

BRITISH ASTRONOMICAL ASSOCIATION  
VARIABLE STAR SECTION

CIRCULAR No. 44

1980 OCTOBER

OFFICERS OF THE V.S.S.

Acting Director D.R.B. Saw, 12 Taylor Road, Aylesbury, Bucks.  
HP21 8DR Tel: Aylesbury (0295) 22564

Assistant to Director S.R. Dunlop, 140 Stocks Lane,  
(inc. Circulars) East Wittering, nr Chichester,  
West Sussex. PO20 8NT  
Tel: Bracklesham Bay (0243) 670354

Secretary G. Coady, 169 Eastgate, Deeping St James,  
Peterborough. PE6 8RP  
Tel: Market Deeping (0778) 345396

Chart Curator R.L. Lyon, Gwel-an-Meneth, Nancegollan,  
Helston, Cornwall. TR13 0AR  
Tel: Praze (020 933) 533

BINOCULAR PROGRAMME

Co-ordinator M.D. Taylor, 17 Cross Lane, Wakefield,  
West Yorkshire. WF2 8DA  
(inc. CSNs) Tel: Wakefield (0924) 74651

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

ECLIPSING BINARY PROGRAMME

Co-ordinator J.E. Isles, 9 Horsecroft Road, Boxmoor,  
Hemel Hempstead, Herts.  
Tel: Hemel Hempstead (0442) 65994

Predictions J.C. Smith, 18 St James' Close, Hanslope,  
Bucks. MK19 2LF

NOVA SEARCH PROGRAMME

Co-ordinator G.M. Hurst, 12 Clare Close, Earls Barton,  
Northampton. NN6 0PP  
Tel: Northampton (0604) 811030

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IMPORTANT - Please see note on last page about receipt of  
light-curves and next Circular

## MAIN PROGRAMME PRIORITY LIST

W And	S Cas	RU Her	X Leo	RV Tau
RW And	V CrB	SS Her	U Mon	SW UMa
UU Aql	W CrB	AH Her	RS Oph	CH UMa
UW Aql	V Cyg	R Hya	CZ Ori	
RW Aur	T Dra	SU Lac	R Ser	

## CHANGES OF ADDRESS

C. Swan - now - 1 Sycamore Close, Knottingley, Yorks. WF11 0PT  
P.J. Wheeler - now - Tullycross, Renvyle, Co. Galway, Ireland

## NEW MEMBERS

S. Allmand - 10 Linden Avenue, Wrexham, Clwyd LL13 8PF  
W. Barnes - New House Farm, Malborough, Kingsbridge, Devon  
J.W. Connolly - 14a Kingsbury Road, London NW9 0RR  
G. Dobie - 47 Brades Rise, Olbury, Warley, West Midlands B69 2EB  
D. Franklin - 573 St Albans Road, Garston, Watford, Herts. WD2 6JH  
T. Henley - 4 Sycamore Street, Pembroke Dock, S.W. Wales SA72 6QN  
S. Hoste - 99 Polderstraat, 9220 Merelbeke, Belgium  
P. Linde - St. Tomegatan 32B:421, S-223 51 Lund, Sweden  
T. Markham - 5 Blantyre Terrace, Edinburgh EH10 5AD  
P. Plunkett - 41 Bristol Road, Bury St Edmunds, Suffolk IP33 2DH  
J. Rock - 41 Kingsley Road, Wimbledon, London SW19  
P. Trevor - The Vicarage, Kirkby Malham, Skipton, North Yorks. BD23 4RS  
A. Turnbull - 13 Kennersdene, Tynemouth, Tyne and Wear

## WELCOME BACK

M.J. Gainsford - 156 Sapcote Road, Burbage, Hinckley, Leics. LE10 2AY  
N.F.H. Knight - 72 Chadacre Road, Stoneleigh, Epsom, Surrey KT17 2HE  
G. Spalding - 2 Hyde Road, Denchworth, Wantage, Oxon.

## LAST SAEs

Martin Pell	P.J. Garner	R.M. MacLeod
P. Bouchier	Mike Hapgood	Robert McNaught
R.H. Chambers	G. Hirst	Marcus Price
A. Cicognani	G.J. Hodgkinson	John Wood
D.J. Cox	J. Lashley	

Apologies We must begin by our (too frequent) apology for the delay in producing this Circular. Apart from the usual reasons of overwork we particularly wished to include a full report of the very successful Lincoln Meeting. Amongst his many tasks, Melvyn Taylor has written a very comprehensive report which will be issued in installments. We have also been struggling to produce the light-curves which were promised some time ago. Problems with photocopying meant that these have to be redrawn - but they will be forthcoming. Similarly, the computer forms were re-examined in the light of comments made at Lincoln and means have been found to take the points into account.

