**British Astronomical Association** 



# VARIABLE STAR SECTION CIRCULAR

# No 102, December 1999

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LIGHT CURVES

DAVE MCADAM



# FROM THE DIRECTOR

#### ROGER PICKARD

Changes have been made regarding the reporting of those observations which are submitted on paper. Please, will all members who still report in this form, now do so to Melvyn Taylor. This applies especially to those members who are new to variable star observing, as Melvyn has volunteered to continue his work in liasing and helping such members get the most satisfaction from their observing.

Regarding the submitting and logging of observations, the major change has taken place *behind the scenes*. After paper reports have been seen by Melvyn and any correspondence dealt with, he will forward the observations to Crayford where Terry Miles has volunteered (?!) to log them. Terry has gained quite a lot of experience in logging the Section's reports as he has done it for some years now. However, from now on, it is anticipated that he will be dealing only with current observations, as it is felt that he will be too busy to log any of the old records!

Besides the new reports coming in, Dave had 4 four-drawer filing cabinets full of past Section records. It was fortunate that three of these cabinets contained records that had already been entered into computer form. This leaves just the one cabinet with records still to be entered. Dave was also being pressed for space at home where these cabinets reside, and so it was agreed that all of them would eventually be transported to Crayford for safe storage. The first cabinet (the one with all the records still to be entered) was transported by John Toone in late September and another team of willing (again!?) helpers at Crayford have agreed to commence keying in these old records. Once entered onto computer all these records will be sent to Dave (either on disc or by e-mail) for logging into the Section's database (currently standing at over 1.6 million observations in machine readable form).

The Section Officers (and especially the new Director) are thankful that Dave has agreed to continue in his main role of logging these observations and maintaining the Section's Web Page, as well as dealing with requests from professionals.

The recent Officer's Meeting brought about a number of changes in both personnel and their titles. Melvyn's title has changed yet again, as he was uncomfortable with his previous title and duties, and so he now becomes the Section's Binocular Secretary. Any queries relating to naked eye and binocular observations should be sent to Melvyn.

We are very fortunate indeed that Tony Markham, the Society for Popular Astronomy's Variable Star Director, readily agreed to combine his roles and take over as Eclipsing Binary Secretary of the VSS when we approached him. All queries, requests for charts, and all observations of eclipsing binaries should now be addressed to Tony (contact details for Tony are on the back cover of this circular).

Our Editor, Karen Holland, has also found that work commitments were precluding her from fulfilling the role of CCD advisor in the way that she wished. We are grateful to Richard Miles for agreeing to take over this task from Karen. Again, any queries relating to all aspects of CCDs should now be addressed to Richard (see back cover for contact details).



Roger with his 16 inch Newtonian Reflector

I reported in the last Circular that Gary Poyner is continuing to look after the Recurrent Objects Programme and the QJ287 project.

The positions of Chart Secretary and Nova/Supernova Secretary remain unchanged.

My thanks to all Section Officers both new and existing, and all those others like Terry Miles who are helping to keep the Section running smoothly.

# **OBSERVING UU AUR**

JOHN TOONE

I have always regarded **UU** Aur as a fine binocular object exhibiting long, flat maxima around magnitude 5.6, with fades to below magnitude 6.5 every 10 months or so.

Recently, however, John Greaves has drawn attention to the fact that comparison stars D and E, in particular, seem to give observers some problems, as one is blue and the other is orange. **UU Aur** is very red (and probably even a deeper red when faint), and some observers have reported only minor variations. These discrepancies may be due to the star's colour and/or the observer's use of the current sequence.

When **UU** Aur goes fainter than E the useful comparison stars are some distance away and this might discourage observers from using them; instead they rely just on stars D and E which are conveniently close. This is one of the reasons why star N (formally star F on chart MDT1972-11-11) was re-introduced on the latest chart.

Please take care when observing this star (particularly in the summer when low in the north), and be alert to the purkinje effect (make the estimate quickly). It is particularly important not to rely solely on stars D and E when making your estimates.

# **REQUEST FOR HELP**

#### ROGER PICKARD

It seems a long time ago when Peter Wheeler kindly undertook the task of compiling an Index to the Circulars, but this he did for numbers 12 - 70, spanning the years May 1972 to April 1990. We now need an Index for Circulars 72 - 100, spanning May 1991 to June 1999 (Circular 71 was the last Index). This is not such a long time span but it does seem appropriate to have another Index now. Is there anybody out there who would be prepared to take on this useful task?

# V844 Her

#### GARY POYNER

The discovery of **V844 Her** was announced in IBVS 4360 (August 1996) by Dr. S.V. Antipin (Sternberg Astronomical Institute), as Var 43 in the field of the bright star Eta Herculis. This followed a study of photographic plates of the Eta Her region taken with the 40cm astrograph in the Crimea, resulting in the discovery of some 27 new variable stars in a 10 x 10 degree field centred upon the bright star. Antipin reports that most of the discoveries are RR and EB type stars, with Var 43 proving to be a Dwarf Novae with a best observed outburst period of 12 and 18 days. Var 43 was found to be in outburst on JD 244175.489 (June 1972)[1].

The announcement of the discovery was also posted on to VSNET [2] by Taichi Kato. Following this, Charles Scovil photographed the field on October 7th, 1996, and found Var 43 Her to be in outburst at magnitude 12.2, fading to 14.3 by October 12th. [3] CCD Photometry undertaken by Tonny Vanmunster (CBA Belgium) on October 13/14 resulted in the detection of weak superhumps [4], thus classifying Var 43 Her as a new member of the UGSU class of DNe.

Var 43 Her (now re-named **V844 Her**) was next seen in outburst on May 21st, 1997, by Robert Modic at visual magnitude 13.1. This again proved to be a superoutburst, with a superhump period measured by several CBA observers to be 0.05602±0.00011 days following CCD photometry obtained between May 25-31st [5]. This proved to be amongst the shortest known periods for any UGSU star, raising the interesting question of which category of ultra



#### Light curve for V844 Her

short UGSU stars does **V844 Her** belong to - UGWZ or UG ERUMa? From VSNET reports, T. Kato suggests a supercycle period of some 220-230 days, with the apparent absence of normal outbursts [6].

R. Modic once again detected an outburst of **V844 Her** on December 10th, 1998, at visual magnitude 12.8. This outburst was poorly covered by both visual and CCD observers due to its low position in the western sky during early evening in Winter.

The most recent outburst was detected by Hazel McGee on September 29th, 1999, at visual magnitude 12.3. This outburst once again proved to be a superoutburst, with early stage superhumps being detected by T. Kato and M. Uemura (Ouda station, Japan) on October 1st [7]. The outburst has been well covered by observers world-wide, with only one day reported without observations during the 20 days duration of the outburst. The light curve opposite is taken from observations reported to VSNET.

Since the IBVS announcement in August 1996, probably one outburst has been missed during Feb-Mar 1998. If we take the outburst period as being around 260 days (revised from T. Kato's 230 days from outburst dates), then we should expect the next superoutburst to occur in the summer of next year. However continued monitoring of the field in the meantime is to be encouraged, as normal outbursts (if they actually occur) have still to be observed.

- 1: IBVS 4360
- 2: VSNET 834. New UG star in Her. September 1996. T. Kato
- 3: VSNET-OBS 4061. Oct 12, 1996
- 4: VSNET-OBS 4075. Oct 14, 1996
- 5: CBA announcement from J. Patterson, June 1997.
- 6: VSNET-ALERT 940. May 27th 1997
- 7: VSNET-ALERT 3545. October 2nd 1999

# WHY OBSERVE ECLIPSING VARIABLES ?

TONY MARKHAM

Much can be learnt from amateur observations of eclipsing variables. Although the times of eclipses can usually be predicted fairly accurately (to within an hour or so), not even the brightest variables such as **Algol** and **Beta Lyrae** are in step with the GCVS elements.

