BRITISH ASTRONOMICAL ASSOCIATION

VARIABLE STAR SECTION

CIRCULAR No. 27

OFFICERS OF THE V.S.S.

Director: J.E. Isles, 118 Liverpool Road, Watford, Herts. WD1 8DN Tel: Watford (0923) 48128

Secretary: D.R.B. Saw, 12 Taylor Road, Aylesbury, Bucks. HP21 8DR

Chart Curator: S.J. Anderson, 65 Peartree Road, Luton, Beds. LU2 8AZ Tel: Luton (0582) 38538

Circulars: S.R. Dunlop, 140 Stocks Lane, East Wittering, Nr. Chichester, W. Sussex. PO20 8NT Tel: Bracklesham Bay (0243) 670354

BINOCULAR GROUP

Co-ordinator: D.A. Pickup, 38 Brockwood Avenue, Penicuick, Midlothian. EH26 9AN Tel: Penicuick 72098

Asst. Co-ordinator: (Post Vacant)

Recorder: A.E.J. Forno, 92 Crockford Park Road, Addlestone, Surrey. KT15 2LR Tel: Weybridge (0932) 44668

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.

BRITISH ASTRONOMICAL ASSOCIATION: VARIABLE STAR SECTION
CIRCULAR No. 27 1976 AUGUST

1975 Observations.

Perhaps contrary to expectation, the Section's observational output suffered a slight drop in 1975, probably due to a combination of inclement weather and reorganisation of observing programmes. If observations of non-VSS stars are excluded, the total for last year is 37,284 results, distributed among the programmes as follows: Main 21 873, Binocular 14 310, Eclipsing 410, RR Lyrae 691. It seems likely that the VSS will have to handle an annual average of about 40,000 observations in the future, which is about four times the output of the VSS a decade ago.

Tables I and II below give the breakdown by observer and by star, from information supplied by the Secretary and the Recorder of the Binocular Group. The Secretary has already plotted many thousands of these observations and the resultant light curves will be discussed in forthcoming Circulars. In Table I, the column headed "Binocular" includes nine binocular or naked-eye objects on the main programme, as well as the work of the Binocular Group.

Nova Vl500 Cyg was the most popular star; this has been given the benefit of the doubt and has been classed as telescopic, although it was of course an easy naked-eye or binocular object for most of the period in question. Excluding novae, the binocular objects on the main programme were observed on average about three times as often as the telescopic objects, but a binocular observer can acumulate about three times as many estimates in a given time as a telescopic observer.

Two observers, Beesley and Middlemist, tied for first place with 3216 observations, while Brelstaff and Taylor were not far behind them. 22 observers reported over 400 results, compared with 24 last year; however only 82 members altogether reported observations, compared with 105 last year. It appears that most of the active observers have continued work at about the same level, but several of the less active members have dropped out.

The Secretary reports that more observers are doing early morning work, enabling light curves to be extended, and wishes in this connection to give special thanks to Messrs Bailey, Beesley, Brelstaff, Broadbent, Griffin, Knox and Rothery. Positive observations of faint stars, however, were due almost wholly to Paterson. A welcome newcomer to the ranks of faint star observers was Lyon, but no observations were received from Howarth. As Knox and Paterson are now unable to observe so frequently, any observations which other members are able to make of faint stars will have added value, provided they are made with adequate instruments (see Doug Saw's remarks later in this Circular).

Coverage of stars was again uneven. R CrB was observed 1086 times and SS Cyg 989 times, contrasting with SU Lac, BW Tau and several RV Tauri stars which were observed less than ten times each. On the whole, however, the response to the RV Tauri project was very pleasing and the Secretary has obtained good curves for 17 of these objects. The Mira and semiregular variables continue to be neglected. Some observers (see VSSC letters) have been sorry to see so many of these objects dropped from the programme; here then is their opportunity to help to give adequate coverage of those which remain.

