British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

No 96, June 1998

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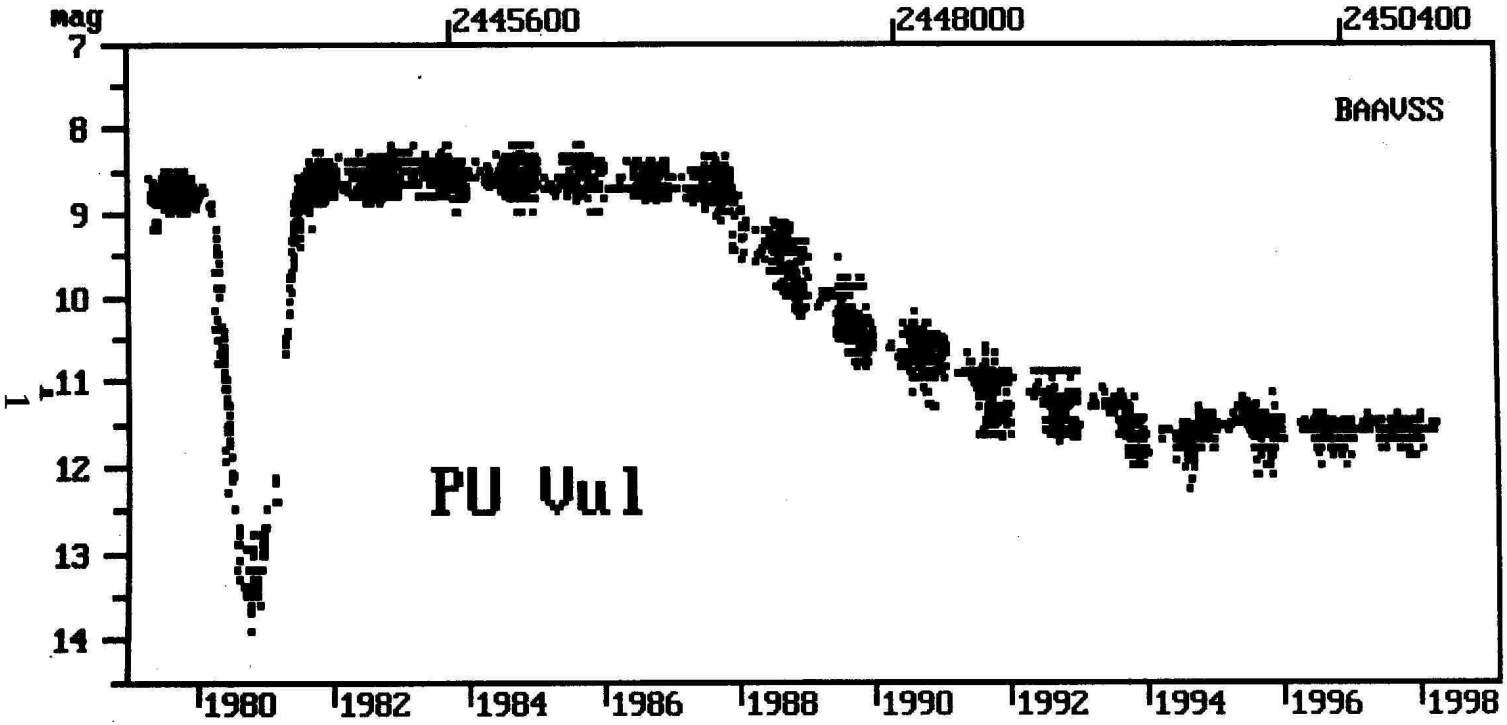
Office: Burlington House, Piccadilly, London, W1V 9AG

LIGHT CURVES

DAVE MCADAM



PU Vul 1979 to 1998. 4341 observations by;- S W Albrighton, C M Allen, R J Bouma, L K Brundle, A T A Bueno, R H Chambers, G A V Coady, J W Cole, D S Conner, H Feijth, M J Gainsford, M Gill, R J Godden, B H Granslo, J Grills, A J Hollis, J G Hosty, G M Hurst, A Hutchings, J E Isles, M L Joslin, S J Kay, N S Kiernan, S Koushiappas, K Lewis, T Markham, J Meacham, P Mettam, I A Middlemist, R W Middleton, H Mikuz, M J Nicholls, R A H Paterson, M Peel, R D Pickard, A Poole, G Poyner, A R Pratt, G W Salmon, J D Shanklin, D Stott, R J Stuart, M Swan, T Tanti, M D Taylor, P J Wheeler.

NOTE FROM ASSISTANT DIRECTOR

MELVYN TAYLOR

The VSS secretarial role is almost by definition multi-onerous, and is as important, as personal to the individual, and can take up much time. But like any voluntary post its success depends on the level of involvement and commitment, so when Gary offered the possibility of not retiring, but taking me on as an assistant, I realised the feet could not be "put up"!

I expect observers who require blank report sheets to still contact myself for these; please enclose a stamped and addressed envelope of an appropriate size. Requests for eclipsing binary charts should now come to this address, as should requests for the section's various leaflets as originated by Tristram, who despite a rest from his EB secretary "job" will still help the section in this programme. Please also refer any requests to join the section mainly to Gary, although I may assist him. One idea I had of producing observer feed-back, would be to submit short summaries and light-curves of vs activity in stars to Karen for the Circular. Those stars roughly in the "binocular" range (magnitude 5-9) are of prime interest to this observer. There are several objects, for example, like AG Dra, SS Cyg and some cataclysmic variables which may be estimated with relatively small apertures. Some observers use 80mm binoculars, or monocular, and very handy, portable reflectors of about 100mm.

General correspondence on "problem" stars, or queries on comparisons may be sent here, and also reports of stars on the eclipsing binary programme and requests for charts of the latter. John Toone is up-grading some binocular charts, and comparisons when necessary, and we are hoping to work on some of the older, and existing charts.

If there are any comments regarding the binocular and eclipsing lists of stars, or suggestions/ criticisms I would be pleased to hear from readers and observers.

Please let Dave have the paper reports to arrive not later than end of August 1998, and for the end of this year, February 1999 at the latest. Late submission of observations may cause some problems when feedback and pro/am liaison are the priorities.

ECLIPSING BINARY SECRETARY

GARY POYNER

After many years of looking after the Eclipsing Binary programme, Tristram has decided to call it a day. However, I am sure he will continue to make a major contribution to the section, albeit from behind the scenes. All Eclipsing Binary observations should now be reported to Melvyn Taylor, who has agreed to take on Tristram's duties. This includes requests for charts. Our sincere thanks go out to Tristram for his dedication and hard work within the Eclipsing Binary programme over the past few years.

SECTION MEETING

GARY POYNER

A section meeting was hopefully going to take place sometime in the Autumn. However because of other committments, it now looks likely that Spring next year will be the earliest time *I*, personally, can arrange it.

***But*, if any person or society would like to organise a meeting this year, they have my full support.** One date to avoid is September 26th, which is the date of the TA AGM in Birmingham.

UK SUPERNOVA PATROL

GARY POYNER

Even more success! Since the last VSS Circular was issued, there have been no less than four supernova CCD discoveries by UK observers. Ron Arbour, after many years of patrolling, discovered SN 1998an in UGC 3683 on April 6th (see page 5 for Ron's account of his discovery). This was quickly followed by two further discoveries from Mark Armstrong (following on from his second supernova success - 1998V - on March 10, with a discovery in NGC 6627) SN 1998aq in NGC 3982 on April 13 (see page 6 for more details), and SN 1998bp in NGC 6495 on April 29. Mark has discovered four supernovae in less than two years patrolling, and the total number of discoveries for the patrol is now nine. Once again our congratulations go out to Mark, Ron and the UK patrol for their superb work.

PSST!... WANT A PICTURE OF YOUR 'SCOPE ON THE WEB???

DAVE MCADAM

Amongst the articles on the BAAVSS web pages are one by Roger Pickard describing the Jack Ells PEP telescope, and another by Gary Poyner called 'My Observatory'. This kind of subject provides a bit of contrast to light-curves, lists, and analytical articles; in particular, casual surfers may find it informative to see that amateurs often use relatively modest equipment to secure useful variable star estimates. Can you loan a good photo of your telescope/ observatory and write two or three paragraphs about using it?

If so contact Dave McAdam, BAAVSS Computer Secretary
E-mail:dave@telf-ast.demon.co.uk
Or visit the web page at **http://www.telf-ast.demon.co.uk/**

OBSERVER TOTALS 1997

GARY POYNER

This period saw a record total of 52,790 observations reported to both Melvyn Taylor and Dave McAdam, either in electronic form or through paper reports. This total includes 1,320 observations reported by Tony Markham on behalf of the SPAVSS, and 1,183 observations reported by Frank Bateson of the RASNZ. A further 6,119 observations, which were reported to the TA variable star column, and incorporated into the VSS database, are flagged as provisional observations because of the absence of any estimate or comparison star reference. Notes on stars under observation during 1997, including priority lists will appear in the next Circular. The Director would like to thank all observers who have contributed observations to the VSS database during the year. Please remember to report your first half 1998 observations to the secretary Dave McAdam by the end of July.

70 observers (9 TA observers)

Albrecht, W	235 #	Liu, A	31 #
Albrighton, S	1,738	Livesy, R.J	361 **
Andujar, J	302	Mackey, J, CCD	35 *
Andersson, K.G	195 *	Markham, T	2,899
Baransky, A.R	858 *	Meacham, J	496
Barrett, M	133 **	Middlemist, I.A	2,706
Bone, N.M	631	Middleton, R.W	117
Bouma, R.J	759 *	Monard, L.A.G	662 *
Brundle, L	1,438	Munden, B.R.M	600
Clarke, M	431 **	Nelson, P	18 #
Coates, J	151 **	Newman. C	182
Cragg, T	26 #	Nicholls, M	394
Day, J.S	1,413	Overbeek, M,D	211 #
Dryden, B	1,130	Patterson, R	1572
Fleet, R	11	Pearce, A	9 #
Fraser, R.B.I	218	Pointer, G	100 **
Gainsford, M.J	2,463	Poyner, G	15,489
Gavine, D	47	Salmon, G.W	68 (part CCD)
Gill, D	505	Shanklin, J.D	169
Gill, M	9	Stephanopoulos, G	3 #
Godwin, S	220 **	Storey, D	360
Granslo, B.H	2,530 *	Stott, D	1,501
Harries-Harris, E	7 #	Stubbings, J	476 #
Hanson, G	28	Taylor, M.D	2,086
Henshaw, C	125 +	Taylor, N	72 #
Herdman, G	20 #	Thorpe, J	122
Hers, J	20 #	Tilbrook, J	3 #
Horsley, E.H	191 **	Toone, J	2,072
Hurst, G.M	800I	Tuboly, V	20 +
nman, S	56 **	Westlund, M	302 *
Jenkins, P	13 **	Williams, P	44 #
Jenner, S	48 **	Worraker, W.J	2,298
Johnston, S	200		
Jones, A.F	8 #	+ = Preliminary observations only (no estimates reported)	
Kelly, R.E	161		
Komorous, M	131 *	* = Preliminary observations reported to TA	
Lehky, M	130 *	** = SPAVSS	
Lloyd, D.K	2	# = RASNZ	

MY DISCOVERY OF SN1998AN

RON ARBOUR

I found the suspect on April 6.871 U.T. 30 arcsecs east and 3 arcsecs south of UGC 3683 on a 30 second exposure image using a Starlight Xpress CCD camera and 30cm f/4.5 LX200 which I have automated to conduct a supernova search.

