COMMISSION 45: STELLAR CLASSIFICATION
(CLASSIFICATION STELLAIRE)

Report of Meetings, 14, 15, 16, 17, 18 and 21 August 1979

PRESIDENT: B. Hauck SECRETARY: A. Maeder

I. JOINT MEETINGS

14 August: Commission representatives attended the meeting on Astronomical Nomenclature: Stellar, Galactic, Extragalactic Objects, held by Commission 5 and representatives of Commissions 8, 24, 25, 26, 27, 28, 29, 30, 34, 37, 40, 42 and 45.

16 August: A meeting on Space Astrometry was held with Commissions 24, 8, 20, 25, 26, 30, 33, 37 and 44.

17 August: Commission 45 held a joint meeting with Commission 29 on Am stars, the full report of the meeting being given below.

18 August: Meeting with Commissions 29 and 36 on Stellar Abundances

21 August: Meeting with Commissions 29 and 36 on Stellar Rotation.

These scientific meetings are outlined, in each case, in the report of the first listed Commission.

Commission 45 also cosponsored the Joint Discussion on Ultraviolet Astronomy held on 15 August.

17 August

II. ADMINISTRATIVE MEETING

1. Activity Report

The President reported on the two meetings organized in cosponsorship by Commission 45, namely IAU Symposium No. 80, "The HR Diagram" held in Washington from 2 to 5 November 1977 and dedicated to H.N. Russell, and IAU Colloquium No. 47 "Classification of the Future", held at Vatican City and dedicated to A. Secchi. A workshop on problems of calibration of multicolour photometric systems was also held in spring 1979 at Dudley Observatory and the proceedings have been published as Dudley Obs. Report No. 14.

The Commission Report published in the Transactions of the IAU, Vol. 17A gives an account of the Commission's activities; particular mention is also made of the new atlas of Drs. Morgan, Abt and Tapscott and of that of Dr. Keenan. The report was approved unanimously.

Dr. C. Jaschek also reported on the activities of the Working Group on Spectroscopic and Photometric Data, which publishes bi-annual lists of catalogues recently published or in preparation. The six lists published since the Grenoble Assembly contained a total of 150 catalogues and six atlases. The different astronomical data centres have prepared a common list of all catalogues existing on magnetic tape.

2. Name of the Commission

Dr. Wing (OSU) had addressed a proposal to the President for a change of name of the Commission. The Organizing Committee and members consulted all agreed with the fact that it was necessary to change the name of the Commission: "spectral classification" is related to a subject area, while "multi-colour band indices" is not on the same level. The proposals to change the name of the Commission and to adopt the name: STELLAR CLASSIFICATION (CLASSIFICATION STELLAIRE) were both accepted by a large majority.

3. Resolution

Commission 45 voted to support the proposal of Commission 24 and the addendum proposed by Commission 25 to have an IAU resolution on astrometric programmes.

4. Membership and Organizing Committee

Seventeen new members were proposed and accepted: Buser R. (Switzerland), Christy J. (USA), Clariá J.J. (Venezuela), Gerbaldi M. (France), Gurzadyan G. (USSR), Hartoog M.R. (USA), Hayes D.S. (USA), Heck A. (Belgium), Levato H. (Argentina), Mead J. (USA), Parsons S. (USA), Richer H.R. (Canada), Stock J. (Venezuela), Strobel A. (Poland), Warren W. (USA), Wyckoff S. (UK), Zdanavicius K. (USSR).

The new Organizing Committee was elected as follows: President: A. Slettebak (USA); Vice-President: V.L. Straizys (USSR); A.L. Ardeberg (Sweden), R.A. Bartaya (USSR), R.A. Bell (USA), R.F. Garrison (Canada), B. Hauck (Switzerland), M. Jaschek (France), A.G.D. Philip (USA).

Dr. C. Jaschek was reelected chairman of the Working Group on Spectroscopic and Photometric Data, the composition of which remains unmodified with the exception of the retirement of W.P. Bidelman.

5. Activity for the next years

A. Slettebak was willing to continue to inform members by sending circular letters and recommended members to send him any material. C. Jaschek would appreciate it if these letters contained the list of national meetings in the field of the Commission. M. McCarthy requested the same for summer schools. B. Hauck thought it best if everybody informed the President.

Future meetings: a) E.E. Mendoza had proposed a Symposium on IR Photometry and Spectroscopy to be held in 1981 at Mexico. This symposium will also be sponsored by Commissions 25 and 29. Commission 45 voted unanimously in favour of Dr. Mendoza's proposal.

b) R.F. Garrison proposed a Colloquium on MK Spectral Classification Criterion and Application to be held in June 1983 in Toronto. K. Nandy asked whether information from the UV would be incorporated, the reply being that the Scientific Committee would decide. The assembly agreed to support the colloquium.

c) M. McCarthy mentioned R.A. Bartaya's suggestion to have a meeting on automatic classification. P.C. Keenan pointed out that it could be very useful to discuss spectral classification in areas of the HR diagram, where classification breaks down. In the discussion which followed, W.P. Bidelman pointed out that the Commission could endorse a meeting on UV classification.

6. Various items

a) W.P. Bidelman, who was the Commission's representative at the session on Astronomical Nomenclature held on 14 August, reported in detail on the main recommendations and decisions taken during that session.

b) P.C. Keenan pointed out a small change in the designation of the brightest supergiants, which henceforth will be noted Ia $\overline{O}$ (instead of Ia O or Ia$^+$). B. Hauck commented on the difficulty of this representation for catalogues on magnetic tape.

c) B. Hauck reported that Commission 29 had envisaged the creation of a Working Group on Ap stars and suggested that this Working Group be common to both Commissions 29 and 45. Members elected by Commission 45 to this Working Group are: W.P. Bidelman, M. Jaschek, M. Gerbaldi, A. Heck, B. Hauck, E.E. Mendoza.