The Secretary suggests that observers aim at one observation every ten days for Mira stars, otherwise bias is likely to set in. Only dwarf novae and novae need observing on every possible night. It is apparent that some observers are looking at other types as often as four times a week and estimating the magnitude as constant to $\pm 0^{m}.1$. They then have a gap in their estimates of 2-3 weeks and on next observing the star they are so delighted to find its magnitude

has changed that they over-estimate the change. Consequently the light curve consists of a series of erratic steps and the composite light curve for all observers is a band as much as $0^m.8$ wide. This is especially true for stars in the 5^m to 9^m range. The more experienced observers, however, rarely differ from one another by more than $0^m.3$. Instead of over-observing, members should pay more attention to other neglected objects.

The Secretary also notes that the numbers of observations in Table II do not show which stars are really most in need of attention: a star observed only once by each of 365 observers, all on the same night, would hardly be adequately covered; neither would a star observed on every night of the year by one observer, since the systematic errors in his observations would not be cancelled by those of other observers. The main programme stars marked with an asterisk are in need of more consistent observation, because either the total number of observations, or the average number of observations per observer, is low.

It is suggested that members try to observe their stars at least 15 times per year, if necessary reducing their effort on their favourite stars in order to increase it on the rest. This should result in much better overall coverage, since a series of estimates for each star is generally much more useful than sporadic observations. The Mira and semiregular variables are those most in need of attention.

The stars whose names are enclosed in parentheses are no longer on any VSS programme. Observers of CO Aur should also note that this star has been transferred from the main to the binocular programme.

As regards the binocular programme, even more stars are seriously under-observed, although most of the 'priority stars' listed in VSSC 19 were adequately covered.

TABLE I

1975 OBSERVATIONS: BREAKDOWN BY OBSERVERS

	Telescopic	Binocular	E & RR	Total
B.J. Beesley	1508	1585	123	3216
I.A. Middlemist	474	2742	-	3216
T. Brelstaff	661	1901	311	2873
M.D. Taylor	346	2109	200	2655
L.R. Mathews	914	778	326	2018
R.A.H. Paterson	1561	14	-	1575
J.A. Bailey	1496	66	-	1562
O.J. Knox	1355	136	-	1491
G. Hufton	63	1390	-	1453
G. Broadbent	670	751	-	1421
A.K. Porter	933	223	-	1156
D.M. Swain	119	987	-	1106
D.P. Griffin	719	268	-	987
G.J. Kirby	102	834	-	936
D.A. Rothery	174	755	-	929
D.R.B. Saw	845	8	-	853
A. Maudsley	274	235	10	519
N. Reid	56	462	-	518
C.R. Munford	512	-	-	512
G.M. Hurst	181	258	-	439

Table I (cont.)

	Telescopic	Binocular	E & RR	Total
J.D. Shanklin	248	178	-	426
P.B. Withers	404	-	-	404
R.L. Lyon	393	-	-	393
R. Pennell	-	354	-	354
J.S. Bullivant	81	268	-	349
W.E. Pennell	333	-	-	333
G. Hirst	319	-	-	319
D.L. Young	37	251	-	288
R.J. Livesey	220	48	-	268
P.A. Moore	221	34	-	255
K.M. Sturdy	238	16	-	254
A.B. Scott	109	144	-	253
M. Peel	101	148	-	249
M. Hoenig	11	205	-	216
R.D. Pickard	210	2	-	212
M. Poxon	61	132	-	193
S.J. Anderson	178	7	-	185
R.H. Chambers	178	-	-	178
R.M. McLeod	69	89	-	158
G.H. Spalding	67	51	40	158
R.Cripps	45	96	-	141
S.R. Dunlop	35	101	-	136
F.D. Chesterfield	107	26	-	133
I. Miller	11	122	-	133
E.H. Collinson	131	-	-	131
T.A. Robinson	92	31	-	123
S.R. Heathcote	11	96	-	107
M. Hather	55	51	-	106
K.A. Brady	100	-	-	100
33 observers	807	396	91	1294
Total	17835	18348	1101	37284