Conditions were far from ideal as there was increasing cloud and fog. This, combined with the Moon at three days past first quarter, conspired to make the sky very bright for my f/4.5 system. I had imaged this galaxy 8 times since 3rd February 1998, but to make sure there was nothing in the suspect's position, I downloaded an image of UGC 3683 from the Digitised Sky Survey. To rule out the possibility of it being a known minor planet I checked Megastar and Micheal Richmond's 'Minor Planet Checker' Website. I managed to secure a total of 12 images over the next 62 minutes before UGC 3683 was totally obscured by thick fog. During this period, it was obvious that any motion would be small. With the impending threat of cloud cover I rang Tom Boles to ask for comfirmatory images and he was to confirm both the object and extend the period of observation over which there was no apparent motion. I was able to do astrometry on most of the exposures using Astrometrica to obtain a precise position for the suspect and the galaxy itself. The offsets I was able to determine by using my image-processing software.

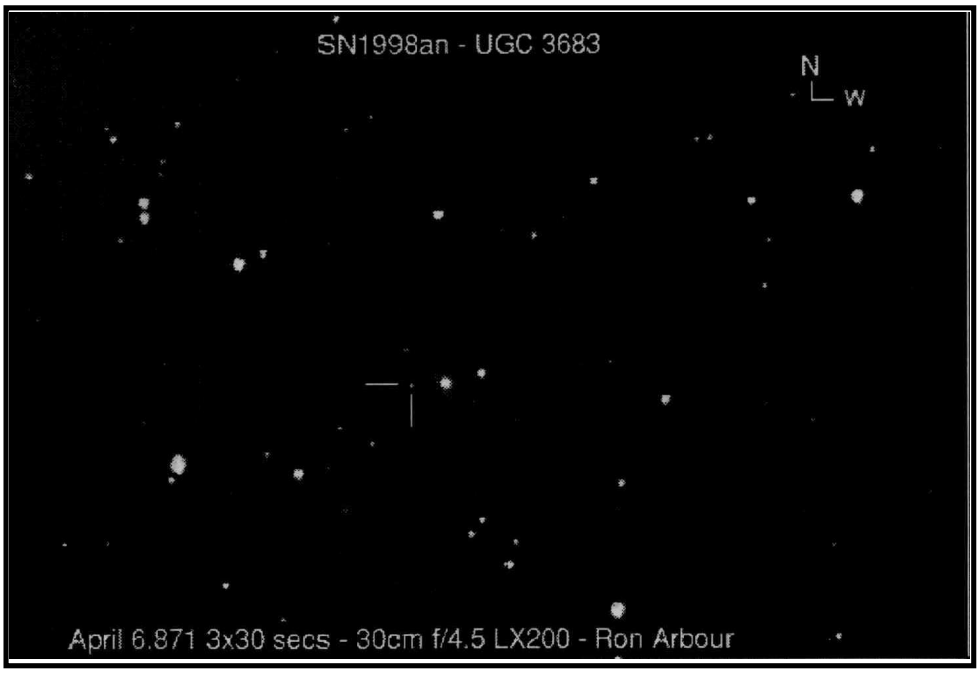
To satisfy the requirements of the IAU, observations of suspect supernovae have to be obtained on 2 separate nights to rule out the possibility of it being a slow-moving asteroid. The U.K. weather forecast for the following 24 hours was appalling, so I phoned Micheal Schwartz in the USA who enthusiastically agreed to help obtain the second night's observation.

Some supernova discoverers have a story of doing something they would not normally do, and in my case, it was setting the telescope on a programmed position ready to take an exposure. It was pouring with rain on the second evening, so this was an even more unlikely thing for me to do.

After peeping out of the window I saw the Moon emerging from thick cloud and ran to open up the observatory and immediately started a series of 30 second exposures. Only on the fourth was the suspect reasonably visible, the rest veiled by cloud but this was enough to show the object was not a minor planet. I continued imaging the suspect until it became invisible, hidden by cloud and a tree. From start to finish this was accomplished in 7 minutes!

Half-way through the night Micheal Schwartz rang to say that he also imaged the object and his astrometry agreed with my observations of the night before. Between us we e-mailed Dr Marsden and within hours the IAU issued Circular 6871 announcing my object as a supernova with the designation SN1998an. It was an emotional moment when I first heard that my object was to be officially designated as a supernova as I had been searching for 20 years almost to the week! Some statistics! It was the 36th galaxy image on 6th April which was the 25th night this year. From the start of 1998 to the first suspect image of SN1998an, I had conducted 1722 patrols which is poor compared to 1997 when in October alone I had over 1000 patrols.

I would like to express my sincere thanks to Tom Boles for his help and confirmatory images and Micheal Schwartz for having extreme patience and being a great help with the official procedure.



ECLIPSING BINARY PROGRAM - VISUAL TOTALS FOR 1997

TRISTRAM BRELSTAFF

A total of 1772 visual observations of eclipsing binaries have been received for the year 1997. The names of the observers and their individual totals are listed below. Many of the observers are members of the Variable Star Section of the Society for Popular Astronomy whose observations have been submitted by Tony Markham.

These observations will be analysed and the results published in a future issue of the VSS Circular.

Name	No Obs	No Stars	Name	No Obsn	No Stars
M Barrett	24	2	S Jenner	14	2
M Clarke	143	4	S Johnston	243	11
J Coates	11	1	GJ Kirby	7	1
D Conner	433	21	T Markham	170	7
RBI Fraser	2	1	C Newman	102	3
S Godwin	96	4	G Pointer	40	6
EH Horsley	24	2	D Storey	20	1
S Inman	13	1	MD Taylor	430	13

SUPERNOVA 1998AQ IN NGC 3982

GUY HURST

The latest object was first imaged by Mark Armstrong of Rolvenden on 1998 Apr 13.04852UT using a 0.26m LX200 with Starlight Xpress CCD with no filter. The position was measured by Mark as: RA 11h56m26.00s DEC +55 07'38.8"(2000).

Unfortunately this placed it just inside the 'nebulosity' of this galaxy as shown on the digitised Palomar Sky Survey so it was difficult to establish whether the object was really new. This was soon resolved by consulting the now extensive library of old images maintained by various patrol members. Clearly it was not present on several earlier images.

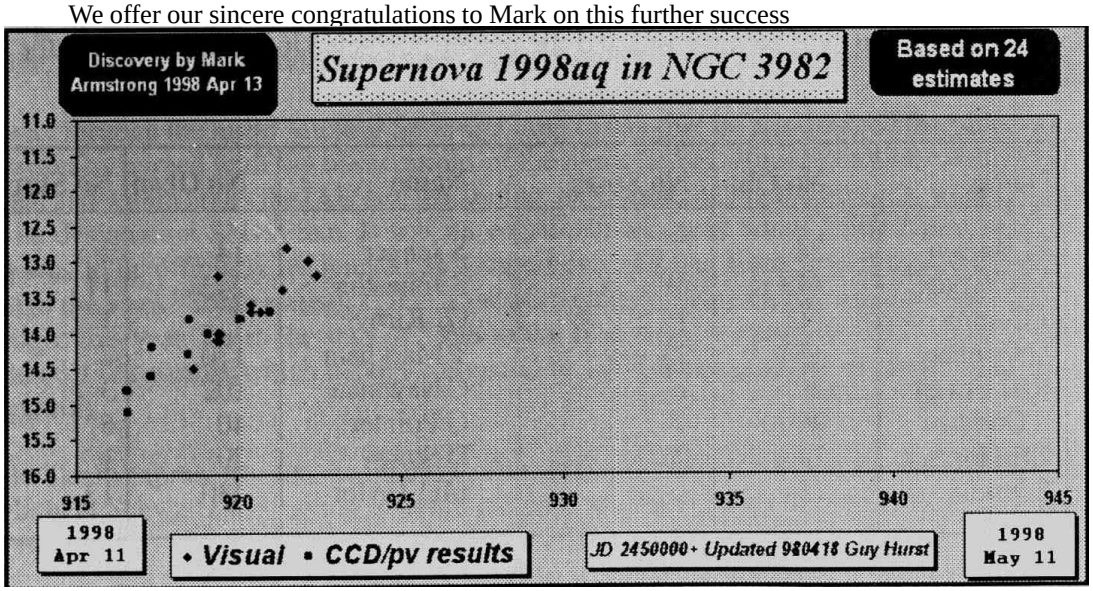
Ron Arbour of South Wonston also imaged the new object on Apr. 13.086UT and it was evident there was no movement. Ron again recorded it the following evening in the same position, thus ruling out an asteroid. The patrol coordinator downloaded the A!.0 catalogue and found no stars to magnitude 10 at the position of the suspect. Using the approximate magnitudes from this same catalogue, he derived a magnitude of 14.9 for the discovery picture.

A report was immediately sent to Brian Marsden at the Central Bureau and the discovery announcement appeared on IAU Circular 6775. A futher appeal by Hurst to Dr. Ayani and Hitoshi Yamaoka in Japan resulted in a confirmatory spectrum, indicating the supernova was of type Ia and about one week before maximum!

The accompanying preliminary light curve clearly demonstrates the supernova is brightening, having reached about magnitude 13.0 by April 18. The monitoring of such objects during a rise to maximum is especially valuable but we also need regular visual estimates or images to cover the decline to as faint a magnitude as possible. A chart and sequence is also given from which the full estimates should be submitted. e.g. A(1)v(2)B etc.

Please send reports/images daily if e-mail available, or alternatively post them to the coordinator weekly. Full instrumetal details should also always be quoted.

