British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

No 109, September 2001

Contents

ISSN 0267-9272

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

259·01 15′ FIELD INVERTED

V478 HERCULIS 17h 21m 05·6s +23°39′37″ (2000)

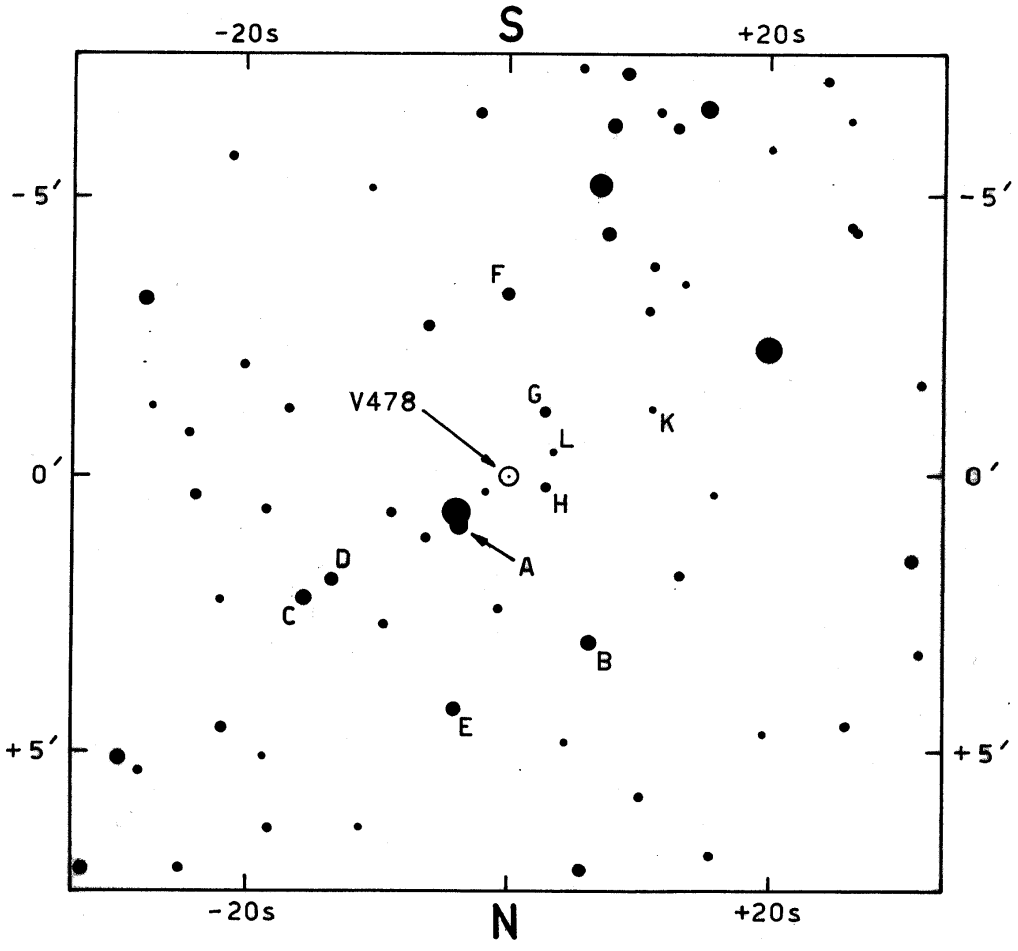


CHART: POSS	A 12·5	F 14·6	BAA VSS
	B 13·4	G 15·0	EPOCH: 2000
SEQUENCE: A.HENDEN	C 13·5	H 15·6	DRAWN: JT 14-07-01
	D 14·1	K 16·0	APPROVED: RDP
	E 14·3	L 16·8	

FROM THE DIRECTOR

ROGER PICKARD

Campaign to Monitor SU UMa
My thanks to those observers who kindly submitted data on this Pro-Am project; namely Len Brundle, Paul Charleton, Michael Gainsford, Gary Poyner, John Toone and Margareta Westlund. See the excellent article by Darren Baskill on page 6 of this Circular to discover how those observations have been used.

