BRITISH ASTRONOMICAL ASSOCIATION

VARIABLE STAR SECTION

CIRCULAR No. 36 1978 JULY

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NOVA SEARCH PROGRAMME

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BRITISH ASTRONOMICAL ASSOCIATION: VARIABLE STAR SECTION
CIRCULAR No.36 1978 JULY

We apologise for the lateness of this Circular; since the Director did not receive the 'March' Circular until May, it was decided to hold over this issue until July. Further delay was caused by the Director's additional observing run at Villafranca, which also led to some delay in dealing with correspondence. However the backlog has now been cleared, and if you have not received a reply to a not-too-recent letter, then your missive has been lost and you should write again!

SS Cygni Following the remarks on X-rays from dwarf novae in the last Circular, the Leicester X-ray group were scheduled observing time on Ariel V to follow this source in April/May, with only very short notice. Selected observers were contacted with a request for close visual coverage, and were rewarded with an outburst, which was also detected at X-ray wavelengths. Especial thanks go to Thomas Gough and Karl Lewis for excellent coverage, including the rise. Ricketts et al. have now submitted a paper on their X-ray data to Monthly Notices, acknowledging therein the value of VSS results.

At the following outburst HEAO-A2 observers detected a periodic modulation of the soft X-ray flux from SS Cyg with pulsed amplitude as high as 50% and period of $8^{s}.9$, presumably associated with the rotation of the white dwarf primary.

The bright dwarf novae and other UV and X-ray sources on our programmes are again strongly commended to all observers. The Director would also appreciate summaries (dates, magnitudes) of observations of SS Cyg made so far this year, from all observers.

V 1057 Cygni This star, with a light-curve to date closely resembling that of FU Ori, rose spectacularly in brightness to a maximum about 1971. Since then numerous observers have documented a slow, steady decline in brightness. In IBVS 1438 Patrick Moore draws attention to a possible recent fade, reporting 1978 Jan 17, 11.6; May 24, 12.0; May 25, 12.0; May 29, 11.9; June 2, 11.8. If real, this fade indicates a departure from FU Ori-type behaviour, though observations in the June AAVSO Circular (May observations) suggest a steady magnitude of 11.1. (The June obs. is confirmed by Storm Dunlop and Paul Doherty using the same telescope, with estimates of 11.8 and 11.7 respectively - SRD)

Nova Miscellany In the 63rd name-list of variable stars, John Hosty's Nova Sge 1977 receives the official designation HS Sge.

Nova Ser 1978 underwent a rapid fade to below magnitude 15 in late May; latest results suggest a possible rise to 14^{m}. Observers able to follow this star may use the TA chart, or may obtain a sequence from the Director; results should be forwarded to Guy Hurst for possible submission to the IAU Circulars.

IAUC's 3238 & 3240 suggest a possible link between a further brightening of GK Per and a newly-discovered nearby X-ray source. GK was recently added to the main programme, but it is not known if any VSS observers have been following it of late; if they have, then they are invited to contact the Director with a note of recent estimates. This ex-nova should be of particular interest to observers, as it is now displaying increasingly frequent

dwarf-nova-type outbursts, and may represent a unique evolutionary link between two types of eruptive behaviour.

Secretary's Report, 1977

A total of 9514 observations were received from 71 observers. The total is less than that for 1976 (67%) due mainly to poor observing weather.

Table I gives the breakdown in numbers by observers in alphabetical order.