Sequence Errors Will observers please note that there is an error on the 'new' U Gem 1<sup>o</sup> chart in the lettering sequence. Please check that stars designated R, S, T on the 1<sup>o</sup> chart agree with those on the 20' chart, which is correct. Later charts have been corrected, so yours may be correct.

Please note also that in the R CrB sequence comparison 'd' is not 6.15 and should be checked if possible. It is approximately 6.33.

Magnitude Estimates Required It would appear that the majority of the 'new' (photoelectric) sequences are satisfactory, but the Acting Director would appreciate examination of the following sequences: SS Cyg, AB Dra, AH Her, TZ Per, UV Per, SU Tau

New Chart A revised position and magnitude chart has been drawn for RW And. Copies may be obtained from the Chart Curator.

Acting Director/Secretary's Report 1979 This Report covers stars and observers of both the Main (M) and Binocular (B) programmes, although some binocular totals may be approximate. A total of 11 502 (M) and 10 500 (B) useful observations were received from 49 (M) and 29 (B) observers. Despite complaints about the weather, the number of observations was higher than in 1978, even though there were slightly fewer observers. Thanks to all observers for keeping up the good work, especially to the binocular observers, whose work has received less recognition in recent years than it deserves. A nucleus of five such observers contributes no less than 85% of the binocular total. The following table gives (in alphabetical order) the observers' totals (B for binoculars).

S.W. Albrighton	( 1049	T. Brelstaff	158
	1382 (B)	C. Brookmann	23 (B)
C. Anton	12	L.K. Brundle	668
D.R. Basey	14 (B)	R.H. Chambers	22
M. Beach	34 (B)	G.A.V. Coady	650
	245	E.H. Collinson	29
M. Bell	( 37 (B)	G. Dobie	80 (B)
R.P. Blackett	18 (B)	B. Espy	( 41
	2		105 (B)
G.C. Blair	( 57 (B)	R.B.I. Fraser	( 256
			2320 (B)

cont. ...

## Observers' Totals (cont.)

E.J. Gainsford	258		R.D. Pickard	( 191
E.J. Godden	244			13 (B)
T. Gough	142		G. Poyner	24
M. Hapgood	( 46		A.K. Porter	246
	90 (B)		J.H. Robinson	34
L.J. Higgins	42		T.A. Robinson	117
G. Hirst	28		D.R.B. Saw	( 647
A.J. Hollis	269			6 (B)
M.B. Houchen	62 (B)		J.D. Shanklin	( 180
D. Hufton	( 200			90 (B)
	1745 (B)		C. Siviter	35
G.M. Hurst	( 181		E.H. Smith	14
	206 (B)		H.W.S. Smith	46
M.L. Joslin	62		A. Snook	73
S.J. Kay	737		D. Stott	1218
N.S. Kiernan	( 53		C. Swan	132 (B)
	35 (B)		M.D. Taylor	( 252
J. Lashley	158 (B)			1708 (B)
R.L. Lyon	326		F. Ventura	36
R.H. McNaught	274		P.J. Wheeler	708
I.A. Middlemist	( 456		H.C. Williams	33
	1784 (B)		P.B. Withers	396
P.W. Middleton	23		7 Observers	167
P.A. Moore	150		Photographic	128
C.R. Munford	434			
T. Neville	60 (B)			
M. Peel	63			

Thanks are especially due to all those observers who contributed early morning observations; these are most useful for extending the time range of the light curves. As well as these observers, the work of the following major observers deserves mention:

Shaun Albrighton, Len Brundle, Greg Coady, Rhona Fraser, Derek Hufton, Stephen Kay, Rodney Lyon, Ian Middlemist, Colin Munford, David Stott, Melvyn Taylor, Frank Ventura, Peter Wheeler and Philip Withers.

Tom Gough, Karl Lewis and Roderick MacLeod have stopped observing but several new members are joining the Section.

The following tables give the number of observations received for each star on the Main and Binocular programmes.

## Main Programme

R And	136	SU Aur	173	Gamma Cas	243
*W And	64	U Boo	96	Rho Cas	186
*RW And	58	V Boo	156	o Cet	100
RX And	293	V Cam	134	R CrB	344
LE And	107	X Cam	209	S CrB	143
R Aql	139	Z Cam	242	T CrB	119
*UU Aql	71	XX Cam	263	*V CrB	63
*UW Aql	83	*S Cas	80	*W CrB	88
*RW Aur	53	T Cas	117	R Cyg	166
SS Aur	305	UV Cas	107	S Cyg	134

cont. ...

Main Programme Totals (cont.)

