8. COMMISSION DE L'ASTRONOMIE MÉRIDIENNE

PRÉSIDENT: M. DYSON, *Astronomer Royal, Royal Observatory, Greenwich, England.*

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1. Since the meeting of 1925 there has been much discussion of the fundamental catalogues. This was stimulated by Kapteyn's remark that a correction of $+''\cdot013 \cos\delta$ to proper motions in declination would bring good agreement in the position of the solar apex from meridian and line of sight observations. Reference was made in the last report to Eichelberger's system, adopted in the *American Ephemeris* and based on modern Washington and Cape observations and the positions at the mean epoch of Boss' *Preliminary General Catalogue.*

In *A.J.* 857 Raymond has discussed the corrections to the declination system of Boss' *Preliminary General Catalogue,* and in *A.J.* 884, B. Boss and H. Jenkins have compared the Albany and San Luis observations made in the closing years of the last century with Boss' system. These investigations are in substantial agreement and give corrections to the declinations and proper motions of the *Preliminary General Catalogue* in the same direction as Eichelberger but of much smaller amount. In *A.N.* 5540 Kopff has determined provisional corrections to Auwers' *Fundamental Catalogue* for stars north of $-20°$ dec. Both in right ascension and declination he finds smaller corrections than Eichelberger to the systems of Auwers, Newcomb and Boss. Since the date of the last report recent observations of the fundamental stars have been published by the observatories of Algiers, Babelsberg, Pulkovo and Washington, and one from the Cape is in the press.

Considerable attention is being given to observations of the sun and planets for the determination of equinox and equator point, and they are being regularly made at Algiers, the Cape, Greenwich, Ottawa and Washington.

In connection with the question of fundamental declinations reference may be made to the prime vertical observations at Greenwich and the observations of azimuth by Sander at Matuba. The azimuth observations projected by de Sitter have not been carried out owing to delay in the construction of the instrument, but this is practically completed and observations at a station near the equator will be commenced shortly.

In *A.J.* 876 Raymond has published the declinations of 47 stars observed by Pond and reduced by Chandler and has compared them with Boss' *Catalogue.* The re-reduction of Hornsby's observations by Jackson and Knox Shaw is progressing rapidly but no results have as yet been published.

Although there are many considerations which render desirable the adoption of one fundamental catalogue by astronomers in all ephemerides, it would seem that the time has hardly arrived when this can be done. The adoption of the same equinox for some definite data, say 1925, would seem worthy of consideration.

2. The stars contained in the list drawn up by Backlund and Hough have been widely observed. It would seem desirable that these stars should be kept under continuous observation, as far as circumstances permit, by observatories which are doing fundamental work. This list contains 3064 stars distributed

uniformly over the sky and makes a necessary extension of the classical lists of the old fundamental catalogues.

At the last meeting attention was drawn to the fact that while Hedrick's *Catalogue* gives the results of the earlier observations of Zodiacal stars, the large number of observations made about 1900 at the instigation of Gill had not been co-ordinated. The preparation of a new Zodiacal Catalogue is being undertaken by Eichelberger, and observations of Zodiacal stars are being made at the Cape and Washington. This catalogue will be of special value to observers of occultations. In addition, it contains many stars which have been long under observation, and is of an almost fundamental character.

3. About the time of the last meeting of the Union two lists of stars to be used as reference stars at the Opposition of Eros in 1930–31 were drawn up by Kopff. Observations made by Tucker at the Lick Observatory have already been published (*Lick Bulletins* 391 and 392). The crowding of the stars from 9 h. 30 m. R.A. onwards makes it difficult to obtain many observations of the stars in this part of the list. The observatories at the Cape, Greenwich, Hamburg, Uccle and Washington have made every effort, and it appears that the first list has been well observed. The second list will, in all probability, be only poorly observed. The question may well arise whether photographic observations should not be made at any rate for the period from Jan. 1 to Feb. 28 when the parallax of Eros is greater than 40″. During this period the R.A. is between 9 h. 30 m. and 10 h. 30 m. and the declination from + 26° to − 24°.

4. Zone catalogues of 11,800 stars from + 35° to + 40° (Gyllenberg), of 9997 stars from − 17°·50′ to − 23°·0 (Algiers), and 12,747 stars − 32°·0 to − 37°·0 (Cordoba) have been published since the last meeting. The observation of the reference stars in the Southern Kapteyn areas has been completed at La Plata. The use of wide-angle lenses, covering large fields, introduced by Schlesinger, is being followed at Bonn, the Cape, and Hamburg. It seems likely that this method will replace Zone observations, but co-operation will be required with meridian observers for reference stars. "Intermediary" stars from + 90° to − 30° have been observed at Washington, and those from + 50° to + 90°, observed at Bonn, have been published in a catalogue of 1830 stars for the epoch 1925·0. These are suitable as reference stars, but many of them are very faint for meridian observing.