Table I

S.W. Albrighton	325	R.L. Lyon	897
D.E. Beesley	37	L. Matthews	80
T. Brelstaff	48	A. Maudsley	92
C. Brookman	54	T.B. McLeish	101
L.K. Brundle	166	R.M. McLeod	67
J.T. Bryan	32	R.H. McNaught	33
R.H. Chambers	50	I.A. Middlehurst	581
F.D. Chesterfield	76	P.A. Moore	64
E.H. Collinson	118	C.R. Munford	554
A. Cook	38	M. Peel	32
G.A.V. Coady	349	R.D. Pickard	260
A. Cosgrove	52	A.K. Porter	33
B. Espey	20	J.H. Robinson	25
K.C.H. Fisher	41	T.A. Robinson	114
R.B. Fraser	153	D.R.B. Saw	285
P.J. Garner	117	J.D. Shanklin	109
R.J. Godden	514	R.C. Shinkfield	28
T. Gough	35	E.H. Smith	27
M. Hapgood	33	H.W.S. Smith	28
G. Hirst	197	A. Snook	28
A.J. Hollis	718	G. Spalding	85
I.D. Howarth	136	D. Stott	329
D. Hufton	122	D.M. Swain	225
G.M. Hurst	188	P.J. Swift	102
M.L. Joslin	118	M.D. Taylor	258
N.S. Kiernan	29	P.J. Wheeler	69
G.J. Kirby	44	H.C. Williams	26
K. Lewis	584	P.B. Withers	413
R.J. Livesey	36	14 Observers	139

Table II gives the breakdown by stars and number of observers. The numbers in brackets give the % compared with 1976.

Table II

Star	Obsns	(%)	Obsrs	Star	Obsns	(%)	Obsrs
R And	124	(73)	17	SU Aur	50	(71)	7
W And	25	-	7	U Boo	138	(99)	14
RW And	30	-	7	V Boo	142	(90)	18
RX And	248	(56)	16	V Cam	79	(64)	10
DZ And	5	-	4	X Cam	170	(61)	13
R Aql	168	(73)	22	Z Cam	371	(77)	14
UU Aql	66	(60)	7	XX Cam	166	(47)	10
UW Aql	65	(92)	10	S Cas	79	(90)	8
RW Aur	-	-	-	T Cas	58	-	11
SS Aur	321	(93)	18	UV Cas	37	(53)	7

Table II cont.

Star	Obsns	(%)	Obsrs	Star	Obsns	(%)	Obsrs
Gam Cas	130	(35)	10	+ KS Ori	19	(65)	5
Rho Cas	165	(44)	11	+ KX Ori	71	(95)	8
Omi Cet	164	(94)	16	+ LP Ori	50	(96)	7
R CrB	237	(36)	20	+ MX Ori	46	(110)	7
S CrB	223	(69)	19	+ NU Ori	92	(126)	10
T CrB	97	(40)	13	+ NV Ori	37	(72)	6
V CrB	5	-	2	+ V359 Ori	94	(114)	9
W CrB	102	(83)	15	+ V361 Ori	52	(87)	7
R Cyg	168	(142)	15	+ V372 Ori	60	(118)	8
S Cyg	99	(190)	9	V529 Ori	33	(36)	3
V Cyg	20	-	5	+ V566 Ori	18	(69)	5
W Cyg	253	(73)	19	+ CSV 100567 Ori	81	(125)	9
SS Cyg	530	(62)	25	+ Var. No.2 Ori	46	(72)	7
BC Cyg	78	(60)	11	RU Peg	216	(61)	19
BI Cyg	109	(88)	16	S Per	171	(88)	18
CI Cyg	109	(330)	11	RS Per	121	(150)	15
V1500 Cyg	60	(23)	8	TZ Per	175	(59)	10
Chi Cyg	133	(64)	18	UV Per	135	(66)	8
HR Del	68	(53)	5	BU Per	117	(154)	16
T Dra	26	-	5	GK Per	11	-	4
AB Dra	78	(49)	5	WZ Sge	19	(15)	3
U Gem	213	(76)	19	R Sct	182	(56)	17
+ U Her	10	-	1	R Ser	105	(70)	15
RU Her	34	-	6	T Tau	53	(44)	7
SS Her	114	(85)	16	RV Tau	148	(90)	18
AC Her	148	(75)	12	+ RY Tau	1	-	1
AH Her	117	(198)	8	SU Tau	68	(45)	9
R Hya	44	(75)	9	+ BW Tau	-	-	-
SU Lac	2	-	1	T UMa	175	(95)	12
X Leo	75	(58)	11	SU UMa	178	(67)	9
+ R LMi	40	-	7	SW UMa	84	(107)	6
AY Lyr	127	(64)	9	CH UMa	107	(83)	8
U Mon	56	(31)	11	+ RS Vir	10	-	4
RS Oph	36	(23)	8	+ RT Vir	1	-	1
+ T Ori	37	(120)	6	V Vul	85	(125)	8
U Ori	133	(86)	18	NQ Vul	132	(30)	10
CN Ori	22	(33)	6	N Sge '77	46	-	3
CZ Ori	34	(72)	8	N Sgr '77	7	-	2
+ GW Ori	2	-	1				
+ IU Ori	28	(80)	6				