*V Cyg	51	AY Lyr	168	HM Sge	2
W Cyg	266	*U Mon	58	HS Sge	10
SS Cyg	714	*RS Oph	57	R Sct	184
BC Cyg	184	U Ori	193	*R Ser	83
BI Cyg	192	CN Ori	125	T Tau	110
CI Cyg	293	*CZ Ori	109	*RV Tau	103
V1500 Cyg	10	V529 Ori	19	SU Tau	141
V1668 Cyg	137	RU Peg	203	T UMa	169
Chi Cyg	173	S Per	90	SU UMa	242
HR Del	129	RS Per	170	*SW UMa	95
*T Dra	54	TZ Per	331	*CH UMa	112
AB Dra	153	UV Per	116	V Vul	181
U Gem	229	BU Per	147	NQ Vul	17
*RU Her	64	GK Per	130	'Kuwano's'	311
*SS Her	90	WZ Sge	125	SN M100	11
AC Her	181				
*AH Her	125				
*R Hya	38				
*SU Lac	55				
*X Leo	78				

Binocular Programme

RS And	42	ZZ Cam	75	33 Cet	20
SU And	18	+61°0668 Cam	55	RR CrB	84
TZ And	45	X Cnc	44	SW CrB	84
VX And	14	RS Cnc	76	T Cyg	45
AQ And	39	RT Cnc	26	RS Cyg	2
BZ And	33	V CVn	95	RU Cyg	38
V Aql	44	Y CVn	88	RV Cyg	57
V450 Aql	57	TU CVn	65	TT Cyg	48
V1293 Aql	54	+49°2165 CVn	20	AF Cyg	111
CSV 101849 Aql	52	WZ Cas	83	CH Cyg	405
V Ari	16	V377 Cas	87	V499 Cyg	3
RT Aur	12	V391 Cas	104	Var.nr.V499	3
UU Aur	126	V393 Cas	104	V460 Cyg	75
AB Aur	196	V465 Cas	154	V973 Cyg	69
AE Aur	315	CSV 171 Cas	97	V1339 Cyg	3
AR Aur	37	+49°4329 Cas	55	V1351 Cyg	2
CO Aur	66	Wr 162 Car	74	P Cyg	91
NO Aur	76	W Cep	92	28 Cyg	52
psi' Aur	21	RU Cep	85	CSV 8283 Cyg	26
+31°1048 Aur	234	RW Cep	77	CSV 8307 Cyg	24
RV Boo	70	RX Cep	88	CSV 8683 Cyg	46
RW Boo	69	SS Cep	80	CSV 103049 Cyg	4
RX Boo	65	AR Cep	155	+47°2801 Cyg	95
UV Boo	67	FZ Cep	37	U Del	82
U Cam	45	NN Cep	43	CT Del	2
RY Cam	64	mu Cep	31	CZ Del	2
ST Cam	90	CSV 927 Cep	33	EU Del	85
UV Cam	89	+59°2383 Cep	62	+19°4450 Del	52
UX Cam	18	+60°2217 Cep	65	RY Dra	138
VZ Cam	32	+84°0536 Cep	106	TX Dra	107

cont. ...

## Binocular Programme (cont.)

UW Dra	68	Y Lyn	78	Z Psc	31
UX Dra	78	SV Lyn	47	TV Psc	49
VW Dra	62	CSV 100869 Lyn	43	TX Psc	42
AH Dra	102	R Lyr	88	V Sge	4
AT Dra	107	XY Lyr	72	S Sct	30
69 Dra	33	Delta <sup>2</sup> Lyr	49	Y Tau	42
TU Gem	55	S Mon	23	TT Tau	56
TV Gem	92	RV Mon	41	BU Tau	109
WY Gem	90	SX Mon	22	CE Tau	39
BN Gem	91	V505 Mon	24	CSV 6048 Tau	67
BQ Gem	41	X Oph	88	+22 <sup>o</sup> 0743 Tau	42
BU Gem	93	V2048 Oph	96	W Tri	53
Var.nr.BU Gem 2		W Ori	50	R UMa	20
DW Gem	21	BL Ori	26	Z UMa	122
IS Gem	46	BQ Ori	46	RY UMa	118
NP Gem	1	CK Ori	43	ST UMa	68
NQ Gem	14	NU Ori	14	TV UMa	47
X Her	71	+14 <sup>o</sup> 1247 Ori	24	VW UMa	147
ST Her	30	AG Peg	130	VY UMa	94
SX Her	11	GO Peg	38	V UMi	84
UW Her	63	X Per	159	RW Vir	12
IQ Her	24	SU Per	36	RX Vir	11
OP Her	83	AD Per	35	SS Vir	23
V566 Her	57	KK Per	17	SW Vir	16
g Her	63	PR Per	19	BK Vir	10
U Hya	10				
SX Lac	29				
CSV 8775 Lac	36				
CSV 102195 Lac	36				
RX Lep	17				

On the Main programme, the totals for many stars are about the same as for 1978. Stars which are under-observed are marked \*. Observers with moderate apertures are asked to observe at least some of these stars (often M, the type probably most frequently needed by the professionals) in order that better light curves can be derived. Observers with large apertures are asked to increase observations of faint stars, mostly UG type, but also others near minimum.

