

## 8. COMMISSION DE L'ASTRONOMIE DE POSITION

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MEMBRES: Atkinson, Barros, Bohrmann, Danjon, Demetrescu, Dick, Dyukov†, Gondolatsch, Gordon, Haas, J. Jackson†, Spencer Jones†, Kopff†, Lacroute, Larink, Lévy, Maître, McClenahan, Nakano, Nefedieva, Nemiro, Pilowski, Planelles, Podobed, Reiz, Schmeidler, Sémirot, Slaucitajs, Spigl, Stoy, Symms, Tuzi, van Herk, Verbaandert, Watts, Woolsey, Xanthakis, Zimmermann, Zverev.

La Commission a une Sous-Commission: 8a

### INTRODUCTION

It is with deep regret that we record the death of the following eminent members of our Commission: J. Jackson 9 December 1958, A. Kopff 25 April 1960, Sir Harold Spencer Jones 3 November 1960, and I. A. Dyukov 25 June 1961.

This report is based on replies received to circular letters sent out on 26 April 1960 and on 2 August 1960. The first letter, a request for commitments to observe the star lists mentioned in Resolution no. 17 of the last meeting, was given a limited distribution inasmuch as it was not sent to any observer situated at a latitude where he could take part in the proposed Southern Reference Star Program. The second letter, a request for material for this report, was given as wide a distribution as possible.

The responses to both circulars were most gratifying and I wish to extend my thanks to all of those who were kind enough to reply. The task of digesting the contents of 65 individual reports and collating the whole material into a concise single report on the activities in the field of positional astronomy is not simple. For that reason the writer would greatly appreciate having any errors, omissions, or inaccuracies drawn to his attention so that proper note may be made of them at the first session of this Commission at Berkeley.

### ACTIVITIES IN SUPPORT OF RESOLUTIONS PROPOSED BY COMMISSION 8 AT THE GENERAL ASSEMBLY IN MOSCOW

*Resolutions no. 14 and no. 15.* The Royal Greenwich Observatory installed an astrolabe at Herstmonceux during 1959 and the U.S. Naval Observatory Time Service plans to move one to Richmond, Florida. Two such instruments are already in operation at the Paris Observatory. The instrument at Quito has been received and it is understood that it will be put in operation. In this connection, a letter stating the contents of Resolution no. 15 and making the appropriate request for action, was prepared by the General Secretary and sent to cognizant officials in Quito on 17 March 1959.

*Resolution no. 16.* The Naval Observatory at Buenos Aires and the Observatory at Santiago, Chile, are considering a discussion of observations accumulated with their Time Service instruments for the purpose of improving the positions of the stars in their observing lists. W. D. Heintz's 'Relative Right Ascensions of 856 Fundamental Stars' ( $\alpha$ ), is a good example of what can be done with such observations. A discussion of over 50 000 observations made with photo-electric transit instruments during the IGY and IGC is in progress in the Time Service Departments of the Pulkovo and Nikolaiev Observatories. The objective of the work is the compilation of independent catalogues of right ascensions of the stars observed. A preliminary catalogue of 505 stars between  $0^\circ$  and  $+80^\circ$  declination has been completed at Pulkovo.

*Resolution no. 17.* A circular letter of 26 April 1960 brought forth the following commitments to observe the star lists mentioned in this resolution. The dates given indicate the approximate times at which observations will commence. Bright Stars: Lund after 1 January 1961, Pulkovo meridian circle during 1962, Nikolaiev meridian circle after 1963, Babelsberg after the AGK 3R, U.S. Naval Observatory six-inch transit circle about 1963, Ottawa after the installation of the mirror transit circle, Strasbourg  $+90^\circ$  to  $+25^\circ$  declinations during 1962, and San Fernando after January 1962. Double Stars: Pulkovo meridian circle during 1962, Nikolaiev meridian circle by 1963, Strasbourg  $+90^\circ$  to  $+25^\circ$  declinations during 1962, Paris after the renovation of the instrument house if it is then not too late, Babelsberg after the AGK 3R, and Bucharest north of  $-10^\circ$  after 1962. Latitude Stars: Kiev under observation at present, Engelhardt autumn 1961, Pulkovo vertical circle during 1962, and the Nikolaiev vertical circle by 1963. PZT Stars: Kharkov during 1962, Pulkovo meridian circle during 1962, Nikolaiev by 1963, U.S. Naval Observatory seven-inch transit circle during 1961, and Kiev decision to be made later.