Discrepancies can occur for various reasons: there may be mass transfer between the two stars; the gravitational effect of a third star in the system may affect the period; there may be errors in the elements, either in the epoch or the period

Even if a variable has been eclipsing in line with the predictions for many years, there is no guarantee that it will continue to do so. **RZ Cas**, for example, was eclipsing more or less in line with the predictions until the late 1980s, but during the 1990s it has started to diverge significantly from the predictions.

The accompanying light curve (see overleaf) shows the primary eclipse of **U Cephei** in 1996. If eclipses were occurring on schedule, the light-curve would be centred on phase 0. Clearly it is shifted to the right, and is centred at about phase 0.03, which is over 90 minutes late.



If you compare the number of observations made of eclipsing variables by section members with the numbers of observations of semi-regular variables or eruptive variables, it is clear that eclipsing variables fare rather poorly.

This is a shame for several reasons. As already mentioned, the times of eclipses can be predicted fairly accurately in advance; the same is not true of the outbursts of most eruptive variables. Additionally, by making estimates every 20-30 minutes, you can see most, or the whole of an eclipse within one night. Often the whole eclipse can be observed before midnight. You have to be a lot more patient to see the brightness variations of semi-regular variables !

It is not essential to observe the whole of an eclipse in one night. It is possible to merge observations made of several different eclipses on different nights into a single light curve.

Of course one difficulty is knowing when a particular variable is going to be in eclipse. Discovering eclipses by trial and error can be very time consuming. Various catalogues do give the epoch (i.e. time of a previous eclipse) and the period. These can be used to calculate the predicted times of future eclipses. However, this can be very tedious if all you have is a calculator and at the end of it, you have to convert Julian dates to calendar dates.

Fortunately the advent of PCs has made life easier. Once you have worked out how to perform calculations in spreadsheets, all you have to do is enter the relevant formula (based on the epoch and period of the variable), highlight the cells involved, and then fill down to obtain predictions for as many future dates as you wish. If you require help with this, please ask me.

There are approx 130 eclipsing variables on the section's programme - a full list was included in VSSC 93, and is also included on the section's web pages. Alternatively, I can supply a list if you send me a large SAE.

So if you do not currently observe eclipsing variables, do give them a try. Eclipsing binary predictions are now included on the variable star web pages (see back page for URL).

# SUMMARY OF VARIABLE STAR SECTION OFFICERS MEETING

MELVYN TAYLOR

1999 August 28 at Basingstoke

#### Reports/reporting section records, current and archived

Dave McAdam was keen to have assistance with the current observations reported by paper and those paper ones which still need archiving. A small team at Crayford Manor House Astronomical Society (hereafter CMHAS) would be contacted over this. Later, Terry Miles (CMHAS) agreed to key-in the current paper reports and other members agreed to work on the older records. Four filing cabinets of paperwork were to be transferred from Dave McAdam's home to Crayford. This slight change to the Secretary's workload would be of great assistance to his central role both in the VSS and as the VS editor of *The Astronomer* magazine. A later development which takes into account the fact that new observers require fairly rapid feedback, or contact with the section, was for these observers to first send their paper reports to Melvyn Taylor, who would maintain a degree of feedback. Their reports would then be sent to Terry Miles on a regular timescale for input.

#### VSS changes in personnel

Roger Pickard is retaining his roles as PALC secretary and PEP advisor. Gary Poyner is to stay as Recurrent Objects Programme coordinator and will continue to deal with VS Alerts. Melvyn Taylor is to have title of Binocular Secretary. Tony Markham, who was subsequently asked to take on the role of Eclipsing Binary Secretary, was willing to do so; observers making any EB observations are asked to contact Tony over their work, acquisition of charts and so on. The role of CCD photometry advisor, which Karen Holland presently holds, was one which she wished to relinquish due to pressure from work commitments. Later, Richard Miles was contacted and agreed to take over this duty.

#### VS and other astronomical discoveries

Guy Hurst highlighted several problems in what is a most important area. It had become apparent in relation to the set standards which the VSS and TA use, that worded statements may have to appear more prominently within the astronomical literature about the reporting of discoveries. This also applied to currently made observations and those made available through the Internet and E-mail systems. In a similar note to that in VSSC 97 (1998 Sep, p8), the problem of observer bias in relation to this aspect was a much discussed subject.

#### **International VS magnitude sequences**

Roger Pickard highlighted the proposal over international variable star sequences, which had been discussed at the instigation of Dick Chambers (CMHAS) at the last officers' meeting. How to put this into context and agreement was a matter of communication, especially with AAVSO.

#### VSS circulars

Karen Holland noted that a larger circular content could be done, given adequate material, but she was keen not to have a cost increase. A wider circulation and sale of the Circular to other groups and professionals was also discussed.

#### **Pro-Am Projects**

Bill Worraker was researching a programme of checking dwarf novae for eclipses in relation to professional work as discussed at the recent Warner symposium (VSSC 100 p14) and was happy to coordinate such a programme (see article on p11). This project would need CCD as well as visual observers and would be an on-going and rolling programme. The faint limit of the survey was to be magnitude 15 visual.

Other items within this heading were the observation of symbiotic stars and SNe.

#### Mike Collins' objects and other variables

Mike Collins' stars are better covered, but there are still many hundreds to work on in terms of visual, photographic, CCD and PEP investigations. Some have reasonable light-curves and Hazel McGee is specialising in observing several stars. It was proposed to add a few new charts of these stars in future VSSCs in order to maintain the interest. Roger reported that some stars had been investigated using the Hewitt Camera Archive, but it was only possible to check the brighter ones. John Toone also suggested the archive could be used to provide additional data on some of the brighter semi-regular variables.

#### Charts

About 90 have been scanned as noted by Dave McAdam. A list of charts available in this form will appear in the VSSC and TA and on the relevant Web pages.

#### Variable star of the year 2000

This honour went to **X Cam** (8.1 to 12.6, Period 144d). John Toone will give Gordon Taylor the relevant information for HBAA 2000.

#### VSS meeting/AOB

A meeting in the north was suggested, possibly in Spring 2000. Melvyn Taylor would investigate this possibility.

An explanation of how the VSS *operates* will appear in the beginners' guide being prepared by Gary Poyner and John Toone. It was noted that very few new/younger variable star observers are coming on the scene. It was generally thought that talks given at meetings such as Winchester, the BAA out-of-town meeting, and to local astronomical societies could be useful in promoting the field of study. Possibly the re-introduction of the Binocular Observers' Handbook, a Volume 2, could be developed along with the introductory leaflets started by Tristram Brelstaff and the *beginners* guides.

# **KNOWN VARIABLES IN THE HIPPARCOS DATA**

TONY MARKHAM

As has been seen, the variability of some suspected variables has been confirmed by the Hipparcos results. What about the variables that were already known? Did Hipparcos confirm their variability and periods ? The table on the next page shows a number of variables, sorted according to the amount of variation detected, and compares the periods found by Hipparcos with the GCVS data. n/a indicates that there was no entry for the variable in the Hipparcos Variability Annex. Periods are given in days. Although the Hp photometric measures are not exactly the same as visual magnitudes, their scatter does give a good approximation as to the amount of variation seen in each variable by Hipparcos. For some variables the amount of variation was clearly small, and was comparable with that seen for the less convincing suspected variables.