IBVS 5099
The title of this IBVS was *Unusual Slow Fading of Standstill in **AT Cnc*** and the authors were listed as Taichi Kato, Rod Stubbings, Maciej Reszelski, Eddy Muyllaert, Mike Simonsen, **GARY POYNER**, Pavol A Dubovsky, Andrew Pearce, Timo Kinnunen, Hiroyuki Maehara. 30 May 2001

Congratulations to Gary Poyner on his work in observing this Z Cam-type dwarf nova.

VARIABLE STAR SECTION MEETING AT ALSTON HALL, NEAR PRESTON, LANCASHIRE, OCTOBER 5-7, 2001

DENIS BUCZYNSKI AND ROGER PICKARD

Members are reminded that the Section will hold its 2001 meeting as a residential weekend at the above location.

Final Call for Poster Papers.
This will be an ideal opportunity to present poster papers of members work, whether you intend to be present or not. If you wish to submit a poster, but are unable to attend you may send it to either the Director, or Denis Buczynski, at any time up to the 1st of October 2001. Ideally the Posters should be A4 size and on stiff card. There will be a short session at the Meeting when the Papers will be formally presented and discussed.

Provisional Programme
About thirty VSS members have booked to date, and the programme is almost finalised. It is intended that there will be three strands to the meeting:

1) Technical talks by professionals currently researching various aspects of variable star astronomy. These will begin with a lecture by Allan Chapman on Friday evening after registration and will continue on the Saturday with Dr Maurizio Salaris, Dr Chris Lloyd, Professor Gordon Bromage and Dr Keith Robinson, culminating with a further lecture by Dr Allan Chapman on the Saturday evening.

2) There will be a series of workshop sessions on the Sunday, which will examine the variety of observational techniques which amateurs within the VSS employ. The workshop will

consist of some short "discussions" introduced by Section members who are active in different areas of variable star studies. Crucial to the success of this session is the active participation by everyone attending the meeting. It is hoped that section members will prepare and display poster papers of their own work, and discuss these during the workshop session. Topics already scheduled are: data analysis and reduction, catalogues, charts and sequences; CCD and filter techniques; nova and supernova search techniques; visual CV observing; the Condor Brow telescope project; amateur spectroscopy; automatic and robotic telescopes and other subjects too numerous to mention.

3) Relaxation! This most important aspect of the meeting will allow members to natter at length (over drinks if required) during the evenings. Also we will have access to the University of Central Lancashire's Observatories (housing a 15 inch refractor and two 12 inch Meade telescopes) during the dark hours, for those who just have to make that vital estimate. Finally we will be able to enjoy two evening talks by Dr Allan Chapman from the University of Oxford on the history of variable star astronomy. These two talks will be highlights of the weekend!

There are a few residential places left yet, but not many, as there has been a good take up, so if you do want to attend then contact Alston Hall directly on 01772 784661, and book your place. Should you wish to attend as a day visitor (perhaps you live locally and wish to commute), then there is plenty of time to book; again this should be done directly with Alston Hall who will give you details of availability and service.

For those who have booked we will be sending (during early September) a copy of the meeting programme and residential information about the Hall itself, including finder charts!

Should anyone require any extra information about this meeting then contact Roger (contact details on the back cover of this circular) or Denis on email:denis@cb978iau.demon.co.uk, or telephone: 01524 68530 (evenings). We look forward to seeing everyone at the meeting.

RECURRENT OBJECTS NEWS

GARY POYNER

A number of changes have recently been made to the Recurrent Objects Programme. Six stars have been dropped, and ten have been added. Those stars which have been dropped are as follows...

3C 279, V635 Cas, V1008 Her, GK Per, UV Per, SW UMa,

One of the main aims of the programme is to raise the profile of certain objects, in order that they might receive increased coverage. This has been successfully achieved with those stars which have now been dropped from the programme. Our knowledge of these systems has increased greatly over the past few years.

V1008 Her is now an established UGSS star, whilst **UV Per** and **SW UMa** have well determined orbital periods following extensive observations of both normal and superoutbursts. **GK Per**, although meeting the ROP criteria for having a greater than one year outburst cycle, is

fairly predictable in its outburst frequency. **3C 279** (the most active of AGN) is a worthwhile object for future monitoring, but does not really fit in with other objects on the programme. Recent activity in this object has born this out. It is hoped that a new AGN programme will soon be drawn up along with our friends in the Deep Sky Section, where 3C 279 will be first on the list!

