COMMISSION NO. 42

CLOSE BINARY STARS (ÉTOILES DOUBLES SERRÉES)

PRESIDENT: R. H. Koch SECRETARY: E. Lapasset

I. BUSINESS SESSION

The Business Session of the Commission was called to order at 11:00 in Room F of the San Martín Cultural Center on July 25, 1991. Thirty seven members and guests attended.

Over the past triennium, the Commission suffered the resignation of one member and the death of D. Ya. Martynov. The attending members observed a moment of silence in memory of our deceased colleague. A total of 38 Union members (3 established members and 35 new ones) had solicited Commission membership and their names were approved unanimously by the current OC and attending members. The new members represent 19 different adhering countries and bring the total Commission membership to 348. This number is certain to grow significantly before the end of the century and communication among the officers and general membership will become a matter of concern.

From the OC, six members (A. Cherepashchuk, E. Budding, K.–C. Leung, J. Rahe, G. Shaviv, and J. Smak) retired. The President took particular note of the administrative and financial support rendered by Dr. Rahe and the personal and scientific support of Profs. Leung and Smak. To replace the retiring OC members, a mechanism of at–large nomination and OC approval voting resulted in new members: P. Eggleton, E. F. Guinan, G. Hill, P. Szkody, A. V. Tutukov, and D.–S. Zhai. The composition of the new OC was ratified by a show of hands. The OC had previously recommended to the Union that Y. Kondo and M. Rodonò succeed as President and Vice–President, respectively, and these choices were unanimously endorsed by the attending members. During thte current triennium, R. S. Polidan will serve as Commission Secretary.

The President commented on the current *Draft Report* and its availability and repeated his appreciation of Dr. Rahe's assistance in its copying and distribution.

Two items of Old Business were aired. The first concerned the conceptual and practical future of critical catalogues of the orbits of spectroscopic binaries such as that in 1989, *Publ. DAO Victoria* **17**, 1. The whole issue is a multi–sided one engrossing experienced and scholarly editors, a possibly–enduring need for a paper–medium catalogue as well as versions on magnetic or optical disks, the very significant costs of publication and distribution, the phenomenal productivity of several observing groups employing photoelectric detection, global diminution of funds for library acquisitions, the utility of catalogue supplements such as those from Toulouse, and possible roles for NASA and ESA and the Strasbourg CDS in disseminating catalogued information. The discussion among A. H. Batten, G. F. Peters, Y. Kondo, W. Wamsteker, M. Rodonò, T. J. Herczeg, J. Smak, A. U. Landolt, and P. B. Etzel led to no comprehensive agreement. The sense of the meeting, however, was that practical constraints and an enduring need will enforce a resolution of the matter in the relatively near future and that the enduring problem will remain the assumption of editorial responsibility.

The second item of Old Business noted that there is no expectation of a new edition of *A Finding List for Observers of Interacting Binaries.* The President remarked on the magnitude of such an editorial effort and also on the formidable chore of making a machine–readable version of the U. Florida *Card Catalogue of Eclipsing Binaries.* F. B. Wood, (whose personal papers include this *Catalogue*) noted that these documents serve as guides to observing programs and local responsibility for the *Card Catalogue* has been assumed largely by K.–Y. Chen. For the foreseeable future, Prof. Chen will continue to respond to requests for information from the *Catalogue.*

At the invitation of the President, New Business was opened by M. Breger, President of Commission 27. Prof. Breger enlarged on the attempts by Konkoly Observatory to sustain institutional and individual distribution of the *IBVS* in the face of financial stringencies. An approach to a solution, very much in the interests of Commission 42 people, appears at hand with a measure of financial assistance from the Union and structural changes in the editorial handling of the *IBVS* content itself. The attending members signified full support for these changes in the directions of stability and continued publication and distribution. The interested reader is referred to the Report of Commission 27 in this volume for the culmination of this matter.

