Disappearances	^s 13.7(55 obs.)	["] 7.5) ^{7.4}
Reappearances	12.7(5 ")	7.1)

The occultation results since the introduction of Brown's tables roughly grouped give:

Longitude.	Time Error.	Error of Moon's Mean Longitude.
	^s	["]
1923.4	14.6	8.0) Includes observations
23.6	16.9	7.6) made elsewhere: see
25.9	15.6	7.5) U.O. Circ. No.63.
24.1	14.9	8.2 See U.O. Cir. No.64.
24.4	16.3(well marked maximum)	9.0
25.4	14.4	7.9)
25.6	13.1	7.2) Unpublished
25.8	13.0	7.1)

It has to be remarked that the star-places available are in general 25 to 30 years or more old. A zodiacal catalogue of stars to the 9th magnitude is much wanted; and apart from its uses for occultations and furnishing comparison-stars for minor planets, its stellar statistical value, covering as it would a great circle of the sky, should be greater than similar data derived from small circle zones. In addition to our own reductions, a considerable number of occultations observed elsewhere during the lunation preceding and lunation following the total solar eclipse of January 1925 were reduced, and the results sent to Professor Brown and Dr. Comrie.

Time-Service. - Throughout the year, the clock corrections have been obtained from the rhythmic signals emitted at 8h U.T. by the wireless station at Bordeaux; the times of the first and the last beats, as signalled on the following day, have been used. Local Sidereal Time is obtained by adding 1^h 52^m 18^s.0 to the Greenwich Sidereal Time obtained from Bordeaux.

Variation of Latitude. - At Dr. Schlesinger's suggestion a curtailed programme of observation has been started.

Union Observatory Circulars. - During the year Circulars Nos. 62, 63, and 64 have been issued, and with them four maps of portions of the southern sky. The progress of the latter now stands as follows:-

Maps already issued	210
Maps in Government Printer's hands	14
Maps still to be made	<u>332</u>
Total	<u>556</u>

Circulars No.65 (Transit of Mercury) and No.66 (Physical Observations of Mars, etc.) are in the Government printer's hands. In No.65 a discussion upon Newcomb's lines of all the transits of Mercury is given, and the conclusion arrived at is that the Earth's rotation is variable, by jumps. This conclusion is confirmed by the time-departures of the Moon, the Sun, and the eclipses of Jupiter's Satellites I and II, the correspondence being exact within the limits of error. A short note to this effect was published in the *A.N.*, No. 5582, whilst the main paper was sent to Cambridge in time for the meeting of the Astronomical Union.

Comets. - The following comets have been observed:-

Comet Reid 1925b	on 53 nights
Comet Tempel (ii) 1925d	" 22 "
Comet Ensor 1925 1	" 13 "

The observations have been fully reduced and will appear in a forthcoming circular.

Orbits of 1925b and 1925 1 have been computed by Mr. H.E. Wood, who is also trying Nerton's and other modifications of Olber's method.

Minor Planets. - During the year 103 photographic positions of 41 minor planets have been obtained with the Franklin-Adams Star-Camera. The places have been sent to the Astronomisches Rechen-Institut.

The Secular Perturbations of Pallas by Jupiter were computed by a modification of Gauss's method, and the results sent to Dr. de Sitter.

Work in Hand. - The usual routine is: Minor planets and comets south of the Sun; eclipses of JI and JII; the measurement of double stars and a zone durchmusterung search for new ones to magnitude 9.0; occultations of stars near 1st quarter; latitude-variation.

The new catalogue of double stars is on the eve of publication, and it will be issued on the loose-leaf system. It will be composed upon a special typewriter now on order, and reproduced by a mineograph machine. As the printed pages require revision, they will be replaced by others brought up-to-date. The additions to every page of the

MS. catalogue due to the use of the 26½-inch render some such arrangement compulsory, otherwise the catalogue would practically be out-of-date on the date of issue.

A new orbit computation of α Centauri is in progress. It takes into account the secular changes of all the elements (save e), and is based on 4-year-interval normal places. The theoretical basis is a slight modification of Thiele's method (*Astron.Nachr.*, No. 2488), and requires for its convenient and general use tables of

$$\begin{array}{ll} X=r/a & \cos v \\ Y=r/a & \sin v \end{array}$$

These tables are now being computed to five decimal places for each degree of M (mean anomaly), and each 0.01 of the eccentricity from 0.00 to 1.00. These tables when completed will have other uses, especially when Cowell's powerful method comes into its own.