V635 Cas remains a most interesting object, both for the amateur and especially for the professional astronomer. Unfortunately its very small outburst amplitude (0.5-1.0mv) and general faintness (14.5-15.5mv), means that coverage of this star has never been high. However previous success in detecting optical outbursts accompanying X-ray activity has raised interest levels in this system from several overseas observers. Now excellent all year round coverage is maintained by a small group of experienced observers from the UK, Europe, Scandinavia and the USA. With this in mind, I have decided to remove **V635 Cas** from the programme to make way for something new, safe in the knowledge that close monitoring for those subtle pre and post X-ray outbursts would continue.

The stars which are to be added to the ROP are as follows (positions are for 2000.0)...

DK Cas	00 18 08	+57 26	14.8v-19.5p	UGSS
V336 Per	03 22 53	+41 37	14.3p-<20.0p	UG
V701 Tau	03 44 01	+22 42	14.3V-<21.0p	UGSU
V650 Ori	05 31 08	+09 45	15.5p-<17.5p	UG
EUVEJ0854+390	08 54 14	+39 05	?? ??	CV
CP Dra	10 15 40	+73 26	14.3v-20.0p	UGSU
KV Dra	14 50 38	+64 03	14.4C- ?	UGSU
V478 Her	17 21 05	+23 39	15.5C-?	UGSU
CI Aql	18 52 04	-01 28	8.7V-	NR
CG Dra	19 07 33	+52 58	15.0p-17.5p	UG

Very little is known about **V336 Per**, **V650 Ori**, **EUVEJ0854+390** and **CG Dra**. The magnitude ranges given above are catalogued ranges only, and these systems may well exceed these limits during outburst.

V701 Tau has had only one previous outburst recorded in December 1995. Superhumps were recorded by observers at Ouda station, Japan, but clearly there is a need for further outburst detections to add to the data from the 1995 outburst. **DK Cas** also has one previous outburst on record in November 1999. The determination of the orbital period in this system remains a high priority. **CP Dra** (for new chart see inside cover) is a recognised UGSU star, established from data obtained from the February 2001 outburst. However the outburst interval remains unclear. This is also the case for **KV Dra** (formerly **RXJ 1450+6403)** whose UGSU status was identified during the May 2000 outburst by Vanmunster. **V478 Her** (for new chart see inside cover) was caught in outburst for the first time by Vanmunster in June; CCD photometry revealed superhumps, classifying the star as a new UGSU object. The outburst peaked at magnitude 15.5C, suggesting that it may be a little faint for the ROP. However, so little is known about the star that it is quite possible that subsequent outbursts could be brighter.

There is a new web site for the Recurrent Objects Programme. Details of the programme, and a selection of light curves can now be found at
http://members.aol.com/GaryPoyner/rop.html

NEWS FROM THE SECTION SECRETARY

JOHN SAXTON

Readers will no doubt have noticed that there are no lightcurves inside the cover of the current circular. This is simply because I'm still learning how to use the database!

I received the database on CD-ROM from Dave McAdam at the end of May, and I am presently in the midst of writing my own software to handle it. Very briefly, the database consists of large numbers of ASCII files (one for each star) with associated files containing the sequence information. It seems extremely well laid out - thank you Dave! Dave and I agreed that it was probably best if I wrote my own software to handle it. This has the advantage that I will properly understand how things work, and can easily modify it if necessary. I've done a considerable amount of programming as part of my work, and have also done a great deal at home; for example, I wrote my own CCD image analysis/photometry software. My programming is done in FORTRAN, which I learnt when I was doing my PhD and have used ever since.

It seems there are three parts to handling the database: (i) reading/checking/decoding the files received from observers; (ii) putting the data into the database and (iii) extracting data from the database. Part (i) is, no doubt, the hardest, and so far all my effort has been spent on this. I haven't got as far as (iii), hence the lack of lightcurves in this issue! In fact, part (i) is basically working. My software will now read and completely decode the standard format of data file received from observers, but making sure this procedure works reliably will take a little while longer. For example, this evening I realised that fractional estimates occasionally get reported as A(1)C(1)V; this is going to require a few dozen more lines of code. Also, the software needs to be able to cope with common typing errors, for example.

So, I am making progress. Stay tuned for another progress report in the next circular, hopefully with some lightcurves!