With regard to the binocular programme, the totals (some are approximate) are given for the first time in several years. The average number of observations per star is about 60; there are about 170 stars on this programme and it may need to be modified. This will only be done after consultation between officers and the main observers; NVAISO may be amalgamating and helping with this work. In the meantime observers are asked to continue with their present programmes.

This year, for the first time, the light-curves (for 1979) of all the Main programme stars are being photocopied (following their exhibition at the BAA May Meeting and the Lincoln Section Meeting) and will be distributed to all Section members. All usable observations have been plotted and members may like to identify their own observations and compare them with the mean curves. In a few cases, observers will find that for some stars the Director has applied a 'personal equation' (i.e. all observations have been moved up or down a little in magnitude) to reduce the dispersion about the mean curve.

It has been felt for a long time that what observers most desire to see is this type of graphical presentation of their results and to see it fairly quickly. The VSS officers have made special efforts to produce these curves and it is very unfortunate that printing problems have caused a long delay. There has been no time to do full analyses and therefore the curves are only 'semi-official'. It is hoped, with continuing financial help from the BAA, that these curves will be an annual feature.

It has not been possible to do the same for the binocular programme this year. However, following consultations between past and present Directors, it has been agreed that this programme is in urgent need of attention, both with regard to the production of light-curves and also publication of results. This work will receive top priority.

Meantime, my thanks to all observers. The Section is flourishing so please keep up the numbers of observations and include some of the under-observed stars on your programme. Let us hope that the weather will be kind to us.

D.R.B. Saw

#### Nova Search Meeting

Thirty-eight persons attended the third annual meeting of the UK Nova Search Programme, held at Earls Barton near Northampton.

Before the talks, members had the opportunity of seeing an extensive exhibition of photographs and drawings contributed by observers from eight countries. In particular, there were many photos of novae including the 'nova-like object in Vulpecula', with prediscoversy photographs by Mike Swan. A 'monster light-curve' by the Co-ordinator showed prediscoversy and later results and an extended up-to-date curve by Melvyn Taylor showed the recent decline following a protracted maximum with a final peak in 1980 February. Items of equipment on display included a patrol camera mount by J.T. Grills and an astrograph by John Hosty.

Proceedings started with the patrol report, which included the following successes: V400 Per prediscoversy (JAVC 2742), a new variable star near V400 Per (BAA Journal), prediscoversy Nova Scuti 1975 (JAVC 2801), prediscoversy HM Sge (JAVC 3018), all on the old photo patrol which did not involve actual checking of negatives. Thereafter the patrol proper was formed with a view to actual searching visually and photographically. Success followed swiftly with HS Sge 1977 found by John Hosty, independent discovery in 1978 of V1668 Cyg by D. Rossitter and numerous prediscoversy images of Kuwano's object by Messrs. Griffen, Pratt, Scott and Swan.

At present about 20 visual and 9 photo searchers are active. Special Nova Search circulars were issued to members, Nos. 4 & 5 appearing in the last year and providing detailed data on past novae and articles on searching techniques.

John Hosty gave a talk on 'Visual Sweeping in the Morning Sky', emphasising the need to follow areas for as many months as possible. Even Sagittarius could be monitored from April to October.

To introduce variety, Mike Maunder gave a report on the 1980 Solar Eclipse (February), supported by spectacular slides, and this was followed by a magnificent 'slide show' by John Sanford visiting from the U.S.A. The slides showed various projects which could be undertaken by amateurs, including details of

'PROBLICOM' run by Ben Mayer who now claims to have 200 'Blinkers' worldwide.

A Nova Patrol debate followed to encourage members to put forward their own ideas and views. New ideas examined included 'Talks to Senior Children in Schools', J.A.S. membership participation (perhaps on a simplified basis), associated variable star work with searching and production of special charts for each area.

Mike Swan followed with details of his 'Galactic Star Atlas' in which it is planned to add omissions from the S.A.O. Atlas and to extend down to magnitude 11.

G.M. Hurst then presented the Nova Patrol Award from the AAVSO to John Hosty amidst loud applause.

At the start of the meeting two charts had been displayed, one with a nova, the other without, and a competition was held to test the detective powers of members. Greg Coady and Mike Swan produced good answers and the nova was identified as LV Vul (1968).

With the aid of slides, the Co-ordinator showed the value of colour film for patrol work. Coloured objects are highlighted and the black background eliminates the troublesome flaws often seen when checking black-and-white negatives.

