BRITISH ASTRONOMICAL ASSOCIATION

VARIABLE STAR SECTION

CIRCULAR No. 26

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ECLIPSING BINARY PROGRAMME

Co-ordinator: P.W. Hornby, 3 Mount Gardens, Leeds 17.

Predictions: J.C. Smith, 18 St. James' Close, Hanslope, Bucks.

NOVA SEARCH PROGRAMME

Co-ordinator: C.V. Borzelli, 12 Corbin Avenue, Jersey City, N.J. 07306, U.S.A.

Charts for the following stars, indicated in the list accompanying VSSC 25 as being out of print, are now available from the Curator; HR Del, AC Her, X Leo, AY Lyr, WZ Sge, V Vul.

1975 observations. The Secretary has once again been caused considerable inconvenience by the late submission of several observers' work. Since many of our most active members are able to get their work to the Secretary during the first few days of January, it has been decided that in future ANY OBSERVATIONS REPORTED LATER THAN THE END OF FEBRUARY WILL NOT BE INCLUDED IN THE SECRETARY'S LIGHT CURVES AND MAY NOT BE USED AT ALL BY THE VSS. Observers should write up their results on report forms progressively during the year and not make an end-of-year mountain of the job. (See VSS "Methods" under "Recording Observations".)

North Western group. Britain has a new VS organisation, and its first ever journal devoted to variable stars. Founded by Colin Henshaw and Ian Middlemist, the North Western Association of Variable Star Observers aims to hold meetings in the Manchester-Merseyside area, to encourage observation of variables and to publish the results in its bimonthly journal "Light Curve", edited by Jeremy Bullivant.

It is not clear from the first two issues of the magazine whether NWAVSO considers itself an indepentent organisation or a local group of the VSS. Editorials state that the results published are preliminary only and that the intention is to support the BAAVSS rather than to compete with it, but the group's programme includes a number of non-VSS stars and it is stated that an aim of the group is to publish results in view of delays inflicated (sic) by the BAAVSS. These things will doubtless be resolved in time; the important development is the magazine which hopefully will not fail for lack of support.

Articles in the 1976 Jan and Mar issues include an inconclusive discussion of suspected variation in Tau Cas, analyses of recent observations of W Cyg (Middlemist finds a period of 203^d with many irregularities) and R Sct (Bullivant finds a period of 162.3^d with range 0.5m brighter than GCVS), and a note on the minimum of AB Aur in Nov/Dec 1975. Membership of NWAVSO costs £1.50 per annum; write to the Treasurer, D. Jones, 13 Gainford Gardens, Moston, Manchester.

LPV Memoir. Work is going ahead on this 'magnum opus' which will present details of maxima and minima and mean light curves derived from observations between 1939 and 1974, as well as a general discussion of all results obtained to date by the VSS from observations back to 1900 or earlier in many cases. The work involves listing observations in chronological order, computing 5^d or 10^d means, plotting them and drawing curves, deriving maxima and minima where possible by Pogson's method of bisected chords, using well-observed cycles to derive mean curves and obtaining dates of remaining maxima and minima by curve-fitting. It is clear that it will take several years to complete unless the work can be divided, and members who are interested in taking part in the compilation are invited to write to the Director. Full instructions will be provided to ensure that the work is carried out in a uniform manner.

Julian Day Calendars. It has been discovered that some of the J.D. calendars included with VSSC 25 were blank on one side. Any member who happened to receive one of these may obtain a replacement

from Steve Anderson.

Index. The enclosed index to VSSCs 12 to 25 has been compiled by Storm Dunlop. The possibility was considered of producing an index to Circulars 1 to 25, but as very few members will posses copies of Circulars 1 to 11 (issued by Dr. F. de Roy between 1922 and 1935) the omission will probably not be regretted. Storm has also prepared an Information Sheet on the international classification and I am most grateful to him. This Information Sheet will be enclosed with a Circular when it is possible to do so without exceeding the weight step. Members who would like a copy immediately, and who have an S.A.E. to their credit, can request one from Storm at the address given on the cover.

John Isles

BINOCULAR GROUP

Assistant Co-ordinator. Alan Smith has for some time been unable to continue his work as Assistant BG Co-ordinater, for domestic reasons. It is planned to analyse the many tens of thousands of observations which have accumulated since the formation of the BSS in 1968, and much of the paperwork has already been cleared by the Recorder and his helpers; but if these plans are to come to fruition additional help will be needed from members who are able to take park in the analysis of observations. This work will be done under the supervision of the Co-ordinator, and instructions will be supplied; but it appears likely that the biggest part can be played by members who have a scientific training and some knowledge of statistics. In particular, anyone who is interested in filling the vacant position of Assistant Co-ordinator is invited to write to Alan Pickup at the address on the cover.