CHART NEWS

JOHN TOONE

The following Main Programme charts are now available from the chart secretary:

025.02 T CrB (formerly 025.01)
50 degree, 9 degree and 2 degree field charts have been drawn, and the sequence has been amended to adopt Tycho 2 (Vj) magnitudes. Comparison stars H and K have been dropped because they are **MS Ser** and **NSV7378** respectively. They are replaced by new comparisons P (**SAO84151**, mag 8.37) and R (**SAO84117**, mag 9.22). **Alpha Oph** (mag 2.08) and S (**SAO84100**, mag 10.30) are also introduced. **T CrB** can go fainter than M, so N (**GSC2037 1228**, mag 11.30) is added to extend the sequence.

059.02 U Ori (formerly 059.01)
5 degree, 50' and 15' field charts have been drawn with the sequence completely overhauled. For many years observers have commented that comparison stars G and J are assigned

magnitudes that are too bright. This was confirmed, and other problems with the sequence were uncovered when they were investigated using Tycho 2 and Brian Skiff's photometry. The new sequence is trimmed by deleting B, E, G, K, N, Q, T, W, X and AA. Stars added are DD (**SAO94934**, mag 7.31), BB (**GSC 1320 878**, mag 13.78) and CC (no GSC ident, mag 14.41). The new sequence is derived from Tycho 2 (Vj), B. Skiff photometry and Kitt Peak CCD(V).

The following Eclipsing Binary Charts are now available from the Eclipsing Binary Secretary:

252.01 ZZ Boo (formerly JEI 72.02.06)
A 9 degree field chart has been drawn retaining the previous sequence but with magnitudes amended to Hipparcos (Vj).

253.01 RS CVn (formerly JEI 72.02.06)
A 5 degree field chart has been drawn retaining the previous sequence but with magnitudes amended to Tycho (Vj).

254.01 U CrB (formerly JEI 1986 July 6)
A 5 degree field chart has been drawn retaining the previous sequence but with magnitudes amended to Tycho 2 (Vj).

255.01 Z Vul (formerly JEI 72.02.05)
A 1.5 degree field chart has been drawn to show the close companion (new comparison star L) to Z Vul. The sequence has been amended to adopt Tycho 2 (Vj) magnitudes. Comparison stars C, E, F and H are dropped and comparison L (**GSC 2128 1962**, mag 10.2) is added. Observers are urged to take care when observing Z Vul at minimum because of the close proximity of L.

The following AGN charts are now available from the chart secretary:

151.02 3C-279 (formerly TA chart GMH920516)
1 degree and 15' field charts have been drawn with a sequence derived from Tycho 2(Vj), A. Henden and VSNET. The previous sequence was based on GSC magnitudes.

244.01 3C-273 (formerly JT 15-7-84)
A 40' field chart has been drawn with the previous sequence retained. The magnitude of comparison star A has been amended from 10.1 to 10.29.

The following recurrent object charts are now available from the chart secretary:

256.01 V650 Ori
A 25' field chart has been drawn with a sequence from mag 11.6 to 16.3 by A. Henden adopted.

257.01 DK Cas
A 15' field chart has been drawn with a sequence from mag 11.8 to 16.4 by A. Henden adopted.

258.01 CP Dra (see inside cover for new chart)
A 15' field chart has been drawn with a sequence from mag 12.7 to 16.4 by A. Henden adopted.

259.01 V478 Her (see inside cover for new chart)
A 15' field chart has been drawn with a sequence from mag 12.5 to 16.8 by A.Henden adopted.

PROGRESS ON THE SU UMA PRO-AM PROJECT

DARREN BASKILL

This article is a quick overview of the successful completion of the recent XTE monitoring campaign of the dwarf nova, SU Ursae Majoris.

Firstly, I'd like to give thanks to everyone who contributed their optical observations, the results of which can be seen in figure 1 on the next page. As you can see, the campaign is divided into two sections: optical and x-ray observations. I'll begin by discussing the optical data.

The first thing you may notice is that observations from the AAVSO database appear to dominate. However, don't let this put anyone off, since every observation counts on its own individual merits. The BAAVSS have fewer observations (which is hardly surprising - I'm writing this in mid-July with thick cloud overhead!) which just means that BAAVSS observers are less likely to catch an outburst than the AAVSO. But the BAAVSS are still catching some outbursts first, which is what we are all aiming for.

