2. PHOTOMETRIC MEASUREMENTS OF MAGNETIC-FIELD AND SPECTRUM VARIABLES

By G. R. Miczaika

In Heidelberg photo-electric measurements have been made on the spectrum variables ι Cassiopeiae, 73 Draconis, γ Equulei, χ Serpentis, ϵ Ursae Majoris, BD+33° 1008 and others. According to our results all of these stars are variable with an amplitude of 0·01 magnitude and period equal to that of the spectral variability. Mr Bahner has carried out some further spectrophotometrical measurements of the line intensities in the spectra of ι Cassiopeiae, χ Serpentis and ϵ Ursae Majoris. These measurements have enabled him to determine the phase relationship between the total light and line variations. The magnetic-field variable HD 133129 is likewise variable in magnitude with a small amplitude. The period, which might be several days long, could not as yet be determined with certainty.

3. THE SPECTRA OF VARIABLE STARS OF THE RW AURIGAE TYPE

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The RW Aurigae stars form a class of variables that has recently been recognized, notably through the work of C. Hoffmeister.* Members are assigned to this class solely on the basis of their type of light variation; specifically, through the possession of rapid, non-periodic fluctuations in brightness. The spectral type and luminosity play no part in the classification. Since the prototype, RW Aurigae, is itself a 'T Tauri star', some misunderstanding has arisen as to the relationship between the RW Aurigae variables on one hand, and the T Tauri stars on the other. It is important to note that assignment to the T Tauri class is based entirely upon spectral criteria, in particular, the possession of a characteristic emission-line spectrum; the nature of the light variation (because the great majority, if not all, of the T Tauri stars are variable) is not considered in making the assignment.

It should be mentioned that the T Tauri stars are but one variety of the emission-line stars found in association with nebular material, although the other types occur much less frequently.† Furthermore, there are many irregular variables whose association with nebular matter cannot be questioned but that definitely show no bright lines. In the Orion Nebula, for example, only 47% of the known variables exhibit emission at H_α. It is not known if the emission and non-emission stars differ in the nature of their light variations.

It is clear, first, that the RW Aurigae class is not identical with the T Tauri stars. This is demonstrated by the fact that a large fraction of the RW Aurigae variables are not associated with nebular material, while, as far as is known at the present time, the T Tauri stars and allied objects occur exclusively in regions of bright or dark nebulosity. At best, then, the RW Aurigae class must be a considerably diluted sample of bright-line nebular variables.

It might then be asked if the T Tauri stars may not be just a sub-group of the RW Aurigae variables which, as Hoffmeister has suggested, may include all of the intrinsic variable stars lying on the main sequence. This does not seem likely, for the T Tauri variables are known to exhibit a wide diversity in their photometric behaviour. It would seem to be difficult, therefore, to find photometric criteria that are adequate to distinguish, in every case, T Tauri-type variables from irregular variables of other types.

Obviously, the best way to test the ability of the photometric observers to pick out T Tauri variables and related objects is to investigate those variables that have been assigned to the RW Aurigae class without knowledge of their spectra. Spectroscopic

* *A.N.* **278**, 24, 1949.

† For a brief discussion of the types of bright-line objects found in nebulae, see G. H. Herbig. *J. Roy. Astr. Soc. Canada*, **46**, 222, 1952.