Variable	HIP	Нр	HIP	GCVS	data
		scatter	period	period	type
			-	_	
IS Gem	32740	0.01	n/a	47	SRc
VW Dra	84496	0.02	n/a	170	SRd
d Ser	90441	0.03	n/a	-	I:
RX Cep	3905	0.03	n/a	55	SRd
BU Tau	17851	0.04	-	-	GCas
SW CrB	76791	0.05	n/a	100	SRb
V377 Cas	1543	0.05	n/a	0.030	DSct
BN Gem	37074	0.06	-	-	GCas
AB Aur	22910	0.06	-	-	Ina
W Boo	71955	0.09	35.33	450	SRb
XX Cam	19340	0.10	26 ?	-	RCB
Beta Per	14576	0.14	-	2.8673043	EA/SD
RW Cep	110504	0.16	-	346	SRd
Rho Cas	117863	0.18	-	320	SRd
Rho Per	14354	0.20	7.45 ?, 26.6 ?	50	SRb
TU CVn	63024	0.25	-	50	SRb
RR UMi	73199	0.26	1.5082 ?	43.3	SRb
TV UMa	57362	0.38	125 ?	42	SRb
BK Vir	61022	0.39	150 ?	150	SRb
AG_Peg	107848	0.47	-	-	Nc
g Her	80704	0.48	-	89.2	SRb
RX Boo	70401	0.51	-	340	SRb
R CrB	77442	0.56	-	-	RCB
SW Vir	64569	0.65	153.6	150	SRb
SX Her	/8994	0.74	206 ?	102.9	SRd
CH Cyg	95413	0.78	-	-	ZAnd/SR
U Del	102440	0.83	-	110	SKD
W Cyg	100042	0.85	132.0	131.1	SKD
Deta Lyr	92420	0.95	12.940	12.915654	
AC Her	90097	1.07	/5.30	/5.01	KVa EA/SD
RZ Cas D Sot	02202	1.10	1.195250	1.193247	EA/SD DVo
	92202	1.17	-	140.5	KVA SDb
V CVn	50225 65006	1.19	101.5	193.3	SR0 SRa
	28041	3 /3	367	368.3	Mira
RW Tau	18792	>3.45	2 76884	2 7688356	FA/SD
R IMa	52546	4 32	299 7	301.62	Mira
Chi Cva	97627	5 19	402.3	408.05	Mira
Chi Cyg	97027	J.17	+02.3	400.05	Ivilla

Note also that the Mira variables will have faded below the detection limit at times. The agreement on periods tends to be good for Mira type and eclipsing variables. For some semi-regular variables there is good agreement between the Hipparcos and GCVS values; for others there is not. Hipparcos was able to detect short period and/or low amplitude variations in these variables more readily than can be done from visual estimates. The possible 26 day period in **XX Cam** is notable.

On the other hand, the 3 year mission duration, and the limited number of measurements per star, made it difficult to detect longer periods or multiple periodicities. The limited number of measurements can also lead to minima being missed. This probably explains the failure to detect the periodicity in **Beta Per** and **R Sct**. Similarly, **R CrB** and **AB Aur** would have had larger ranges of Hp measures if sampled in other years. Hence, although the Hipparcos data do provide some answers, there is still a lot of work for amateurs to do.

# A NEW OBSERVING PROJECT TO DETECT ECLIPSING DWARF NOVAE

BILL WORRAKER

#### Introduction

This is to inform readers of a new Pro-Am project run by the Variable Star Section, to detect eclipses in dwarf novae that were not previously known to exhibit eclipses. Both visual and CCD amateur observations are needed. Keele Observatory, where Dr Tim Naylor is Director, have offered to confirm positive results; their view is that the results are publishable, whether positive or negative.

A simple check shows that out of 400+ known dwarf novae (DNe), no more than a dozen or so are known to undergo eclipses due to the secondary star blocking out light from the accretion disc (and sometimes the primary star) during orbital motion. Eclipses should occur when the angle of inclination of the system (the angle between the orbital axis and the line of sight to the observer) exceeds about 70 degrees. Theoretically about 34% of DNe should show eclipses, implying that eclipsing systems are under-represented by a factor of 10 amongst known DNe!

Recent discussions with professional astronomers strongly support the view that this shortfall is due largely to under-observation, rather than to any selection effect. This in turn, suggests that a systematic survey of DNe aimed at detecting eclipses should reveal a considerable number of hitherto unknown eclipsing systems, INCLUDING A GOOD NUMBER (~60!) OF DEEPLY ECLIPSING SYSTEMS, i.e. where the angle of inclination is above 80 degrees. Eclipsing systems are highly valued by professionals because eclipse light curves can help them to understand the mechanisms underlying the dwarf nova outburst cycle. Thus, for example, the eclipsing systems **U** Gem and **Z** Cha have been particularly important in establishing the present understanding of DNe.

#### **Objectives**

The idea of setting up this Pro-Am observing project is therefore to search known dwarf novae, especially systems which are poorly observed, for orbital light variations which might indicate eclipse behaviour. By-products of this activity might include: (i) setting upper limits on angles of inclination for systems found to be non-eclipsing; (ii) detecting orbital light variations due to effects other than eclipses, e.g. an orbital hump due to a hot spot on the accretion disc; (iii) occasionally, measuring the orbital period, where this was not previously known; orbital period is the single most important parameter in characterising cataclysmic variable stars. Information gained under all of these headings is, in principle, publishable, as well as both positive and negative results for the occurrence of eclipses.

#### Instrumentation and observing techniques

The CCD technology now being used by amateurs is ideal for the necessary time-resolved photometric observations. Although many of the candidate target stars are probably too faint in quiescence, observations during outburst will in most cases show eclipses if they occur in the system at all. Furthermore, IT IS NOT NECESSARY TO USE FILTERS in order to detect eclipses. The most important role for visual observers in this project is to detect outbursts, and report as quickly as possible, as is currently done in the Recurrent Objects Programme. However, in some cases, eclipses may be detectable visually, just as superhumps in SU UMa stars have on occasions been detected visually.

Whatever the observing technique, eclipse detection needs observing runs at least as long as the orbital period of the dwarf nova, which is generally in the range 80 minutes to 2 hours for SU UMa-type stars, and upwards of 3 hours for U Gem and Z Cam stars. For practical reasons the upper limit is 10 hours. The more demanding long-period systems should provide ideal targets for users of automatic telescopes! Prof F. A. Ringwald (Florida Institute of Technology) has suggested that once 3 orbits of a star have been covered, it should be clear whether eclipses are present or not, and the star can be removed from the programme. A rolling programme is therefore envisaged in which the target list is updated regularly.

The sample of DNe studied in this project will be flux-limited, i.e. only stars brighter than magnitude 15 are to be observed. In most cases this will apply to outburst magnitudes, since relatively few (e.g. **TZ Per**) are bright enough to observe in quiescence at a sufficient data rate and with adequate signal-to-noise ratio to obtain reliable results. A useful rule-of-thumb for the necessary data rate might be about 100 data points per orbit. Thus for SU UMa stars probably 1 estimate or CCD frame per minute is needed, while for U Gem and Z Cam stars a rate of 1 every 2 or 3 minutes is probably adequate to detect eclipses.

#### **Reporting Observations**

Visual observations of stars on the Eclipsing Dwarf Novae Programme should be reported monthly to the VSS Computer Secretary Dave McAdam in the usual way. If an outburst of any Programme star is detected, it should be reported immediately to Gary Poyner (especially if it is also on the Recurrent Objects Programme), or to myself, so that CCD observers can be alerted as soon as possible. Any Programme star in outburst should be regarded as a high-priority object if it is fainter than visual magnitude 15 at minimum light. Its priority will not be so high towards the beginning and end of a seasonal period of visibility when long observing runs are not possible.

