

COMMISSION 25: PHOTOMETRY AND POLARIMETRY (PHOTOMETRIE ET POLARIMETRIE STELLAIRES)

Report of Meetings: 14, 16, and 20 August 1979

PRESIDENT: M.F. McCarthy
VICEPRESIDENT: J.A. Graham

SECRETARY: B. Bookmyer

Activities of Commission 25 at the Montreal General Assembly consisted of 5 sessions apart from informal exchanges among members on tours, at intersessions and coffees.

Two of these five sessions were Joint Meetings with other Commissions, full details of which are communicated elsewhere in these Proceedings. The other three sessions were concerned with matters specifically connected with Commission 25 itself.

JOINT MEETINGS

The Joint Meeting on Astronomical Nomenclature was organized by Commission 5 and was presided over by C. Jaschek on 14th Aug. This session addressed the problem faced by all of us today of how adequately and accurately to specify astronomical objects observed and how to give ample and unique cross references to our colleagues in different specialized fields. The delegates of the several Commissions approved with commendation the offer of Dr. Jaschek to draw up a Reference Catalogue. This group also approved the offer of Dr. Jaylee Mead to prepare a first draft of a Users' Guide. Colleagues are invited to communicate to Dr. Mead their needs, suggestions, results and questions.

The second Joint Meeting on Aug 16 was devoted to Space Astrometry and was organized by Commission 24 and 33 with the cooperation of Commissions 4, 7, 8, 19, 20, 26, 33, 36, 37, 45 and our own Commission 25. This session was chaired by Gart Westerhout. Details are given elsewhere in these Proceedings. Of specific importance for Commission 25 members was the request to our Commission to support the proposal of Commission 24 for adoption by the Final Meeting of the General Assembly at Montreal. This proposal read as follows in the form suggested by Pres. C.A. Murray of Commission 24:

The General Assembly noting the support of Commission 4,7,8,19,20,25,26,33,36, 37 and 45 is asked to adopt the following resolution by Commission 24:

The IAU strongly supports the independent and complementary astrometric programmes proposed for the ESA Astrometry Satellite and the NASA Space Telescope.

At the recommendation of Commission 25 and 45 a proposal listed below was attached to the original proposal given above. This was done at the business sessions of the respective Commissions. After discussion, the addendum to the original proposed resolutions was formulated and approved unanimously by the members of Commission 25. The following is the text of the addendum:

Noting the strong support of the IAU for space astrometric programmes, Commission 25 (and 45) recommends that complementary ground based support in astrometry, photometry and spectroscopy etc. should be encouraged.

At the recommendation of the General Secretariate this resolution was subsequently formulated as a separate resolution and was passed in the form stated above by the General Assembly on 25 Aug.

Dr. Westerhout and Pres. C.A. Murray of Commission 24 had earlier requested the President of Commission 25 to name a speaker to examine what work would be required in the fields of photometry and polarimetry to enable the full potential of the new astrometric data to be developed for the full benefit of astronomy and astrophysics. After consultation with the Organizing Committee the President invited A.D. Code who described the impact of new astronomical data on ground and space based photometric and polarimetric studies. Dr. Code presented clearly the needs of ground based and space based photometry and indicated the progress which could be expected from the proposed programs in space astronomy.

SCIENTIFIC SESSIONS

Three were the sessions of Commission 25 at Montreal: one a Business Session was devoted to election of new members of the Commission and new Officers and the routine business details of the Commission during the past triennium and accepted proposals for its work during the years ahead; the second and third sessions were specifically scientific and presented reports and papers of interest to the Commission. New Techniques in Stellar Photometry was the topic of the first Scientific Session and this was chaired by M.F. McCarthy. New Techniques in Stellar Polarimetry was the title of the Second Scientific session, which was chaired by Dr. J. Landstreet. Both sessions were held on 20 Aug, the first in the morning and the second in the afternoon. Since it is planned to publish elsewhere the papers presented at these two Scientific Sessions, we list here the program with the names of the speakers and the topics as presented. There was an active discussion period following each paper and at the end of each session. Many members of other Commissions were welcomed at Commission 25 at these Scientific Sessions and contributed important questions and comments. The Commission is grateful to J. Tinbergen who organized the scientific session on polarimetric techniques.

NEW OBSERVING TECHNIQUES IN STELLAR PHOTOMETRY

New Detectors in Stellar Photometry G.E. Kron (USA)

TV Reduction Techniques for Stellar Photometry R. Albrecht (Austria)

in situ Techniques for Data Reduction with New High Speed Detectors

W.E. Kunkel (Brazil)

Electronographic Stellar Photometry A.P. Penny (U.K.)

NEW OBSERVING TECHNIQUES IN STELLAR POLARIMETRY

Polarimetric Techniques for Photometrists J. Tinbergen (The Netherlands)

Multiplex Detectors and High Resolution Polarimetry I. MacLean (U.K.)

Magnetic Field Measurements E.F. Borra (Canada)

BUSINESS MEETING

President McCarthy opened the Business Meeting of the Commission 25 on Aug 16 with twenty-five members present. He began with a commemoration of Prof. H. Haffner who died since the last General Assembly; the members stood for a minute to commemorate our departed colleague.