The Pulkovo Observatory has offered to assist with the centralized computations connected with these programs.

*Resolution no. 18.* Report will be made by D. Brouwer.

PROGRAMS AND STUDIES IN PROGRESS IN SUPPORT OF RECOMMENDATIONS  
BY THE IAU AND OTHER INTERNATIONAL ORGANIZATIONS

*The Revision of the FK 3.* The improvement of the system of positions and proper motions of the FK 3 has been in progress since 1957. The work on the declinations is completed and that on the right ascensions is nearly completed.

The positions and proper motions of the FK 4 will be published as soon as possible after the completion of the work. In order to facilitate the transition from the FK 3 to the FK 4, and from FK 3R to FK 4, suitable tables of the differences FK 4 *minus* FK 3 and FK 4 *minus* FK 3R for selected equinoxes will be published in 1961.

The work on the revision of the FK 3 to produce the FK 4 clearly indicates the necessity for more series of absolute observations in the southern hemisphere. The FK 4 system of motions in right ascension in the northern hemisphere depends on series of observations produced at Greenwich, Pulkovo, and Washington, whereas, in the southern hemisphere, it depends only on observations produced at the Cape Observatory. The possibility of discontinuities in instrumental systems makes it dangerous to construct a fundamental co-ordinate system on such scanty material; in particular, the right ascensions in the neighborhood of the polar caps are not completely satisfactory. The systematic FK 4–FK 3 differences are generally greater in R.A. than in Dec. On the average, the error of the centennial proper motion system may be as much as three times that of the right ascension system. This means that the systematic error introduced in the FK 4 places by the proper motions is already comparable with the error of the position system. The mean epochs of the right ascension and declination systems are about 1935 and 1928, respectively. See reference (2).

*Geschichte des Fixsternhimmels.* The compilation of the southern part of the GFH was continued. Volumes 1–17 of Abteilung II, the part done under the direction of J. Haas (Kommission für die GFH of the Prussian Academy of Sciences), have been completed for several years. The remaining part of Abteilung II is being produced under the direction of J. Dick (Deutsche Akademie der Wissenschaften zu Berlin). Of this part, the volumes for 23<sup>h</sup>, 22<sup>h</sup>, 21<sup>h</sup>, and the first half of 20<sup>h</sup> and 19<sup>h</sup> have been printed. The second half of 20<sup>h</sup> is in press and the manuscript for the last half of 19<sup>h</sup> has been completed. The remaining volumes for 17<sup>h</sup> and 18<sup>h</sup> are in progress.

In order to facilitate the search of the GFH for stars in doing proper motion work the U.S. Naval Observatory is preparing an index to the GFH. This index will be arranged according to BD number and will give the volume, page, and column of the GFH in which the star may be found as well as the number of catalogues entered in the GFH for the star. It is expected that the index for the northern GFH will be completed by 1963.0. The index for the southern GFH is also in progress but cannot be completed until the remaining volumes of the GFH have been published.

If sufficient demand for such an index appears to exist it may be possible to arrange for a limited publication of this work.

*Index der Sternörter.* The first volume of the new index is in press and should appear early in 1961. It is hoped that the remaining material will be published during 1962.

*Stars of the Blaauw and Parenago Lists.* Observations of stars from Blaauw's list have just been completed at Besançon and are in progress at Herstmonceux, Munich, and Ottawa (stars marked p). The U.S. Naval Observatory is observing stars from the Parenago list with the seven-inch transit circle.