CCD observations can be reported either to Dave McAdam or myself as soon as possible after reduction of the raw data. It is recommended that the brightness of two other stars in the same field as the variable should be recorded simultaneously, if possible one of them being about the same brightness and one rather brighter than the variable. The basic data required is magnitude or count rate for all 3 stars against time. Observers should report (a) instrument details (telescope and camera); (b) the frame exposure time, (c) the frame interval, (d) whether times refer to the beginning, middle or end of exposures. Also for each star, a reference frame should be kept, or sent to me carrying some form of labelling of the variable and comparison stars to ensure correct identification when the data is analysed and/or published.

#### **Programme stars**

The target list given on pages 13 and 14 consists of dwarf novae which either have a fairly high but somewhat uncertain orbital inclination, or are rather poorly observed but not thought to have outburst intervals longer than about 1 year. In particular, they are not listed as targets under the Recurrent Objects Programme. Note that ANY DWARF NOVAE ON THE RECURRENT OBJECTS PROGRAMME SHOULD ALSO BE REGARDED AS HIGH-PRIORITY TARGETS UNDER THE ECLIPSING DWARF NOVAE PROGRAMME.

In principle any dwarf nova not already known to be eclipsing is a potential target for this programme, including bright, familiar DNe such as **SS Cyg, RU Peg, Z Cam, RX And, SU UMa** and so on. These are low-priority targets for the programme, and can be observed whenever no high-priority target is currently in outburst. Observers should contact me for suggestions whenever there is no current high-priority object available.

Stars which have been adequately observed (i.e. for at least 3 orbital periods as noted earlier) will be listed on the BAAVSS web pages

#### FURTHER INFORMATION

Interested observers should contact me to register their interest and to obtain further information. The BAAVSS web pages **http://www.telf-ast.demon.co.uk**/ will carry updated information on the project and regularly updated lists of programme and ex-programme stars.

Dr. W. J. Worraker 65 Wantage Road Didcot Oxon. OX11 0AE U.K. Tel 01235 812181 (up to 10:30 pm) e-mail: bill.worraker@hyprotech.com

#### ECLIPSING DWARF NOVAE PROGRAMME

Object Name Altern.Name	Coordinates (J2000)	Туре	Min	Max	T1 T2	P_orb(h) P_shu(h).
FO And	01 15 32.1	SU	17.5	13.5	15-23	1.7186
	+37 37 36 1					1.779
KV And	02 17 13.8	SU	22.5	14.6	18-55	1.733*
	+40 41 31 1			14.1	270	1.783
TT Boo	14 57 44.7	SU	19.2	12.7	45	1.85
	+40 43 41 1					1.875
AT Cnc	08 28 37.0	ZC	15.0B	12.7B	14	5.72858
Ton 323	+2520 021		16.2B			
CC Cnc	08 36 19.1	SU	17.4	13.1B	??	2.261
	+21 21 06 1		18.8			1.826
GX Cas	00 49 01.5	SU	18.5	13.3	??	2.14*
	+56 52 44 1					2.23
KU Cas	01 31 02.6	UG	18p	13.3p	??	??
(DS)	+57 54 12.3					
SV CMi	07 31 08.5	ZC	16.3	13.0	16	3.74
	+05 58 47 1					
V503 Cyg	20 27 17.4	SU	17.4	13.4	30	1.8168
	+43 41 23 1		17.6		89	1.9442
V516 Cyg	20 47 09.9	UG	16.8p	13.8p	??	??
(DS)	+41 55 26.0					
V1060 Cyg	21 07 42.3	UG	18p	13.5p	??	??
(DS)	+37 14 08.3					
V1504 Cyg	19 28 57.0	SU	17.4p	13.5p	??	??
(DS)	+43 05 36.0					1.656
ES Dra	15 25 32.0	DN?	15.4			4.238
PG 1524+622	+62 00591					
AQ Eri	05 06 13.1	SU	17.7		78	1.4626
	-04 08 08 1			12.5		1.494
AW Gem	07 22 40.6	SU	18.8	13.8	98	1.84416?*
			12			

	+28 30 16 1		19.4	13.1	410	1.9063?
V844 Her	16 25 01.7	SU	17.5			1.32*
	+39 09 26			12.5		1.34
T Leo (DS)	11 38 27.0	SU	15.7	10		1.41166W
	+03 22 07.0				420W	1.4436W
RZ LMi	09 51 49.1	ER	16.8	15.0	4	1.404*
PG 0948+344	+34 07 24 1			14.2	19	1.4270
SX LMi	10 54 30.5	NL?	16.B			1.50
CBS 31	+30 06 09 1					
AY Lyr	18 44 26.6	SU	18.0	13.2	19-32	1.7688?*
	+37 59 52 1			12.3	205	1.8233?
V344 Lyr	18 44 39.0	SU	>20	14.5	13-19	2.10*
	+43 22 27 1			13.8	240	2.1948
V426 Oph	18 07 51.8	ZC	13.4	11.5	17-55	6.847
	+0551 48 1					
HX Peg	23 40 23.8	ZC[1]	16.6	12.9		4.819
PG 2337+123	+12 37 41 1					
TZ Per	02 13 50.8	ZC	14.7	12.3	10-20	6.252
	+58 22 53 1		15.6	13.3		
FY Per	04 41 56.7	P/NL?	14.5	11.0W		1.556W
(DS)	+50 42 35.7					
KT Per	01 37 08.6	ZC	15.4	10.6	26	3.905
	+50 57 21 1		16.1	12.3		
PY Per	02 50 00.2	ZC	19.8	13.8		3.715
	+37 39 22 1					
TY Psc	01 25 39.3	SU	15.3	12.2	11-35	1.6399
	+32 23 11 1		16.3	11.7	370	1.68
RZ Sge	20 03 18.5	SU	16.9	12.8	62-93	1.6471*
	+17 02 53 1		17.4	12.2	266	1.6901
CI UMa	10 18 13.0	SU	18.8	13.8	34	1.44
	+71 55 44 1				140	1.500
CY UMa	10 56 57.1	SU	17.0	13.5	115	1.399?W*
	+49 41 18 1		17.8	12.3	297	1.423?W
HS Vir	13 43 38.5	ER	16.6	14.6	8	1.85
PG 1341-079	-08 14 04 1					1.9385
VW Vul	20 57 45.0	UG	15.6	13.6	14-23	1.754
	+25 30 27 1					
FY Vul	19 41 40.0	ZC[1]	15.3B	13.4B		??
(DS)	+21 45 59.0					

Symbols

Data taken from Downes and Shara, PASP 105, 127 (1993) DS

W Data (not position data) taken from Warner, 'Cataclysmic Variable Stars', CUP (1995) р

T2

B Johnson B-band magnitude

- T1 Normal outburst interval (days)
- photographic magnitude
- Superoutburst interval (days)

- DN Dwarf Nova,
- Dwarf Nova Z Cam type Dwarf Nova, ER UMa type ZC ER
- Dwarf Nova, U Gem type Dwarf Nova, SU UMa type UG
- SU
  - Р
    - Polar system ystem having recorded standstills [1] s

NL Novalike variable Asterisks after the orbital period indicate that this figure has been estimated from a \* measured superhump period.