+ No longer on programme

Thanks for those especially useful early morning observations are due to S. Albrighton, T. Brelstaff, G. Coady, R. Godden, T. Gough, M. Hapgood, A. Hollis, G. Hurst, K. Lewis, G. Kirby, P. Lyon, R. McLeod, R. McNaught, L. Matthews, P. Moore, C. Munford, M. Peel, J. Shanklin, G. Spalding, D. Stott, D. Swain, M. Taylor,

P. Withers. Individual acknowledgements will be given in the forthcoming "Notes on 1977 light-curves".

Of the new observers, the results of G.A.V. Coady deserve especial mention, whilst T. Gough and R.H. McNaught made a valuable Scots contribution. The re-emergence of I.D. Howarth and J.E. Isles as observers is a pleasant surprise.

The almost complete absence of results from the 'Busy B's', namely J.A. Bailey, B.J. Beesley, T. Brelstaff, G. Broadbent and J.S. Bullivant is a great loss. These 5 observers contributed over 3500 observations in 1976. The two last named observers were making very useful contributions from the North-western area. Fortunately I.A. Middlemist's results were increased in number (thanks) and now A. Hollis has moved to the region.

For their invaluable help with the logging of observations I would like to give my thanks both personally and publicly to Colin Munford, David Swain and Philip Withers.

With regard to the stars on the main programme, SS Cyg is the most observed star but we need more observations Feb. to April. R CrB lost its second place, doubtless because it was faint for most of the year. It was replaced by Z Cam; observers are doubtless following this star with interest, waiting for its record-breaking 'standstill' to end. At the other end of the scale, NO observations of RW Aur were received, only 2 for SU Lac and 5 for DZ And. However now that charts are available for DZ And, UV Cas and SU Lac it is hoped that the number of observations of these stars will increase.

It will be noted that in Table II this year, a column is included which gives the % observations compared with 1976 (except for some dropped stars, new 'Hatfields', old 'Canterburys', novae and where low numbers of observations makes the % insignificant). The % for most of the stars is similar to the average (67%) but there are some exceptions. It is very pleasing to record that observers are responding to the request to observe the semi-regulars, the relative numbers for UW Aql, BI Cyg, RS Pes, BU Per being higher as well as for U Boo, V Boo, W Cyg and S Per. Only BC Cyg is down; please continue the good work. Strangely enough the % for the dropped Orion variables was up. This was because a small nucleus of observers decided that they would like to continue to observe them, even though variability of results makes any interpretation very difficult. Perhaps these observers would like to look after RW Aur, SU Aur and T Tau in the future, all of which are underobserved.

Of the LPV's (Miras) the numbers for R Cyg, S Cyg and T UMa were up. However the number for Chi Cyg was disappointing: as were the numbers for every RCB star except R CrB itself.

The numbers for nearly all the UG/Z stars were down; we have lost observers with large aperture instruments who can follow these (in general) faint stars and a large gap exists in our coverage.

The observations of the Novae - T CrB, HR Del, RS Oph, GK Per and WZ Sge - were dramatically low.