New BG Chart Notes: new charts issued since January 1975

Star	Desig.	Range	Type	Period	Sp	Notes
AQ And	002235	8.0 - 8.9	SR	346^d	Nb	1
V450 Aql	192805	6.3 - 6.7	SRb	40^d:	M8	2
V1293 Aql	192804	6.7 - 7.4:	SRb	?	M5	2
CSV101849 Aql	192502	6.1 var?	-	-	K5	2
V Ari	020911	7.8 - 8.8	SRb	77^d	R4	3
NO Aur	053431	6.1 - 6.7	Lb	-	M0	4
BD +31°1048 Aur	053431	? - 6.0	flares	-	B8	4
CH Cyg	192150	6.6 - 8.5	Z And	-	M7	5
NQ Gem	072524	7.4 - 7.8?	SR?	-	R8	6
TV Psc	002217	4.8 - 5.7	SR	49^d	M3	7

Notes:

1. AQ And: The previous sequence has been limited to comparisons A to K, and the magnitudes have been revised.
2. V450/V1293/CSV101849 Aql: These are all on the same chart. V1293 Aql is the new designation of CSV101855 Aql; the sequence is unchanged from that on the previous combined chart (dated 71.07.28).
3. V Ari: This is a star not previously on our programme.
4. NO Aur/BD +31°1048 Aur; These stare share the one chart which is based on the previous BG chart. Comparisons C, E, H, K, L have been dropped, while the magnitude for M has been revised from 6.3 to 6.7.
5. CH Cyg: This new chart replaces the one previously in use. The new sequence is the same as that used by the AAVSO.

6. NQ Gem: This is the new designation for the star previously charted as HD59643 = BD +24°1686 Gem. The sequence is unchanged from that on the previous BG chart as amended on 71.09.09.

7. TV Psc: The new chart differs from the previous one (dated 72.09.09) only in that comparison B (= Zeta And EB 4.06 - 4.20V 17.7684^{d}) is deleted.

D.A. Pickup

ECLIPSING BINARY PROGRAMME

This is the first of a series of notes about eclipsing binaries and the eclipsing binary programme, a series which will hopefully become a regular feature of VSS Circulars.

The report of the EBP for 1975 is now in preparation; all 1975 observations submitted to date have been reduced, and the analysis of the resulsts is almost complete. Prompt submission of any outstanding results from last year will considerably aid the early publication of the report.

In the four years of its existence, the EBP has accumulated well over 250 timings of eclipsing binary minima. One unsatisfactory feature has been the very uneven distribution of observed minima among the 37 programme stars. Three stars (RZ Cas, VW Cep and W UMa) have been timed more than twenty times, whereas twelve stars (V822 Aql, WW Aur, ZZ Boo, RS CVn, EI Cep, Y Cyg, Z Her, U Oph, DM Per, IZ Per, SZ Psc and Z Vul) have been timed either once or not at all. Most of these stars have a history of period changes, and in order to obtain a baseline from which to monitor such changes in future, we need several good timings for each star. Please make every effort to secure timings of these stars as soon as possible.

A good example of what can be missed came in recently in the shape of a postcard from Tristram Brelstaff. Tristram had attempted to observe a minimum of RS CVn on April 7, only to find his attempt frustrated by the fact that RS CVn seemed to be eclipsing four hours early. There are no other timings of this star in the files, so we have no idea of what has led up to this enormous discrepancy. It is well known that there is a cyclic variation in the period, but this has been allowed for in the predictions, so the observation remains a mystery. RS CVn should be at the top of every observer's priority list, in order that a close watch may be kept on this star.

There are several other programme stars which have shown major activity recently, chief among which are U Cep and RW Tau. RW Tau underwent a substantial change of period in early 1971, just before our programme started, and minima were, as of our last timing in 1974 September, running around 1½ hours early. RW Tau will have disappeared into twilight before you read these notes, but it will reappear in the morning in August, giving opportunities to discover if anything further has occurred to the star since we last observed it. U Cep was the subject of much professional activity in late 1974, when spectroscopic and photoelectric observation revealed that the G8 giant component had transferred matter into a disc around its smaller B8V companion. Angular momentum conservation dictates that this must have been accompanied by a period change, but our last timing was in 1974 July. At this stage, minima were occurring about an hour early, as compared with the 1969 General Catalogue of Variable Stars, although a more recent set of elements, published by the AAVSO, and incorporating the results of a 1967 period change, describe the star's 1974 behaviour well.