14

# VARIABLE STARS DOWN-UNDER (CONTINUED) JOHN TOONE

The next day, in heavy rainfall, I drove southeast into the Great Dividing Range. I got the feeling that I was driving in the wrong direction if I wanted clear skies, but this part of the itinerary was fixed - the SPSP. I arrived at the venue Wiruna (which is ASNSW's dark sky site) in the early afternoon. I attended the welcome meeting, and witnessed the sacrificial burning of a mock schmidt cassegrain telescope, the purpose of which, I was told, was to get the sky Gods to smile on us. It had the opposite effect though, as the next three nights were generally overcast and damp with only occasional glimpses of the sky. I managed a solitary observation on the second night, and a further 5 on the final night, but that was it in terms of variable stars. I did, however, get a glimpse through thin cloud, of the Tarantula Nebula in a 20" reflector, and Mars through a 10" Dobsonian. The thin cloud actually improved the image of Mars (reducing the glare), and I saw several dark markings as well as a prominent north pole cap.



The twin radio telescopes visited at Narrabri

In spite of the weather there was plenty of entertainment, and with 300 astronomy enthusiasts from around the world, there was no end of lively conversation. I met Bob Evans and Gordon Garradd, but most of my time was spent with Fraser Farrell and Peter Williams, two of Australia's leading variable star observers. Fraser was based in South Australia, and had recently produced a booklet entitled *Binocular Variables for Southern Observers* which I promptly purchased. The charts contained within this document covered a lot of stars that I produced charts for in the early to mid eighties, but Fraser's charts were in computer format and contained magnitudes from Tycho. Peter was from Heathcote, near Sydney, and described to me how he discovered comet 1998 P1 whilst attempting to observe **TV Crv**. Peter expressed surprise that David Levy had not found this comet before him, as David is a well known comet and variable star specialist, whose favourite object is **TV Crv**! Both Fraser and Peter helped me out with questions I had on some of the RASNZ charts, particularly those which did not include magnitudes for the lettered comparison stars.

I shared the SPSP long distance award with a bloke from Switzerland, whose name I could not pronounce nor remember. The adjudicator said that it depended on which way you travelled as to whether the UK or Switzerland was further away from Australia, and he did not want to initiate a war (as if the home of the Geneva Convention would ever get in a scrap!). So I shared a bottle of so called *Pickled Possum Port* (17% alcohol) with my new friend from Switzerland - it was very nice too. On the final day of the SPSP there was a series of amateur rocket launches. After the event, I was discussing the legal aspects of this sport with the rocket specialist, when I noticed a mean looking snake approaching him from behind. Judging from the speed at which he shifted following my warning, I considered that a 2 metre *red bellied black* was not something you got too close to.

The SPSP ended in heavy rainfall, and after four virtually washed out nights, I was desperate to observe. The wind was coming from the WSW so I headed in that direction. On the radio



#### The SPSP site at Wiruna

it announced that the current weather was the wettest in up to 40 years for the region, so prospects did not look good. I travelled as far west as practical and stopped off in the old mining town of Cobar. The motel owner apologised for the freezing weather but it felt like springtime in England to me. As darkness fell, I noticed Venus through a gap in the cloud. The rest of sky soon cleared, and this turned out to be one of the best nights yet (22nd March). I found a dark spot four miles north of the town, but because of all the rainfall, I got stuck in mud. I decided to just get on with the astronomy and worry about being stranded later (priorities, of course!). I did a lot of photography of the Milky Way between Canis Major and Scorpius once the crescent moon in Taurus had set. **CN Ori** was at its pre-maximum standstill at mag 13.5. **BV Pup** and **HL CMa** were in outburst again, and **AP Lib** at mag 15.9 was the second faintest observation secured with the C8 (**X Leo** at mag 16.0 from Kulgera in April 1986 is the faintest). I abandoned the Land Cruiser and walked back to my motel room in Cobar and witnessed many meteors en-route.

The following morning I got a truck from the local garage with the intention of towing my vehicle out of the mud. By 11am it was already 25 degrees Celsius and the ground seemed much drier, so I switched into 4WD and got out without a tow. As the good weather was travelling east I followed it, and stopped the next two nights back at Gilgandra. Conditions were clear but the moon was starting to become troublesome in the evening.

I observed a lot of relatively new binocular variable stars in Hydra, Crater, Corvus and Libra, and covered my normal programme of stars, as well as the priority eruptive variables. These two nights turned out to be the first consecutive nights that I have managed to exceed 100 observations. This is not practical back home, because most binocular stars do not warrant observing on consecutive nights, whereas being in Australia (closer to the equator) more binocular stars are accessible.

On the first night (23rd March) **BB Vel**, a UG star, was suspected of being visible but the RASNZ chart was of insufficient detail to confirm it. As with **V442 Cen** I drew a sketch with the intention of passing it on to Frank Bateson for his records, and (hopefully) identification purposes. On the second night (24th March), I examined **SAO251015** with the C8 and found that it had a companion around mag 12 closely SP. **HP Nor**, a UG star was caught in outburst at mag 12.9, and **RX Tel** at mag 7.0 was noted as being brighter than its official range. By now, I was getting much more proficient at observing the southern telescopic variables. **VW Hyi**, **W Men** and **RR Pic** had become so familiar that I did not need to refer to the RASNZ charts any more, and my average time for a telescopic observation had improved to less than five minutes. My negative observation of **VY Aqr** was limited to star T at mag 13.8, because of a magnificent zodiacal light display. The pale green cone of light projected up from the ENE horizon through Aquarius and Capricornus and intersected with the Milky Way in Sagittarius. To a British astronomer, starved of such views it was a truly awe-inspiring sight.

My time in Australia was now drawing to a close, and I had to move back towards Sydney. My final night (25th March) was spent back at Mount Victoria, which was the same venue as the first night. It was clear, but the first quarter moon in Gemini spoilt the evening conditions. I observed **Mira** at mag 7.5, which is the latest date that I have seen this star before its solar conjunction. **V818 Sco** had brightened to mag 11.9, and even **Eta Car** had shown a hint of brightening to mag 5.5. **VW Hyi** was still at minimum at mag 13.9, so I was not fortunate to see an outburst of this famous UG star on this trip; maybe I will have better luck next time. My last observation was of Pluto in Ophiuchus at mag 14.4. It was fitting perhaps, that it should be the most distant major body in the solar system, as I was about to start my long journey home.

The following day I drove into Sydney past the newly erected Olympic Stadium, and into a massive traffic jam. I dumped the clothes that I had purchased two weeks beforehand, together with my trusty Land Cruiser, and got a taxi to the airport. Shortly after take-off, I flew over Sydney Harbour and the Blue Mountains. Surprisingly the flight also passed very close to Siding Spring with the white AAT dome very prominent against the green background. I wondered if flights along this route are prohibited after dark. I then sat back and reflected upon the experiences of my time in Australia. My mobility plan had worked very well and I had covered 3,000 miles in 16 days. The only nights that were cloudy were (ironically) when I was stationary in Coonabarabran (2 nights), and at the SPSP at Wiruna (3 nights). I had spent 57 hours and 45 minutes actually observing, clocking up 730 observations of variable stars and taking many photographs. I felt very tired, but satisfied. The flight home was uneventful apart from lightning over the Caspian Sea. Because I was travelling in a WNW direction, there was one long night and it was good in a way to be able to see Perseus, Andromeda and Cassiopeia once again. I was already starting to miss Crux and the southern



The gibbous moon over Sydney visible during the flight home

Milky Way though, and I hope it is not too long before I get to see the magnificent southern skies again.

Listed below is a summary of activity seen in southern hemisphere variable stars between the 10th and 25th March 1999. The declination cut-off for inclusion is -20 degrees for binocular stars and -10 degrees for telescopic objects:

	<u>N</u>	<u>1ra</u>	
R Car	Steady at 5.0 (3 observations)	R Dor	Possible rise from 6.2 to 6.0
S Car	Rise from 6.3 to 5.9 (3)	(3)	
R Cen	Steady at 7.5 (3)	<b>R</b> Hya	Steady at 6.4 (3)
RV Cen	Fade from 8.4 to 8.7 (2)	V Hya	Seen at 8.1 (1)
R Crv	Steady at 13.6 (2)	S Sco	Seen at 13.4 (1)
	•	RR Sco	Rise from 7.3 to $7.0(2)$

. ..