The President invited Dr. B. Bookmyer to serve as Secretary for this session of the Commission.

The Triennial Report for Commission 25 appears in Vol 2, p. 83-96 of Reports on Astronomy. It was discussed and approved by vote of the Commission Members present. Two items which arrived too late for them to be included in the published report are given here.

REPORT FROM MEMBERS

From F. Rufener, Geneva Observatory : Geneva Photometric System

New catalogues assembling all the measurements made in the Geneva photometric system (UBV $B_1 B_2 V_1 G$ system) are being published. 55,000 measurements of 13,000 stars have been obtained through June, 1978. A compilation of these data allows the establishment of

- a) a list of all the measurements reduced outside the atmosphere with a weight for the colours and the V magnitude as well as the Julian date and place of observation.
- b) a catalogue arranged according to increasing right ascension containing the mean colour indices for each star with the number (P) of good measurements and their dispersion (σ_c) as well as the V magnitude, its weight (Q) and dispersion (σ_v). A variant of this catalogue contains the derived indices and parameters (d, Δ , g, m_2 , B_2-V_1 , V_1-G , X, Y, Z, β_c).
- c) a catalogue grouping in photometric boxes all the stars having the same colours within one hundredth of a magnitude.

The observations are being made from the Northern and Southern hemispheres. The selection of stars to be measured depends upon the field of interest of the various research workers at Geneva Observatory (galactic clusters, zones of the galactic poles, Am and Ap stars, stars with particular kinematics, stars in the solar neighborhood, supergiants and OB stars).

From M. Golay, Geneva Observatory:

I wish to inform you that we have started the photometry at 1900 \AA (pass-band = 200 \AA) of the galactic plane. The plates cover a field of 6° . I join an example containing the Andromeda Nebula. The President circulated among the members of the Commission the print photo sent by Prof. Golay; this photo is remarkable for the preeminence of one of the spiral arms of this galaxy and illustrates the new regions now available for photometric studies.) We reach magnitude 13 for B stars with 3 or 4 minutes exposure time.

In discussion of the Triennial Report the question was raised (by Vice President J. Graham) as to whether a more extensive report, one longer than the 12-14 pages which the IAU can publish in its volumes: Reports on Astronomy, should in the future be prepared and circulated to members; an example of this is the very detailed and full report of Commission 33 on Galactic Structure and Dynamics as

prepared by F. Kerr and colleagues. This full report is issued independently of the shorter version submitted for Reports on Astronomy. It has the advantage that more recent data concerning research in the fields of interest to the Commission can be reported. For Reports on Astronomy, the effective closing date for research which can be reported is approximately one year before the opening of the General Assembly; the deadline for the current Reports on Astronomy was 31 Dec 1978. The fuller version is usually mimeographed or xeroxed and can have a much later deadline for information submitted; it also allows a more fulsome description. The members of Commission 25 commenting on this suggestion agreed that such a fuller report would be most desirable, would be of great value to individual members and to others who look to such a report for specific references and general coverage of material for classes and lecture purposes. It was pointed out that this fuller report should be made available to those requesting it within or outside of Commission 25 but would not be circulated generally.

Among the topics discussed at the Business Session of Commission 25 were the following:

1. There is a need to give good references to the passbands used in photometry. This is very necessary for any intercomparisons of photometric results.
2. There is a divergence in the epochs employed in different listings of observations: e.g. HD used 1900, the SAO uses 1950 some others use 2000. With modern calculators the precession to these other systems is not difficult but sometimes involved. Most tabulations at present seem to favor the 1950 epoch, though we are now closer to 2000 AD. Important it is to be clear in specifying which epoch one is using and to give the coordinates with the best possible accuracy.
3. There is an increasing need for improving and extending photometric systems for faint stars. This becomes more evident with each new break-through involving radio sources, X-ray sources, gamma-ray sources etc. Attention of telescope allocations committees should be called to the long and short range needs of astronomical photometry and polarimetry and more consideration should be given to the use of time with large telescopes for work with photometric sequences. This topic could well be discussed whenever we are speaking of the needs of ground based and space photometry. Perhaps a large size ground-based photoelectric telescope in each hemisphere to aid in photometry for space observatories would be a prudent and profitable step at this time. There were several valuable comments and objections concerning the programming and support for such a project. It was pointed out that neither the Union or Commission 25 were fund raising or fund granting organizations. The importance of the IAU is founded on the concerted motivation of its constituent members who can return to their homelands with specific recommendations for their communities.
4. Of importance for the budget and for uniformity of standards in photometry is the fabrication at the same time of several sets of photometric filters. D. Crawford (USA) may be contacted to coordinate orders in bulk. J. Graham noted that KPNO can order in bulk, then charge individual purchasers of filter sets. He stressed the value of having similar transmission characteristics for photometric researches whose results will be intercompared.
5. One of our Commission members, A. Cousins has devoted a tremendous amount of work to define the infrared photometric system in the southern hemisphere. The problem of the differences, specifically in the red-infrared wavelength bands were discussed and the importance of specifying bandpasses and of giving transmission curves to define one's system was emphasized. It should be noted in this regard, added Vice President J. Graham, that UBVR photometry in Chile, S. Africa, Australia is different from the H.L. Johnson system. W. Wisnieski noted that a comparison between the H.L. Johnson RI and the Cousins RI is difficult. It is now

impossible to obtain the original Johnson type filters from the manufacturer and thus comparisons become impossible. J. Graham noted that there is some difficulty in reproducing magnitudes and colors for very red stars on the Cousins system but no difficulties are experienced up to spectral type about K5.

