

III. JOINT DISCUSSION ON FUNDAMENTAL STARS

(5 September 1955)

CHAIRMAN: Prof. O. Heckmann.

SECRETARIES: Dr E. P. Fedorov, Dr A. Reiz.

INTERPRETER: Mrs S. D. Gossner.

I. REPORT ON THE REVISION AND ENLARGEMENT OF THE FK₃

By A. KOPFF

Already at the meeting of I.A.U. at Rome 1952 the revision and enlargement of FK₃ was announced (Recommendation 17 of Commission 4). A 'Note on the revision of FK₃ and the formation of a FK₃ Supp.' was published in December 1952 by the Astronomisches Rechen-Institut at Heidelberg.

Meanwhile, two circumstances make it necessary to accelerate the work: the second repetition of the Catalogue of the Astronomische Gesellschaft and the announcement of the International Geophysical Year.

(1) *The state of the work.* The number of the new catalogues available for the revision of FK₃, which were observed after the publication of FK₃, has grown up to more than 70; the greater part of them can only be used for the individual corrections of the places and proper motions and not for the correction of the system of FK₃ itself.

The work began in the middle of the year 1953. The comparison of the observed catalogues is finished for the greater part and the weights of the catalogues in the system of the weights of Auwers are being obtained for the declinations, so that the individual revision of the places and proper motions can be started. Details are given in an article in the *Monthly Notices* subsequently mentioned.

The individual corrections must be followed by the systematic correction of the FK₃, which is especially necessary for the stars of high northern declination and for the southern sky. For this last part the small number of observations on the southern hemisphere is more conspicuous than it was for the formation of FK₃ itself. Individual corrections for the northern sky should be finished towards the beginning of 1957, for the southern sky by 1958.*

(2) *The paper in 'Monthly Notices', vol. 114, p. 478, 1954.* There the work of revision of FK₃ is discussed in detail and a comparison of FK₃ with N₃₀ is given. It must be mentioned here again that N₃₀ is not a fundamental catalogue in a strict sense. For the mean epoch 1930 the catalogue is the best available, but not for epoch 1950, for which it is given, especially not for the proper motions (compare the papers of Nemiro).

Contrary to N₃₀ the revision of FK₃, which is now going on, refers to the positions and the proper motions of FK₃ (compare the article in *M.N.*). The whole material of the nineteenth century is thus fully used for the formation of the proper motions in the revised FK₃.

(3) *The additional stars (Zusatzsterne) of FK₃.* The question was: have these additional stars changed the system of the old Auwers stars? The results of a new inquiry into this question by H. Nowacki appeared in the *Nachrichtenblatt* of the Astronomische Zentralstelle (9. Jahrgang, S. 15, 1955). From the curves and tables you will see that the system is not changed by the additional stars, so that the whole system of FK₃ is a homogeneous one (Auwers- + Zusatzsterne). Copies of this paper are to be distributed.

(4) *The Supplementary stars of FK₃ (FK₃ Supp.).* In the Appendices to the *Astronomisch-Geodätisches Jahrbuch* for 1954 and 1956 the number of 1987 suppl. stars brighter than 7 mag. are given. The formation of FK₃ Supp. was necessary for the special

* The individual corrections for the whole sky can be completed by the middle of 1957, so that the individually revised FK₃R will be available for the geophysical year (11. 10. 1956).

demands of the Deutsche Geodätische Kommission and is also necessary for the special needs of astronomy itself. The number of bright stars in FK 3 and FK 3 Supp. is nearly the same as the number of bright stars in N 30. But the distribution of these stars in both hemispheres is much more regular than in N 30.

Positions and proper motions of FK 3 Supp. stars are at the moment taken from N 30. But it is absolutely necessary to observe in future these stars on the meridian circles of both hemispheres. I therefore propose to observe these Supp. stars within the programme of the Anhaltssterne for AGK 3, as it is also planned for other stars. Observers who wish to observe FK 3 Supp. should give a note to the Astronomisches Rechen-Institut.

REMARKS

Answering a question from Prof. Heckmann, Prof. Kopff explained that he was willing to provide to observers intermediate corrections for 1957 as well as for later dates.

2. FK 3, N 30 AND PULKOVO ABSOLUTE CATALOGUES

By A. A. NEMIRO

I. PULKOVO ABSOLUTE OBSERVATIONS

The Pulkovo absolute catalogues of right ascensions and declinations of stars have played an important part in deriving the fundamental systems now in use. The Pulkovo catalogues were given very high weights when the work on the FK 3, the GC and the N 30 was carried out.

The continuation of the traditional Pulkovo series of absolute determinations appears to be a very important task at the present time too, since this work is closely connected with the improvement of the existing fundamental systems.

Another work of paramount importance is the preparation of the new fundamental catalogue of faint stars (FKSZ), the proper motions of which must be referred to extragalactic nebulae.

The preparation of the FKSZ has a direct bearing on the classical problem of the formation of fundamental systems. That is why the meridian observations of brighter and fainter stars should be carried out simultaneously with the same instruments.

In view of these two requirements, the Pulkovo programme of absolute observations has been considerably extended. It contains now not only the bright Pulkovo stars, but also all the FKSZ stars in the zone from $+90^\circ$ to -10° .

The list of bright stars involved in the programme of absolute determinations was revised⁽¹⁾. Some double stars, as well as some stars for which neighbouring stars might impede visual and especially photo-electric observations, were replaced. The present programme thus covers 625 bright fundamental stars in the declination zone from $+90^\circ$ to -30° . 515 of them (from $+90^\circ$ to -10°) are observed at Pulkovo. The stars are uniformly distributed in α and δ (but not over the area!). All of them are contained in the FK 3. In this way, with an additional 531 FKSZ stars, the Pulkovo programme of absolute observations covers 1046 stars, 332 of them being observed in both culminations. This new Pulkovo programme has also been adopted at Nikolaiev, Tashkent and Kazan.

In our opinion, the number of stars in absolute catalogues must not exceed ca. 1000, since such a limitation contributes to the improvement of the accuracy of the observations. The observations for catalogues containing several thousands of stars can be performed quite efficiently with meridian circles by means of differential methods.

The Pulkovo methods of absolute determinations of right ascensions and declinations have been employed quite successfully for many decades both at Pulkovo and at some other observatories. At present some modifications of these methods are required. In determining the right ascensions, it seems advisable, for instance, to confine the observation of stars to night time. This is particularly important for the photo-electric registration of star transits which will be made in the very near future. With this aim in view, a new