<u>Se</u>	<u>mi-Regular / Irregular</u>		V341 Car	Possible fade from 6.7 to 6.9
U Ant	Rise from 6.2 to 6.0 (3)			(2)
Theta Aps	Possible rise from 6.3 to 6.1 (2)		S Cen	Slow fade from 7.9 to 8.1 (3)
T Cae	Rise from 8.0 to 7.7 (2)		T Cen	Slight fade from 8.5 to 8.7 (3)
VY CMa	Steady at 8.5 (3)		Y Cen	Steady at 8.1 (2)
GH CMa	Possible fade from 7.2 to 7.4 (2)		TV Cen	Seen at 8.7 (1)
LQ CMa	Fade from 6.7 to 7.0 (2)		UY Cen	Steady at 7.9 (2)
MZ CMa	Steady at 6.5 (2)		V412 Cen	Seen at 7.2 (1)
NN CMa	Steady at 7.3 (2)		UW Crv	Seen at 8.7 (1)
RT Cap	Seen at 8.0 (1)		R Crt	Seen at 9.1 (1)
BO Car	Steady at 7.5 (2)	18		

AO Cru	Steady at 8.3 (2)
WZ Dor	Steady at 5.6 (3)
VW Eri	Seen at 9.1 (1)
X For	Seen at 8.8 (1)
RZ For	Seen at 8.3 (1)
ST For	Seen at 9.1 (1)
Pi 1 Gru	Seen at 6.6 (1)
V Hor	Possible rise from 7.6 to 7.4 (2)
TW Hor	Possible fade from 5.9 to 6.1 (2)
W Hya	Rapid rise from $8.9$ to $8.0(2)$
Y Hya	Seen at 7.5 (1)
S Lep	Steady at 7.0 (2)
GO Lup	Possible fade from $7.4$ to $7.2$ (2)

BO Mus	Fade from 6.3 to 6.8
Lambda Pav	Seen at 4.2 (1)
S Pav	Seen at 7.7 (1)
X Pav	Seen at 8.9 (1)
NU Pav	Seen at 5.3 (1)
R Pic	Fade from 9.8 to 10.0 (2)
Y Pic	Seen at 8.6 (1)
L2 Pup	Steady at 6.7 (3)
Y Scl	Seen at 8.7 (1)
AH Sco	Seen at 8.3 (1)
RX Tel	Seen at 7.0 (1)
X TrA	Steady at 6.9 (2)
GK Vel	Possible fade from 6.4 to 6.6
	(2)

## RV Tau / Z And

RT Car	Rapid fade from $7.6$ to $8.8$ (2)
W Car	Fade from 8.0 to 8.4 (3)

# Dwarf Novae

Dwart nova	e
Z Cha	Seen at 15.2 on occasions
(11)	
HL CMa	Fade from 11.8 to 14.0, then
	rise to 11.3 (11)
OY Car	Not seen <15.0 (9)
BV Cen	Minor fluctuations between
	12.9 and 13.3 (8)
V442 Cen	Fade from 13.1 to <14.5 (8)
V485 Cen	Seen fading at 14.5 and then
	<14.8 (7)
VW Hyi	Minor fluctuations between
-	13.7 and 14.0 (12)
BR Lup	Not seen <14.7 (7)
HP Nor	Rise from <14.8 to 12.7 (3)
UY Pup	Fade from 13.8 to <14.1 (9)
BV Pup	Seen at 14.7, then <14.4,
•	followed by rise to 13.6 (8)
BB Vel	Possibly seen at 13.9 but
	mainly negative (8)

		<u>Quasars</u>	
		AP Lib	Fade from 15.5 to 15.9, rise to 15.7 (7)
<u>Novae</u> RR Pic	Minor fluctuations between 12.1 and 12.3 (11)	3C-279	Minor fluctuations betw 15.1 and 15.3 (9)
T Pyx	Minor fluctuations between		

# RCB

S Aps	Slight rise from 10.7 to 10.5
(10)	
UW Cen	Not seen <14.5 (9)
DY Cen	Fade from 13.0 to 13.6, then
rise	to 12.9 (10)
V854 Cen	Slight rise from $7.3$ to $7.1$ (9)
V CrA	Steady at 10.2 (3)
W Men	Rising from 14.2, then steady
	at 13.9 (11)
RT Nor	Slight fade from $9.7$ to $10.0(2)$
RY Sgr	Fade from 6.5 to 7.0, then rise
	to 6.4 (9)

## 15.1 and 15.3 (10)

Unique / X Ray / Suspects

Unique / A	<u>Nay / Suspects</u>
Eta Ĉar	Rise from 5.8 to 5.5 (12)
AG Car	Steady at 7.4 (3)

AG CarSteady at 7.4 (3)SAO251015Steady at 9.6 (7)S DorFluctuations between 8.9 and 9.2 (3)

V818 Sco Fade from 12.4 to 12.7, then rise to 11.8 (8)

Valuelle	
AP Lib	Fade from 15.5 to 15.9, then
	rise to 15.7 (7)
3C-279	Minor fluctuations between
	15.1 and 15.3 (9)

# PEP FROM THE BACKYARD OBSERVATORY AT RYDE -THE FIRST 5 YEARS (PART 2)

KEVIN WEST

This series of articles sets out to show PEP light curves with some provisional analysis, and to compare these with any available visual light curves. The stars are all part of a programme of the long term monitoring of high declination, bright variables, conducted by the author. The data is readily available from the BAA database. It is intended that a more detailed compilation of the articles will be submitted for publication in the Journal. The programme comprises:

Psi <sup>1</sup> Aur, UU Aur, BR CVn, TU CVn, Y CVn, V465 Cas, Mu Cep, UX Dra, g Her, OP Her, Delta 2 Lyr, R Lyr, XY Lyr, X Per, ST UMa, VY UMa, RR UMi.

#### UX Dra

mag

Very early observations were published in IBVS and the analysis showed a period of 168 days. With the benefit of a longer series, recent work by 2 independent analysts have given 178 and 179 days. A nicely pulsating longer period variable well suited to our limited UK observing opportunities.



Kevin West's PEP light curve





McAdam 608 observations by;-

J M F Andujar, P Craven, B S Crawford, S Elliott, S J Evans, R B I Fraser, C Henshaw, T Markham, I A Middlemist, B R M Munden, G Pointer, G Ramsey, A Smeaton, M D Taylor.

#### ST UMa

A relatively poorly observed variable that was picked up at the suggestion of Melvyn Taylor, I believe after questions were raised about its variability. A healthy total range to date of almost 1 magnitude. I have only one analysis of this thin data which gives 111 days. The only listed information I have is 81 days(?) from a 1970 Binocular Sky Society chart. More data needed.







**Observer list for ST UMa for 1993 to 1999, provided from the BAA database by Dave McAdam**. 784 observations by;-

S W Albrighton, A R Baransky, P Bibbings, N M Bone, J S Day, S J Evans, R B I Fraser, B H Granslo, C Henshaw, T Markham, I A Middlemist, Volodymir G Mormyl, I P Nartowicz, M J Nicholls, B O'Halloran, G Pointer, G Ramsey, D M Swain, M D Taylor, J Toone, Erol Yusuf.

