

## 27. COMMISSION DES ÉTOILES VARIABLES

PRÉSIDENT: M. HARLOW SHAPLEY, *Director of the Harvard College Observatory, Cambridge, Mass., U.S.A.*

MEMBRES: MM. Nijland (*V.-Pres.*), Ascarza, Baldwin, Banachiewicz, A. Bemperod, Mlle Blagg, A. N. Brown, Mlle Cannon, De Roy, Dugan, Grouiller, Hagen, W. Hall, Hertzsprung, Jordan, Kordylewski, Kristensen, Lacchini, Lundmark, Luplau-Janssen, Mascart, Merrill, Niethammer, Olcott, Phillips, J. S. Plaskett, Russell, Ryves, Schilt, Shinjo, Stebbins, Stein, Stewart, Strömngren, Thomson, Turner.

No attempt will be made in this report to summarize the great activity during the past three years in the field of variable star astronomy.

Since the Cambridge meeting of the I.A.U. great activity has been displayed in the field of variable star astronomy. Observers have been requested through several astronomical journals to send statements of progress directly to the Chairman of the Commission not later than May 1, 1928. The valuable work which has been done by the several variable star associations, especially on long period variable stars and certain stars of irregular character, should again be recognized. Thanks to this work and that of many individual observers, several stars, *e.g.* RT Andromedae, SX Aurigae, SX Cassiopeiae, RZ Pegasi, X Persei, etc., might now safely be deleted in the Lists I and II (Appendix B, *I.A.U. Report for 1925*), since the character of their variation is sufficiently known for the present. But by far the greater number of the variables included in these lists still need co-operation or deserve special attention and will continue to do so.

For some of them (SS Aurigae, R Coronae Borealis, SS Cygni, U Geminorum) co-operation works very well, for many others it does not as yet. Notwithstanding the strenuous efforts of several observers of the light-curves of the U Geminorum variables RU Pegasi, UV Persei, TW Virginis, X Leonis, etc., and of the very interesting "rapid" stars RX Andromedae, RW Aurigae, Z Camelopardalis, etc., very little is known as yet. The chief trouble is the lack of good charts and of reliable sequences of comparison stars. The wish is further expressed that astronomers in charge of large instruments (20 in. or more) would observe the quasi-constant phase of minimum light of U Geminorum and other members of this family.

1. There is an urgent need for more comparison star sequences for variables, especially for those on Nijland's lists of incompletely observed stars, and for long period variables with undetermined light curves.

2. Revised magnitudes are much needed for a limited number of comparison stars in the neighbourhood of most of the variables which are observed by direct visual methods.

Each of these *fundamental comparison stars* might differ from the next in the sequence by about one magnitude (with one or two extra stars at the ends of series); they should be white (or pale yellow), single, not too near other stars in the field, and well distributed around the variable.

The magnitudes should be determined by more than one method (polarizing photometer, wedge photometer, photovisual) and at different observatories and these comparison stars should be watched and their photographic images examined in order to detect possible variability (P. M. Ryves).

3. Plans for the publication of old observations should be considered, ob-

taining when possible the assistance of the academies and observatories in the countries where the observations originate (Shapley). Prompt publication of current results should also be strongly urged by the Commission (Dugan), and the publication of lists of variable stars under observation at various observatories, by associations and by individuals, might be considered (Stebbins).

4. For more than 50 per cent. of the recorded variable stars the spectra are unknown, a fact to which general attention should be drawn in the hope of encouraging systematic observations of variable star spectra (de Roy). It is also of importance to record spectra for comparison star sequences.

5. Collaboration in the *visual* observation of selected Cepheids to parallel the *photographic* scheme of co-operation initiated at the 1925 meeting of the International Astronomical Union is suggested by Blažko.

6. Emphasis should be placed on the study of bright irregular variable stars, and especially of stars with periods intermediate between those of typical Cepheids and those of typical long period variables; both groups are significant for theories of long period variation.

7. Careful and very detailed study of the light curve of R Aquarii is recommended by Dr Merrill, who notes especially the peculiar behaviour near minimum (Ryves, *Monthly Notices*, May, 1927), and the peculiar changes in the spectrum accompanying the extraordinary outburst in 1926.

8. The question should be raised whether to observe a few variables (long period class) assiduously, or to extend the list that might be followed by the various variable star associations (Thomson). The continuity of observations on old variables should be emphasized, notwithstanding the apparent completeness of our knowledge of the light curves over an interval of years (Miss Blagg).

9. The question has been raised whether action should be taken to make uniform the names of classes of variables, for example, Cepheids, Lyrids, Algolids, Mirids. With reference to this matter, the American Section of the International Astronomical Union, at its meeting on December 31, 1927, unanimously carried the following recommendation, proposed by Russell:

In the opinion of the American Section the existing lack of uniformity in the nomenclature of various types of variables does no harm and it is unnecessary to attempt to modify the existing terminology.

10. Professor Nijland urges the general adoption of the numerical system (in addition to other systems) for designating variable stars and points to the urgency of using one and the same form of new nomenclature. It is recommended to write V 19 = SS Cygni, this being the original designation of Chambers and André, and not SS Cygni 19 or Cyg 19. The American Section approved (December 31, 1927) the plan recommended in 1925 (*Trans. I.A.U.* 2, p. 240) of beginning the use of the numerical system exclusively with V 335 for each constellation, but using it only optionally before that number is reached. Professor Nijland has undertaken to revise and extend the two Lists I and II (*Trans. I.A.U.* II, 104, 107, 1925). In order to avoid confusion, they shall be called A, B, and a third list C has been prepared, containing a great many stars, that are known, for 20 years or more, to be variable, but whose light variation is still wholly unknown. It is proposed to publish these lists at the end of the year in the *Bull. of the Astr. Inst. of the Netherlands*, and that they shall be freely and largely distributed to all applicants.

11. For eclipsing variables thorough observation spectrographically is as important as photometric observation. For the fainter stars of this type determina-

tions of the spectral type and of the maximum velocities of approach and recession are very valuable in the interpretation of the photometric curve.

Occasional photometric observation of the times of minima, both primary and secondary where possible, should be continued, to furnish material for study of changes in period; and it is desirable that spectrographic determinations be repeated, in view of the possibility that they may furnish an interpretation of the changes in the period.

Especially is this important in such a case as Y Cygni, where changes in the period have been apparently traced to a revolution of the line of apsides.

The Cracow ephemeris of eclipsing stars, which is in part supported by a grant from the International Astronomical Union, will hereafter include dates in terms of Julian Days, according to a communication from Professor Banachiewicz. Attention should be called to the publication by Prager in 1927 of a survey entitled *Tabellen zur Nomenklatur der veränderlichen Sterne*, a valuable collection of check lists and synonyms for variable stars; and to the Harvard catalogue of long period variable stars, including more than 1600 objects, which will be published before the meeting in Leiden.

The valuable work which has been done by the several variable star associations, especially on long period variable stars and certain stars of irregular character, should again be recognized. The usefulness of collections of photographic plates in the systematic study of the RV Tauri type, eclipsing and long period variable stars has been demonstrated during the past year by several investigators at the Harvard Observatory.

The Mount Wilson and Leander McCormick observatories have started the systematic observation for proper motions of all Cepheids of known periods and north of declination  $-23^{\circ}$ . At the McCormick Observatory the first series of plates is nearly completed. The purpose of this very valuable work is to determine the parallaxes of the Cepheids from a discussion of their motions, both parallactic and peculiar.

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*President of the Commission*

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