

COMMISSION 26: DOUBLE STARS (ÉTOILES DOUBLES)

Report of Meetings, 25 August 1970

PRESIDENT: P. Couteau.

SECRETARY: S. L. Lippincott.

The session was opened by President Couteau. Greetings were conveyed from Finsen and Arend, who were not able to attend. Names of officers were proposed and accepted by the Commission. New Commission members were accepted. The Draft Report was accepted; several further comments on recent progress were made. *Worley* commented on the double star Card Catalogue deposited in Washington. Since the Draft Report, 18 new lists of measures, involving some 6800 cards have been added to the Catalogue. Although unpublished observations are not added to the Catalogue, it remains of interest to submit lists of observations prior to publication since it serves as a signal to help catch the publication when received in the USNO library.

P. Morel described 'The Atlas of Orbits of the Nice Observatory', which includes a computer traced diagram of the orbit indicating the part of orbit observed. A sample copy was made available. Those further interested should consult P. Couteau or P. Morel.

The Circular of P. Muller giving lists of new orbits has also always been considered to serve as a communication outlet for the Commission. Fuller use of the latter aspect would be achieved by giving such information as number of observations not yet published; bibliography of new publications; changes of addresses, etc.

The concern in the long delays in publication of observations was discussed; a less expensive and expedient method must be found in a publication which will be assured maintenance by libraries. The discussion resulted in the resolution given at the end of this report.

The continuing need for communication with astrophysicists on particular double stars which hold answers to problems otherwise unattainable. Of special interest are binaries containing high luminosity, or subdwarf components, classes for which masses are very uncertain. *Luyten* cited the astrophysical interest in wide doubles containing white dwarf components. He further said it is evident that, at least at present, these constitute the only group of objects from which eventually the masses of white dwarfs can be determined – by statistical methods, using orbital motions, but this requires very large telescopes. Photometry is also an essential parameter for the study of double stars. *Franz* reported recent progress at the Lowell Observatory of magnitude determinations of high luminosity components off the main sequence, and also of systems with variable component. The need for contact with other commissions to set up exchange of demands was expressed by *Dommanget*. *Eggen* pointed out that the astrophysicists have the problem of being able to critically select the proper information from publications on double stars.

The need for high dispersion radial velocity observation of binaries with special interest was discussed. *Batten* proposed that astronomers with high dispersion equipment be encouraged to join Commission 26; *Couteau* suggested that *Dommanget* work with *Batten* (Commission 30) to establish a list of individual radial velocities for orbital analysis. *Batten* expressed interest in seeing a new edition of the *Dommanget-Nys* Catalogue of ephemerides of radial velocities which is now nearing the end of its usefulness.

Specialized methods of double star observations are being developed such as from occultations. *R. Hanbury Brown* reported on observations of the double-lined non-eclipsing spectroscopic binary α Virginis, as an example of the information which can be obtained with an intensity interferometer. The observations have been compared with a theoretical model of a binary star to find the inclination of the orbit, angular size of the semi-axis major and of the primary, brightness ratio, position angle of the line of nodes, and sense of orbital motion. By combining the parameters known spectroscopically with those gained above, the parallax to the system was found with an uncertainty of

about 4%, along with other information about the components, including their masses. By building a larger and more sensitive interferometer it would be possible to extend the measurements to fainter binaries and to obtain information about their distances, masses, radius and absolute magnitude.

The President expressed the concern of the competition with other programs on large telescopes. It is imperative to maintain observations both in the Northern and Southern hemispheres. Perhaps a list of telescopes, which could be used for double star measures, would be useful. Refractors should be preserved and not allowed to run down; the restoration of a good refractor (Nice) is less expensive than a new telescope. *Djurkovic* announced the possibility of an exchange of staff between the observatory at Belgrade and an observatory in another country-exchange involving only personnel with no monetary considerations.

The President discussed the interest in having another colloquium on double stars, which had been suggested by Arend and Dommanget in the March 1970 Circulaire of Muller. The following title conveys the scope of the subject matter which should be discussed: 'Orbital and Physical Parameters of Double Stars'. It seems appropriate for this colloquium to be held in 1972, possibly at the Sproul Observatory, or Coïmbra.

The proposal made by Dommanget in the Draft Report (p. 256) suggesting that the methods of orbit calculations and parallax derivations be given in the publications was approved. Dommanget will undertake to carry out proposal no. 2 (p. 256) of the Draft Report concerning a statistical study of couples in the Jeffers-Van den Bos Catalogue as a function of separation, magnitude and Δm .

RESOLUTIONS ADOPTED

1. Commission 26 realizes the necessity in the near future to compile homogeneous data for visual double stars for which the following information is known: all orbital elements, photometric, spectroscopic and astrometric; this data will serve as a basis for research on mass-luminosity relation on stellar evolution and related problems. (This was first proposed at *IAU Colloquium No. 5 on Visual Double Stars at the Nice Observatory September 1969.*)

2. Commission 26, facing similar problems for publishing double star observations as Commission 42, supports its resolution concerning the desirability for editors of all journals to accept and even request for publication complete lists of double star observations.