

BRITISH ASTRONOMICAL ASSOCIATION

VARIABLE STAR SECTION

CIRCULAR No. 24

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ECLIPSING BINARY PROGRAMME

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1975 DECEMBER

This Circular probably will not reach you until the new year, and I offer my humble apologies for the delay, which is for the reason given in VSSC 23. My wife and I have nearly finished decorating our new house and I hope I will soon have time (and space) to deal with all those unanswered letters. Sorry about this, but you were warned!

I am most grateful to Storm Dunlop, who has had the job of typing all the stencils for a long time, for undertaking the production and distribution of this and future VSSCs. Addressed (and, in the case of UK members, stamped) envelopes for the Circulars should in future be sent to him at the address given on the front of this issue.

Another change, announced at our recent meeting at Chester, is that the schedule for publication of Circulars is to be changed so that they will be issued in those months when there is no BAA Journal, starting in March. We hope to publish more material in future and suitable articles or notes should be sent to me.

I trust you all had AM Eri X Mus and I hope 1976 will bring you all the clear skies you can use.

John Isles

Chart Curator. Members should note Steve Anderson's new address, given on the cover.

Eclipsing Binary Programme. The Council has appointed Peter Hornby as Co-ordinator of this Programme. Correspondence relating to eclipsing binaries, including observations, should now be sent to him at the address given on the cover, and not to the Director.

1975 observations should be submitted as early as possible in the new year, so that an early start can be made on checking, tabulating and plotting. Observations of stars on the Binocular Group Programme (list D in VSSC 23) should go to Alan Forno. Observations of stars on the main programme (lists A and C in VSSC 23) should go to Doug Saw. Note that reports on binocular stars common to the binocular and main programmes (list A) are now to go to Doug and not to Alan. Observations of eclipsing binaries should go to Peter Hornby, and observations of RR stars should go to the Director.

Blank report forms may be obtained, in exchange for return postage, from Alan, Doug or Steve Anderson. Alternatively they may be obtained at the BAA Library from the Assistant Librarian; this of course applies to personal callers only.

The secretary has pointed out that many members are not completing the forms correctly, and all members are asked to take note of the following points.

(1) Dates should be given as e.g. "Feb 12", not 2/12 or 12/2 which are ambiguous.

(2) Julian dates given in the "Methods" are for day 0 in each month, not day 1!

(3) Times should not be given more accurately than to the nearest 0^d.1, except for novae, dwarf novae and nebular variables. (There is no need to give any JD and decimal conversion for eclipsing variables and RR stars since the conversion is normally done after the light-time correction has been made by the person analysing the results.)

(4) Magnitudes should be rounded to the nearest 0^m.1.

(5) Fractional observations should be recorded as e.g. A(3)V(2)B, meaning V is fainter than A by three fifths of the magnitude interval between A and B (where B is of course fainter than A). Pogson step observations should be recorded as e.g. A-3, B+2, meaning that

V is 0^m3 fainter than A and 0^m2 brighter than B, these being independent estimates. Argelander step observations should be recorded as e.g. A(3)V, V(2)B, meaning V is three steps fainter than A, and two steps brighter than B, these being independent estimates.

VSS Programme. The RV project comes to an end on 1975 Dec 31, and the following stars are therefore no longer included in the programme:

TW Cam, EQ Cas, DF Cyg, V360 Cyg, SS Gem, SU Gem, EG Lyr, EP Lyr, TT Oph, TX Oph, UZ Oph, V564 Oph, CT Ori, DY Ori, TX Per, R Sge, Z Sex (SRc).

The following RV stars are being retained on the programme and observations of them should continue to be sent to Doug Saw:

AC Her, U Mon, R Sct, RV Tau, V Vul.

CO Aur (type Lb?) is still on the Binocular Group programme; 1975 observations of this star should be sent to Doug for inclusion in the report on the international project but in future years results should be sent to Alan Forno.

Several T Tauri stars were temporarily added to the programme in 1974 as visual light-curves were required for comparison with spectrograms obtained at Herstmonceux by Robert Forrest. The Herstmonceux project has now come to an end and observers are asked to send the Director a summary (dates and magnitudes) of their unreported results. However, in view of the interest in these objects shown both by our members and by professionals, it has been decided that these objects will be retained on our programme permanently and reported on in the BAA Journal. Observers are asked to send full details to the Secretary of any observations not so far reported to him for the stars concerned, which are: RW Aur, SU Aur, GW Ori, T Tau, RY Tau. Notes on the behaviour of these objects during the period of the project will be given in the next Circular when all the observations have been examined.