TABLE II

1975 OBSERVATIONS: BREAKDOWN BY STARS

	Obsns.	Obsrs.		Obsns.	Obsrs.
Main Programme					
R And*	292	22	U Boo*	180	16
RX And	407	14	V Boo*	296	22
DZ And*	68	3	V Cam*	90	10
R Aql*	219	19	X Cam	226	10
UU Aql*	119	10	Z Cam	535	15
UW Aql*	168	15	(TW Cam)	183	13
RW Aur*	141	5	XX Cam	446	16
SS Aur	408	19	S Cas	194	11
SU Aur*	105	5	UV Cas	170	7
CO Aur*	412	26	(EQ Cas)	3	2

Table II (cont.)

	Obsns.	Obsrs.
Gam Cas	503	14
Rho Cas	555	21
Omi Cet*	238	20
R CrB	1130	36
S CrB	304	20
T CrB	520	20
W CrB*	139	14
R Cyg*	199	14
S Cyg*	84	7
W Cyg	658	27
SS Cyg	989	29
BC Cyg*	190	14
BI Cyg*	252	17
CI Cyg*	103	4
(DF Cyg)	112	9
(V360 Cyg)	37	6
Chi Cyg	353	22
HR Del	252	14
AB Dra	218	10
U Gem	419	24
SS Gem*	274	20
(SU Gem)	104	11
SS Her*	146	19
AC Her	399	19
AH Her	179	10
R Hya*	43	10
SU Lac*	3	1
X Leo*	191	17
R LMi*	43	10
AY Lyr	200	10
(EG Lyr)	26	7
(EP Lyr)	23	7
U Mon*	258	23
RS Oph*	195	11
(TT Oph)	37	4
(TX Oph)	35	4
(UZ Oph)	18	3
(V564 Oph)	14	3
T Ori*	72	6
U Ori*	232	22
CN Ori*	113	12
(CT Ori)	99	11
CZ Ori*	91	8
(DY Ori)	82	10
GW Ori*	77	5
IU Ori*	43	5
KS Ori*	41	5
KX Ori*	32	2
LP Ori*	59	6
MX Ori*	46	5
NU Ori*	67	7
NV Ori*	57	6
V359 Ori*	30	2
V361 Ori*	46	5
V372 Ori*	48	6
V529 Ori*	76	3
V566 Ori*	45	4
CSV 100567 Ori*	53	4
Var No 2 Ori*	54	5
RU Peg	473	20
S Per	286	15
RS Per*	215	15
TZ Per	363	14
UV Per	230	11
BU Per*	202	14
GK Per*	44	4
(R Sge)	114	12
WZ Sge	184	6
R Sct	507	28
R Ser*	274	24
(Z Sex)	76	11
T Tau	195	11
RV Tau*	303	26
RY Tau*	83	5
SU Tau	272	15
BW Tau*	2	1
T UMa*	283	19
SU UMa	265	12
SW UMa	163	10
CH UMa	163	10
RS Vir*	52	10
V Vul*	114	10

Table II (cont.)