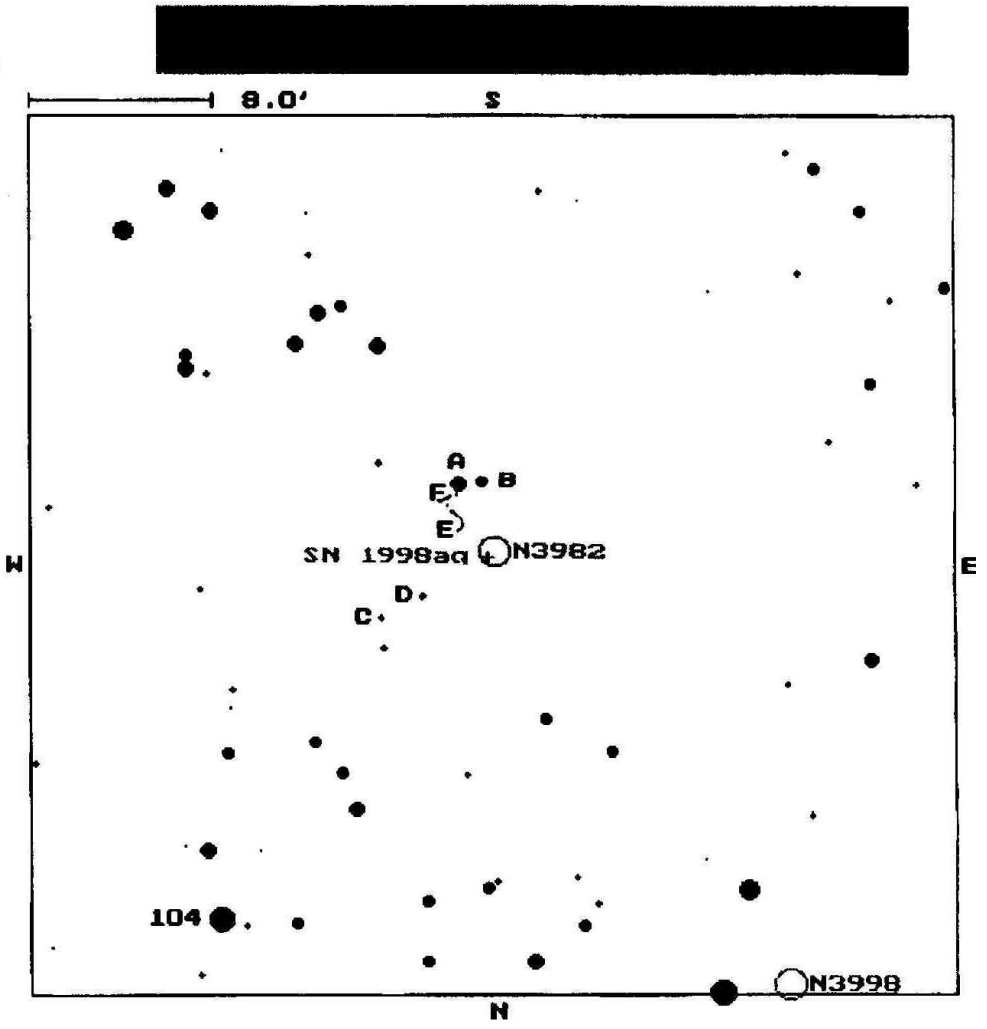
We offer our sincere congratulations to Mark on this further success



SN 1998aq b in NGC 3982

11h 56.4m +55 08' (2000)
Range: 14.5 - [19
Seq GSC & A1.0

A	12.10
B	13.00
C	13.70
D	14.40
E	15.00
F	16.00



Seq: SN/037.01

Chart number: 1
P - Print chart
F - Forward one chart
B - Back one chart
E - Exit

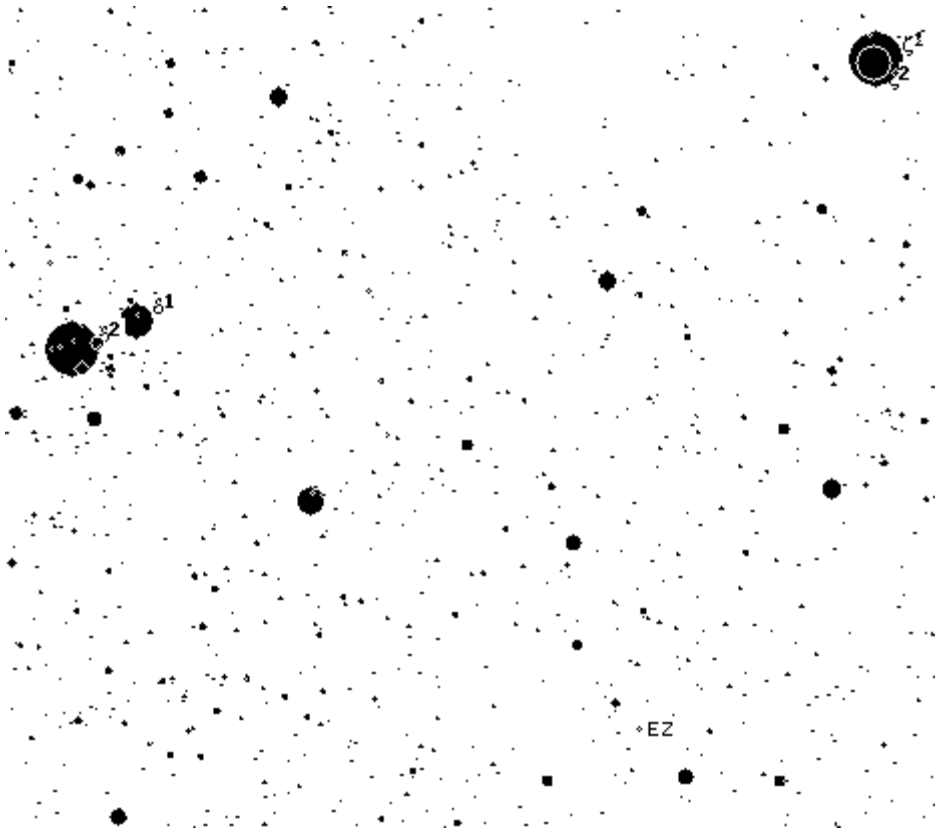
EZ LYRÆ, AN EASY RR LYRÆ STAR

J GREAVES

The RR Lyræ star EZ Lyræ lies in an easily found field, just South and West of δ Lyræ and South and East of ζ Lyræ (see below), and completes one cycle in only 12.6 hours. Further, the rise time from minimum to maximum is only one tenth of the period, that is approximately 1¼ hours! Observers can see this star rise from its minimum value of magnitude 11.8 (V) to its maximum of 10.8 (V) in this short period of time.

This rise is quite easy to follow because through good fortune EZ Lyræ is also the primary star in the double Ali 142, having a magnitude 12.3 comes lying some 13.7" distant in a position angle of 302°. So, in any one rise from minimum to maximum EZ will appear to be roughly equivalent to this companion star at first, until just over an hour later it will appear around three times as bright. The companion also assists in confirming identification.

The following chart shows the position of EZ Lyræ and was created using Guide 6.0 from Project Pluto. The field is roughly 2° square and the limiting magnitude around 13.



Predicted Times of Maximum and Minimum For the RR Lyræ variable EZ Lyræ

Maximum				**Minimum**			
Day	Date		UT(h)	Day	Date		UT(h)
Tue	2	Jun	0.0	Mon	1	Jun	22.8
Wed	3	Jun	1.3	Wed	3	Jun	0.0
Thu	11	Jun	23.6	Thu	11	Jun	22.3
Sat	13	Jun	0.8	Fri	12	Jun	23.5
Sun	14	Jun	2.0	Sun	14	Jun	0.7
Tue	23	Jun	0.3	Mon	22	Jun	23.0
Wed	24	Jun	1.5	Wed	24	Jun	0.2
Wed	1	Jul	22.6	Wed	1	Jul	21.3
Thu	2	Jul	23.8	Thu	2	Jul	22.6
Sat	4	Jul	1.0	Fri	3	Jul	23.8
Sun	5	Jul	2.2	Sun	5	Jul	1.0
Sun	12	Jul	23.3	Sun	12	Jul	22.1
Tue	14	Jul	0.5	Mon	13	Jul	23.3
Wed	15	Jul	1.8	Wed	15	Jul	0.5
Wed	22	Jul	22.9	Wed	22	Jul	21.6
Fri	24	Jul	0.1	Thu	23	Jul	22.8
Sat	25	Jul	1.3	Sat	25	Jul	0.0
Sun	26	Jul	2.5	Sun	26	Jul	1.2
Sat	1	Aug	22.4	Sat	1	Aug	21.1
Sun	2	Aug	23.6	Sun	2	Aug	22.3
Tue	4	Aug	0.8	Mon	3	Aug	23.5
Wed	5	Aug	2.0	Wed	5	Aug	0.8
Thu	6	Aug	3.2	Thu	6	Aug	2.0
Tue	11	Aug	21.9	Tue	11	Aug	20.6
Wed	12	Aug	23.1	Wed	12	Aug	21.8
Fri	14	Aug	0.3	Thu	13	Aug	23.1
Sat	15	Aug	1.5	Sat	15	Aug	0.3
Sun	16	Aug	2.7	Sun	16	Aug	1.5
Mon	17	Aug	4.0	Mon	17	Aug	2.7
Fri	21	Aug	21.4	Fri	21	Aug	20.2
Sat	22	Aug	22.6	Sat	22	Aug	21.4
Sun	23	Aug	23.8	Sun	23	Aug	22.6
Tue	25	Aug	1.1	Mon	24	Aug	23.8
Wed	26	Aug	2.3	Wed	26	Aug	1.0
Thu	27	Aug	3.5	Thu	27	Aug	2.2
Tue	1	Sep	22.1	Tue	1	Sep	20.9
Wed	2	Sep	23.4	Wed	2	Sep	22.1
Fri	4	Sep	0.6	Thu	3	Sep	23.3
Sat	5	Sep	1.8	Sat	5	Sep	0.5
Sun	6	Sep	3.0	Sun	6	Sep	1.7
Mon	7	Sep	4.2	Mon	7	Sep	2.9
Thu	10	Sep	20.5	Thu	10	Sep	19.2
Fri	11	Sep	21.7	Fri	11	Sep	20.4
Sat	12	Sep	22.9	Sat	12	Sep	21.6
Mon	14	Sep	0.1	Sun	13	Sep	22.8
Tue	15	Sep	1.3	Tue	15	Sep	0.0
Wed	16	Sep	2.5	Wed	16	Sep	1.3
Thu	17	Sep	3.7	Thu	17	Sep	2.5
Sun	20	Sep	20.0	Sun	20	Sep	18.7
Mon	21	Sep	21.2	Mon	21	Sep	19.9
Tue	22	Sep	22.4	Tue	22	Sep	21.1
Wed	23	Sep	23.6	Wed	23	Sep	22.4
Fri	25	Sep	0.8	Thu	24	Sep	23.6
Sat	26	Sep	2.0	Sat	26	Sep	0.8

The accompanying table (see previous page) lists predictions for the times of maxima and minima for this star from June to September 1998 inclusive, and was derived using elements from the database compiled annually by Rocznyck Observatory in Poland.