Finally Francis van Looy demonstrated his projector blink comparator and John Hosty his astrograph.

A more detailed account appears in 'Nova Search Circulars'; interested members should contact the Co-ordinator.

G.M. Hurst

#### A Flare Star Programme

We hope to set up a flare star programme very shortly under the co-ordination of Shaun Albrighton. Both visual and photographic work is contemplated. As most members will know this work tends to be difficult and time-consuming, but the importance of independent observation of variations is very great. Observers who think that they would like to try this form of work are invited to drop a note to that effect to the Acting Director. Further details will be announced in due course.

#### VSS Observations and Cyg X2

The way in which observations may prove to be of use in what are at first sight unrelated fields, is well illustrated by a recent instance. We received a request from Dr G. Carpenter and Dr C. Goodall (Dept of Space Research, University of Birmingham) for information about the behaviour of SS Cyg on 1979 September 18. On that date their equipment aboard the Ariel 6 satellite monitoring Cyg X2 recorded a significant enhancement of the soft X-ray flux ( $\sim 1/4$  keV). There was a possibility that the Cyg X2 data could have been contaminated by SS Cyg (due to the wide field of view and spacecraft attitude), if this star had been at outburst. A quick check with the observations and light-curve suggested no correlation whatsoever, so that it appears that not only does Cyg X2 possess a soft X-ray component, but also that it is variable. This is important evidence that Cyg X2 is likely to be a binary system containing an accreting white dwarf.

#### Scorpius X1

Because of our help with Cyg X2, we now have an even worse (much worse) question to answer! Dr A. Pollock at Birmingham asks if anyone has any information about Sco X1 around JD 2 444 333-4 (1980 April 3-4). We know of no-one who has observed this, but if anyone, anywhere has any details, or just happened to photograph the area ( $16^{\text{h}} 17^{\text{m}} 4.49^{\text{s}}$ ,  $- 15^{\circ} 31' 14.8''$  (1950)) will they please contact Storm Dunlop. Overseas observers are particularly urged

to do so.

#### The Use of UT and MJD in Reports

During the discussion of the computing project which took place at the Lincoln Meeting, the question of the use of UT rather than GMAT was raised. Although it was generally agreed that in most cases the use of UT would cause no great difficulty, there were some reservations about the changeover at midnight, and suggestions that perhaps double-dates should be employed. It was pointed out that professional observations employ UT and that this is in accordance with the recommendations of the IAU, adopted at the Melbourne Assembly. As a matter of interest Resolution 4, clauses (a) to (g) states that (among other points) 'it is desirable to refer such dating to 0<sup>h</sup> UT', 'a simple conversion from ... conventional JD count', 'that a 'Modified Julian Day' count is already in use' and recommends that the term 'Modified Julian Date' and the symbol MJD be used only for the quantity JD minus 2 400 000.5, MJD being equal to 0 on 1858 November 17, 0<sup>h</sup> UT.

How does this affect us? Very little actually, except it may be pointed out that in accordance with this resolution some predictions, for example those issued by the Jagiellonian University at Krakow for eclipsing binaries, use MJD. However, on the new computer forms JD (or MJD) numbers are not required (they have been found to lead to frequent confusion), and it will be possible for observers to use UT or GMAT whichever they prefer (but not a mixture!), provided they indicate this suitably on the report forms.

#### ADS 5188 (Comparison 'F', UU Aurigae)

George Emsden (74 St George's Avenue, Tufnell Park, London N7 0AJ) suspects some variation in this star in the UU Aurigae field. He would be pleased to hear from anyone who has made observations, or taken photographs of the area, which might throw light on the possible changes. Mr Emsden will be pleased to supply further details and a modified chart of the area to anyone who is interested.

#### A soft X-ray halo around SU UMa

Some very interesting results have been reported by Cordova and Mason observing with equipment on board the Einstein X-ray satellite (Nature 287, 25 - 1980 September 4). They find a patchy 'ring' with mean radius of ~ 14 arcmin surrounding the star SU UMa. So far such a ring is unique to SU UMa - it is not an instrumental effect. The total flux from the ring is ~ 13% of that from the central source. The temperature of the material is estimated to be of the order of 10<sup>6</sup> K. The symmetrical distribution suggests that it is material ejected by the central object, and calculations of the initial explosion energy are consistent with a nova eruption. The expansion age is ~ 500 years.

The main significance of this discovery, is of course, the fact that it suggests a link between novae and dwarf novae, a possibility which has been frequently discussed in the past, with conflicting opinions and results. There are also obvious implications for the evolutionary history of eruptive objects.