## Y CVn

Another longer period variable for which the weather windows and seasonal gaps don't have too detrimental an effect on the appearance of the light curve. As I understand it, Fourier analysis is almost unaffected by irregular gaps in the data. However, there is some disageement on the periods found within this particular data. One analyst found a period of 690 days and another found 240 and 310 days. Hopefully more data will eventually resolve this.





Visual observers' light curve provided by Dave McAdam from the BAA database



**Observer list for Y CVn for 1991 to 1999, provided from the BAA database by Dave McAdam** 1184 observations by;-

S W Albrighton, A R Baransky, R Billington, N M Bone, R C Dryden, S J Evans, R B I Fraser, D Gill, B H Granslo, C Henshaw, Steve Johnston, R Livingstone, T Markham, R A Marriott, I A Middlemist, Volodymir G Mormyl, I P Nartowicz, B O'Halloran, G Pointer, G Ramsey, D M Swain, M D Taylor, J Toone, Erol Yusuf.

## Delta 2 Lyr

The first quarter of the data analysed for an IBVS gave a period around 79 days. The longer baseline of the complete dataset (to date) has provided a much cleaner power spectrum with possible periods evident at 1225, 88.2 and 65.6 days. Independent analysis gives some confimation with 68 and 89 day periods seen.





Visual observers' light curve for Delta 2 Lyr provided by Dave McAdam from the BAA database



**Observer list for Delta2 Lyr for 1994 to 1999, provided from the BAA database by Dave McAdam.** 117 observations by;-T Markham, I P Nartowicz.

For comments or further information please contact: Kevin West at 5, Edward St., Ryde, Isle of Wight. England. PO33 2SH Tel: 01983 614591. E mail: kwest@ryde.prestel.co.uk



## VARIABLE STAR SECTION WEB PAGE UPDATE

DAVE MCADAM

http://www.telf-ast.demon.co.uk

#### BAAVSS www update 10 - 15 Aug 1999

The following items have been added since 14/07/99

#### Nova 1999 Aql: CCD image obtained at Condor Brow : D G Buczynski

#### **New Current lightcurves**

RX And, 3C66A And, FO Aql, V1493 Aql, TT Boo, NGC4151 CVn, Z Cam, HT Cas V635 Cas, V386 Cep, V451 Cep, W Com, V516 Cyg, V630 Cyg, V1504 Cyg, AB Dra AY Lyr, V426 Oph, GK Per, KT Per, V Sge, RZ Sge, CI UMa, Z UMi, RZ Vul VW Vul, FY Vul

#### BAAVSS www update 11 - 01 Oct 1999

The following items have been added since 15/08/99

From the New Director : R D Pickard Animated CV Demonstration program : D McAdam VSS Officer Meeting, 28 Aug 1999 : D McAdam

#### **New Current lightcurves**

RX And, AR And, V1413 Aql, V1493 Aql, CG Cam, V635 Cas, NSV203 Cas TASV J2352+665 Cas, V854 Cen, R CrB, SS Cyg, CH Cyg, AM Her, V493 Lyr, RZ Nor, RU Peg, TZ Per, Z UMi Delays due to a failed hard drive

#### **BAAVSS www update 12 - 17 Oct 1999**

The following items have been added since 01/10/99

#### **The period of beta Lyrae** : Tony Markham **The period of RZ Cas** : Tony Markham

#### **New Current lightcurves**

Z And, RX And, AR And, FN And, 3C66A And, TAV J0218+507 And, FO Aql, V1493 Aql, Markarian 509 Aqr, TT Ari, SS Aur, NSV2537 Aur, TAV J0550+543 Aur, BR CVn, NGC4151 CVn, AM Cas, KU Cas, V770 Cas, NSV165 Cas, TASV2204+59 Cep, TAV2034+61 Cep, V CrA, R CrB, DD Cyg, EM Cyg, V503 Cyg, V751 Cyg, V930 Cyg, V1028 Cyg, NSV13262 Cyg, TAV1933+53 Cyg, AG Dra, DO Dra, EX Dra, AC Her, AH Her, AM Her, BL Lac, V426 Oph, NSV8001 Oph, NGC7469 Peg, TZ Per, KT Per, NSV623 Per, TY Psc, LX Ser, V Sge, FG Sge, VZ Sgr, GU Sgr, Z UMa, Z UMi, V Vul, RZ Vul, WW Vul, FY Vul

#### **Observing charts**

SS Aur (003.02) - AR, EO, LY Aur (841224), V448, V453 Cyg (860706) - RS CVn (720206)

Plus long term lightcurves are updated, latest lists, observing totals, and other details are added regularly Email stating subscribe/unsubscribe BAAVSS update notices to: dave@telf-ast.demon.co.uk 25

# **PRO-AM EXCHANGES REPORT 17**

GUY HURST

Covering period 1996 July 1 - December 31

Date	Subject Remarks	Professional
960714	GRB 960409	Tom Harrison,
	GMH identified this gamma ray burster occurred	New Mexico
	in field of Comet C/1996 B2 Hyakutake and	
	therefore searched for optical counterpart using	
	images by Arto Oksanen, Pierre Girard and Mauro	
	Zanotta. Variable object found to be V452 Per	
	(12.4-12.8p) but no other obvious object giving	
060715	variation.	Tom Homison
900/15	GKB 900409 De previous entry Tom finds 'transient' et:	Tom Harrison, New Merrico
	Reprevious entry, roll linds transferit at. $P \wedge 2b57m57c \text{ DEC} + 41.44^{2}13.8^{\prime\prime}(2000) \mod 0$ We	New Mexico
	do not find any corresponding object on our photos	
960718	WX Ceti outburst	Alan Gilmore
200710	Alan relays that Albert Jones recorded an outburst	New Zealand
	on July 17.646UT at 12.0. We confirm via Patrick	
	Schmeer (18.078, 11.6). Logged as Q1996/052.	
960719	CCD Enquiry	Steve Lopez,
	Arizon Republic newspaper in Phoenix interviewed	Arizona
	Thomas Bopp who suggested they contact us to	
	establish in which areas amateurs were now using	
	CCDs effectively. We replied detailing many but	
0/0010	especially variables!	Is a Dattanaan
900819	WA Cell De entre 060718 Detterson reports monitoring of	Joe Patterson,
	the outburst shows common superhump of 85 5mins	Columbia Univ.
960831	TOAD Homenage	Steve Howell
200001	New International Toad Watch (ITW) introduced to	USA
	exchange alerts of these eruptives using WWW pages.	CON
960908	V635 Cas	Brian Marsden,
	Observations by Gary Poyner of an outburst	CBAT
	submitted to CBAT and published on IAUC 6468:	
	Aug 8.008, 15.0; 11.956, 15.1; 17.027, 14.7; 18.991,	
0.0000	14.3; 21.979, 14.3; 25.897, 14.6	<b>T</b> 1 <b>C</b> 1 1 <b>C</b>
960909	V337 Cygni	Brian Skiff,
	Enquiry from Tonny Vanmunster re lack of position	Lowell
	for this eruptive. Brian indicates that from Baade's	
	R = 1923, its position should be. R = 1959m53 3s DEC $\pm 39.13^{\circ}55^{\circ}(2000)$	
960909	<b>X Persei</b>	Paul Roche
200202	Paul awarded time on ORFEUS and seeks our	i aui Rociie,
	assistance with simultaneous optical observations	Sussex Univ
	to complement his studies of the spectrum.	
	-	