The RV Stars did quite well except for the two binocular stars U Mon and R Sct. It is to be hoped that the binocular observers do not feel neglected. This is not so; the main programme binocular stars are just as important as stars needing large aperture instruments. I personally find the RV Stars, with their primary and secondary minima most interesting. Their (generally) short periods mean that a change is often seen (say) every 3 days (or rather nights) and one can readily draw one's own light-curve from a pageful of observations for the year - always enjoyable.

Let us hope that the remainder of 1978 brings better observing weather so that our totals show an increase over 1977. Thanks to all observers who sent in observations; remember that a few early morning observations are always invaluable in extending a star's light-curve. Finally, I give a summary below of those stars in drastic need of observation (but please do not neglect your present programme) in alphabetical order. If this list is used in conjunction with the Main Programme of the BAA (VSS) 1978 listing which accompanies this report, observers will be able to pick out the stars best suited to the aperture of their observing equipment:-

W And, RW And, DZ And, UU Aql, RW Aur, SU Aur, V Cam, S Cas, T Cas, UV Cas, T CrB, V CrB, V Cyg, BC Cyg, Chi Cyg, HR Del, T Dra, AB Dra, RU Her, R Hya, SU Lac, X Leo, AY Lyr, U Mon, RS Oph, CN Ori, CZ Ori, TZ Per, UV Per, GK Per, WZ Sge, R Sct, T Tau, SU Tau, SU UMa, SW UMa, CH UMa, V Vul, together with any recent novae still above limiting magnitude. - D.R.B. Saw

Nova Search Programme Meeting

The meeting of the British Nova Search Programme, which was announced via 'The Astronomer' and BAA Circular, was held in Earls Barton on 1978 June 24, and was attended by 36 keen amateur astronomers. It was probably the first meeting of its kind on a national scale, devoted exclusively to a subject in which the amateur can play a valuable role alongside professional research. A letter was read expressing support from the RGO, in addition to encouragement already expressed by Dr. Brian Marsden of the IAU.

Guy Hurst, the co-ordinator gave a report on the first two year's work. He reported that of 52 amateurs who had joined to date, 37 remained active; a remarkable percentage for such specialised work which requires dedication and perseverance.

It was mentioned that a comprehensive listing of past nova discoveries and other data was being collected and would appear in the Circulars of the Nova Search Programme.

In the Visual section, monthly report forms showed many observers who were spending 15 hours and more on their work, with some now checking zones to mag. 9.0.

Combining the results of the old TA photographic patrol and the two photographic sections of the new programme, some 227 batches of film had been received. Only since 1976 June when the TA Nova Search Programme started however, have these been checked to mag. 8.0. Prints are gradually becoming available from master negatives of each area prepared by members, and are available from the co-ordinator on request. Limiting magnitude is often 10.0 or fainter and they are in the usual "10 x 8" format and excellent for checking purposes.

Our omission list giving data on stars not included in SAO/ Borealis/Eclipticalis Atlases, but brighter than 9.5, now covers 1300 stars and is being updated monthly. This list was proving of interest and assistance to professional observers.

A summary of results was then given. In 1974, the TA Photo Patrol yielded pre-discovery images of Nova Per 1974 at maximum, and data appeared in an IAU Circular. In 1975, pre-discovery images of Nova Sct 1975 were found and this suggested that a proper photographic search and checking programme should be introduced. 1976 saw yet another remarkable photographic succes with colour pre-

discovery images of the remarkable object HM Sagittae. Then, in 1977, John Hosty discovered Nova Sagittae 1977 visually in very difficult circumstances with the object only visible early in the evening and very low in the west.

Photo checking has already y elded 'rediscovery' of 25 Mira variables at, or near, maximum, and this data is being investigated further. Meanwhile the BAA VSS Director has asked for photographic variable star results to be reported on an annual basis.

John Hosty then described his acquisition of a 'stereoscope' - equipment originally designed for checking aerial photographs - and how he is currently constructing a 'blink device' within the instrument for photo checking. Storm Dunlop commented that quite possibly the stereoscopic effect alone might reveal an 'intruder'.