Prof. Breger then described the likely closing of the Sonneberg Observatory which has made effective and abundant contributions to photometry of many northern and southern close binaries as well as of intrinsic variables. This event appears to be just one of the numerous unhappy episodes befalling German scientific enterprises and is a German domestic matter to be decided in the best national scientific interests. Commission 42 needed no urging to recognize that the very large Sonneberg plate collection should be preserved not only as archival material but also as a working resource which has not come close to exhaustion. A very aninmted discussion on the niceties of how to move in this direction resulted among R. E. Wilson, and Profs. Smak, Herczeg, Rodonò, Leung, and Breger. The attending members then gave assent to the President's engaging this topic with the intention of generating a Resolution jointly from Commissions 27 and 42, such Resolution to speak to the matters under discussion and to be presented to the Second General Assembly for its consideration. As may be noted elsewhere in this volume, the Resolution was passed.

The triennial administrative and financial report concerning the *Bibliography and Program Notes on Close Binaries* had been prepared by the Editor–in–Chief, A. Yamasaki, and was read to the attending members. Some concern was voiced that Prof. Yamasaki seemed to commit himself to only a short–term continuaton of his role. It was left to the incoming President to resolve the matter.

The President then called upon Prof. Wamsteker to explain the realization of several World Astronomy Days (WADs) in the International Space Year, 1992. The novelty and utility and the constraints upon such an enterprise were developed by F. Giovanelli and Profs. Rodonò, Herczeg, Smak, and Peters. The assembled members signified their expectation that the Commission interest itself in initial planning stages so as to realize this concept and associate itself with a recommendation for the WADs. At a meeting on July 29, 1991 attended by Prof. Kondo (then the Vice–President) CVs and X–ray close binaries were singled out as two of the few possible types of targets which the WADs could exploit. The winds from hot stars were also noted as likely phenomena which could profit from WAD attention and, as is well– known, very many such stars are really interacting binaries and that clashing winds from the binary components will be an important ingredient in the

eventual comprehensive understanding of winds. Commissions 15, 27, 28, 42, and 44 were all associated with a Resolution to the Second General Assembly endorsing the WADs and their realization. The Resolution was accepted.

Having already signified his assent to the current thinking of the Working Group *Designations* of Commission 5, the President did not attend the July 27, 1991 meeting of the WG. The concern of the WG is with adequate identification of a celestial target when the research concerning it is eventually published. Problems arise particularly for newly–discovered objects for which only "non–standard" names are given in the publication making it difficult for other investigators to attempt verification or subsequent observation.

Prof. Lapasset remarked on the upcoming IAU Symposium No. 151 to convene in Cordoba when the General Assembly ended. The President then summarized some news regarding an aborted neutron– stars meeting and a projected IAU Sympoium for which Commission 42 co–sponsorship would not have been appropriate. Finally, Prof. Budding summarized the state of tentative preparation for a meeting in the mid–future of interest to the Commission and to be held in New Zealand.

The meeting adjourned at 12:30.

II. SCIENTIFIC SESSIONS 2 AND 3

As planning started for the Commission's scientific program, there arose the possibility for time dedicated to the methodology of light curve analysis. This concept, central of course to the Commission, had been advanced by E. F. Milone in the recent past so it seemed opportune to create it for the current General Assembly under the chairmanship of Prof. Milone. An SOC was composed in good time and a program developed and accepted by the Union Executive.

Two 90–minute sessions were scheduled for July 31, 1991 but the fire that morning in the Cultural Center annihilated this schedule. Through the good offices of the General Secretary, it was possible to meet for 90 minutes in a bistro near the Cultural Center. For this situation Prof. Milone re–worked the schedule so as to give time only to speakers who were not attending the Cordoba Symposium. Even this arrangement meant that some speakers had to abridge their presentations and none of the scheduled posters could be displayed. Prof. D. P. Hube acted as Secretary for this session, which was attended by about 45 members. Seven oral papers were presented. The first, by R. E. Wilson, elaborated on the opportunities within the WD code to extend the modelling parameters beyond the conventional light and velocity ones in the sense, for example, of interpreting color and line index and polarization information. On behalf of Prof. Wilson and himself, D. C. Terrell then described attempts to calculate assorted binary gas flows and the observational consequences of these flows. J. Kallrath's paper concerned the *SIMPLEX* algorithm and the power of its application at the appropriate stage of modelling. R. L. Kurucz next presented a brief summary of his modernized stellar atmospheres built around more realistic continuum opacities and line inventories than had been available hitherto. W. van Hamme then desribed the new treatment of the "reflection" effect now developed for the WD code, its application to the binary BF Aur, and the change in interpretation fo this binary that now eventuates. Prof. Wilson then summarized briefly the attempts by J. Mukherjee, Dr. Peters, and himself to determine rotational velocities from line profiles. Finally, Prof. Leung (on behalf of his co-author D.–Q. Zhou) elaborated on the possibility that light–curve