*KSZ and FKSZ.* Observations of these stars north of  $-20^\circ$  declination and additional stars near selected galaxies (3) have been in progress at Kazan, Kiev, Moscow, Nikolaiev, Odessa, Tashkent, and Bucharest. All of these stars north of  $-5^\circ$  declination are included in the AGK 3R list. The La Plata Observatory is observing the FKSZ stars south of  $+10^\circ$  declination.

*AGK 3R Program.* See report of Sub-Commission 8a.

#### OBSERVATORIES: OBSERVATIONS AND DISCUSSIONS

Observations for the *Second Cape Catalogue for 1950.0* were completed early in 1959 and printer's copy, with the exception of proper motions, has been prepared. This catalogue, containing 6763 stars, includes many of the FK 3 stars south of  $+30^\circ$  and most of the GC stars brighter than  $8^m.5$  between  $-30^\circ$  and  $-52^\circ$ . A second section of the catalogue contains 450 stars south of  $-80^\circ$  selected to serve as standards for the reduction of photographic astrometric observations. A short program of observations of the right ascensions of FK 3 stars has been undertaken while alterations are being made on the declination circle cameras.

The Cooke transit circle of the Royal Greenwich Observatory has been engaged in a program of fundamental observations since 1957. The observing list contains the AGK 3R stars, FK 3 and FK 3 Supp. stars north of  $-30^\circ$ , various PZT star lists, Blaauw's star list, and members of the solar system, including the four brightest asteroids. The very transparent skies at Herstmonceux have led to a modification of the traditional practice at Greenwich with regard to the control of the  $\Delta\alpha_a$  term in fundamental work. It is now possible to strengthen the former 12-hour and 6-hour series through the inclusion of 24-hour series. Several consecutive series of this kind have already been obtained. Similarly, the ability to observe the azimuth stars at consecutive upper and lower transits, in combination with meridian mark readings, has permitted the azimuth error of the instrument to be determined free of star place. Proper motions in declination of several hundred bright stars are being determined from observations made between 1851 and 1940 with the Airy transit circle. The introduction of traveling threads in 1915 precludes a similar treatment of the right ascensions. The Herstmonceux PZT list has been reduced to 128 stars. The revised places of these stars are given in *RG0 Bulletin* no. 11, 1959.

The program of the Ottawa meridian circle, described in the Report for the Moscow meeting, will be completed during 1962. The AGK 3R observations will be finished by the end of 1960.

No future programs are planned for this instrument. The PZT observations made at Ottawa from 1952 to 1960 are being formed into a catalogue.

The six-inch transit circle at the U.S. Naval Observatory has been engaged in a program of fundamental observations of FK 3 and FK 3 Supp. stars north of  $-30^\circ$ . This program also includes the Sun, Moon, planets, and the four brightest asteroids. In addition, 11 686 AGK 3R stars are being observed differentially. The seven-inch transit circle, since 1957, has been engaged in a program of differential observations of 11 326 AGK 3R stars, 246 Parenago stars, 3000 close double stars (van Herk's list), and PZT stars. The final reductions for the 1949–55 work with the six-inch transit circle (see last report for details) are in progress.

In addition to its AGK 3R commitment, the Pulkovo Observatory has been conducting a program of fundamental observations of 515 bright Struve stars (4), 531 FKSZ stars, BD 89° 3, and of the Sun during spring and autumn. The program started in 1954 has been concluded. The Pulkovo Observatory is completing the reductions of the fundamental observations of 2500 Backlund-Hough stars made at Melbourne between 1928 and 1941. Fundamental observations of the Sun, Moon, major planets, and 625 Struve stars north of  $-30^\circ$  have been in progress at the Nikolaiev Observatory. The Nikolaiev Commitment to the AGK 3R is nearly completed.