#### Observations of HR Del, SU UMa & Nova Vul 1979

A request for observations of these 3 eruptive objects during August was made through BAA Circular 607 and telephone requests to various observers. This was on behalf of Dr M. Bode and Dr M. Evans (University of Keele) who were observing these objects with the

IUE (International Ultraviolet Explorer) satellite on August 14 and 16. Thanks are due to Messrs. L. Brundle, A. Hollis, R. Pickard and D. Saw for their observations. Unfortunately these do not show any significant activity during the observing windows. [My apologies, I nearly forgot M. Gainsford, who also contributed - SRD.]

V603 Aquilae (Nova Aql 1918) Also as a result of IUE observations, the famous nova V603 Aql has been shown to be an eclipsing binary with an amplitude of about  $0.3^m$  (visual) and with the previously established period of  $3^h 19.5^m$ . The eclipses are tentatively interpreted as eclipses of the accretion disc by the late component.

Eclipsing Binary Programme The following is a brief summary of the proposed changes to the programme which were discussed at the VSS meeting in Lincoln.

There will be 5 lists of objects officially on the programme, as follows:

List A Objects with minima adequately observable with binoculars in a single night. This will resemble the present programme, but some recently discovered systems will be added and a few objects will be removed to other lists in which they more appropriately belong.

List B Similar objects to those in List A, but with maximum magnitude between 8 and 10. No charts will (at present) be issued for these objects. Observers will be supplied with 1950 coordinates and any other relevant information which may aid identification. It should be possible to identify these objects using atlases (SAO, Eclipticalis/Borealis, Vehrenberg, etc.) and to select comparison stars at the telescope. As comparison star magnitudes will not be known, observations should preferably be made using Argelander or Pogson step methods. Any observers using the fractional method should also submit estimates of the magnitudes of the comparison stars which they have used.

List C Objects with longer eclipses or visible for too short an interval (i.e. Declination between  $0^\circ$  and  $-18^\circ$ ) for minima to be timed from a single night's work. Observations made on more than one night are to be combined to yield a single light-curve for the eclipse.

List D Objects with very long eclipses (several days or more) which are to be observed once or twice a night.

List E EB and EW stars with smaller amplitudes ( $0.4^m$  to  $0.6^m$ ) and objects whose periods are unknown. Observations may be made at intervals on any night, and will be combined to form mean light-curves for each star.

Predictions will be issued separately for Lists A, B, C and D. Those for A, B and C will indicate the times to commence and cease observing each object, and the light-time correction for each minimum. Those for List D will indicate which stars are in eclipse on each night.

The total programme will initially contain about 300 stars. Some objects fainter than  $10^m$  at maximum, for which charts will be necessary, may be added later to form a List F. In the meantime, observations of any non-programme stars will be welcome and will be published.

Observations should be reported on the standard (i.e. non-computer) forms, every month or so, to the Co-ordinator, using a separate sheet for each star. There is no need to complete the column for Julian Date and Decimal except for stars on List D, for which two decimals should be given. If the fractional method is used, deduced magnitudes may be entered in the appropriate column. If a step method is used,

this column should be used to enter the deduced grades, as described in VSS Information Sheet No. 1. (This sheet is out-of-print, but a revised version is being prepared.) If you are unsure about the calculation of grades, leave the column blank. Derived times of minima, corrections for light-time, etc., may be given following details of the relevant observations. If a standard chart has not been used (as will be generally the case except for most stars on List A), a field sketch indicating orientation, scale and comparison stars used should be given on the reverse of the form (or reference may be made to a preceding report giving this information).

These proposals will be implemented when computer programs to produce the new-style predictions have been developed. In the meantime any comments, as well as observations of programme or non-programme stars, will be most welcome.

A future Circular will give a summary of recent observations held by the Co-ordinator, so that observers can check their individual contributions and ensure that the next EBP report in the Journal, which will cover all outstanding observations up to the end of 1979, will be complete.

- JEI

#### Section Meeting at Lincoln

The meeting at Riseholme, near Lincoln was highly successful. [Indeed it has been most gratifying that in subsequent correspondence all those who attended have been most enthusiastic. But those who want another meeting next year had best start doing some of the organising! - SRD] A report is to appear (all being well) in the December issue of the BAA Journal, but it is proposed to give a fuller account, prepared by Melvyn Taylor, in the Circulars. The first installment follows. The papers by Dr Bode, Dr Andrews and Tristram Brelstaff are not given in full, as they will also appear in the Journal, but discussions and relevant issues will be mentioned.

Saturday, July 5

#### 'The Search for Novae' - Guy Hurst

The original observational scheme was established in conjunction with the AAVSO and later developed mainly through the initiative of VSS members and the observational magazine 'The Astronomer' (TA). As to objectives, these are obvious - the discovery either visually or photographically of novae and the rapid communication of this information to other astronomers, both through amateur networks and through the IAU. There are also several spin-off results and as a cooperative programme it probably offers more than any other. However, even though the 'spade-work' of discovery was not easy, the potential for producing scientific results is high.