7. Discussion

a) J.R. Lesh reported on the applicability of MK standards in wavelength regions outside the photographic region and at dispersions appreciably different from 100 Å/mm. She emphasized some principles used in the "Revised MK Spectral Atlas for Stars Earlier than the Sun" by W.W. Morgan, H.A. Abt and J.W. Tapscott, published in 1978, continuing with the following important remarks:

"The message contained in this text is clear: if one wants to do MK classification in any wavelength region, one uses MK standards, because the system is defined by the standard stars. The process of transferring the MK grid to a new region may, of course, be a delicate one, and requires the same degree of thoughtfulness and thoroughness as any other pioneering operation in scientific research. [...]

There is, of course, always the possibility that someone may want to set up an entirely new classification system in another wavelength region (or even in the ordinary photographic region), and that the new system may be more useful for some purposes than the MK system itself. In that case, the classifier will choose whatever standards and/or criteria he wishes. The only caveat is that such an independent classification system should not be expressed in the MK notation (especially by using the Roman numerals for luminosity classes). Using the same notation for spectral types obtained by fundamentally different methods does a disservice both to the MK system and to the new system, and defeats one of the basic purposes of spectral classification itself: namely, to provide a large body of homogeneous data concerning the normal stars."

b) R. Nandy presented a report on Spectral Classification of Faint Stars, emphasizing the main points in this extension of spectral classification.

III. SCIENTIFIC MEETING

1. Joint Meeting with Commission 29 on Am Stars

K. Kodaira (Japan) reviewed the spectroscopic works devoted to the decomposition of Am binary systems since 1976 and discussed the interrelation between the Am property and the δ Scuti variability concerning the decomposed individual stars. Finally, the observations indicating the spectral inhomogeneities on the surface of Am stars were presented.

M. and C. Jaschek (France) reported, as they have shown in previous papers, that Am stars can be detected in the ultraviolet of the TDI spectra, in the wavelength region λλ1350-2750. Spectral type and luminosity may also be determined (see Cucchiaro et al., *Astron. Astrophys. Suppl.* 35, p. 75). However the spectral type determined with two different criteria gives two different types. This parallels the situation in the classic λλ3600-4800 region.

H. Levato (Argentina) reviewed the latest results contained in Abt's statistical study (*Astrophys. J.* 230, 485; 1979), which is primarily based on Abt and Levato's extensive observations of open clusters and associations. Among the main

results, it was found that Am stars appear in clusters as young as $10^{5.7}$ y., that there is no simple dependence of the frequency of Am with age of the cluster. The decrease of rotational velocities with age and the evolutionary sequences leading to Am stars were discussed.

A.A. Boyarchuk (USSR) reported on a survey of the physical characteristics of the atmospheres of Am stars, in which the similarity of parameters and structures of atmospheres of Am and A stars has been shown and anomalies of chemical composition discussed. The deficiency in C, O, Mg, Ca and Sc along with the excess of heavier than Ni elements with respect to Fe has been pointed out and the excess of Fe with respect to H also noticed. The hypothesis of the origin of observed anomalies was discussed briefly.

R. Kurucz (USA) presented a review on enhanced abundance model atmospheres. He has computed model atmospheres for three and ten times scaled solar abundances for 5500 to 20000K. These are not exactly appropriate for Am stars but they are a considerable improvement over using solar abundance models in interpreting spectra. In particular they have steeper temperature gradients that can considerably affect derived abundances and microturbulent velocities. Colours will be forthcoming. The models give reasonable agreement with the spectrophotometry and Balmer line profiles of Sirius.

B. Hauck (Switzerland) reviewed the properties of Am stars in various photometric systems. He mentioned Kurtz's work on seven very late Fm stars. In general many properties of the Am stars may be investigated using these systems. For example, a correlation of the metallicity index Δm_2 with Δd, the luminosity parameter, at a given temperature, was found for δ Del stars but not for Am stars. It was concluded that some evolved Am stars may be pulsators.

E.E. Mendoza (Mexico) reported that multicolour photometry of Am stars, when compared with normal main sequence stars, shows colour deficiencies in $U-V$ and $B-V$ (0.11 and 0.06 mag. respectively). There is perhaps a small colour excess in $V-R$ and $V-I$ (0.01) but normal colours in $V-J$ and $V-K$. The oxygen (λ7775Å) line is noticeably weaker, and still weaker in Ap stars. The photometric reference index is $\alpha(16)$, which measures the total strength of the H_α line.

C. Burkhart (France) reported that for main sequence Am stars (the early Am excluded), the correlation between the photometric index δm_1 and the projected rotational velocity shows that the degree of metallicity does not disappear progressively with increasing velocity and it seemed that rotational velocity was not the only metallicity parameter.

C. Van't Veer (France) and collaborators have shown that UV photometry of A and Am stars using the UV fluxes given by S2/68 experiment, allows the segregation of Am stars from standards in correlation with metallicity, with possible theoretical model atmosphere interpretation.

A. Heck (Belgium) and collaborators have performed a statistical parallax calibration of the absolute magnitude of Am stars versus several photometric indices. They comment quite satisfactorily giving a mean absolute magnitude of about $1\overset{m}{.}2$ with a spread between $0\overset{m}{.}4$ to $2\overset{m}{.}0$.

https://doi.org/10.1017/S0251107X00025918 Published online by Cambridge University Press