The light curves show that the x-ray observations appear to mirror the optical observations. But what causes this? Even during quiescence material is falling through the disc, giving optically an ~14.5 apparent magnitude disc. Meanwhile, XTE detects ~1.5 x-rays per second from material pounding the white dwarf at the centre of the disc. When the mass transfer rate through the disc increases, the disc optically outbursts. After a delay, the region at the centre of the disc becomes optically thick due to the in-flowing material, and the x-rays cannot escape. This is why the XTE count rate falls to zero.

During the campaign, we managed to catch six outbursts. This was the ultimate aim of the project, allowing comparisons of the x-ray emission between successive outbursts. A graph of recurrence frequency against x-ray brightness revealed that SU UMa was the best target; it outbursts every ~15 days, and it is the second x-ray brightest dwarf nova observed with the ROSAT satellite. Unfortunately, there are potential problems with both these points: the ROSAT observations were short snapshots within the outburst cycle, so we had no handle on how the x-ray count rate varied, and SU UMa undergoes superoutbursts (a ~5 times longer outburst). Had we been unlucky, we would have observed just one long superoutburst.

You may also note that, on some occasions, the x-ray count rate appears to go below zero! Of course, this is a physical impossibility, but demonstrates the limitations of XTE.

Many x-ray observatories have imaging capabilities. If you have internet access, you can see the x-ray view of any area of the sky, using the ROSAT all sky survey at:
http://ledas-www.star.le.ac.uk/arnieV4/dbframe/frame_rassimages.html
(Just type in an object name, click "resolve name", "submit query" and then "products", before clicking on the image to get a full sized image of that region of sky).
Imaging x-ray telescopes do not just produce pretty images, but also allow foreground x-rays to be separated from background x-rays. There is a constant hiss of background x-rays, of which at least 75%, if not all, are coming from very distant active galaxies. A ROSAT image of the moon demonstrates this well - the dark side of the Moon is actually darker than the "blank" x-ray sky behind it! [http://ledas-www.star.le.ac.uk/rosat-goc/moon.gif]