Any binoculars or any camera with a 'B' setting can be used and to date there are 25 very active participants. Monthly reports are sent to the co-ordinator and he is thus able to monitor the observational activity and obtain related statistics. Any reported discoveries are verified by the co-ordinator himself and/or other patrol members before the information is passed to the RGO and the IAU.

In addition to pure discovery the patrol provides a valuable check on recurrent novae which may brighten to magnitude 8 or more, and variable star estimates from photographic negatives are produced for the VSS. The most fruitful areas to search are Sagittarius, Scorpius, Aquila and Cygnus. Interested patrollers are asked to select a number of areas, covering  $10^\circ$  in Declination by  $40'$  in

Right Ascension, which are agreed with the co-ordinator.

A specialist photographic patrol exists for owners of 35 mm cameras and a 135 mm focal length lens. Individual observers generally standardise their film/developer combinations and, if possible, their limiting magnitude. Some of the films used by the team are: Ektachrome 200 and Ektachrome 400, FP4, HP5, K2475, SO-115 and Tri-X. Duplicate exposures are made so that flaws may be recognised when checking, as they frequently appear stellar-like. The exposures should be checked as soon as possible after the observing session. In the standard patrol no driving facilities are necessary and even with 'average' sky conditions a 50 mm focal length lens can give short trails of magnitude 8 to 9 stars, in exposure times of 10 secs. With a f/2.8 or f/4 lens magnitude 10 or 11 can be achieved by some patrollers if the camera is driven equatorially, or simply by using short exposures in 'very good conditions'.

Checking of the photographic negatives has been taken on enthusiastically by keen members and innovators in the patrol, notably F. van Looy, and in particular devices similar to blink comparators are being used. For a quick check a simple 'light-box' can be employed; a magnifying glass allows the checker to compare the negative against a standard atlas or master photograph. [The advantages and disadvantages of the various methods of checking were discussed, including the use of two projectors, projection of negatives onto master charts, and stereo arrangements.] Printed atlases invariably contained flaws, errors or omissions which could mislead the checker.

The visual patroller has to 'beware of the planets', watch out for variable stars, particularly those of the M class, and be able to distinguish the brighter minor planets, several of which can be found in the Handbook. There is no standard observational procedure laid down for the individual observer, except that he or she should at least make checks on the allotted areas. Nova discoverers have remarked that patterns of stars are readily recognised and can sometimes be easily memorised. Sometimes geometrical and animal forms can be seen in asterisms, and any intruder upsets the visual/mental picture.

One of the more commonly used atlases such as Coeli, Eclipticalis, Borealis or SAO, and a computerised list of the atlas omissions and errors (available through Geoff Kirby) are almost essential requirements. On a successful night the information required to be communicated to the co-ordinator is as follows: RA and Dec (1950), if possible a field drawing with reference stars, approximate magnitudes, and North marked. Other standard information about date/time and observer/instruments should be available. Rapid communication by telephone is appreciated as then confirmation may be obtained quickly. Overseas members are advised to communicate the information to the nearest national observatory, and a telephone call or international telegram to the co-ordinator would be helpful.

The patrol has a number of achievements including predisccovery images of Nova Persei, 1974 (V400 Per), Nova Scuti, 1975, (V373 Sct), HM Sge and Y. Kuwano's 'nova' in Vulpecula in 1979. The patrol's first major discovery, Nova Sagittae, 1977 (HS Sge), by John Hosty was a morale booster, with one patroller, David Rossitter, taking only one minute to detect Nova Cygni, 1978 in twilight skies. [Several photographic colour slides of some of these objects were shown, and in a lively discussion the merits of various films were brought to the fore. It was pointed out by Guy Hurst that out-of-date Ektachrome 200 film was relatively inexpensive, and quite adequate. In fact its red sensitivity gave it advantages over black-and-white films because certain red objects were immediately obvious. However the estimation of apparent

magnitudes from such slides is unreliable. With a panchromatic film the use of a W8 filter allowed very useful results to be obtained as the response was then close to the visual one, and photographs could be used for visual sequences.]