After an excellent three-course luncheon provided by the TA Secretary, and a visit to the top of Earls Barton Church Tower by some of the braver members, the afternoon session resumed with a remarkable demonstration of 'in-cassette development' of film by Mike Maunder. With complete disregard for sensible shutter speed settings for indoor photographs of members, no flash equipment, and no temperature control of the 'new chemicals' used, finished negatives were projected onto a screen in less than 30 minutes! The appeal is clear - quick development of nova patrol shots, with fast checking of queries.

Mike Swan then explained his 'Melinex Overlay System' for checking photographs. The overlay contains black images of stars in the search area. New shots are turned into prints and the overlay placed over it. An 'intruder' should then remain uncovered!

Finally Dave Branchett, one of the most prolific visual observers, talked on visual search techniques and answered several questions from members and non-members. His enthusiasm clearly reached the audience and several new members have since been recruited to this section.

Anyone who requires further details of this project, is invited to contact the co-ordinator. - G.M. Hurst

'TA' Charts By arrangement with 'The Astronomer' surplus copies of the chart pages are available for distribution to members, free, on receipt of a stamped, addressed envelope. These are naturally subject to availability, but at present include:

Nova Ser 1978 (2 charts), 2S 0114+650 - possible optical component of X-ray source in Cassiopaeia, NQ Vul (= Nova Vul 1976), HS Sge (= Nova Sge 1977) and AM Her.

SAEs should be sent to Alan Dowdell, 18 Wrights Way, South Wonston, nr Winchester, Hants. Storm Dunlop and Rodney Lyon will also be holding a few copies, for distribution.

Computerization A preliminary investigation is being made into the possibility of greater use of computing power for dealing with VS records, particularly with regard to handling and analysing the backlog of unpublished observations. Anyone possessing, or with access to, facilities, particularly data preparation equipment, is invited to contact Storm Dunlop.

Index An Index to VS Circulars Nos. 26 - 35 is enclosed with this issue.

Finally, there will be no VSS report in the 1978 Aug BAA Journal; the proposed report on Nova CP Lac had to be withdrawn at the last minute because of difficulties with the illustrations. Apologies for this (although there will be a major paper on SS Cyg included). - IDH

Changes of Address

DUFF, I. 58a Broxburn Road, Warminster, Wilts. BA12 8EY
HOLLIS, A.J. 85 Forest Road, Cuddington, Northwich, Cheshire.
MacLEOD, R.M. 3 Victoria Gardens, Bristol. BS6 5SS (Temp. only)

Omissions from Members List

BAILEY, J.A. Postgraduate Pigeonholes, Physics Building, University of Sussex, Falmer, Brighton. BN1 9QH
CURRIE, M. (As for Bailey, above)
GILL, P. 35 Wilkins House, Churchill Gardens, London. SW1V 3BY

New Members

CICOGNANI, A.J. 37 Gorse Mead, South Ashford, Kent. TN23 2PN
DAVIES, A. 187 Trallwn Road, Llansamlet, Swansea, W. Glamorgan.
DUFFILL, K. Burnside, Invergarry, Inverness-shire.
HAMPTON, J.S. 63 Cork Road, Lancaster. LA1 4AY
HIGGINS, L.J. 21 Clifton Street, Swindon, Wilts.
STANLEY, P. 20 Elstead Close, Ifield, Crawley, Sussex.

Apologies to N.S. Kiernan for giving him the wrong initials; and also to R.M. MacLeod for dropping the 'a' from his name in the Secretary's report in this Circular.

Last SAE Reminder

ALBRIGHTON, S.W.; BELL, M.; BRANCHETT, D.W.; BROOKMAN, C.E.; BULLIVANT, J.S.; COSGROVE, A.; DAVISON, E.K.; FRASER, Miss R.; GARNER, P.J.; GOUGH, T.T.; HAPGOOD, M.; HIRST, G.; HUFTON, D.; KIERNAN, N.S.; McGENITY, P.; MacLEOD, R.M.; MUNFORD, C.R.; PRITCHARD, M.J.; REID, N.; SHARRATT, B.; SPALDING, G.; SWAIN, D.M.; SWIFT, P.J.; WILLIAMS, H.; YOUNG, Miss J.E.