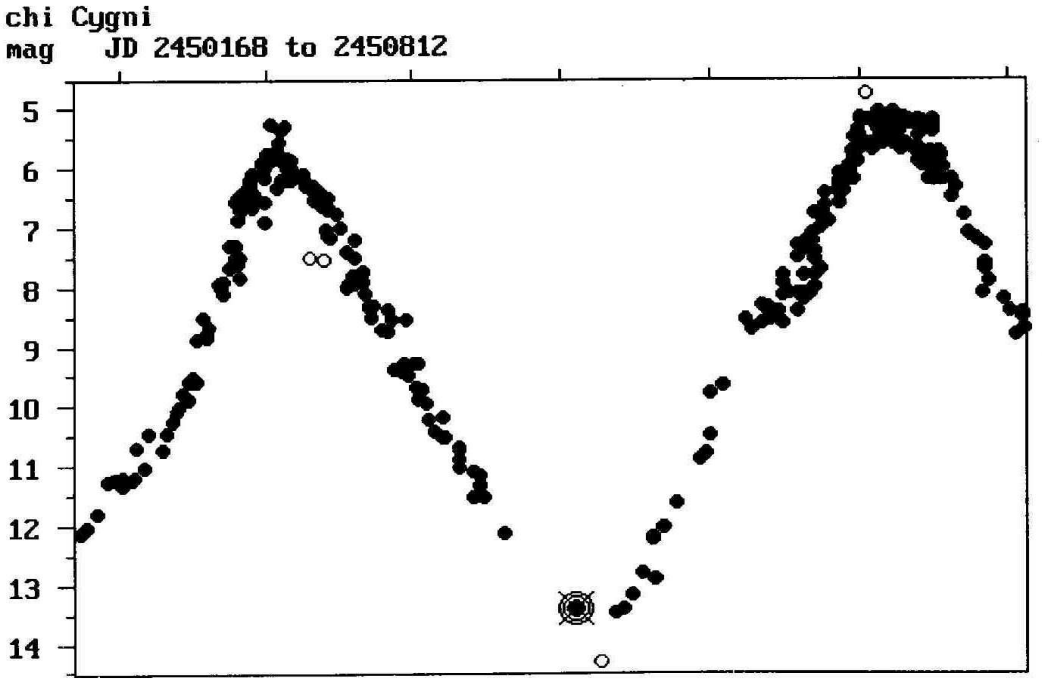
The day, date and hour of each event is given in UT. Precision is to ± 6 minutes (0.1 of an hour) and no correction has been made for light time travel, which could be up to roughly same order. The elements are of 1984 vintage and with all such predictions, whether for RR Lyræ stars, eclipsing binaries or whatever, the star should be watched from a quarter up to half an hour before the event to ensure that it isn't missed! Equally, observers should familiarise themselves with the field during "normal" periods (especially the identification of the proper component in the double).

MIRA STARS; CHI CYGNI

DAVE MCADAM

As noted in the BAA Journal[1], chi Cygni was the first variable to exceed a 100 year record in the BAAVSS database. Now there are several more and although I am usually pre-occupied with the task of logging further observations old and new, it is difficult not to want to do at least some analysis on such a wealth of data. A program was written some time ago for compiling lists of mira maxima and minima directly from the archive and recently Karen Holland suggested short articles based on these lists could be considered for publication. Also, John Greaves has discussed in letters, further statistical techniques which I might easily add. This encouragement has led me to check through the existing program and at the same time derive 91 maxima for chi Cygni. 86 minima were also derived in a similar way but only the maxima are discussed here. Maxima are determined by first loading two years of data into the program

Figure 1



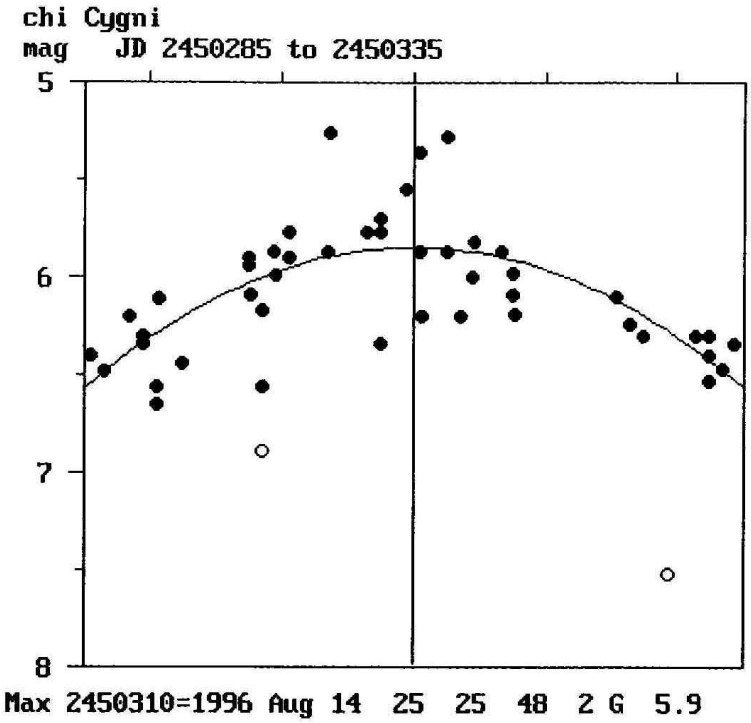


Figure 2

and selecting a suitable 'window' with a double edged cursor set initially to 50 days width and then adjusted as necessary. Fig.1 shows the display of 1996 to 1997 before defining the window. Stray observations (shown as open circles) can be omitted from the calculation by stepping the crossed concentric-circle indicator along the observation set. Least-squares quadratic equations[2] are then applied to the selected set of observations and the JD at maximum of the fitted parabola (Fig.2) is filed along with the UT date; the days before and after maximum in the time window; the number of observations used and any excluded; the 'goodness of fit' and the magnitude.The goodness of fit is simply estimated by eye as either Good, Average or Poor. Some maxima only have 3 or 4 available estimates giving a very inaccurate determination of the magnitude. In such cases the magnitude is omitted from the file even though the time of maximum is retained. For other maxima only the rising or fading slopes are well observed and the centre line of the parabola is obviously too early or too late. In these difficult instances, an approximate JD can be entered as a last

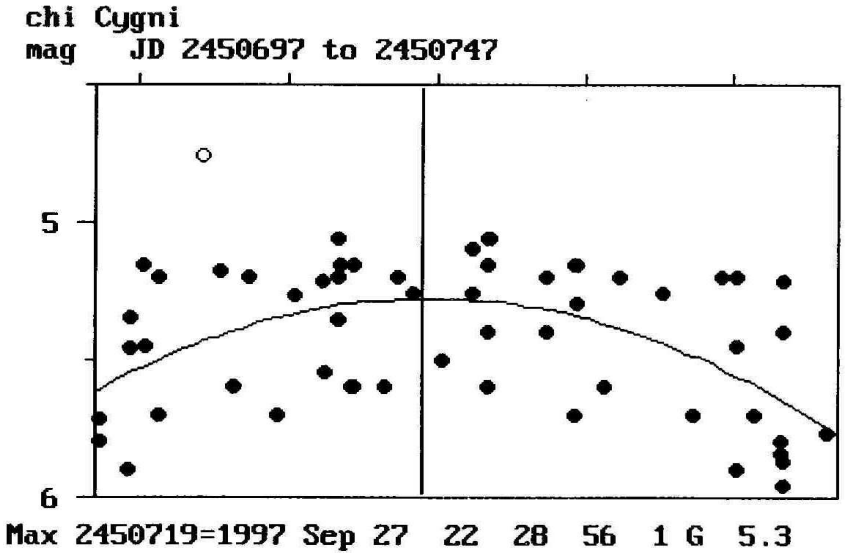


Figure 3

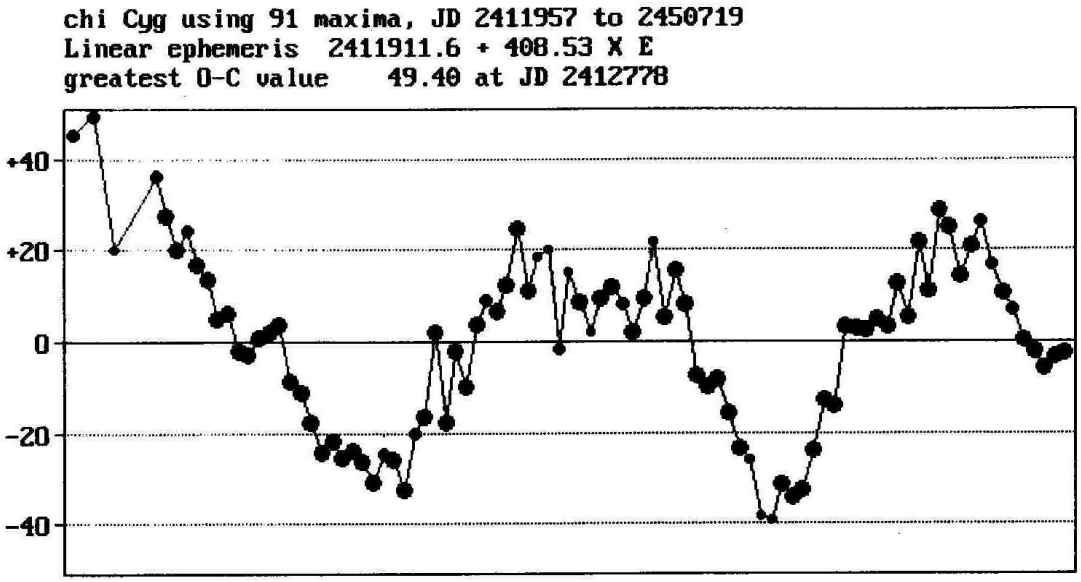


Figure 4

resort if it is felt of any value to do so. The fit is then listed as 'Estimated' without the other parameters. None of the chi Cyg maxima were estimated although several poor ones were listed. Fig.3 shows the fit to the second (1997) maximum from Fig.1. It is recognised that using a parabolic fit could produce a systematic error on miras with strongly asymmetric lightcurves. However, using a minimum practical time window excludes the flanks and produces good results for well observed maxima, Fig.2 and Fig.3 being typical. When the table of maxima is completed, a least-squares line is fitted to them (so called 'Linear Regression'[3]) thus deriving the elements from which a series of O-C values are generated. For this the program applies weights of 3, 2, and 1 for Good, Average, and Poor (or Estimated) maxima and Fig.4 indicates these with large, medium, or small dots respectively. As can be seen, the O-C values range from -40 to +49 days with the latter occuring in the 1890's near the beginning of the dataset. Although the pre-1905 observations could not be checked and validated to the same extent as later results, the initial excursion of these early O-C away from the fitted (zero) line is probably real; we can see in other places that consecutive O-C (of Good fits) differ by up to plus or minus 20 days and conclude that times of maxima of chi Cyg really do wander by this amount. The rough sinusoidal shape of the O-C diagram indicates that a periodic term would tend to 'straighten it out', but I believe such terms are no longer thought to describe real cyclic phenomena in mira stars.