	Obsns.	Obsrs.
Novae		
V1301 Aql	11	2
V1500 Cyg	1138	41
V616 Mon	7	3
V400 Per	122	7
V373 Sct	123	14
Binocular Group		
RS And	11	2
SU And	8	2
TZ And	33	3
AQ And	49	6
BZ And	36	5
V Aql	95	10
V450 Aql	61	8
V1293 Aql	38	6
CSV 101849 Aql	40	5
V Ari	22	3
UU Aur	269	20
AB Aur	83	5
AE Aur	179	12
NO Aur	51	5
Psi^{1} Aur	30	5
+31°1048 Aur	26	4
RV Boo	20	6
RW Boo	22	6
RX Boo	162	12
UV Boo	151	10
U Cam	46	4
RY Cam	98	6
ST Cam	122	8
UV Cam	104	7
UX Cam	19	4
VZ Cam	140	7
ZZ Cam	107	7
+61°0668 Cam	97	6
X Cnc	95	8
RS Cnc	167	15
RT Cnc	25	5
V CVn	216	12
Y CVn	221	13
TU CVn	226	13
W CMa	12	2
WZ Cas	221	11
V377 Cas	233	11
V391 Cas	71	6
V393 Cas	125	7
V465 Cas	364	16
CSV 171 Cas	66	5
+49°4329 Cas	69	1
Wr 162 Cas	208	13
W Cep	158	10
RU Cep	41	5
RW Cep	178	14
RX Cep	33	5
SS Cep	165	10
AR Cep	192	11
FZ Cep	5	1
NN Cep	235	6
Mu Cep	142	7
CSV 927 Cep	122	3
+59°2383 Cep	70	3
+60°2217 Cep	87	4
+84°0536 Cep	44	3
33 Cet	13	4
RR CrB	59	7
SW CrB	54	7
T Cyg	109	9
RU Cyg	24	3
RV Cyg	96	9
TT Cyg	60	5
AF Cyg	262	14
CH Cyg	349	15
V460 Cyg	138	11
V973 Cyg	77	6
V1351 Cyg	1	1
P Cyg	279	13
28 Cyg	113	6

Table II (cont.)

	Obsns.	Obsrs.
CSV 8307 Cyg	44	3
CSV 8683 Cyg	39	5
+47°2801 Cyg	115	7
U Del	219	15
EU Del	221	16
+19°4450 Del	112	10
RY Dra	304	17
TX Dra	103	6
UW Dra	53	3
UX Dra	69	4
VW Dra	43	5
AH Dra	40	5
AT Dra	45	5
69 Dra	61	4
TU Gem	44	7
TV Gem	101	9
WY Gem	100	9
BN Gem	75	8
BQ Gem	53	4
BU Gem	132	9
DW Gem	15	2
IS Gem	66	5
NQ Gem	9	2
X Her	273	18
ST Her	46	6
SX Her	31	6
UW Her	57	4
IQ Her	126	12
OP Her	163	12
V566 Her	58	6
g Her	240	15
U Hya	18	2
SX Lac	21	3
CSV 8775 Lac	134	12
CSV 102195 Lac	115	11
RX Lep	17	2
Y Lyn	103	9
SV Lyn	41	4
CSV 100869 Lyn	33	3
R Lyr	145	9
XY Lyr	58	6
δ^2 Lyr	72	7
S Mon	38	3
RV Mon	16	2
SX Mon	1	1
V505 Mon	231	2
X Oph	78	5
V2048 Oph	79	3
W Ori	100	10
BL Ori	33	4
BQ Ori	111	8
CK Ori	31	4
+14°1247 Ori	35	4
AG Peg	207	12
GO Peg	13	4
X Per	293	17
SU Per	34	5
AD Per	24	5
KK Per	32	5
PR Per	38	5
Z Psc	35	3
TV Psc	73	6
TX Psc	59	6
S Sct	63	8
Y Tau	117	12
TT Tau	22	4
BU Tau	116	11
CE Tau	53	3
CSV 6048 Tau	57	8
+22°0743 Tau	31	3
W Tri	57	5
Z UMa	233	13
RY UMa	214	14
ST UMa	132	8
TV UMa	14	4
VW UMa	136	6
VY UMa	95	6
V UMi	3	3
RW Vir	3	1
RX Vir	3	1
SS Vir	29	4
SW Vir	16	3
BK Vir	7	2

Eclipsing Binary Programme

410 usable estimates of the programme stars have been reported for 1975. These have already been analysed and the report should appear in the Journal later this year. Only six observers are currently active, and several of the programme stars are still severely or totally neglected; VSSC 26 p3 drew attention to some 'priority stars' on which any member possessing binoculars or a small telescope can make a valuable contribution.