Nova Cygni 1975 (V1500 Cyg). A 3^o field chart and preliminary sequence down to 9^m3 were issued in September, and a 1^o field chart with extended preliminary sequence down to 14^m5 may be obtained from Steve Anderson.

Owing to an error in Publ. USNO XXI, the magnitude of comparison star C was incorrectly given as 6.05 in the first copies of the sequence to be issued; this should read 6.46.

Observers are advised that only observations properly written up on VSS report forms and communicated to the Secretary will be used in the report on this object in the BAA Journal.

Charts. Not all members of the Binocular Group may be aware of the valuable Comparison Star Notes issued by Alan Pickup in exchange for SAEs and comments on sequences. The latest issue (No. 6, dated Dec 14) includes notes on 56 fields and preliminary charts for W Boo, RX Boo, UV Boo, BD +57^o257 Cas, RU Equ, RV Equ.

Although the accuracy required of comparison star magnitudes for larger amplitude telescopic variables is not the same, there is still much work which needs to be done on the charts for main programme objects, both in revising existing sequences and in issuing new ones. The Director would welcome suggestions as to how this work might be organised.

RR Lyrae Project. The first campaign of observation comes to an end on 1975 Dec 31 and the results are being communicated to the French group for analysis and publication. It is intended that further campaigns should be organised and observers are advised to retain the charts issued (covering CY Aqr, AE Boo, RZ Cep, DY Her, RR Lyr, DH Peg,

DY Peg and AE UMa) as some of them will be needed again.

BSS Circulars. Former members of the Binocular Sky Society will be interested to learn that Storm Dunlop has compiled a detailed index to the Circulars issued since its formation in 1968 until its absorption into the VSS in 1974. A copy will be supplied free of charge to members who send him a SAE at the address given on the cover.

CORRESPONDENCE

Tristram Brelstaff (7 Thweng Way, Guisborough, Cleveland. TS14 8BW) writes: "Two points about the 1974 observers list: (1) Is it necessary? Surely it takes a lot of time to count up all the totals. (2) The eclipsing binary totals do not include the many unusable estimates which the observer didn't bother to send in. If these were included it could double the eclipsing binary totals."

(In answer to (1), I agree that the list has no importance except that it may be interesting to members and may encourage some. It certainly is useful to the VSS officers and members to know what stars were observed how often by how many people, and this is the important part of the statistics. Regarding (2), the published totals only include observations which could be used to derive times of minima. Observers are reminded that fragmentary observations may sometimes be useful and are therefore advised to report everything they record. - JEI)

B.J. Beesley (51 Downview Road, Greenisland, Carrickfergus, Co. Antrim.) writes: "I feel that we have too many stars on our programme and should reject some. Only stars which can be adequately observed from the British Isles with amateur equipment should be included. This rules out any star with declination below -10° and also some of the fainter eruptive objects. No new objects (except Novae, etc.) should be added; all changes for the present should be rejections. We have far too many RV Tau's on due to the European Project. We also have too many nebulas, particularly since many of them need very intensive study and all are in the same general region of the sky. (Probably the best way of dealing with the faster ones is to have one night in every ten when interested observers can observe several intensively.) Personally I feel that too much effort is being wasted trying to "co-operate with observatories" by setting up and dismantling after a few months programmes for the study of particular stars. It could be possible to even out the number of observations of slower variables by observing only if the star's RA and the JD give the same remainder when divided by 5."

Ian Middlemist (26 Lockside, Marple, Cheshire.) writes: "I understand from your statement at the VSS meeting that you might not be proceeding with the addition of SRc/Lc stars to the main programme. I think this is a pity. The mayhem among the Mira stars seems regrettable, especially as a lot of people enjoy observing them. I wonder if the right stars were dropped."

(The above two, necessarily shortened, letters are typical of several which have been received following the last VSSC. I cannot answer them in detail here. It is impossible to please everybody, but unless you let us know your views they cannot be taken into account. - JEI)

Rodney Lyon (Gwel-an-Meneth, Nancegollan, Helston, Cornwall TR13 OAH) writes: "In looking through my observations of eruptive types I note that observations made around minimum light prove unsatisfactory in that those which are not negative are rarely Class 1. Far more could be learnt if more detailed studies could be carried around minimum, particularly at the point when the 'triggering' of the eruption takes place. Would it be possible to initiate a programme on say 3 or 4 stars by those who possess larger apertures or have access to professionals' telescopes? Possibly simultaneous spectroscopic analysis could be carried out. Z Cam, SU UMa, TZ Per and AB Dra appear good candidates as they are circumpolar and accessible at minimum with larger apertures."