Predicted maxima from the derived elements; 2411911.6 + 408.53E JD2451130 = 1998 Nov 12 (The 1998 BAA Handbook gives Nov 08) JD2451538 = 1999 Dec 25 JD2451947 = 2001 Feb 06 JD2452356 = 2002 Mar 22 JD2452764 = 2003 May 04

References

1 D McAdam; letter BAAJ 107,6,1997 p302.
2 Jean Meeus; 'Astronomical Algorithms' Willman-Bell Inc. 1991 p43.
3 ibid; p36.—

Dave McAdam
dave@telf-ast.demon.co.ukBAAVSS Computer Secretary
http://www.telf-ast.demon.co.uk/

PHOTOELECTRIC MINIMA OF ECLIPSING BINARIES, 1997

TRISTRAM BRELSTAFF

The numbers of photoelectric observations of eclipsing binaries received in 1997 are listed in Table 1.

Table 1. Observer Totals

Observer	No Obsns	No Timings	Notes
J Ells APT (EJ)	1271	5	1
Total	1271	5	

Notes:
1. The code EJ indicates timings made with the Jack Ells Automatic Photoelectric Telescope operated by M Gough and RD Pickard.
The timings derived from these observations are listed in Table 2. A colon ':') following a timing indicates that it is uncertain either because the observations show large scatter or else because the rising or fading limb was poorly covered. The O-C values are relative to the linear elements given in the 4th Edition of the GCVS.

Table 2. Timings of Minimum

Star	Epoch	JD Hel	O-C (d)	No	Observer	Filter
AR Aur	2988	2450756.5674	-0.0845	89	EJ	V
IU Aur	6646	2450487.4652	-0.0063	80	EJ	V
AR Lac	4595	2450706.3992	-0.0805	103	EJ	V
AR Lac	4596.5	2450709.3732:	-0.0813:	72	EJ	V
AM Leo	22015	2450546.4120	-0.0068	44	EJ	V

MIKE COLLINS VARIABLE STARS

We continue this month with charts for a couple more of Mike Collins discoveries. Mike provided the following information on these stars. Any observations should be reported in the normal way to Dave McAdam (see back cover for details), but copy details of the observations to Mike for his information.

TAV 2230+58 is spectral type N - a carbon star - very, very red! It has a very unusual asymmetric lightcurve with a short stay at minimum, a sharp rise to a round maximum and a slow fade. The amplitude is not great, 9.5-10.8, and is usually only of about 1 magnitude. However, there is a nice periodicity of about 389 days.

TAV 2034+61 is currently being monitored by visual observers, but the variation appears very haphazard despite a good range, 9.6-11.2 (visually to 11.5?). There appears to be no pattern to the variation on a monthly time-scale.

(B) **TAV 2034+61**

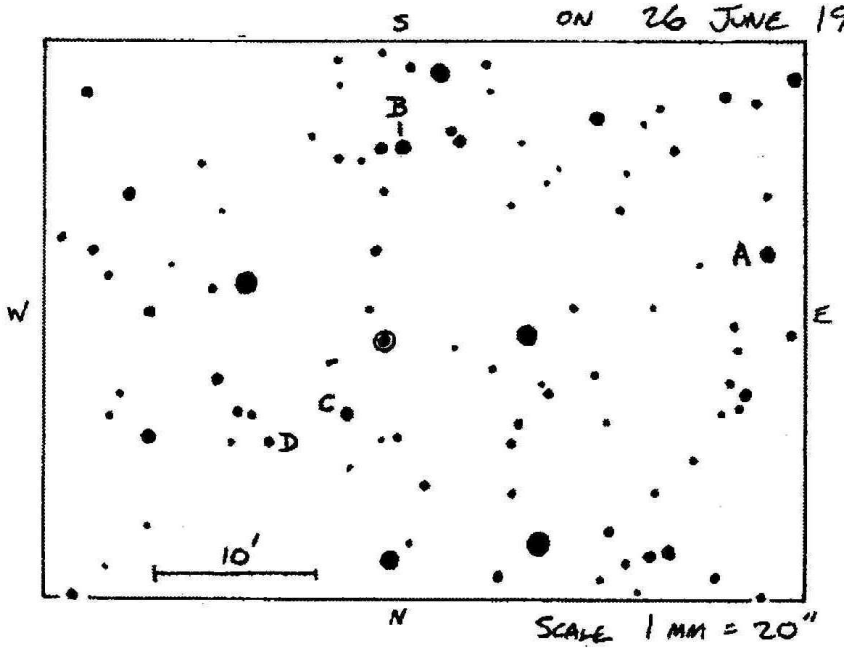
(= DC 38642)

RA $20^{H}\ 34^{M}.2$ DEC $+61^{\circ}\ 38'$ (1950)

MAGNITUDE : 9·6 – 11.0

TYPE OF VAR : ?

DISCOVERED BY MIKE J. COLLINS ON UK NOVA PATROL PHOTOS ON 26 JUNE 1989



SEQUENCE
pv transfer from GSPC-I
P106 using TVMPSA

A	9·6
B	10·0
C	10·6
D	11·2

TA Refs: P61-62

CHART : FROM TVMPSA
by M. J. COLLINS
890628

(B)

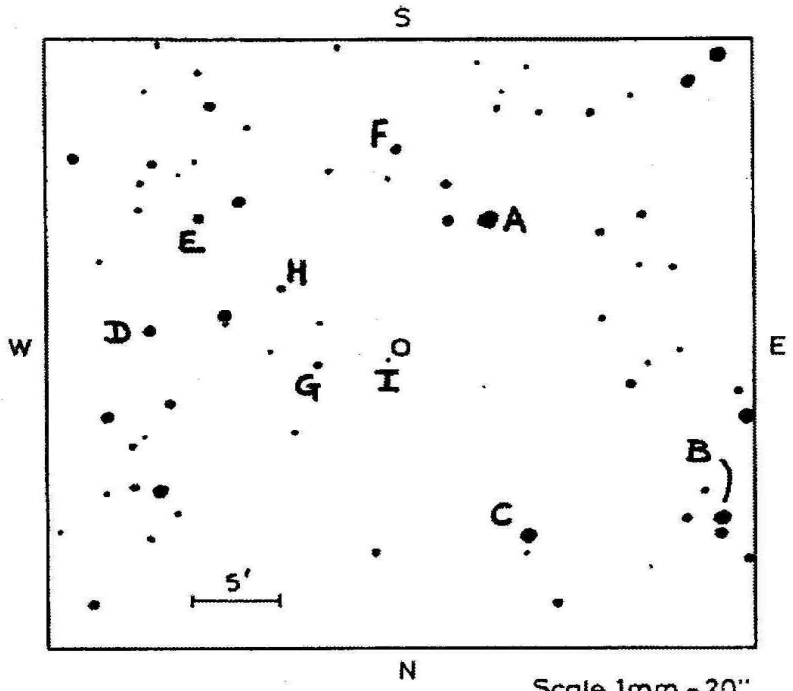
TAV 2230+58

RA 22ᴴ 30ᴹ·6 (1950)
22 32·4 (2000)

Dec. +58° 21′ (1950)
+58 37 (2000)

Magn 9·8 – 10·8 Type : Sp : N

Discovered by Mike Collins on Uk Nova Patrol photos, 9 Sep 199



Scale 1mm = 20"

Sequence : Guide Star Catalog

A	8·0
B	8·9
C	9·4
D	10·0
E	10·6
F	10·9
G	11·4
H	12·0
I	12·3

Chart : From TVMPSA
by M.J.Collins
Adopted 901020

 OCTOBER 199<

CH CYGNI

MELVYN TAYLOR

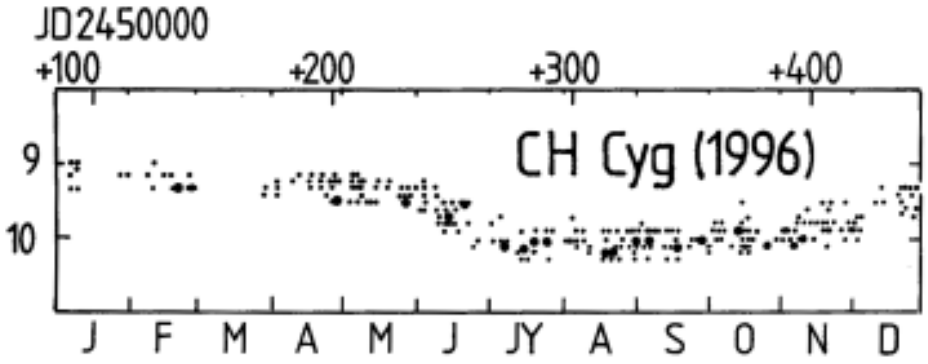
CH Cygni is an unusual object, a triple system, in a class of so-called symbiotic stars, and in recent years has been in an overall decline phase from the autumn of 1994 when it was about magnitude 7.6.

A light-curve reproduced in BAA VSS circular no.90 1996 December shows the section's coverage of this remarkable variable since 1971.The VSS light curve for 1996 is preliminary and shown below. The faintest magnitude this star reached as the plot shows was between 9.9 and 10.2 from June to November of 1996. The star's visible component faded rapidy from 1996 May at mag 9.4 to 10.1 in early July and this brought about an equally rapid development of the chart's comparison stars with the assistance of Brian Skiff.

During 1997 an initial investigation of VSS work shows CH Cygni to be slowly recovering possibly with semi-regular activity of a low amplitude. The star reached a mean magnitude of 9.0 in 1997 August, through to the end of 1997 at 9.1. There is large scatter in October and November with a few observers making estimates at the 8.5 magnitude level. It is possible these are discordant estimates in this interval. In 1998 though, up to April, the star appears to be going into a possible more active phase and observers are urged to go for this star whenever the sky clears in order to extend the light-curve.

This brief report of activity in CH Cygni is derived from the work of; Albrighton, Bone, Brundle, Day, Fraser, D.Gill, Hurst, Kelly, Livesey, Markham, Meacham, Middlemist, Poyner, Storey, Stott, Taylor, Toone, and Worraker.

The latest chart is 089.02 and appears in the 1996 December circular; chart copies may also be obtained from the chart secretary.



SUMMARY OF PHOTOELECTRIC PHOTOMETRY OBSERVATIONS

KEVIN WEST

All observations were made by the author, using an OPTEC SSP3 photometer through a 21cm Newtonian Reflector. Differential photometry was carried out through a close matched Johnson V filter , and corrected for differential extinction where necessary. All detailed data is readily accessible from The BAA computer database.