The fundamental program of the vertical circle at the Goloseevo (Kiev) Observatory contains 1792 Struve and FK 3 stars north of  $-30^\circ$ , the FKSZ stars north of  $-25^\circ$ , BD 89° 3, Vesta, and Pallas. Both the Kiev and Kharkov Observatories have continued the determination of the right ascensions of circumpolar stars. The reductions of a series of meridian circle observations of circumpolar stars made 1909–14 are in progress at Kharkov.

The Odessa Observatory compiled the following catalogues: 'Improved Proper Motions of 46 Cepheids' (5), 'Positions of 70 Variable Stars' (6), and 'Declinations of the Latitude Stars of Poltava, Pulkovo, and Engelhardt Observatories'.

The Sternberg Astronomical Institute compiled a 'Catalogue of Right Ascensions of 99 Circumpolar Stars' and a 'Catalogue of FKSZ Stars based on the 1953–57 meridian circle observations made at Moscow'. The reductions of meridian circle observations of 1058 stars between  $+50^\circ$  and  $+55^\circ$ , made 1918–32 by S. Kasakov at Moscow, are in progress.

The Paris Observatory, after the completion of its AGK 3R work, will undertake the publication of several meridian circle catalogues completed about 1956. (See *Trans. IAU* 9, 111). The Paris Astrolabe results presented at the Moscow Meeting were published in full (7). Since then a program including over 400 FK 3 and FK 3 Supp. stars has been commenced with two astrolabes of Model O.P.L. It is planned that each star will be observed 20 times at both the east and west passages. The results appear to be extremely accurate and indicate the errors of the FK 3 given by the FK 3R are underestimated.

A catalogue of meridian circle observations of 2024 reference stars for the zone  $+11^\circ$  to  $+18^\circ$  observed at Bordeaux from 1950 to 1955 was published in 1958 by the Centre National de la Recherche Scientifique. Both Bordeaux and Strasbourg are well advanced with their AGK 3R commitments. A program of observations of the Blaauw stars and a few other Orion stars has been in progress since 1957 at Besançon.

The Uccle Observatory will publish a catalogue of proper motions of 440 stars of the International Latitude Star lists in 1961.

Observations of the AGK 3R stars at Heidelberg will be completed in 1961. The Bergedorf and Babelsberg commitments to this program were about 70% and 80% completed, respectively, as of September 1960. A selection of FK 3 Supp. stars is also under observation at

Babelsberg. J. E. B. v. d. Heide determined curves of the azimuthal component of the polar variation from studies of the azimuth of the meridian marks as determined from observations of the FK 3 stars. These curves are in good accord with similar curves based on data published by the BIH.

F. Schmeidler, using the Munich vertical circle, is engaged in a program of observations of the FK 3 Zusatz stars. W. D. Heintz of the same Observatory recently completed the observations of a list of double stars and stars from the Blaauw list.

The Astronomical Observatory at Brorfelde proposes to use its new photographic meridian circle on programs of astrophysical interest. The first of these, a proper motion program in the Perseus region, has been started.

The program of observations of the right ascension of the Moon by K. Tuzi with the Tokyo Repsold transit instrument was completed in 1959. A catalogue of positions of the equatorial stars will be published in 1961. Observations of the Moon, outer planets, and the four brightest asteroids with respect to the FK 3 stars were continued by S. Nakano with the Gautier meridian circle. The observed right ascensions of these objects from 1957 to 1959 have been published (8), as also was a catalogue of 612 zenith stars (9). The (O-C)'s for the Moon's mean longitude were  $-4^{\text{m}}36$ ,  $-4^{\text{m}}72$  and  $-4^{\text{m}}98$  for the epochs 1957.480, 1958.511 and 1959.530 respectively. Limb corrections were neglected. The manuscript for the declinations of the planets observed 1954-59 is under way. Stars selected from the PZT lists of Mitaka, Mizusawa, Washington and Richmond were observed with this instrument from January 1958 through January 1959.

The La Plata Observatory has continued the observations of the zone  $-72^{\circ}$  to  $-82^{\circ}$  and the Faint Fundamental Stars. The computational work on a catalogue of absolute declinations of 157 FK 3 stars is expected to be finished during the year 1961.