asymmetries arise in part from stellar atmospheric circulation patterns. Despite the curious venue and crowded schedule, vigorous questioning and discussion followed the papers.

Through the procedural and financial assistance of the LOC for the Cordoba Symposium, it was possible to schedule a 60– minute session in a meeting room of the Gran Hotel Dorá in Cordoba on August 7, 1991. About 25 delegates attended this rump session, Prof. Milone again in the Chair. Prof. Budding first offered his appreciation of the posters deferred from presentation in Buenos Aries. Only one of these, that by I.–S. Nha and H.–I. Kim, concerned application of modelling procedures to real light curves, in this case the intrinsically variable curves of RX Cas. A poster by J. Díaz–Cordoves, A. Claret, and A. Giménez concentrated on the subtle effects between linearized and non–linearized darkening laws while another paper by Profs. Giménez and Díaz–Cordoves remarked on two particular prospective improvements to the *EBOP* code. An *ad hoc* summary of a poster by T. Banks represented the state of the software package ILOT.

Four oral papers were then given. Prof. Etzel developed at some length his expectations for improvements in *EBOP* beyond those already mentioned and laid emphasis on the limitations of applicability of the code. On behalf of D. H. Bradstreet, E. F. Guinan gave a short description of a pedagogical package *Binary Maker* which is basically a graphics tool for displaying light and velocity curves and aspects of close binaries at chosen orbital phases. Prof. Guinan then rehearsed his model for Eps Aur wherein a hollow, tilted disk can account for a major fraction of the eclipse detail. Finally, and on behalf of C. R. Stagg, Prof. Milone briskly summarized prospective changes and improvements to the WD code that are to implemented at Calgary. A short but spirited and rather far–ranging discussion closed this session.

The proceedings of the sessions are to be refereed and edited by Prof. Milone for a Kluwer volume.

III. SCIENTIFIC SESSIONS 4 THROUGH 7

For almost a year planning had progressed for a joint meeting among Commissions 9, 25, 27, and 42 concerning modern stellar polarization. The Union Executive eventually accepted this as a joint–meeting topic with Commission 25 acting in the lead role. Four 90–minute sessions were scheduled to occupy the entire working day of July 29, 1991. Between 55 and 60 people were in attendance.

The morning sessions, chaired by R. H. Koch, concerned itself primarily with the physical processes generating polarizated radiation from stars, modern instrumentation for medium and large ground–based instruments, the character and magnitude of polarized signals from star–forming regions, precision currently attributable to polarization standards, and the apparent constancy of the visible–band polarized radiation from Plaskett's Star.

The afternoon sessions were chaired by I. S. McLean and spoke more closely to interests of Commission 42 members. Three contributions from the Wisconsin group emphasized that spectropolarimetry of moderately–bright stars can now be accomplished both from ground and Earth–orbit with even modest– aperture telescopes. R. Schulte–Ladbeck and K. Nordsieck elaborated on the Pine Bluff and WUPPE observations of hot, massive stars whereas M. Magalhães presented his and others' work on luminous late–type variables. R. Boyle's paper was concerned with the polarization of Miras and P. Bastien's

with that from young stars. A second paper from the Montreal group was given by A. Moffat and showed impressively that the polarization parameters from at least selected Wolf–Rayet stars can remain stable and very well–defined over at least brief time intervals. This, leading to evaluation of the orbital plane inclinations for W–R close binaries, permits accurate determinations of masses and mass functions so that it is possible to make an orderly evolutionary sorting between subtypes of the WC and WN classes.

More detailed presentation of the results of these sessions may be found in the Commission 25 Report.

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