Main Programme

Star	JD	No of Observations	
Psi 1 Aur	50077-50809	36	
UU Aur	50118-50809	22	
V465 Cas	49280-50809	47	
Mu Cep	49554-50809	77	
BR CVn=HD 116475 =(SAO 44590)	49482-50746	155	
TU CVn	49477-50746	77	
Y CVn	49477-50746	63	
UX Dra	49582-50785	112	
AT Dra	49894-50791	48	
g Herc	9482-50446	67	
OP Her	49510-50785	71	
Delta 2 Lyr	49277-50785	134	
R Lyr	49510-50791	86	
XY Lyr	49247-50787	55	
X Per	49372-50809	56	
(Plus 8 R filter and 25 I filter)			
ST UMa	49445-50809	32	
VY UMa	49482-50809	115	
RR UMi	49477-50787	127	
Cepheid Variables			
SU Cas	49372-50247	24	
RT Aur	50049-50179	13	
V473 Lyr	50142-50401	16	
Zeta Gem	49404-50201	9	
Eta Aql	50216-50406	17	
Eclipsing binaries			
V1143 Cyg	49302	25	Minimum
AR Aur	49706	52	Minimum
U Oph	49895	26	Minimum
WW Aur	50061	26	Minimum
VV Ori	49344-50142	32	
HU Tau	49422	25	Minimum
	49720	27	Minimum
	49724	6	
Beta Per	49988	32	Minimum
RZ Cas	50247	37	Minimum

In addition I have 20 or fewer observations on the following:

NO Aur, AE Aur,
Lambda And,
W Boo,
ST Cam, VZ Cam,
RS Cnc, X Cnc,
Gamma Cas, SAO 22154 Cas, Phi Cas,
NSV 13656 Cep, HD202380 Cep, NSV 13807 Cep, NSV 13729 Cep,
33 Cet,
NSV5976 CVn,
P Cyg, Chi Cyg, Zeta Cyg,
69 Dra,
EU Del, U Del,
BN Gem, HD52005 Gem, HD52609 Gem, NP Gem, Eta Gem,
V771 Her,
R Leo,
Theta Lyr,
HD 61296 Lyn, HD 62647 Lyn
CK Ori, BD=14deg1247 Ori, BL Ori
Epsilon Peg,
Rho Per,
TV Psc, TX Psc,
R Sct,
Tau 4 Ser,
NSV1671 Tau, BU Tau, CE Tau, NSV 1702 Tau,
R Tri
R UMa, 70 UMa, Delta UMa

LETTERS

The editor welcomes any letters which readers might wish to have included on this letters page (see back cover for editor's details). Please include your address and/or e-mail address if you are happy to have this published.

RESPONSE TO JOHN ISLES LETTER IN VSSC 95

I would agree that we should make use of the Hipparcos magnitudes to make improvements to the binocular sequences. However, I don't expect that this will lead to sequences that everyone is happy with. Most observers (in the UK at least) observe from sites with some light pollution. The sky glow from street lighting affects the relative apparent brightnesses of red and non-red comparisons. Hence, even if the revised magnitudes reflect the true brightnesses of the comparison stars, they may still look wrong to observers (and then there is the effect of moonlight, twilight, etc. and the systematic differences that occur in colour-sensitivity between observers anyway ...). Do we really want to amend current sequences (based on visual estimates) about which no-one has complained and replace them with ones using Hipparcos magnitudes (derived from instrumental measurements) and then find that observers preferred the old sequences ? Maybe we should only revise those sequences for which observers have found problems. i.e. if it aint broke, don't fix it !

Tony Markham

PRO-AM EXCHANGES REPORT 15

GUY HURST

Covering period 1995 July 1 to Dec 31.

Date	Subject	Professional	Remarks

Additions to Report 14 (1995 Jan 1-June 30)

950223 NSV 1702 Tau Chris Lloyd, RAL
688 obs supplied to Chris covering 1971-1988.

950227 NSV 1280 Tau Chris Lloyd, RAL
1208 obs supplied to Chris covering 1971-1987 and 1994.

950325 T CrB Chris Lloyd, RAL
9975 obs plus archive information files supplied, 1946-1995.

950406 AK Cancri Ronald Mennickent, Chile
149 obs 1992-1995 supplied via Bill Worraker to Ronald.

950516 NSV 14680 Cep Chris Lloyd, RAL
1296 obs supplied to Chris covering 1973-1987.

950617 8 cataclysmics B.Espey, John Hopkins Univ
10,650 obs on 8 cataclysmics 1974-1995 supplied to Brian.

950629 6 cataclysmics Fred Ringwald, Keele
48,279 obs on 6 cataclysmics 1926-1995 supplied to Fred.

950629 8 variables Dr.Frank Bateson, RASNZ
358 obs of 8 variables (southern) supplied to Frank.

(8 additions, totals amended in summary)

950701 SN in ZWG 017.091 Rob McNaught, Australia
Found by McNaught on film by M.Drinkwater of 1995 June 29 mag 18. Later announced on IAUC 6182

950704 SN in NGC 4456 Rob McNaught, Australia
Found by McNaught on film by K.Russell of 1995 July 3, mag 18. Later announced on IAUC 6185

950717 HZ Herculis Paul Roche, Sussex
Visual estimates by Hurst of 1995 July 15.93UT, 12.9 and July 15.95UT, 13.0 supplied as part of special target period.(See report 14 entry for 950624 regarding campaign)

950720 Z Cam Peter Wheatley, Utrecht Univ
General enquiry re BAAVSS with specific query on Z Cam answered.

950729 CSV171=NSV 650 Cas Chris Lloyd, RAL
Answered query from Chris as to origin of this object. Noted on Binocular Sky Society chart for V391 Cas, 7.3-7.7 Sp=AO.

950724 DH Aquilae Taichi Kato, Japan
Taichi suggests re-classification from SS Cyg to SU UMa type based on recent detections of this variable.

950804 Z Cam Peter Wheatley, Utrecht Univ
Following entry of 950720, 16,947 obs of Z Cam covering 1926-1995 sent to Peter by Dave McAdam.
950805 HZ Her Paul Roche, Sussex16 measures obtained during 1995 July by Giovanni Sostero et.al.,Italy sent to Paul regarding recent campaign.
950806 GO Com Taichi Kato, Japan
Exchange of results on outburst between our observers and those based at Ouda who supply us with V measures.
950818 3C 66A Tapio Pursimo, Finland
Gary Poyner supplies personal estimates for July/Aug to Tapio.The object remained around magnitude 14.0-14.1 during this period.
950823 V1028 Cygni Ron Downes, USA
Precise position by John Mackey supplied to Ron in connection with updates to his cataclysmic catalogues.
950828 Nova Cas 1995 Osamu Ohshima, Bisei Obsy
Pre-discovery data by K.Kosaka (CCD) supplied to us.
950827 Nova Cas 1995 Sumner Starrfield, USA
Sumner expresses thanks for fast update of light curve on WWWpages which has assisted with IUE scheduling.
950826 Nova Cas 1995 Brian Marsden, CBAT
We supply CBAT with visual confirmation by Hurst (Aug 26, 9.2v) and pre-discovery photographic data by Mike Collins (Aug 22, magnitude 9.0pv).
950906 R CrB and SU Tau Andrew Pogosyants, Moscow
Enquiry from Russia for full details of observations of thesestars and charts/sequences which are supplied.
950917 Nova Cas 1995 Taichi Kato, JapanSuggests 45 day light curve has similarities with DO Aql (nova, 1925).
950925 Comet/NGC 2775 Brian Marsden, CBAT
CBAT ask us to check possible comet of mag 9 detected 1995 Sept 24 apparently moving? Later research suggests NGC 2775
951017 5 variables Paul Roche, Sussex
Dave McAdam supplies 22,722 obs of R Ari, X Aur, X Cam,SS Her and X Per 1924-1995 to Sussex.
951018 Nova Cas 1995 Craig Collins, Birmingham University
Craig obtains data from TA WWW pages and requests follow-up information which we supply.
951020 3C66A and OJ287 Tapio Pursimo, Finland
Obs by Poyner and Worraker (Oct 4-18) supplied to Tapio.
951024 R CrB Phil Hill, Don Pollacco, Observing at La Palma
We supply daily information to assist with scheduling the monitoring of this star with the INT.
951028 AL Com Fred Ringwald, Keele
Hurst supplies database on AL Com for 1995 Apr 3-May 22 during a period of outburst.
951028 3C66A and OJ287 Tapio Pursimo, Finland
Obs by Poyner (Oct 20-28) supplied to Tapio.
951102 SN 1995al in NGC 3021 Brian Marsden, CBAT
Object found by Pesci and Mazza Nov 1 mag 13.5 confirmed by Mark Armstrong on Nov 2 at mag 13.2 (CCD). Discoveryand confirmation announced on IAUC 6255 of 951102.This is the SECOND supernova found by a member of the UK Nova/Supernova Patrol.
951105 3C66A and OJ287 Tapio Pursimo, Finland
Obs by Greaves and Poyner (Oct 27-Nov 3) supplied to Tapio.

951105 SN 1995al Kazuya Ayani, Bisei Obsy
Details of spectral confirmation supplied to us.
951117 HT Cas Brian Marsden, CBAT
We supply note of outburst detected by Worraker Nov 17.9UT at magnitude 13.4v after long period without outbursts.The observation appeared on IAUC 6264 of 951118.
951117 UZ Boo Fred Rinwald and Steve Howell, USA
We supply data on UZ Boo re potential paper.
951117 3C66A and OJ287 Tapio Pursimo, Finland
Obs by Worraker and Poyner (Oct 15-Nov 18) supplied to Tapio.
951121 HT Cas William Welsh, Keele
Requests we monitor system on Nov 23 to coincide with monitoring by Hubble Space Telescope.
951123 V635 Cas Diane Roussel-Dupre, Los Alamos Nat.Lab.
Recent visual observations by Poyner enabled predictions of a later x-ray outburst, now confirmed!
951128 PICA Jan Manek, Czech Rep.
Jan describes PICA project which aims to obtain precise positions for about 7,000 variables. Various archive pages from 'The Astronomer' containing key data requested and supplied. 951204 V1974 Cyg and V705 Cas Arkadiusz Olech, Poland. We agree light curves on TA WWW pages for above novae can be used for article by Olech being prepared for Polish magazine'Wiedza i Zycie' ('Knowledge and Life').
951212 AL Com Erik Kuulkers, Netherlands
We agree use of TA WWW light curve by Erik.
951231 3C66A and OJ287 Tapio Pursimo, Finland
Obs by Worraker and Poyner (Nov 17-Dec 29) supplied to Tapio.

PRO-AM Exchanges Summary Updated

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	35	15
To Date	729	

Updated 1998 April 17

ECLIPSING BINARY PREDICTIONS

(JULY -SEPTEMBER 1998)

TRISTRAM BRELSTAFF

The following predictions are calculated for an observer at 53 degrees north, 1.5 degrees west but should be usable for observers throughout the British Isles. The times of mid-eclipse appear in parentheses with the start and end times of visibility on either side. The times are hours GMAT, that is UT-12h. 'D' and 'L' are used to indicate where daylight and low altitude, respectively, prevent part of the eclipse from being visible. Charts for all of the stars included in these predictions (17 in all - see below for a list) are available from the Assistant Director at 10p each (please enclose a large SAE).