6. J. Tinbergen presented the members with his special Bibliography for Optical Polarimetry Standards. These are the result of collaboration between Tinbergen and the following colleagues: P.A. Bastiaansen, G. Knoechel, J.D. Landstreet and J.J. Michalsky. These standards are applicable to both the visual (300 to 1050nm) and for the UV and IR regions.

7. An excellent summary of recently available photometric catalogues was given at Montreal by A.D. Code in his address to the Joint Meeting on Space Astrometry, mentioned above. Attention was also called to a listing of photometric catalogues in Dudley Obs. Report no. 14 by A.G.D. Philip.

8. C.J. Van Houten asked about the definition of magnitudes and colors and specifically about possible advantages of a system such as that introduced by the Walravens where $\log I$ rather than magnitude was employed. He noted that perhaps by using a variety of logarithms to different bases etc., a differentiation could be made among systems whose similar letterings i.e. UBVR_I, ubvy, can become confusing. Van Houten noted also that the old term of "Color Index" was being dropped by many in favor of the word "Color". It was pointed out that with present day calculators logarithms to different bases offer no stumbling block but the intercomparison of results might become more involved. The specification of bandpass and the publication of transmission curves for filters were suggested as further aids for avoiding confusion when writing about magnitudes and color indices.

9. A report on the comparison of stellar spectrophotometry made at the Sternberg Astronomical Institute and the Astrophysical Institute in Alma Ata with photometry in various systems was given as a present to the Commission by I.N. Glushneva and A.V. Kharitonov. Because of the heavy schedule and the consequent lack of available time it was not possible for Dr. Glushneva to read her paper at Commission meetings. The President noted for the members that the paper contains: 1) tables of the mean differences between the spectrophotometric data and the photometric data of Johnson and Mitchell, 2) the results of intercomparing spectrophotometric data with the photometric data on the Vilnius system, and at Alma Ata and 3) a comparison of data between the Moscow and Alma-Ata systems. Dr. Glushneva was invited to rise and accept the congratulations of Commission members of this interesting work in photometry carried out in the Soviet Union. The President announced that copies of this paper would be available during the time of the Montreal assembly.

The President then read the list of the names of new members of Commission 25 to be voted on by members of the Commission. These are listed in this Volume, page . Commission 25 has seventy seven members currently and thirty four new names were proposed. Since several of the newly proposed members had not as yet been admitted to the Union itself, it was decided to approve them conditionally subject to their candidacy as members of the Union being approved. All 34 newly proposed candidates were approved by the vote of the members present of Commission 25. Subsequently the General Assembly on Aug 23, voted to make the conditionally elected candidates member of the Union! So now our Commission is 111 members strong. We have 2 Consultants to the Commission: H. Butcher and E. Miller.

Dr. U. Steinlin was named and approved as Commission Representative to consult with Officials of the Working Group on Photographic Problems. This Group offers much excellent service and information to all colleagues working in photographic research.

Next the President noted the list suggested for the Organizing Committee of Commission 25 for the next term. This list was drawn up after consultation with the present members of the Organizing Committee and with the Officials and the Executive Committee of the IAU. This list was proposed to the members of the Commission present and it was approved unanimously. Our new President will be J. Graham (USA) with J. Tinbergen (The Netherlands) as Vice President. The Organizing Committee for the epoch from the end of the present General Assembly until the end of the next one will be composed of the following:

A. Behr, M.S. Bessell, P.F. Chugajnov, G.V. Coyne, A. Feinstein, B. Hauck, P.W. Hill, A.R. Hyland, A.U. Landolt, T. Markkanen, M.F. McCarthy, F.G. Rufener, W. Schoneich. The President thanked in the name of the Commission the retiring members of the Organizing Committee who have served our sciences so well for several years. They are Prof. M. Golay (Switzerland), Prof. K. Osawa (Japan) and Prof. V.L. Straizys (USSR).

Concluding the Business Session the President thanked all of the members, present and absent, for their kind cooperation and response to letters during the past triennium. He mentioned the special help and advice received from the Vice President and the Organizing Committee. Three secretaries have assisted in the past three years in sending letters and circulars to members; unlike the Secretary for the present session of the Commission, Dr. B. Bookmyer, these persons are neither photometrists nor polarimetrists but have helped both fields and this commission by their generous work. B. Epp of New York, R. Amati of Marino, Italy, and E. Bauer of La Serena, Chile, all merit our gratitude and thanks.

Now we have an increase of 33 per cent in the membership of Commission 25; we have a new President and Vice President and Organizing Committee. Sic iter ad astra.

M.F. McCarthy S.J.