960912	V705 Cas	Nye Evans,
	Nye enquires about our detection of a dip before	Keele
	the main deep fade. My report in TA Vol 30 No 359	
	p242 [1994] covers and copy submitted to Nye.	
960912	V337 Cygni	Jan Manek,
	Jan reports outbursts on his PICA project when	Stefanik, Obs
	examining Sonneberg plates during 1994	
	(see also 960909)	Czech
960912	V337 Cygni	Bruce Sumner,
	Bruce examines POSS and finds a close double	USA
	of mags 15 and 17 separation 4.5 arcsec PA140deg.	
960921	BD+33 2642	Janet Wood, Keele
	Janet reports she detected an eclipse on 951102	
	which was not a known variable. We report back	
	that the GSC has it as 1575.481 at mag 10.48 although	
	this catalogue is not known for reliable magnitudes.	
	BD has mag 9.5.	~
960923	TAV J2106+194	Chris Lloyd,
	Chris requests data for preparation of a paper. We	Rutherford
	send E1090 and E1131 of 'The Astronomer'	
	containing preliminary discovery and follow-up	
0.0000	details.	N E E Z
960923	V/05 Cas, DQ Her Confirme TA reference $O(0012)$ will be added to	Nye Evans, Keele
	Confirms TA refs (see 960912) will be added to	
	commont that a similar pro dealing din might be	
	avident in DO Herculis (Neve, 1024)?	
061007	Possible Compt	Dan Groon CRAT
901007	CBAT seek our assistance with investigation of a	Dali Oleeli, CDAI
	possible comet noted by Liebl Pet in Luxembourg in	
	UMa We reply that this is a known comet Comet	
	C/1996 O1 (Tabur) found on Aug 19 and CBAT	
	concur	
961009	SS Cygni	Peter Wheatley.
	Peter monitoring with three X-ray satellites and	Utrecht Univ
	needs to know if an outburst occurs. Biorn Granslo.	
	Norway confirms an outburst on Oct 9.776UT, at 10.3.	
	Relayed by telephone and e-mail to Peter in Utrecht.	
961014	CI Čygni	Brian Skiff, Lowell
	Provides a detailed study of the sequence for this	
	eruptive which is on the BAAVSS main programme.	
961014	AF and AW Cygni	Brian Skiff, Lowell
	New sequence supplied to us for these red variables.	
961016	3C 66A	Tapio Pursimo,
	Data by Gary Poyner submitted to Tapio showing	Finland
	object at mag 14.4-14.5 on Oct 3,5,13.	
961016	DW Cygni	Brian Skiff, Lowell
	New sequence supplied to us.	
961017	IP Pegasi	Emilios Harlaftis,
	September outburst details requested and	St Andrews
	supplied.	

961018	Supernovae	Robert,McNaught
	Queries why three discoveries have not brought	AAT
	spectral confirmation from other observers. We	
	respond that whilst we lack ability to do this	
	at present, we are moving into CCD imaging to	
0(1022	extend the faint end of these light curves.	M Turette ECO
961023	SIN IN INGU 073 Made Armateuro formal a nagaible SIN of mag 15	M. Iuratto, ESO
	in NCC (72 on Opt 22 E mailed annious mag 15	CD AT
	in NGC 6/3 on Oct 23. E-mailed various pros for	CBAI
	M Turgetta an Opt 24 10UT Object designated	Jasper Wall, KGO
	SN 1006be and announced on IAUC 6407 a UK	
	SIN 199000 and announced on IAUC 0497, a UK	
	Wall Director BCO	
061103	Wall, Different, ROO.	Brian Skiff I owall
<b>J</b> 01103	New sequence supplied to us by Brian	Dilan Skiii, Lowen
961103	V723 Cas	Brian Skiff Lowell
<b>JUIIU</b> J	Extends sequence for this 1995 nova to mag 13.2	Dilan Skiii, Lowen
961122	X Persei	Paul Roche
<i>,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Re entry 960909. Paul advises Shuttle now launched	Sussex Univ.
	and dates for X Persei monitoring awaited.	
961105	BD+24719 = V1061 Tau	Ivan Andronov.
	Examination of Odessa plates JD 2439418-49014	Odessa
	show variation 7.2-8.3 and possible RR Lyr type.	
	T.Kato, Japan advises this is V1061 Tau.	
961105	DD Cygni	Brian Skiff, Lowell
	New sequence supplied to us.	
961106	Landolt standards	Brian Skiff, Lowell
	Makes available new positional measures for	
	1,100 standard stars in series of papers by	
	Arlo Landolt.	
961108	3C66A and OJ 287	Tapio Pursimo,
	Observations by Gary Poyner on Oct 25 and 30	Finland
	show 3C66A at 14.4 and on Nov 8 has OJ287	
	at 14.5.	
961128	IP Pegasi	Tim Naylor, Keele
	Outburst detected by Gary Poyner mag 12 on	
	Nov 27.866UT. Bill Worraker confirms and details	
0(1120	relayed to 1 im Naylor.	
901130	Markarian 421 Driehtening Oct 18 (12 0 Decrear) to New 10 (12 4	Gino Tosti, Italy
	Trans) sublished on E114( and relevand to Cinc	
061212	V705 Cos	Nuo Euona Vaala
901212	V 105 Cas Data 1004 Ian 27 to Eab 17 supplied by us to allow	Nye Evans, Keele
	Nue to analyze the pro-dealing din in more detail	
061212	SN 1037C	Bardley Schoofer
701212	Supplies conv of his SN 1037C paper and seeks	Vale
	our views on the effects of day/night vision on	Taic
	estimates	
	estimates.	

Half year ending	Number of exchanges	My Report Nos
1988 Dec 31	42	1
1989 Jun 30	51	2,3
1989 Dec 31	45	3
1990 Jun 30	69	4
1990 Dec 31	23	5
1991 Jun 30	40	6
1991 Dec 31	43	7
1992 Jun 30	52	8
1992 Dec 31	42	9
1993 Jun 30	63	10
1993 Dec 31	59	11
1994 Jun 30	58	12
1994 Dec 31	52	13
1995 Jun 30	55	14
1995 Dec 31	42	15
1996 Jun 30	41	16
1996 Dec 31	35	17
To Date	812	

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# **OBSERVER LISTS FOR COVER LIGHT CURVES**

DAVE MCADAM

#### RU Peg observers in 1999;-

R J Bouma, R C Dryden, M J Gainsford, B H Granslo, A F Jones, M Komorous, H W McGee, E Muyllaert, M D Overbeek, G Poyner, P Schmeer, J Stubbings, J Toone, W J Worraker.

**CG Cam 1998 to 1999. 90 observations by;**-G Poyner.

SW Vir 1993 to 1999. 218 observations by;-

S W Albrighton, T Markham, M J Nicholls, B O'Halloran, G Pointer, D Stott, M D Taylor, J Thorpe, J Toone.

OP Her 1994 to 1999. 753 observations by;-

S W Albrighton, R Billington, N M Bone, P Craven, J S Day, S J Evans, R B I Fraser, D Gavine, M Gill, C Henshaw, Steve Johnston, D K Lloyd, T Markham, I A Middlemist, B R M Munden, I P Nartowicz, G Pointer, M D Taylor, J Toone.



The deadline for contributions to the 103rd issue of VSSC will be February 7th, 2000. All articles should be sent to the editor (details are given on the back of this issue)

Whilst every effort is made to ensure that information in this circular is correct, the Editor and Officers of the BAA cannot be held responsible for errors that may occur.

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#### TELEPHONE ALERT NUMBERS Nova and Supernova discoveries

First telephone the Nova/Supernova Secretary. If only answering machine response, leave a message and then try the following: Denis Buczynski 01524 68530, Glyn Marsh 01772 690502, or Martin Mobberley 01245 475297 (weekdays) 01284 828431 (weekends).

#### Variable Star Alerts

Telephone Gary Poyner (see above for number)

# BAAVSS web pages:http://www.telf-ast.demon.co.uk/

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