Stars Included in the Predictions

Star	Range (mags)	Period (days)	Duration of Eclipse (hours)
RZ Cas	6.18 - 7.72V	1.19524892	4.9
U Cep	6.75 - 9.24V	2.49307	9.0
SS Cet	9.4 - 13.0v	2.973967	9.3
SW Cyg	9.24 - 11.83V	4.573011	13
Z Dra	10.8 - 14.1p	1.3574257	4.8
TW Dra	7.3 - 8.9v	2.806842	11
S Equ	8.0 - 10.08V	3.4361291	11
RW Gem	9.53 - 11.76V	2.8654972	10
V640 Ori	11.2 - 13.5p	2.0207326	5.3
Z Per	9.7 - 12.4p	3.0562868	10
ST Per	9.52 - 11.40V	2.6483358	8.3
Y Psc	9.44 - 12.23V	3.765723	9.0
U Sge	6.45 - 9.28V	3.3806129	14
RW Tau	7.98 - 11.59V	2.768780	9.3
X Tri	8.88 - 11.27V	0.9715306	4.2
TX UMa	7.06 - 8.80V	3.063305	8.8
Z Vul	7.25 - 8.90V	2.45492679	11

1998 Jul 1 Wed
TW Dra D10(06)11
1998 Jul 2 Thu
Z Vul D10(05)10
U Sge D10(10)14D
Y Psc 12(16)14D
RW Tau L14(11)14D
1998 Jul 3 Fri
Z Per L10(12)14D
U Cep 11(16)14D
ST Per 13(17)14D
1998 Jul 4 Sat
Z Vul 11(16)14D
Z Dra 11(14)14D

1998 Jul 5 Sun
SW Cyg D10(05)11
RZ Cas D10(12)14D
U Sge 14(20)14D
1998 Jul 6 Mon
S Equ D10(12)14D
Z Per D10(13)14D
ST Per L11(09)13
Y Psc L11(10)14D
X Tri 14(16)14D
1998 Jul 7 Tue
TX UMa D10(06)11
X Tri 13(16)14D

1998 Jul 8 Wed
U Cep 11(16)14D
X Tri 12(15)14D
Z Dra 13(16)14D
1998 Jul 9 Thu
U Sge D10(05)10
Z Vul D10(14)14D
Z Per D10(14)14D
TW Dra 11(16)14D
X Tri 12(14)14D
SW Cyg 12(18)14D
1998 Jul 10 Fri
TX UMa D10(08)12

X Tri L11(14)14D
RW Tau 14(19)14D
1998 Jul 11 Sat
Z Dra D10(09)11
RZ Cas D10(12)14
X Tri L11(13)14D
ST Per 12(16)14D
1998 Jul 12 Sun
TW Dra D10(12)14D
U Sge D10(14)14D
Z Per 11(16)14D
X Tri L11(12)14D
RZ Cas 14(16)14D
1998 Jul 13 Mon

S Equ D10(09)14D
TX UMa D10(09)14
U Cep 11(16)14D
X Tri L11(12)14
RW Tau L13(13)14D
1998 Jul 14 Tue
SW Cyg D10(08)14D
Z Vul D10(12)14D
ST Per L10(07)11
X Tri L11(11)13
1998 Jul 15 Wed
TW Dra D10(07)12
Z Dra D10(11)13
X Tri L11(10)13
Z Per 12(17)14D
1998 Jul 16 Thu
TX UMa D10(11)14L
X Tri L11(10)12
S Equ 14(19)14D
1998 Jul 17 Fri
RZ Cas D10(11)13
X Tri L11(09)11
Y Psc 13(18)14D
1998 Jul 18 Sat
U Cep 10(15)14D
RZ Cas 13(16)14D
Z Per 14(18)14D
1998 Jul 19 Sun
U Sge D10(08)14
Z Vul D10(09)14D
TX UMa D10(12)14L
Z Dra 10(12)14D
ST Per 10(14)14D
1998 Jul 20 Mon
S Equ D10(06)11
1998 Jul 21 Tue
Y Psc L10(12)14D
1998 Jul 22 Wed
TX UMa D10(14)13L
ST Per L10(06)10
U Sge 12(17)15D
1998 Jul 23 Thu
RZ Cas D09(10)13
SW Cyg D09(12)15D
U Cep 10(15)15D
S Equ 11(16)15D
Z Dra 12(14)15D
TW Dra 12(17)15D
1998 Jul 24 Fri
Z Vul D09(07)13
RW Tau L12(15)15D
RZ Cas 13(15)15D
1998 Jul 25 Sat
Y Psc L10(06)11
TX UMa 11(15)13L
1998 Jul 26 Sun
Z Dra D09(07)10
TW Dra D09(12)15D
Z Vul 13(18)15D
1998 Jul 27 Mon
ST Per L10(13)15D
RW Tau L12(09)14
Z Dra 13(16)15D
1998 Jul 28 Tue
U Cep 10(15)15D
TX UMa 12(17)13L
RW Gem L14(18)15D
1998 Jul 29 Wed
Z Vul D09(05)10
TW Dra D09(08)13
RZ Cas D09(10)12
U Sge D09(12)15D
1998 Jul 30 Thu
Z Dra D09(09)11
S Equ D09(13)15D
RZ Cas 12(14)15D
1998 Jul 31 Fri
Z Vul 11(16)15D
RW Gem L14(15)15D
1998 Aug 1 Sat
SW Cyg 09(15)15D
Y Psc 15(19)15D
1998 Aug 2 Sun
U Cep 09(14)15D
1998 Aug 3 Mon
Z Dra D09(11)13
RW Gem L14(12)15D
1998 Aug 4 Tue
RZ Cas D09(09)12
ST Per L09(12)15D
RW Tau 12(17)15D
1998 Aug 5 Wed
U Sge D09(06)12
Y Psc D09(13)15D
Z Vul D09(14)15D
RZ Cas 12(14)15D
1998 Aug 6 Thu
SW Cyg D09(05)11
S Equ D09(10)15D
TW Dra 13(18)15D
1998 Aug 7 Fri
U Cep 09(14)15D
Z Dra 10(12)15
RW Tau L11(11)15D
1998 Aug 8 Sat
U Sge 09(15)15D
X Tri 15(17)15D
1998 Aug 9 Sun
Y Psc D09(08)12
TW Dra D09(13)15D
X Tri 14(16)15D
ST Per 15(19)15D
1998 Aug 10 Mon
RZ Cas D09(09)11
Z Vul D09(12)15D
SW Cyg 13(19)15D
X Tri 13(16)15D
1998 Aug 11 Tue
RZ Cas 11(13)15D
Z Dra 12(14)15D
X Tri 13(15)15D
1998 Aug 12 Wed
Z Per D09(05)10
TW Dra D09(09)14
ST Per D09(10)15
U Cep 09(14)15D
X Tri 12(14)15D
1998 Aug 13 Thu
S Equ D09(07)12
X Tri 11(14)15D
1998 Aug 14 Fri
Z Dra D09(07)10
X Tri 11(13)15D
1998 Aug 15 Sat
TW Dra D09(04)09
Z Per D09(07)11
SW Cyg D09(08)15
U Sge D09(09)15
Z Vul D09(09)15
X Tri 10(12)15
Z Dra 13(16)15D
RW Tau 14(19)15D
1998 Aug 16 Sun
RZ Cas D08(08)11
X Tri 09(12)14
S Equ 12(18)15D
1998 Aug 17 Mon
U Cep 08(13)15D
X Tri L09(11)13
RZ Cas 10(13)15
ST Per 13(18)15D
RW Gem 15(20)15D
Z Vul 15(20)15D
1998 Aug 18 Tue
Z Per D08(08)13
Z Dra D08(09)11
X Tri L09(10)13
RW Tau L11(13)16D
U Sge 13(18)16D
RZ Cas 15(17)16D
1998 Aug 19 Wed
X Tri L09(10)12
Z Dra 15(18)16D
1998 Aug 20 Thu
S Equ D08(04)09
Z Vul D08(07)13
ST Per D08(09)13
X Tri L08(09)11
Y Psc 10(15)16D
RW Gem L13(17)16D
TW Dra 14(19)16D
1998 Aug 21 Fri
Z Per D08(09)14
X Tri L08(08)11
RW Tau L10(07)12
1998 Aug 22 Sat
U Sge D08(04)09
TX UMa D08(05)10
RZ Cas D08(08)10
U Cep D08(13)16D
Z Dra 08(11)13
X Tri L08(08)10
Z Vul 13(18)16D
1998 Aug 23 Sun
X Tri L08(07)09
TW Dra 09(14)16D
S Equ 09(14)16D
RZ Cas 10(12)15
RW Gem L13(13)16D
1998 Aug 24 Mon
Y Psc D08(09)14
Z Per D08(11)15
SW Cyg D08(12)16D
X Tri L08(06)09
RZ Cas 15(17)16D
V640 Ori L16(16)16D
1998 Aug 25 Tue
Z Vul D08(05)10
TX UMa D08(06)11L
U Sge D08(13)16L
ST Per 12(16)16D
1998 Aug 26 Wed
TW Dra D08(09)14
Z Dra 10(12)15
RW Gem L13(10)15
V640 Ori L16(16)16D

RW Tau 16(20)16D

1998 Aug 27 Thu

Z Per D08(12)16D
U Cep D08(13)16D
Z Vul 11(16)16D

1998 Aug 28 Fri

Y Psc D08(04)08
RZ Cas D08(07)09
ST Per D08(08)12
TX UMa D08(08)11L
V640 Ori L15(17)16D

1998 Aug 29 Sat

TW Dra D08(05)10
Z Dra D08(06)08
RZ Cas 09(12)14
RW Tau 10(15)16D

1998 Aug 30 Sun

Z Vul D08(03)08
S Equ D08(11)16L
Z Per 08(13)16D
Z Dra 12(14)16D
RZ Cas 14(16)16D
V640 Ori L15(17)16D

1998 Aug 31 Mon

TX UMa D08(10)11L
TX UMa L13(10)14

1998 Sep 1 Tue

U Sge D08(07)13
U Cep D08(12)16D
Z Vul 09(14)16L
RW Tau L10(09)14
V640 Ori L15(18)16D

1998 Sep 2 Wed

Z Dra D08(07)10
SW Cyg 09(16)16D
Z Per 10(15)16D
ST Per 11(15)16D

1998 Sep 3 Thu

RZ Cas D08(06)09
TX UMa D08(11)10L
TX UMa L13(11)16
Z Dra 14(16)16D
TW Dra 14(19)16D
V640 Ori 15(18)16D