(This is an interesting idea; any comments? - JEI)

1974 observations. The following notes, based on plots prepared by the Secretary, are continued from VSSC 23.

RW Aur (IST): erratic variation 10.0 - 11.4; a sharp minimum occurred around Oct 17.

SU Aur (Ins): slow variations 8.8 - 9.4, possible period of around 50^d.

CI Cyg (Z And): max (10.1) in Feb, down to 11.2 at end of year.

DF Cyg (RVb): fragmentary observations, range 11.3 - 12.8.

V360 Cyg (RV): variations 10.3 - 12.2 in double period about 70^d.

S Del (M): min (11.5) late May, max (8.7) late Sep.

HR Del (Nb): decline from 11.0 to 11.2, possibly with fluctuations.

R Dra (M): max (7.7) Jan, min (12.8) May/Jun, max (6.9) late Sep.

R Gem (M): min (13.3) Feb, max unobserved in Jun.

U Gem (UG(E)): only one max, a short around Oct 27, observed. Under-observed.

SS Gem (RV): variations 8.2 - 9.6 in double period about 90^d. Primary and secondary minima apparently interchanged during the year.

SU Gem (RVb): slow variations 11.5 - 12.7. The 50^d period variations were small or absent.

T Her (M): min (13.3) Feb, max (8.7) early May, min (13.8) late Jul, max (8.6) Oct.

U Her (M): max (7.6) Apr, down to 12.7 in mid Nov.

SS Her (M): minima early Feb (12.9), May/Jun (13.7), early Sep (13.0); maxima early Apr (8.8), late Jul (9.2), late Oct (8.4).

AC Her (RVa): variations 7.2 - 8.6 in double period 75^d.

AH Her (Z Cam): maxima (11.1 - 11.9) around Jan 16, 30, Feb 17, Mar 10?, 27?, Apr 12 (standstill Apr 23 - May 1), May 6, 26, Jun 11, 27, Jul 15, 30 (double), Aug 19, Sep 5, 23, Oct 10, 26, Nov 16. Period comes to 17^d. Many irregularities; underobserved.

R Hya (M): decline from 5^m in Jan to 8^m late May. 6^m in Dec. Underobserved.

SU Lac (M): decline from 11^m in Jan to 15^m in May. Minimum unobserved. Rise from 14^m5 in Aug to max (11.1) late Nov; a hump on the rise. Underobserved.

R Leo (M): min (9.8) late Apr, max unobserved in Aug.

X Leo (UG): maxima (12.0 - 12.5) around Feb 2, 23, Mar 25?, Apr 19, May 6, 18 ... Sep 27?, Oct 18, Nov 21, Dec 7. Period 22^d if there were no intervening maxima, but the star is still underobserved.

R Lyn (M): max (8.1) late Mar, below 13^m in last four months of year.

W Lyr (M): max (8.0) Mar, min (12.4) late Jun, max (8.3) late Sep.

AY Lyr (UG): maximum (12.6 - 13.5) around Mar 18 (supermax?), Apr 26, May 25, Jun 11, 24, Jul 20, Aug 11, Sep 17, Nov 18 (supermax).

Underobserved.

EG Lyr (RV): variations 11.7 - 12.6 in double period around 140^d.

EP Lyr (RVa): variations 10.2 - 11.5 in double period around 85^d.

U Mon (RVb): variations 5.7 - 6.9 in double period around 90^d.

RS Oph (Nr): erratic fluctuations 11.2 - 12.1.
TT Oph (RVa): fragmentary observations, range 9.4 - 10.3.
TX Oph (RVa): fragmentary observations, range 9.7 - 10.4.
UZ Oph (RVa): fragmentary observations, range 10.3 - 11.5.
V564 Oph (RV): variations 10.0 - 10.8 in period around 90^d.
 (GCVS 70^d6.) Secondary minimum shallow or absent.
T Ori (Inas): rapid variations 9.6 - 11.0.
U Ori (M): min (12.5) Apr, max (6.5) late Aug, down to 11^m at end Dec.
CN Ori (Z Cam): maxima (11.9 - 12.2) around Jan 10, 26, Feb 13, Mar 3, 18, Apr 7 ... Sep 16 ... Nov 9, 26, Dec 10. Period comes to 17^d. Underobserved.
CT Ori (RV): variations 9.9 - 11.2 in double period around 70^d. Secondary minimum shallow and sometimes absent, but certainly there sometimes. GCVS gives double period as 136^d; an error?
CZ Ori (UG): maxima (11.7 - 12.2) around Jan 15, Feb 9, Mar 30 (long) ... Sep 9, Nov 22 (long), Dec 22. Underobserved.
DY Ori (RV?): slow variations 11.3 - 11.8, no obvious period.
GW Ori (Inb): at 9.5 during Oct - Dec.
R Ser (M): min (13.2) late Apr, max (6.1) late Sep, down to 9^m in mid Dec.
T Uma (M): bright (8.1) at beginning Jan, min (12.9) early May, max (7.8) Aug/Sep, down to 13^m at end Dec.