So RS CVn, U Cep and RW Tau are this Circular's priority stars. RW Tau won't be available until late summer, and the long period of

RS CVn, nearly five days, means that minima don't occur very often, but U Cep has a series of morning minima coming up. We should be able to make headway on these stars pretty soon.

Finally, I'd like to invite any VSS members who haven't yet observed an eclipsing binary to try it. Predictions are available from J.C. Smith at the address on the front of the Circular; I think you'll find observing eclipsing binaries a fascinating pastime. Those members who prefer telescopic observation will be catered for in the near future, as several fainter objects are being considered for inclusion in the programme.

P.W. Hornby

CORRESPONDENCE

1) BD +57° 0257 Cas - Suspect in NGC 457 Cas

On 1974 Dec 29 the variable V465 Cas was being estimated in 8x 40 B when a star not on the chart was noticed for the first time. V465 had been under observation from July of that year and the same binoculars had always been used. Its position is south preceding Phi Cas, amongst the stars of NGC 457, an open cluster in Cassiopeia. Its colour was noted in a 76mm OG and its magnitude with reference to comparisons for V465, was 6.8 - 6.9 over a period of about 5 hours. It is not marked in Coeli (1950.0).

With the initial 'panic' over a check was made for finding if it was a known variable. The observation was reported to the BG Co-ordinator and later more information was acquired and two other observers had a look at it. Alan Pickup identified it as BD +57° 0257 Cas, a star suspected of variation (7.0v?) with possible rapid fluctuations. USNO XVII (part VII) gives its magnitude as 6.9?, but SAOC gives it as faint as 7.9. A paper in Ap.J about NGC 457 shows it to be a supergiant, spectrum B6Ib with an absolute mag. of -6.8, and that in 1956 it was 0.08m brighter than in 1959 (when the paper was published). The paper gives the B-V as +0.5, U-B as -0.37. The position from GCVS data is $01^h\ 16^m.7$, +57°56'.6 (1950.0).

Three observers, Tristram Brelstaff, Guy Hurst and myself have observed it on accasions in 1975. The few observations to hand show wide differences and ranges, with a mean of 7.4 from 39 reported observations. Bearing in mind the closeness of Phi Cas (2 to 3 arc mins.) and possible estimating errors, the extreme range is 6.6 to 8.3. On 1975 Jun 28 three different magnitudes were estimated in a period of $1^h\ 40^m$, i.e. 7.2, 7.9, 7.8. On the same date independent estimates were made at $10^h\ 30^m$ ($\pm 1^m$) giving 7.0 (Taylor; 10x 50 F) and 7.2 (Brelstaff; 60mm OG).

Using low power hand-held binoculars it is difficult, almost senseless to estimate, and even with 76mm OG (field 1°.2) the comparisons in the V465 sequence have to be judged outside the field of the suspect. Interested observers may obtain a chart from me.

M.D. Taylor, 17 Cross Lane, Wakefield, West Yorkshire. WF2 8DA

(This is HD 7927C, listed in Publ USNO XXI as V = 6.94, B-V = +0.40, U-B = -0.38, Sp. B6Ib; source is Tolbert, Ap.J. 139, 1105 (1965). (HD 7927A is Phi Cas.) It is not in the Catalogue of Suspected Variables but nearby is GSV 5911 = Wr 53, 8.5 - 9.1, Lc?, Sp. M0Ib-II, at (1950) $01^h\ 16^m\ 43^s$, +58° 00'.8 which would seem worth looking at at the same time. - JEI)

2) Suggestions to observers

Recently I have been assisting in the logging of VSS observations; in doing so I have come across trends by various observers which are not always to the benefit of the stars concerned, since they lead to an undue amount of scatter and make interpretation of the results

obtained more difficult.

(i) It is a mistake to use any instrument to observe stars which are above about 4 mags above the threshold. At a pinch one can lose a mag or so by stopping down the objective, thus helping to keep the Purkinje effect under control, but this does not affect the inaccuracies caused by two of the larger instruments' inherent defects, namely lack of field size and slowness in centring stars for comparison.

As most stars below 11^m seem to be underobserved, I feel it would be best if observers having access to 25 cm or more restricted their attention to these stars alone, leaving the brighter phases and brighter stars to those more numerous observers with 15 cm or less of aperture.

(ii) I feel that the practise of entering the "most usual" instrument and power on the report form is not helpful. If it must be used then any variation from the norm should be entered in the Remarks column.