1998 Sep 4 Fri

RZ Cas 09(11)13
U Sge 10(16)15L
Y Psc 12(16)16D

1998 Sep 5 Sat

ST Per D08(06)11
Z Per 11(16)16D
RZ Cas 13(16)16D
V640 Ori 16(19)16D

1998 Sep 6 Sun

S Equ D08(08)14
Z Dra D08(09)11
Z Vul D08(12)15L
U Cep D08(12)16D
TX UMa 08(13)10L
TW Dra 10(15)16D
TX UMa L13(13)16D
RW Gem 16(21)16D

1998 Sep 7 Mon

SW Cyg D08(05)11
Z Dra 15(18)16D

1998 Sep 8 Tue

Y Psc D07(11)15
Z Per 13(17)16D

1998 Sep 9 Wed

RZ Cas D07(06)08
TW Dra D07(10)15
TX UMa 09(14)10L
RW Tau 12(17)16D
TX UMa L13(14)16D
RW Gem 13(18)16D
S Equ 13(19)15L
SS Cet 16(21)16D
X Tri 16(19)16D

1998 Sep 10 Thu

RZ Cas 08(11)13
Z Dra 08(11)13
ST Per 10(14)16D
X Tri 15(18)16D

1998 Sep 11 Fri

Z Vul D07(10)15
U Sge D07(10)14L
U Cep D07(12)16D
RZ Cas 13(15)16D
SW Cyg 13(19)16D
Z Per 14(19)16D
X Tri 15(17)16D

1998 Sep 12 Sat

Y Psc D07(05)10
TW Dra D07(06)11
RW Tau L09(11)16
RW Gem L11(15)16D
TX UMa L12(16)16D
X Tri 14(17)16D
SS Cet 15(20)16D

1998 Sep 13 Sun

ST Per D07(05)09
S Equ D07(05)11
X Tri 13(16)16D

1998 Sep 14 Mon

Z Dra 10(13)15
X Tri 13(15)16D
U Sge 14(19)14L
Z Per 15(20)16D

1998 Sep 15 Tue

RZ Cas D07(05)08
RW Tau L09(06)10
RW Gem L11(12)16D
X Tri 12(14)16D
TX UMa 12(17)16D
SS Cet 15(19)16D

1998 Sep 16 Wed

Z Vul D07(07)13
SW Cyg D07(09)15
U Cep D07(11)16
RZ Cas 08(10)12
S Equ 10(16)14L
X Tri 11(14)16

1998 Sep 17 Thu

Z Dra D07(06)08
X Tri 11(13)16
RZ Cas 12(15)17D
TW Dra 15(20)17D

1998 Sep 18 Fri

U Sge D07(05)10
ST Per 08(12)16
X Tri 10(12)15
RW Gem L11(08)13
Z Dra 12(14)17D
Z Vul 13(18)15L
TX UMa 14(19)17D
SS Cet 14(19)17D

1998 Sep 19 Sat

X Tri 09(12)14
Y Psc 13(18)17D

1998 Sep 20 Sun

S Equ D07(02)08
X Tri 09(11)14
TW Dra 11(16)17D
RW Tau 14(18)17D
SW Cyg 16(23)17D

1998 Sep 21 Mon

ST Per D07(04)08
RZ Cas D07(05)07
Z Vul D07(05)11
Z Dra D07(07)10
U Cep D07(11)16
X Tri 08(10)13
U Sge 08(14)14L
SS Cet 13(18)17D
TX UMa 15(20)17D

1998 Sep 22 Tue

RZ Cas 07(09)12
X Tri 07(10)12
Z Dra 14(16)17D

1998 Sep 23 Wed

X Tri D07(09)11
TW Dra D07(11)16
S Equ 07(13)14L
Y Psc 08(12)17D
RW Tau L08(13)17D
Z Vul 11(16)14L
RZ Cas 12(14)16
ST Per 15(19)17D

1998 Sep 24 Thu

X Tri D07(08)11
SS Cet 13(17)17D
RZ Cas 16(19)17D

1998 Sep 25 Fri

X Tri D07(08)10
SW Cyg D07(12)17D
Z Dra 07(09)12

1998 Sep 26 Sat

Z Vul D07(03)08
TW Dra D07(06)11
X Tri D07(07)09
U Cep D07(11)15
ST Per 07(11)15
RW Tau L08(07)12
Z Dra 15(18)17D

1998 Sep 27 Sun

X Tri D07(06)09
Y Psc D07(07)11
SS Cet 12(17)17D

1998 Sep 28 Mon

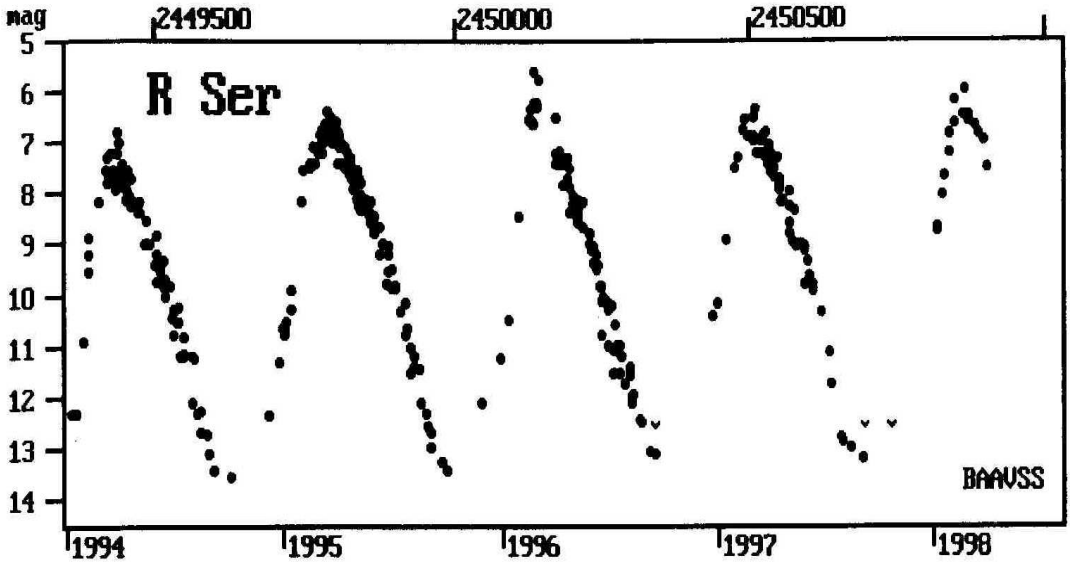
X Tri D07(06)08
U Sge D07(08)13L
RZ Cas D07(09)11
Z Vul 09(14)14L

1998 Sep 29 Tue

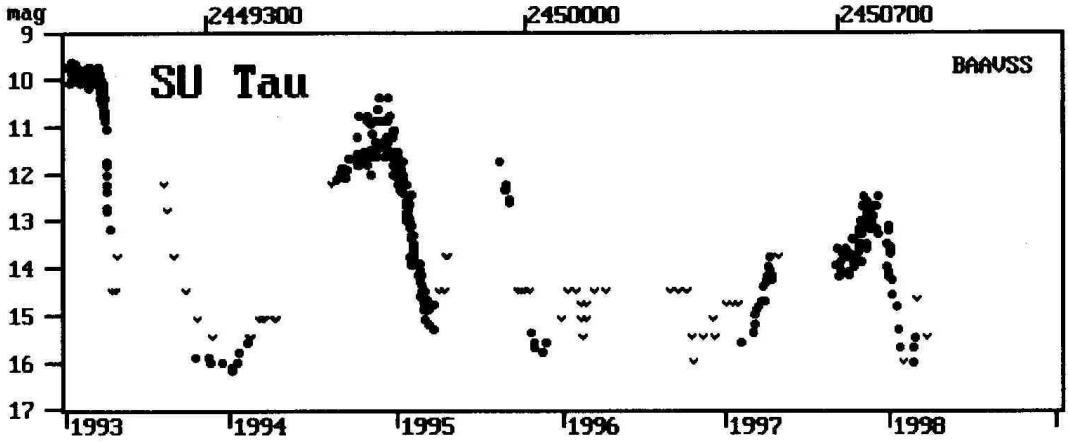
TW Dra D07(02)07
ST Per D07(03)07
X Tri D07(05)07
Z Dra 09(11)13
RZ Cas 11(13)16
RW Gem 14(19)17D

1998 Sep 30 Wed

SW Cyg D07(02)08
Z Per D07(03)08
X Tri D07(04)07
S Equ D07(10)14L
SS Cet 12(16)17D
RZ Cas 16(18)17D



R Ser 1994 to 1998. 375 observations by;- S W Albrighton, R Billington, R J Bouma, M Clarke, G A V Coady, M J Gainsford, S Godwin, B H Granslo, L Green, E H Horsley, T Markham, I P Nartowicz, G Pointer, G Poyner, J D Shanklin, J Toone.



SU Tau 1993 to 1998. 1103 observations by;- S W Albrighton, K G Andersson, R J Bouma, L K Brundle, G A V Coady, R C Dryden, M J Gainsford, M Gill, D Gill, B H Granslo, J Greaves, G M Hurst, C P Jones, R E Kelly, Miroslav Komorous, S Koushiappas, J Meacham, R A H Paterson, G Poyner, M D Taylor, J Toone, C Washington, E J W West, M Westlund.

The deadline for contributions to the September issue of the VSSC will be August 7th. 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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SECTION OFFICERS

Director Gary Poyner
67 Ellerton Road, Kingstanding, Birmingham, B44 0QJ.
Tel : 0121 6053716 E-mail : gp@star.sr.bham.ac.uk
Assistant Director Melvyn D. Taylor
17 Cross Lane, Wakefield, West Yorks, WF2. 8DA. Tel: 01924 374651
Chart Secretary John Toone
Hillside View, 17 Ashdale Road, Cressage, Shrewsbury, SY5 6DT.
Tel : 01952 510794 E-mail : john.toone@dial.pipex.com
Secretary Dave McAdam
33 Wrekin View, Madeley, Telford, Shropshire, TF7 5HZ.
Tel : 01952 432048 E-mail : dave@telf-ast.demon.co.uk
Nova/Supernova Secretary Guy M Hurst
16 Westminster Close, Basingstoke, Hants, RG22 4PP .
Tel & Fax : 01256 471074 E-mail : Guy@tahq.demon.co.uk
Pro-am Liaison Committee Secretary & Photoelectric Photometry Advisor
Roger D Pickard, 28 Appletons, Hadlow, Kent TN11 0DT
Tel : 01732 850663 E-mail : rdp@star.ukc.ac.uk
Circulars Editor and CCD Advisor Karen Holland
136 Northampton Lane North, Moulton, Northampton, NN3 7QW
Tel: 01604 671373 Fax: 01604 671570 E-mail: kho@star.le.ac.uk
Recurrent Objects Co-ordinator - as Director

TELEPHONE ALERT NUMBERS

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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).

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Telephone Gary Poyner (see above for number)

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