BRITISH ASTRONOMICAL ASSOCIATION

VARIABLE STAR SECTION

CIRCULAR No. 35 1978 MARCH

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ECLIPSING BINARY PROGRAMME

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Changes of Office Because of the pressure of professional commitments, John Isles and Alan Smith have had to resign their respective offices in the VSS. We are pleased to have Storm Dunlop take on overall responsibility for work on our outstanding Mira star observations, while Melvyn Taylor is promated to BG co-ordinator. They will continue to supervise production of VSS Circulars and CSN's respectively.

Viva España The Director should be at the Villafranca ESA ground station observing with the International Ultraviolet Explorer during late April and early May. Any urgent correspondence likely to otherwise reach him in that time should be addressed to Doug Saw.

Non-Member? The following omission from the Members List in Circular 34 has been notified:

HOWARTH, I.D. 67 Lichfield Road, Portsmouth PO3 6DF.

BAA Meetings If any members are considering making special trips to London for BAA meetings, they may be interested to note the following talks are scheduled for the April meeting:

'Eclipsing Binaries' (Peter Hornby)
'An Observing Run at the South African Astronomical Observatory' (Jeremy Bailey)

We also expect to have Doug Saw's display of 1977 light-curves at the Exhibition meeting in May.

X-rays from Dwarf Novae In Astronomy & Astrophysics 63, L 1 (1978) Hense et al. report the detection of both soft (0.16 - 0.28 keV) and hard (1 - 7 keV) X-rays from SS Cygni at minimum by the ANS (Netherlands) X-ray instrument. This observation has important consequences and may indicate similarities with AM Her, particularly a strong magnetic field associated with the white dwarf.

The UK satellite Ariel V has also detected X-rays from SS Cygni, the signal strength varying markedly with the optical state. These results are as yet unpublished, and Dr. Martin Richetts of the Leicester University X-ray group has been making extensive use of our estimates in interpreting the data. In a recent visit to the Director, Dr Richetts emphasised the value of our results and said that he was hoping to secure more observations this year. Since only rather short notice of his observing programme may be available, it is hoped that observers will watch SS Cygni, and the other dwarf novae and potential X-ray sources (e.g. γ Cas, X Per) on our programme, particularly closely in coming months.

In this connection, the HEAO group have asked for our observations of the 1972 October outburst of U Gem, for which they have X-ray data. Unfortunately only one of our observers - E. Coady - has yet reported positive observations of this event. Please bear in mind that any early morning observations of stars on our programme are likely to be of particular value, not only in defining general behaviour behaviour, but directly in facilitating the interpretation/professional observations in other spectral regions. of

CI Cygni The observation by Guy Hurst and others of a recent rapid fade by CI Cyg ties in with the suggestion (JBAA 87, 88 1976) that this is an eclipsing system, the decline taking place just about when expected for an 855^d period. Estimates made during the eclipse phase should give valuable information on the ralative variability and dimensions of the components. Althoug rather poorly placed for observation at the moment, an early morning assault on CI and SS Cygni would be most useful.

RCB Variables In a recent paper A.F. Pugach (Peremennye Zvezdy 20, 391 1977) describes a strong relationship between $(B-V)_0$ (i.e. intrinsic colour, after correction for interstellar reddening) and the mean rate of fading during minima, in the sense that the reddest stars show the slowest fades. A possible exception is XX Cam, which, whilst not especially red, faded rather slowly during the only reasonably well-observed minimum to date. However, a close watch has been kept on this star only since its 'adoption' by British amateur observers in the late '60s, so some minima may have been missed if they were rather short.

Recurrent Novae RASNZ VSS Circ.77/10 confirms the report (see VSSC 34) that the 'fade' of V1017 Sgr notified earlier was spurious; the star estimated at $\sim 16^m$ was not V1017, which had apparently remained steady at $\sim 13^m.2$. However, Circ.77/11 reports a possible fade of the right star from 13.1 on JD ....351 to 14.7 on ....461, with the comment that confirmation is required!