The Cordoba Observatory is completing the reduction of the observations of stars in the south polar cap,  $-82^{\circ}$  to  $-90^{\circ}$ . A reprinting of the *Cordoba Durchmusterung* is in progress.

#### INSTRUMENTS

The last three years have been characterized by the progress that has been made in the relocation of a number of meridian circles and plans that are in progress for providing better housing for a number of others.

The new Askania meridian circle of the Cagigal Observatory will be set up in Caracas for testing, pending the completion of a selection of a suitable site outside the city. Other sites are also being examined for the location of the astrophysical instruments of this Observatory. The Lick Observatory meridian circle is being installed at La Leona, Argentina ( $-50^{\circ}$  latitude). A dome to house this instrument is in an advanced state of construction. Dedication ceremonies for the La Leona Observatory were held 7-11 November 1960. The Cordoba meridian circle is in the process of being moved to San Juan in western Argentina. The construction of a new house for the instrument is in progress. The move of the Santiago, Chile, Observatory to a site outside of the city is in an advanced state of progress. The meridian circle has been mounted but cannot be put into operation until construction work in the vicinity has been more nearly completed. Plans for moving the Bucharest meridian circle out of the city are in a favorable state. It is possible that this move may be completed about 1963.

The construction of improved housing for the Heidelberg and Paris meridian circles is scheduled to start in the near future. Both of these projects will require about two years for completion.

Progress has been reported on the design and construction of four mirror transit circles. The



Ottawa instrument will be completely assembled by the summer of 1961. Minor modifications may be necessary before it will be put into use. Tests of photographs of stars and instrumental constants have proved most encouraging. The mirror transit at the University of Oporto (10) constructed by M. P. Barros, is nearly completed but will not be put into use due to lack of funds. The installation of a large horizontal mirror transit, (objective 20 cm, focal length 4 m) according to the design of Sukharev has been started at Pulkovo. Tests of an axis and mirror for R. d'E. Atkinson's proposed mirror transit at the Royal Greenwich Observatory have proved most satisfactory. The complete design of this instrument is well advanced.

Two new instruments for absolute observations are under construction at Pulkovo. One is a transit instrument with a central pentagon and the other is a photographic vertical circle. The former is according to the idea of A. A. Nemiro and the latter by M. S. Zverev. These instruments are proposed for the Southern Hemisphere Expedition.

H. S. Spigl reports that the pivots of the Perth Observatory meridian circle are being reshaped and tested. New pivot supports have been installed. It is quite possible that this instrument will be in operation by 1962.

A special transit designed to be free of the effects of pivot errors and flexure was constructed at the University of Oporto by Barros (11). Tests of this instrument started in July 1960.

K. Pilowski at Hanover made a series of test observations of declinations with a newly designed portable meridian circle (12). The results of these tests have not yet been published.

The construction of the Lund photographic transit circle according to the plans presented by Reiz and Hanson at the last Meeting has continued. The new Brorfelde photographic transit circle by Grubb-Parsons was put into operation during the spring of 1960. A program of Küstner series of observations undertaken at that time showed promising results. It appears that stars ranging from  $4^m$  to  $10^{m.5}$  may be photographed with ease. Thus, a good relation of faint stars to bright stars may be obtained with this telescope. The micrometer of this instrument is photographic with a plate drive adjustable for declination. The position of the stellar image is measured with respect to fiducial marks impressed on the plate during the course of the observation. The collimation error, and the level from nadir observations, are determined photographically. The azimuth error is determined from observations of close circumpolar stars.

Numerous experiments and developments for reading the circles have been in progress. A. Efimov at Pulkovo has continued the development of a photo-electric method for reading circles. J. Matsumoto at Tokyo developed a model instrument using photo-multipliers for reading photographic records of the circle. Plans are in progress at Brorfelde to modify the Watts measuring engine so as to permit the measurement of the reference line with respect to a pair of adjacent divisions on the photograph of the circle. A projection apparatus, using a Zeiss Spiralokular, was constructed at Babelsberg for reading the circle photographs. The Cape Observatory has completely redesigned the circle cameras so as to give higher initial magnification. It is expected that this will improve the accuracy of the circle readings. The Uccle Observatory is planning a method to make the measurement of the circle photographs quasi-automatic.