F. W. Dyson
President of the Commission

Appendix

The following suggestions have been made of subjects which may be usefully discussed at Leiden.

1. In order to throw more light on the nature of apparent diurnal changes in clock rate and of the annual changes in right ascension depending upon right ascensions it is proposed that, where possible, special programmes be inaugurated comprising the following features:

(*a*) Determination of 24-hour rates from observations of identical groups of stars made by the same observer.
(*b*) Inclusion of 12-hour clock rates.
(*c*) Observations of groups of clock stars by the same observer at intervals of about an hour, to be carried over as long a period of the day as possible, daylight as well as night observations to be included.

(*d*) Observation of the same circumpolar stars above and below pole, made by the same observer. (Boss.)

2. The following suggestions are designed to produce uniform systems of declination from pole to pole:

(*a*) The ideal programme requires that the same observers, with the same instrument, observe declinations from northern and southern hemispheres, extending the observations to overlap as wide an arc as possible.

(*b*) Where it is impossible to remove observers and instrument to the opposite hemisphere, two observatories north and south of the equator might agree upon a list of stars to be observed simultaneously, observing and reducing their observations in an identical manner. (Boss.)

3. In connection with meteorological data, it is recommended that whirling thermometers, Assam thermometers, or thermometers mounted in air currents maintained by blowers, be used.

Stagnant air often gives thermometer readings as much as 0°·5 C. in error. (Littell.)

4. It is recommended that in all fundamental work, regular observations of the sun and planets (also possibly of the moon and minor planets) be included for the special purpose of determining the position of the celestial equator, thus affording a fixed reference line in the middle of the celestial sphere, almost as definite as the circumpolars furnish at the two poles. At the same time this affords the usual means of determining the equinoctial point. (Littell.)

5. In fundamental work in right ascension, even if the impersonal self-registering micrometer is used, it is recommended that absolute personal equations for stars, sun, moon and planets, be determined, by special apparatus, for each observer. In the cases where a fixed reticle is used, such determinations are even more necessary. (Littell.)

6. Determinations of time in the direct and reversed positions are not always consistent. It is suggested that the effect may vary with meteorological conditions in such a way as to produce seasonal variation. The problem might be approached by establishing a right ascension system on observations made with a small quickly-reversible instrument. (Jeffers.)

7. It is recommended that all meridian work be published at as early a date as possible. (Porter.)

8. It seems desirable to consider further the co-ordination of meridian and photographic observations and to decide whether meridian circle observers should give preference to the fundamental lists published by the *Conn. des Temps* and to the list of intermediary stars as recommended in 1922, or whether the fundamental list should be extended to include all stars to a certain magnitude as was suggested in 1925. (Hammond.)

9. Attention of meridian observers is called to the phenomenon of the difference in transits observed near sunset and sunrise.

As distinctly verified at Lick Observatory, meridian transits are recorded $0^s{\cdot}06$ earlier at sunset than at sunrise. This difference is probably divided, and transits are recorded $0^s{\cdot}03$ too early at sunset, and $0^s{\cdot}03$ too late at sunrise.

While this would appear to be a problem for the improvement of fundamental right ascensions, yet in the series of observations for the *Eros* stars transits of bright stars may extend into the sunrise period at the beginning, and fall within

the sunset period at the close. One apparent effect is a faster computed clock rate during the night than the actual daily rate of the clock.

Azimuth computations from observations of the circumpolar stars during periods near sunset and sunrise would also be affected. The phenomenon is clearly not due to the usual form of the magnitude equation in transits observed with bright sky illumination.

It can be tested for any station by observations of two groups of stars, differing by twelve hours, near sunset and sunrise; and repeated six months later, to eliminate the errors in the adopted right ascensions of the clock stars. Such checks upon fundamental right ascensions appear to be of prime importance.

(TUCKER.)

10. It is desirable that the Commission should make a recommendation with regard to the equinox to be adopted for meridian catalogues. The correction required by Newcomb's equinox at the present epoch is known with considerable accuracy and Eichelberger's *Catalogue* incorporates the correction. The equinox of this catalogue might conveniently be adopted now that the positions of the catalogue are used in several of the ephemerides, and adhered to until such time as a further recommendation should be made. There has hitherto been no uniformity in the procedure adopted at different observatories and a recommendation by the Commission would help in securing uniformity in future.

(JONES.)