'The Binocular Programme' - M.D. Taylor

There is nothing new about observing brighter variables with binoculars and some such as W Cygni and R Scuti have been followed for many years, but the programme as such was formed in 1969 and later was amalgamated with that of the Binocular Sky Society. Generally the brightness of stars being observed lies between magnitudes 5 and 9, so a binocular of 30 to 50 mm is a useful instrument. The existing observational programme has altered little since that early stage and it now consists mainly of pulsating variables, semi-regular and irregular types, with a breakdown of 170 stars into 54% SR, 22% L, 14% suspects and 10% other classes. Excluding the suspects some 38% of the programme's stars have uncertain data given for them in the latest (1969) GCVS and its 3 Supplements. We can hope to revise or confirm the information for many of these by sufficient observation. The current state of the group shows that the number of observations is steady at around 10 000 per year, but that there is still plenty of coverage to be done. One of the principal aims is to obtain good quality estimates adequately distributed over the light curves. Thirty-eight stars are on the 'Priority List' are the first to be analysed, followed by others for which the group has good coverage. One area in which experienced observers could assist is by checking various chart queries which have been noted over the years. Dubious comparisons and comments on individual fields were listed by the previous co-ordinator, and this work is still continuing. The fields of TU, BU, WY Gem, BQ Ori and WZ Cas are typical areas which prove difficult to chart and cause problems in establishing good sequences. The logging and checking of all estimates is another aspect where members could provide a lot of assistance. Even if individuals could only take on a small amount of checking it would prove of great help. Although few results from the binocular programme have been produced in the past 10 years, these are now being given priority and there are plans to publish some light-curves on a regular basis, as well as yearly results and summaries of behaviour.

On the practical level, binoculars can be chosen with the observing site in mind. In an urban location with artificial light and pollution problems one which gives a small exit pupil, such as the 3.3 mm one from 12x, 40 mm binoculars or 3.1 mm from 16x, 50 mm, will give a better limiting magnitude than those of lesser power. Under darker country skies with few artificial lights and less pollution, an instrument with an exit pupil of 7 mm or even 8 mm (depending upon the eye of the observer) is preferable, such as 7x, 50 (7.1 mm), 8x, 56 (7.0 mm), or 10x, 80 (8 mm).

A survey of the more commonly used prismatic binoculars available 'off-the-peg', shows that there is a very large range of prices between £15 and £300 for apertures of 15 mm to 80 mm, and magnifications 6x to 30x. The largest selection is in the 8x, 40, 10x, 50 and 7x, 50 sizes in a price range between about £45 and £90. The choice in any purchase probably resolves around price, limiting magnitude and ease of handling.

The mounting of binoculars on a firm stand can take many forms and have an effect upon the quality of the observations. Tripod mounts are not ideal, unless having a fork offset, and may cause the observer actual discomfort. Alternative better designs incorporating an

overhead support for the binocular on movable or non-movable observing chairs are to be preferred. Use of the 'merry-go-round' rotating shed with the instrument and observer contained in a darkened 'shed-on-wheels', as used by the late Leslie Peltier is probably the ideal. Many observers prefer the mobility offered by a hand-held position in which comfort is at a premium. A deck-chair or 'sun-lounger' suitably insulated from damp ground, provides support to the arms which can be braced to steady the binocular.

[In the discussion it was re-emphasised that publication of binocular results was a priority, and it was suggested that as many of the smaller overseas groups made extensive use of such small instruments, co-operation in the checking of fields and comparison star magnitudes could well be a very useful first step towards greater international co-operation.]

(Report to be continued)

#### Some late items

ADS 5188 (see page 7) Details of the suspect star are:  $6^{\text{h}} 30.9^{\text{m}}$ ,  $+ 38^{\circ} 7'$  (1950). It is of course a double, or rather multiple, object, with a total of 4 components having approximate magnitudes of 6.6, 10.0, 10.6 and 11.0. Mr Emsden suspects component B (10.0) to be the most likely candidate for variation.

SCO X-1 (see page 6) This star is on the programme of the southern hemisphere groups, and F.M. Bateson has already been able to provide us with some preliminary information. Nevertheless any further data will be welcomed.

Obs. of HR Del, SU UMa and 'Nova' Vul (see page 7) We have just been informed that unfortunately due to computer problems the planned observing runs could not be carried out with the IUE satellite. However Drs Bode and Evans hope to be successful in their application for time next year. Let us hope that the objects will be more favourably placed next time.

A most welcome return of some earlier observers It is always encouraging to welcome back to observing members who have contributed in the past. George Spalding, fully involved with meteors for some time now, has just moved, and promises to observe variables again - when meteors are not active, of course! However it gives us even greater pleasure to welcome Mr E.F.H. Knight back into the fold. Anyone who examines variable star reports of earlier years will see the very great contribution which he made both before and after the Second World War. We are delighted that he should become an active observer again.

Light-curves, Notes on light-curves and Circular 45 The light-curves and the accompanying notes have been produced and will be distributed to UK members (and Eire) within about a week. If this Circular comes in your last SAE (see list inside front cover) or you wish the material to be unfolded, please send appropriate envelopes NOW. Because of costs we have only been able to produce sufficient copies for our known members, and we may not be able to satisfy requests for back issues. Similarly a large amount of material is to hand for Circular 45 and this also will be issued just as soon as possible. (Overseas members will receive this Circular 44, the light-curves and the notes in a single mailing.)

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