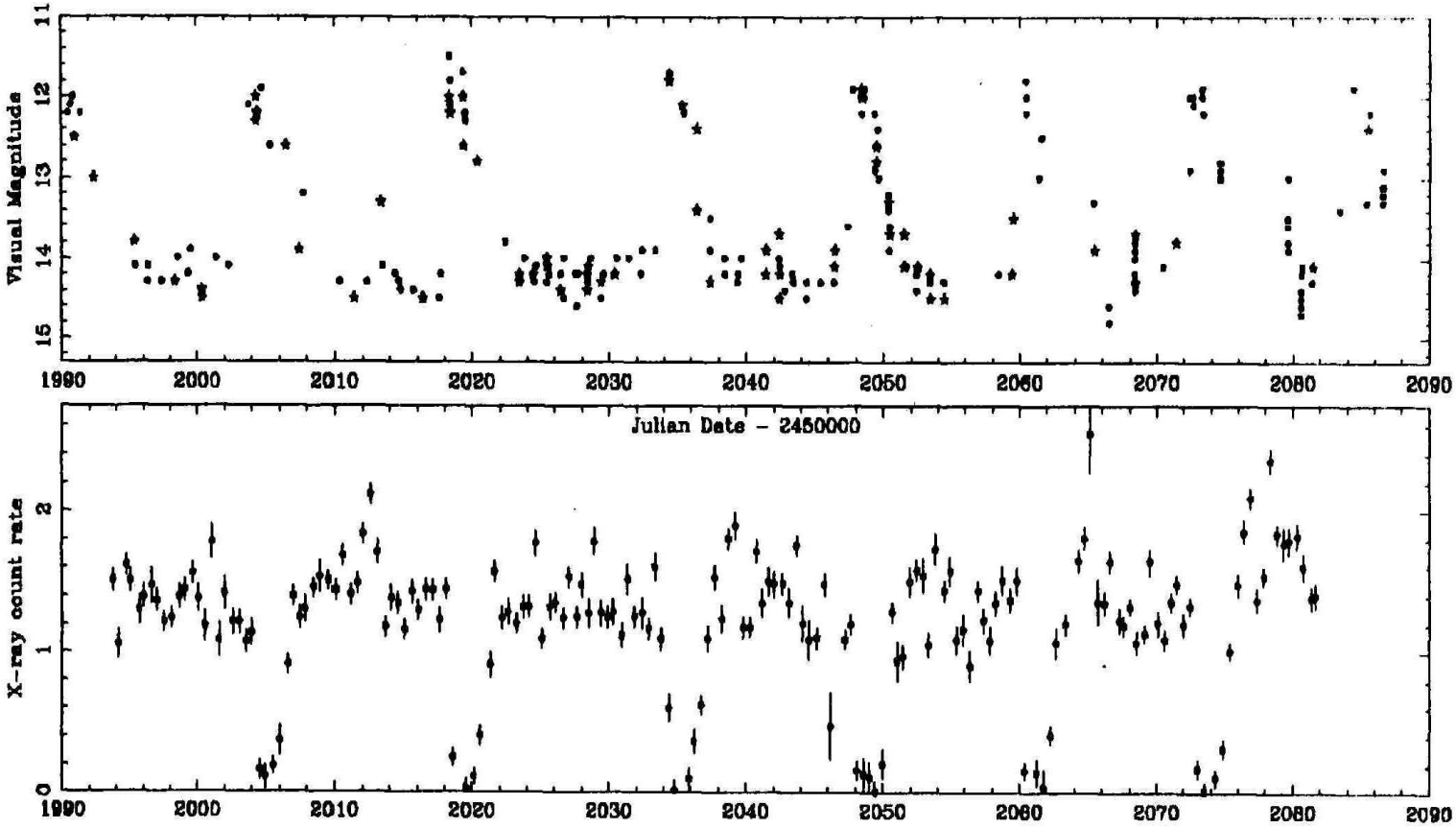


Figure 1: The optical and x-ray light-curve of the dwarf nova SU UMa. Top panel shows the optical observations (the contributions by the BAA-VSS are shown as stars, and the AAVSO contribution as dots), and the bottom panel shows the x-ray light curve from the XTE satellite (error bars are 1-sigma error, and so the x-ray count rate has a 68% chance of lying within the range indicated).
Source: http://www.star.le.ac.uk/~dbl/suuma.ps

However, the XTE satellite has no imaging capabilities whatsoever. A “guess” of the background is subtracted from the data, which is based on frequent observations of “empty” patches of sky. Where negative count rates occur, the background has been over-estimated. This problem can usually be neglected, as the foreground usually dominates any error on the background estimation, but this is not the case during the optical outburst when there is little x-ray emission.

Another striking feature of the light-curves are the wild variations in the x-ray count rate during quiescence. So, even whilst the majority of the disc is in a stable quiescent state, there are still rapid variations in the amount of material hitting the white dwarf from the inner disc. It would have been nice to have been able to observe SU UMa in the extreme ultraviolet at the same time, which would have told us the exact mass flow through the inner disc.

These x-ray fluctuations agree with recent theoretical work carried out by colleagues here at Leicester University (Graham Wynn, Mike Truss and James Murray). Their research simulates the physics occurring in dwarf novae accretion discs. By using UKAFF, a 128 processor supercomputer, they have discovered what they call mini-outbursts - small amplitude, short lived oscillations in both x-ray and optical wavelengths. Further analysis of the data is required to confirm if these mini-outbursts are what we are observing in the SU UMa data. UKAFF has also been used to simulate a host of other astrophysical phenomena such as colliding stars, star cluster formation, and merging neutron stars, to name but a few. For more information, see http://www.ukaff.ac.uk

In this article I have quickly described some of the highlights of our observing campaign. Much more work still needs to be done on this data, and I have yet to look at the spectral information! The detailed analysis of this data may take a year or more to complete, due to the more urgent task of completing my PhD thesis. When I finally complete a thorough analysis of the SU UMa data, we will have improved our understanding of how dwarf novae work. This is something which would not have been possible without the help of the amateur astronomers who have contributed to this project.