The following provisional list, on which comments are invited, has been drawn up of neglected telescopic eclipsing binaries to be added to the programme. When charts have been drawn up their advent will be announced in VSS Circulars.

Name	Range	Period	Minimum
SW Cnc	$11^m.6 - 12^m.5$	$1^d.8$	4^h
GM Cyg	12.0 - 13.5	4.7	8
V345 Cyg	11.3 - 11.8	2.1	9
V346 Cyg	11.8 - 13.6	2.7	8
V387 Cyg	11.5 - 12.3	0.6	(EB)
V359 Her	10.1 - 11.2	1.8	7
EK Lac	11.2 - 11.7	1.5	$5\frac{1}{2}$
VZ Leo	10.6 - 11.7	1.1	6
WZ Leo	11.3 -(12.0	1.4	4
TY Lyn	10.0 - 10.8	4.3	10
AT Mon	10.6 - 11.4	2.0	6
EP Mon	10.5 - 11.1	1.1	6
V423 Oph	11 - 12	1.2	?
FH Ori	10.5 - 11.5	2.2	$7\frac{1}{2}$
KR Per	10.4 - 11.1	1.0	5
AW Vir	11.4 - 12.0	0.4	(EW)

Peter Hornby

Binocular Group

An updated catalogue of BG charts has been prepared by Alan Pickup and will be distributed when it can be enclosed with a Circular without exceeding the first weight step. Anyone in a hurry for a copy may obtain one from Storm Dunlop.

NWAVSO (See VSSC 26 p1)

Doug Saw writes: "May I comment on the formation of the NWAVSO? If this is a regional section of the VSS, then the founders are to be congratulated. It is hoped that members based in the north west will continue to send observations to the VSS, because the weather is very often clear in the north west, Scotland and Ireland when it is cloudy in the south. By pooling observations from all regions, gaps in coverage of stars are much reduced.

"If however the organisation has been started in view of 'delays inflicated by the BAA VSS', then the founders can have no conception of the tremendous amount of voluntary work shouldered by VSS officers and helpers. So far this year I have spent 2-3 hours per night, 5 or 6 nights per week, checking 20,000 estimates and times, plotting curves of about 100 stars in time for the Exhibition Meeting, finishing logging of observations for 1974 and commencing those for 1975. I found time to observe on only three nights up to the end of March! I also know that the Director is seriously over-burdened with work. Not only is he responsible for the programme, dealing with a massive amount of correspondence and the correction and publication of

star charts, but he is responsible for all publications. Analysis of results and preparation for publication is extremely time consuming and he and his helpers are doing an admirable job of work, as can be seen from the rate of publication of reports and papers in the BAAJ. All the officers need help from competent observers who are reliable, neat and numerate to help share their work-load. I would like to express my own grateful thanks to those who have been helping myself in the thankless, tedious task of logging observations, namely, Brian Beesley, David Griffin, Colin Munford and David Swain."

Ian Middlemist (Director of NWAVSO) writes: "About NWAVSO's intended relationship with the VSS, which was questioned in VSSC 26, I would say:

1) We are independent - we have not even discussed affiliation to the BAA, although we probably should.

2) We have an overlap in membership and program with the VSS, but we consider that VSS members can, or should be trusted to report to the VSS appropriate observations.

3) We could probably create machinery for reporting or passing on observations by non-VSS members, again perhaps we should.

4) All over 1 or 2 year light curves are preliminary, as many observations used are available to the VSS for re-use in long term analyses. In the case of other stars, or stars which have been clearly underobserved by the VSS, we reserve the right to publish our own analyses, either in memoir form or as papers in "Light Curve".

5) We would welcome any opportunities for co-operation, as a matter of policy, with the VSS or any other VS group, whether local, regional or national, British or foreign."