..(To be continued)

PREDICTED BRIGHTNESS OF LONG PERIOD VARIABLES IN 1976

The following diagram indicates when the Mira variables currently observed by the VSS are expected to be brighter than magnitude 9 and therefore observable with binoculars (XXX), between magnitudes 9 and 11 and therefore within the range of instruments of 75 - 100 mm aperture (xxx), between magnitudes 11 and 13.5 and therefore within the range of about 150 mm aperture (---), and fainter than magnitude 13.5 and therefore requiring observation with large instruments (blank). The predicted dates of maximum and minimum are indicated by M and m respectively.

It must be remembered that considerable deviations from the predicted behaviour can occur, and observers should not allow these predictions to influence their observations. The purpose of these predictions is simply to indicate which stars are worth looking for on a given night with an instrument of a given aperture.

Observers who obtain good determinations of the dates of maxima and minima are invited to send details on a postcard to the Director, so that future predictions can be based on the most recent observations available. Determinations are particularly needed for R LMi, SS Vir, R Hya, RS Vir, X Oph, R Aql, SU Lac. Observers should also inform the Director quickly when the magnitude at maximum or minimum differs from the mean value by more than a magnitude.

	Star	Mean range	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
001838	R And	6.9-14.3	Xxx	xxx	x--	---	-		m	-	---	--x	xxx	XXM
011272	S Cas	8.9-14.8	--				m			-	---	---	---	--x
021403	o Cet	3.5- 9.2	XXX	XXM	XXX	XXX	XXX	XXX	XXX	Xxx	mxm	xxx	XXX	XXX
043274	X Cam	8.1-12.6	XXM	XXx	xx-	-m-	-xX	XXM	Xxx	x--	m--	xxx	MXx	xx-
054974	V Cam	9.9-15.4			--	-xM	xxx	---	---	---	---	---	---	---
054920	U Ori	6.3-12.0	xxx	xxx	x--	--m	---	-xx	xxX	XXX	MXx	XXX	XXX	XXx
093934	R LMi	7.1-12.6	xXX	XXM	XXX	XXX	xxx	xxx	xx-	---	---	m--	---	-xx
122001	SS Vir	6.8- 8.9	XXX	XXX	XXX	XXX	XXX	mXX	XXX	XXX	XXX	XXX	XXX	XXM
123160	T UMa	7.7-12.9	XXM	XXX	xxx	x--	---	m--	---	xxX	XXM	XXX	Xxx	xx-
132422	R Hya	4.5- 9.5	XXX	XXX	XXM	XXX	XXX	XXX	XXX	XXX	xxx	mxm	xxX	XXX
142205	RS Vir	8.1-13.9	m		---	xxX	XXX	MXx	XXx	xxx	xx-	---	---	---
151731	S CrB	7.3-12.9	XXM	XXX	XXX	Xxx	xxx	x--	---	---	m--	---	-xx	XXX
154615	R Ser	6.9-13.4	xx-	---	---	m--	---	-xx	xxX	XXX	MXx	XXX	XXX	XXX
161138	W CrB	8.5-13.5	Xxx	xx-	---	--m	---	---	xxX	MXx	xxx	x--	---	-m-
162807	SS Her	9.1-12.4	xxx	--m	-xx	xMx	xx-	m--	xxM	xxx	--m	-xx	xMx	xx-
183308	X Oph	6.8- 8.8	MXx	XXX	XXX	XXX	XXX	XmX	XXX	XXX	XXX	XXX	XXX	MXx
190108	R Aql	6.1-11.5	-xx	xxX	XXX	XXM	XXX	XXX	XXx	x--	m--	xxx	xXX	XXX
193449	R Cyg	7.5-13.9	--x	xXX	XXX	MXx	XXX	Xxx	xxx	x--	---	---	---	---
194632	X Cyg	5.2-13.4	m--	---	xxx	xXX	XXX	XXM	XXX	XXX	XXX	xxx	xx-	---
200357	S Cyg	10.3-16	--x	xMx	x--	---			m			---	---	-xx
221955	SU Lac	?11-15	-			m		--	---	-M-	---	---	---	---