BRITISH ASTRONOMICAL ASSOCIATION

Main Programme 1978

Star	Type	Range+
R And	M	6.9 - 14.3+
W And	M	7.4 - 13.7+
RW And	M	8.7 - 14.8+
RX And	UG	11.1 - 13.4+
DZ And	RCB	10.3 -(14.0
R Aql	M	6.1 - 11.5+
UU Aql	UG	11.4 - 15.9
UW Aql	SR	8.9 - 9.5
RW Aur	InT	9.6 - 13.6+
SS Aur	Z?	10.8 - 14.7+
SU Aur	Ins	9.1 - 10.7
U Boo	SR	10.3 - 12.2+
V Boo	SR	7.6 - 10.4+
V Cam	M	9.9 - 15.4+
X Cam	M	8.1 - 12.6
Z Cam	Z	10.2 - 14.5
XX Cam	RCB	7.3 - 9.7+
S Cas	M	9.7 - 14.8+
T Cas	M	7.9 - 11.9+
UV Cas	RCB	10.5 - 15.2
Gam Cas	γC	1.6 - 3.0
Rho Cas	SR?	4.1 - 6.2+
Omi Cet	M	3.4 - 9.1+
R CrB	RCB	5.8 - 14.4+
S CrB	M	7.3 - 12.9+
T CrB	Nr	2.0 - 10.2+
V CrB	M	9.1 - 12.8+
W CrB	M	8.5 - 13.5+
R Cyg	M	7.5 - 13.9+
S Cyg	M	10.3 - 16+
V Cyg	M	9.1 - 12.8+
W Cyg	SRb	5.0 - 7.6
SS Cyg	UG	8.2 - 12.4
BC Cyg	SRc	9.6 - 10.5
BI Cyg	Lc	9.3 - 9.8
CI Cyg	Z And	9.1 - 11.5
V1500 Cyg	N	1.8 -(21
Chi Cyg	M	5.2 - 13.4+
HR Del	N	3.5 - 12.3

Star	Type	Range+
T Dra	M	9.6 - 12.3+
AB Dra	Z	12.4 - 14.3+
U Gem	UG	8.2 - 14.9
RU Her	M	8.0 - 13.7+
SS Her	M	9.2 - 12.4+
AC Her	RV	7.0 - 8.4
AH Her	Z	10.2 - 14.7
R Hya	M	4.5 - 9.5+
SU Lac	M	11 - 15
X Leo	UG	12.3 - 15.0
AY Lyr	UG	13.2 - 15.0+
U Mon	RV	6.3 - 7.1+
RS Oph	Nr	4.3 - 12.6
U Ori	M	6.3 - 12.0
CN Ori	Z	12.2 - 14.3+
CZ Ori	UG	12.1 - 15.7
V529 Ori	Nr?	?6 -(11
RU Peg	UG	10.7 - 12.5+
S Per	SRc	8.6 - 10.6+
RS Per	SRc	7.8 - 8.9
TZ Per	Z	12.5 - 15+
UV Per	UG	12.8 - 17+
BU Per	SRc	9.0 - 10.0
GK Per	N	0.2 - 14
WZ Sge	Nr	6.0 - 15.0
HS Sge	N	6.? -
N Sgr '77	N	7.? -
R Sct	RVa	5.0 - 8.4
R Ser	M	6.9 - 13.4
N Ser '78	N	8.? -
T Tau	InT	9.6 - 13.5
RV Tau	RVb	9.5 - 10.5+
SU Tau	RCB	9.3 - 16.0
T UMa	M	7.7 - 12.9+
SU UMa	UG	12.1 - 14.2+
SW UMa	UG	10.5 - 16.0
CH UMa	UG	11.7 - 14.7+
V Vul	RVa	8.1 - 9.4
NQ Vul	N	6.5 -

\+ Mean Range (often from VSS observations and analyses)