Darren Baskill: dbl@star.le.ac.uk; http://www.star.le.ac.uk/~dbl

ECLIPSE OF OW GEMINORUM

ALEX VINCENT

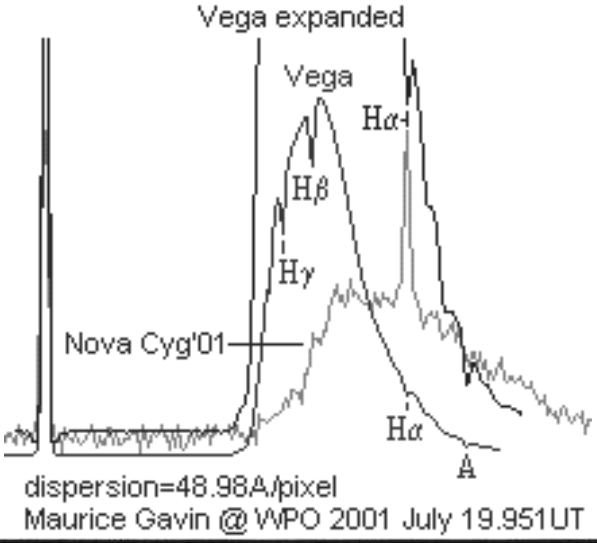
The long period eclipsing binary star OW Geminorum will be at minimum on January 3/4, 2002. This star has a period of 3.4459 years (1258.63 days), and at maximum it is of magnitude 8.2 and drops to 10.0 at minimum. The duration of the eclipse lasts 16 days, and so observations should be made between December 26 and January 12. The primary star is almost totally eclipsed at minimum.

The orbit of OW Geminorum is elongated and therefore secondary minima are to one side of primary minima, and the next one is due around October 26, 2002. The amplitude will be much shallower at secondary minimum. The star is at RA 06h 31m 42s, Dec +17° 04.9' (2000). It is about 1.5 degrees of the second magnitude star Gamma Geminorum Good observing.

NOVA CYGNI 2001

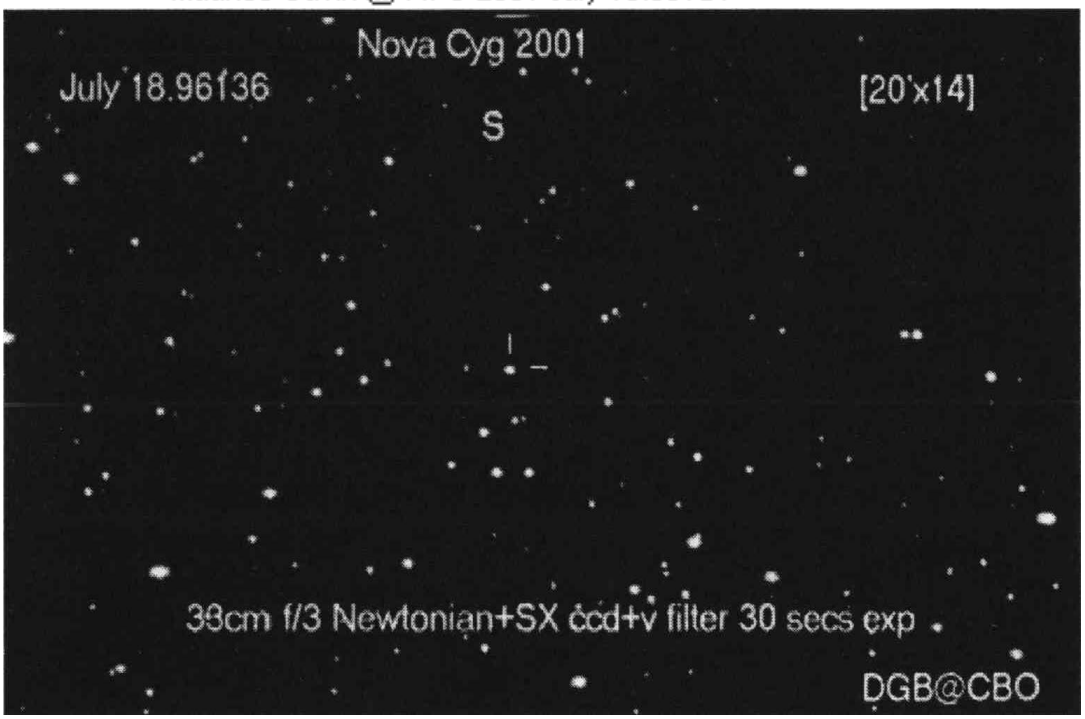
KAREN HOLLAND

Nova Cyg 2001, now designated V2274 Cyg was discovered at magnitude 11.9 by Yuji Nakamura using Tri-X film exposed on July 13.651UT with a 200mm f/4 lens. Subsequent images taken by H. Fukushima, NAO, resulted in the following magnitudes: July 16.515, V = 11.69; 16.533, I = 9.55.