The motor drive for the right ascension micrometer and the selsyn motor device for recording the readings of the zenith distance micrometer described at the last meeting by P. Sémirot have been constructed and are now under test at Bordeaux. The electronic apparatus at Hermonceaux for recording transits directly on punched cards has proved to be a marked success and has resulted in an extraordinary saving of office time. A digital recording system is being developed for the transit circles at the U.S. Naval Observatory under the supervision of A. N.

Adams. A servo-repeater system, using miniature synchro-resolvers geared to the micrometer screws, is used to connect the micrometer to a shaft position encoder. At the observer's discretion, pulses from the standard clock cause the device to record the position of the micrometer screws (traveling threads) to the nearest milli-revolution. The recording part of the cycle requires less than 50 micro-seconds. The record may be printed, punched on cards, or recorded on tape. For declination, the positions of both right-ascension and declination screws are recorded, while, for right ascension, the instant of the clock pulse and the reading of the right ascension screw are recorded. An improved motor drive for the right ascension screw is also under development.

Paralleling the developments for automatic registration of the micrometer readings, considerable thought has been given to the problem of photo-electric guiding. A new photo-electric transit, constructed according to the design of N. N. Pavlov, has been placed in operation in the Time Service of the Pulkovo Observatory. An integrating photo-electric micrometer is being built by E. Hög at the Bergedorf Observatory (20). The general design of a photo-electrically operated micrometer and a brief discussion of the use of information theory with it will be covered in an article now in press (*Astr. J.*) by G. van Herk and A. J. J. van Woerkom. In this connection it seems proper to mention that experiments with an image tube are now in progress at the Dudley Observatory in co-operation with the General Electric Company.

A number of important, but usual, investigations of instruments have been started and some completed since the last meeting. Among such investigations are:

- (a) the determination of division errors at Brorfelde, Odessa, Uccle, and La Plata,
- (b) the investigation of the shape of the pivots at the Sternberg Astronomical Institute using Podobed's method (13), at Kiev by a photographic method, and at the Cape Observatory,
- (c) studies of the effects of wind, refraction anomalies, and local air currents on the performance of Pavlov's photo-electric instrument.

A large number of Observatories reported studies of the errors of micrometer screws and determinations of the flexure. In reference to the latter quantity, R. d'E. Atkinson has furthered his investigations of the use of a pentag for its measurement. His second paper (14), in combination with an earlier one, provides a complete analysis for determining flexure in declination at all zenith distances.

The new PZT now being built at Babelsberg will be used along with the meridian circle in solving basic problems in astronomy.

The Bergedorf Observatory reports favorably on the performance of a quartz clock of the Federal Physical and Technical Institute in Braunschweig.

#### COMMENTS AND RECOMMENDATIONS

1. The meridian circle work for some of the pressing astrometrical problems in the northern hemisphere is either now in progress or in the planning stage as a result of commitments volunteered in support of recommendations made at previous Meetings of the IAU. A similar state of affairs does not yet exist in the southern hemisphere. However, considerable progress, as described in the report of Sub-Commission 8a, has been made. The need for moving and renovating many of the instruments in that part of the world will delay the start of intensive programs for another year or two. As M. S. Zverev suggests (comment no. 4), northern observatories could give considerable help in expediting the reference star work in the southern hemisphere.

2. The urgency for reference star programs in no way should lead to a decrease in fundamental programs in either hemisphere. Such programs, using all types of suitable instruments,

must be prosecuted with greater vigor than ever before. The demands currently placed on the fundamental co-ordinate system require a definite improvement in its accuracy and not a maintenance of the status quo. A short discussion of the FK 4 is proposed for the Berkeley Meeting.