(iii) I am unhappy with the "three class" system, and propose the following five class system which, if rigidly adhered to, should aid greatly the interpretation of results obtained.

Class 1 Star suitably bright (about 2 mags above direct vision threshold); sky in vicinity of variable free from all trace of haze, high cloud, etc. Observation judged "perfect".

Class 2 Star suitably bright, but observation judged as possibly suspect due to slight observer fatigue, very thin haze or presence of not more than ⅔ moon not interfering with observation.

Class 3 Star faint enough to require averted vision; other conditions as for Class 1: or thicker haze, uniform high cloud, interference from moon or artificial lighting, etc., making observation suspect.

Class 4 Sky very poor, or intermittent patches of thin cloud crossing field, or averted vision necessary, sky fair as for Class 2.

Class 5 Averted vision in poor sky; or, in fair to good sky, star so close to limit of vision as to engender doubts as to the identity of the objects observed or suspected. Very doubtful observations.

A suitable system of weighting observations when calculating means, etc., would add greatly to the ease of interpretation of the pooled results and would be feasible without great increase in the workload of section officers, etc., in these days of cheap electric calculators. Proposed weights: Class 1 1.0, class 2 0.9, class 3 0.7, class 4 0.3, class 5 0.1.

B.J. Beesley, 51 Downview Road, Greenisland, Carrickfergus, Co. Antrim.

(Doubtless other observers will wish to comment. For what they are worth my immediate reactions to Mr. Beesley's suggestions are as follows:

(i) This seems to be sensible advice.

(ii) As there is not room on the form for an "Instrument" column, the VSS "Methods" says "If more than one instrument is used for a variable, any variations are noted clearly in the Remarks column."

(iii) There would be an obvious disadvantage in changing to such a five-point scale as some observers would doubtless continue using the three-point scale and it would be difficult for future users of VSS results to interpret the "Class" entries. However, the same objection does not apply to using 1½ and 2½ to indicate condition intermediate between 1 and 2, and 2 and 3. I do not think an inflexible weighting system as proposed would

be satisfactory, as some observers' class 2 estimates are more reliable than others' class 1. In taking daily or ten-day means for VSS reports, reduced weight is given to observations not only when they are class 3 but also when the other recorded details suggest that the observation is unreliable - e.g. glimpses, fractional extrapolations, estimates over a very large magnitude or step interval. When these considerations are taken into account I do not see any advantage in abandoning the present three-point scale. - JEI)

As an additional reminder to those members whose SAEs expire with this Circular, their names are listed below:

C.M. Bates, G. Broadbent, L.K. Brundle, A.P. Buckman, J.S. Bullivant, A. Burd, R.W. Cripps, M. Currie, F.E. Davis, M. Fiddler, C.H. Fisher, A.R. Good, D.P. Griffin, M.D. Hamilton, M.A. Hapgood, N. Hatchard, C. Henshaw, G. Hirst, D. Hufton, G. Hurst, C. Kear, B. Kennedy, G. Kirby, O.J. Knox, R.M. MacLeod, A. McWilliam, L.R. Matthews, A. Maudsley, D.J. Miles, I. Miller, W. Morris, M. Poxon, C. Radley, B. Smith, M.D. Taylor, R. Tew, P.B. Withers.

Prompt renewal will be greatly appreciated.

Members might like to include a note of their telephone no. when renewing, for incorporation when the Members List is revised.

The following is a list of additions and corrections to the 1976 March Members List.

ALBRIGHTON, S.W. 23 St. Nicholas Est., Baddesley Ensor, Nr. Atherstone, Warwickshire. CV9 2EY
BAILEY, J.A. Address changed to Astronomy Centre, Physics Building, University of Sussex, Falmer, Brighton.
BELL, M. 38 Pendine Crescent, North Hykeham, Lincoln. LN6 8UR
BULLIVANT, J.S. For "Beaminster Road" read "2 Beaminster Road"
COOK, A. "Woodlands", 6 Lakeland Drive, Frimley, Surrey, GU16 5LD
EASTBOURNE ASTRONOMICAL SOCIETY Now c/o R.W. CRIPPS
FIDDLER, M. 12 Engleton Lane, Brewood, Stafford.
GILL, P. 36 Wilkins House, Churchill Gardens, Westminster, London SW1V 3BY
KEENS, J. 202 Noak Hill Road, Billericay, Essex. CM12 9UX
PEEL, M. Delete London address - no new one as yet.
SPALDING, G.H. Address changed to 35 Northcroft, Slough, Berks. SL2 1HR
TRUE, Flat 2, 45 High St., Colsterworth, Nr. Grantham, Lincs.