(Although I am sure the officers of NWAVSO are not ignorant of the hard work done by the officers and helpers of the BAA VSS, it is clear that the formation of NWAVSO constitutes an indirect criticism of the BAA VSS, and it is not difficult to see that criticism is justified. To run the VSS efficiently, and to publish all that ought to be published, would require manpower and financial resources which are simply not available within the BAA. All we can hope to do is concentrate our resources on those activities which have the highest priorities. If members think we have the prioities wrong, they should tell us.

NWAVSO can serve its most useful purpose if it assumes a subsidiary role to the BAA VSS. Otherwise it will come up against exactly the same problems. Its members should bear in mind the dangers that (a) their observations reported to NWAVSO but not to the VSS may be wasted if NWAVSO ceases to exist, and at best will become known to a very limited audience, and (b) their observations reported to both NWAVSO and the VSS may be taken as independent by those who attempt to use the published results.

Although I am unhappy about the thinking, or rather the lack of it, which has gone into the formation of NWAVSO, I am delighted at last to see a magazine devoted to variable stars and I hope it will receive the support it deserves. - JEI)

Correspondence

Doug Saw writes: "I agree with Brian Beesley (VSSC 26 p4) that observers with large telescopic apertures should concentrate on the faint stars and not observe stars brighter than 10^m (except dwarf novae at maximum). Such observers, including myself, are inaccurate when observing the brighter stars. As a corollary to

this, and probably more important, I strongly suggest that observers with telescopic apertures of $8\frac{1}{2}$ inches (22 cm) or less should not observe stars below 11 - 11.5^m. It is well known that estimates are most accurate 2 - 3^m brighter than the threshold limit and that estimates fainter than this become increasingly inaccurate as the faint limit is approached. This is most noticeable in the case of SS Cyg: when the star is at normal minimum, all the experienced observers with large apertures estimate its magnitude between 11.8 and 12.1; however, estimates by observers using 6" and 8" apertures differ widely in the 11 - 12^m range and should be class 3 estimates.

"With regard to the number of classes, I agree with the Director that, although the present three classes are subjective, they are sufficient, because the reproducibility between different observers is not such that any more complex system is warranted. We obtain good light curves, despite the inaccuracy of visual technique, simply because we obtain a large number of observations."

GCVS Supplement.

The third supplement to the 1969 GCVS has been received from Prof. Kukarkin; it includes several amended entries based on the work of VSS members, and we hope to include in a future VSSC a summary of those entries which are most likely to be of interest to members.

Information Sheet No.3 (Classification of Variable Stars)

IS 3 (held over from last Circular) is distributed herewith to U.K. members. It is regretted that most of the Greek letters and some other markings did not reproduce well, but in most cases members should not be in much doubt as to which were intended. The typical SRc star is Mu Cep, while that for Isa is Phi Per. The emission lines of S II and O I in InT stars are 'forbidden'.

It may be noted that as the 3rd Supplement to the GCVS has reclassified RT Ser, the Nc sub-division may be presumed to have lapsed.

Members list changes and additions:

CRAGG, T.A. Address changed to 100 Dalgarno Street, Coonabarabran N.S.W. 2857 Australia.

COLLINS, B. 18 Ryecroft Avenue, Wolverhampton. WV4 5UQ
GARNER, P. 64 Broadway, Northampton. NN1 4SQ
JOSLIN, M.L. 15 Cherwell Drive, Chelmsford, Essex.
STANLEY, I. Address changed to: 53 Cornpitt Hills, Roughton Road, Cromer, Norfolk. NR 27 9LJ

Last SAE reminder:

S. Bottam, O. Brazell, T. Brelstaff, H.R. Cole, K.J. England, Miss R. Fraser, S. Hynes, I.A. Middlemist, R.A.H. Paterson, I. Stanley, D. Stott, J. White, H. Williams.

WE APOLOGISE FOR THE DELAY IN ISSUING THIS CIRCULAR, DUE TO VARIOUS CIRCUMSTANCES, INCLUDING PRODUCTION DIFFICULTIES, BUT HOPE TO RESUME REGULAR PUBLICATION IN FUTURE.