In Astronomy & Astrophysics 62, 273 (1978), J.E. Steiner attempts to show that there is a relationship between eruption magnitude and time interval between two eruptions for individual recurrent novae. He goes on to claim that it is then possible to predict the epoch of the next eruption, and to infer some conclusions about the nature of the eruptions of recurrent novae. Using 3 points for RS Oph, 4 for T Pyx and 2 for V1017 Sgr, Steiner finds relationships of the form

$$A = a + b.\log T$$

where T is the time between eruptions and A is the amplitude. Using these meagre data he claims that employing the amplitudes of eruptions at the start of cycles gives smaller scatter than using those at the end, and discusses this in terms of thermonuclear events. He also 'predicts' the approximate time of the next outburst of RS Oph as 1977.9.

We have, of course, found similar relationships (of far greater reliability) for a number of dwarf novae, except that use of following outburst amplitude is more strongly correlated with cycle length in most cases. The statistical significance of Steiner's results (which he does not discuss) are so low that, in the Director's opinion, his discussion must be treated as essentially speculative.

Spectroscopy of Variable Stars (contributed by R.J. Livesey)

Some years ago the writer was lucky enough to be given a Wood's grating having 13 500 lines per inch (~ 530/mm). This has been mounted in a holder which slides over a x70 Erfle eyepiece which is used in conjunction with an 8½ inch (215 mm) reflector.

When a star is observed in the grating, the image of it appears as normal, if somewhat fainter, making the location of the star in the apparatus relatively easy. On either side of the image appears the primary spectrum, and outside these, and more elongated, the

secondary spectrum, which is much fainter.

As the spectroscope, so called, is slitless, the apparatus is used only on point objects such as stars but the great advantage is that the star field is still visible in the equipment for locating purposes. A second advantage is that by turning the grating, two stars may be compared by aligning them parallel to the lines of the grating. It is thus possible to observe the differences between the spectra. The classic demonstration is Beta Cygni which comprises a yellow and blue double.

When a red M giant variable such as Omicron Ceti is observed at reasonable brightness, it is noted that parts of the spectrum are bright and faint. At peak magnitude it is possible to make notes and draw diagrams to illustrate these variations. These turn out to be the obscuration bands of titanium oxide in the stellar atmosphere. Other M variables can be similarly studied.

Another type of star studied has been the nova, the classic example being Nova Cygni 1975, which was very bright and on which good detail of the spectrum could be noted.

The variation of the eye's sensitivity to light with wavelength and the Purkinje effect, together give problems in interpretation of visually observed spectra. For instance in o Ceti, a band in the yellow part of the spectrum looks intensely bright and might be mistaken for a region of emission were it not for the fact this is the wavelength of peak sensitivity, the bands on either side appearing dark due to the TiO absorption and the fall in sensitivity away from maximum. Secondly, in Nova Cygni 1975 the bright emission of H appeared to fall off quickly with time, although the star in integrated light was clearly red. The reason was that the Purkinje effect was taking over and reducing the apparent brightness of the whole red end of the spectrum and the Hα line in particular, as the star faded - remembering that the red light is spread out and faded initially by the grating.

For diffuse objects such as the Ring Nebula, comets and the Orion Nebula, the writer places a pocket spectroscope complete with slit and magnifier, over the Erfle eyepiece, so that the spectrum observed is that of the line of light passing the slit and not the overlapping diffuse surface spectra in the other equipment. Using this method it is possible to examine the emission lines in the nebulae and comets.

The key to spectroscopy is to have adequate light-gathering capacity, but for visual work in respect of self-education and not a high order scientific research, the door is not closed to the amateur with average-sized small telescopes.

Charts Charts are now available from the Curator for DZ And, UV Cas and SU Lac.

Additions to Members List

ANDERSON, S.J. 65 Peartree Road, Luton, Beds. LU2 8AZ
CURRIE, M.J. Physics Building, Univ. of Sussex, Falmer, Brighton.
HUFTON, D. 4 Albany Court, Ackworth Road, Pontefract, W. Yorks.
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New Members

ESPY, B. 9 Morehampton Terrace, Donnybrook, Dublin 4, Eire.
SMITH, E.H. Red Hill Farm, Asterby, Louth, Lincs. LN11 9UE

Change of Address

DOWDELL, A.P. 18 Wrights Way, South Wonston, Nr. Winchester, Hants.

+ Storm Dunlop would like to apologise for the delay in issuing this +
+ Circular, due to pressure of other work. +