3. The resolutions adopted at the last meeting (15) and at the Second Astrometric Conference (16) regarding the establishment of a chain of astrolabes have not produced the desired results. B. Guinot is of the opinion that they ought to be renewed. He also suggests that observatories having astrolabe results that are suitable for improving the fundamental system should:

- (a) discuss and publish their derived right ascensions and declinations,
- or (b) notify the Paris Observatory if such studies cannot be made and, if possible, the Paris Observatory will undertake the required discussions.

4. The Second Astrometric Conference (17), the First Inter-American Conference (18), and a small meeting on "Problems of Astrometry and Celestial Mechanics", 7-11 November 1960, at La Plata (19) dealt with many aspects of the problems of fundamental work and reference star work in the southern hemisphere. The resolutions adopted at the above Conferences are of particular interest to this Commission. A number of correspondents have advised that the question of southern hemisphere astrometric work should be discussed at the forthcoming meeting. Among the specific subjects proposed for discussion were the following, mainly by M. S. Zverev:

- (a) Intensification of observations in the southern hemisphere. In particular, it should be recommended that the northern observatories at San Fernando, Caracas, Belgrade, Abbadia, Bucharest and Tokyo assist the southern hemisphere observatories in this work.
- (b) The most urgent programs for the southern hemisphere are the absolute observations of fundamental stars, observations of reference stars, and eventually the observation of star lists similar to those mentioned in Resolution no. 17 of the 10th General Assembly of the IAU.
- (c) It is desirable that the Cincinnati Resolution accepting the reference star list south of  $-30^\circ$  prepared by the Cape Observatory be confirmed. Likewise the augmentation of the KSZ list  $0^\circ$  to  $-30^\circ$  in progress at the U.S. Naval Observatory should be confirmed.

5. A number of observers commented on the necessity of organizing the collection, discussion, and publication of the results of observations of the star lists in Resolution no. 17, Moscow.

With co-ordinated meridian programs an established fact, J. Lévy suggests that it may not be out of place to discuss how meridian observations in general ought to be made so that the maximum of information may be drawn from them.

The subjects of this comment will be on the agenda, therefore the views of individual observers will not be summarized here.

6. J. Dick suggests that some observatories renew their observations of BD 89° 1 and other close circumpolars, inasmuch as these objects are of special value in determining the Besselian  $n$  used in the reductions.

7. With the growth of improvements in registration and photo-electric micrometers being as fast as it is, J. E. B. v. d. Heide suggests that there ought to be a greater exchange of information on these subjects.

F. P. SCOTT  
*President of the Commission*



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8a. SOUS-COMMISSION DES CATALOGUES PHOTOGRAPHIQUES  
D'ÉTOILES JUSQU'À LA 9-ME GRANDEUR

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Lourens, Scott, Vasilevskis, H. W. Wood.

PHOTOGRAPHIC CATALOGUE

*The AGK 3R program.* F. P. Scott, the chairman of the committee on the AGK 3R, reports that the AGK 3R program has progressed steadily since the latest report made to the Sub-Commission. The Paris Observatory was the first to finish its observations, in September 1960. The observatories at Bordeaux, Heidelberg, Ottawa, Pulkovo and Strasbourg have completed approximately 99% of their observations. The remaining observatories, at Babelsberg, Greenwich, Nikolaiev, and the two instruments at the United States Naval Observatory, will require until early in 1962 to complete their observations. The Lund Observatory, foreseeing that it would be difficult to meet its commitments on time, decided in March 1960 to withdraw from participation in the AGK 3R observing program. Of the 7658 stars in the Lund commitment, 3516 were added to the program of the Greenwich reversible transit at Herstmonceux, and 4142 to the program of the six-inch transit circle at the U.S. Naval Observatory. These additions increased the commitments of both instruments considerably; extra time will therefore be needed to meet them.

Since the inception of the program the U.S. Naval Observatory has served as a center for the computation of the reductions from apparent place to mean place for all stars observed in