The spectrogram shown here was taken by Maurice Gavin, Worcester Park on July 18 at 02h08m36sUT with a 0.30-m Schmidt-Cassegrain telescope + grating + MX9 CCD on a 60 sec exposure. Unfortunately poor conditions meant that a spectral analysis was inconclusive.

The image below was taken by Denis Buzcynski



LONG TERM TRENDS IN ECLIPSING BINARIES

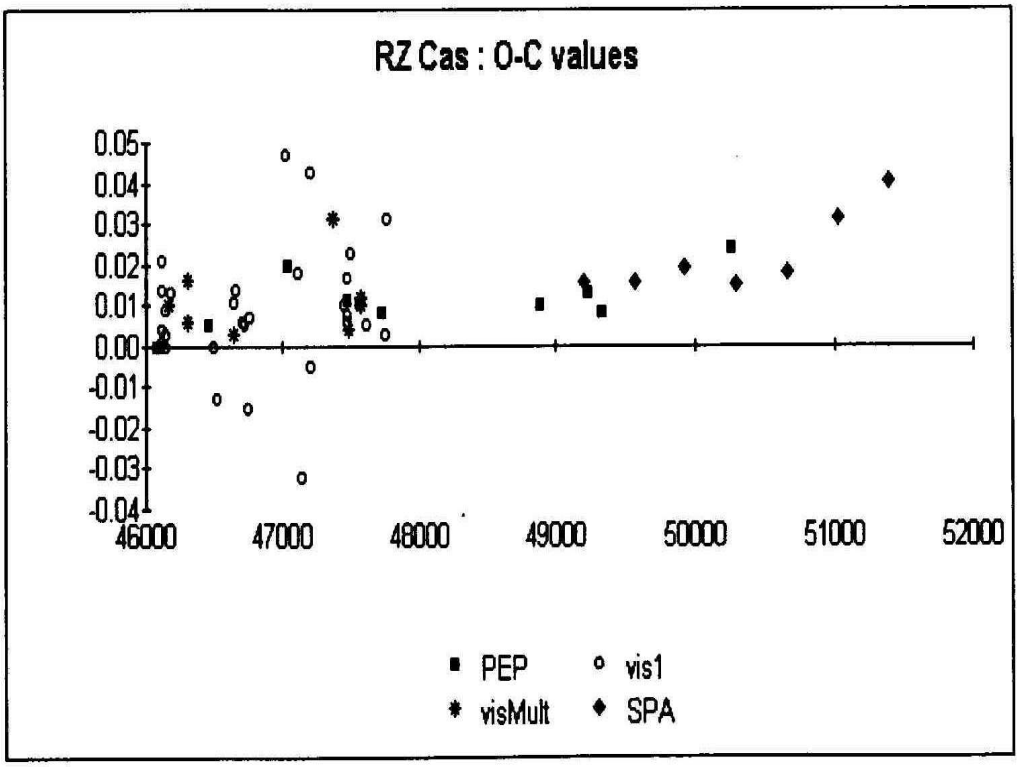
TONY MARKHAM

From time to time analyses of eclipsing binary minima are published. These quote O-C values, showing how the observed time of eclipses differed from those calculated using the elements in the GCVS. Negative values indicate that the eclipse is occuring earlier than predicted; positive values indicate that it is late.

However, these analyses typically only list results for a particular year, so it is not straightforward to see long term patterns.

The accompanying graphs summarise the results published in VSS circulars since the late 1980s for primary eclipses of four eclipsing binaries. The **RZ Cas** graph also includes results from the SPA VSS.

In these graphs, *PEP* indicates that the analyses were based on photoelectric observations of a single eclipse; *vis1* indicates that the analysis was based on visual observations of a single eclipse by a single observer; *visMult* indicates that observations of several eclipses were combined and *visSPA* indicates analyses of all visual observations by SPA VSS members during a calendar year. O-C values are in days; the horizontal axis shows the Julian Date-2400000.

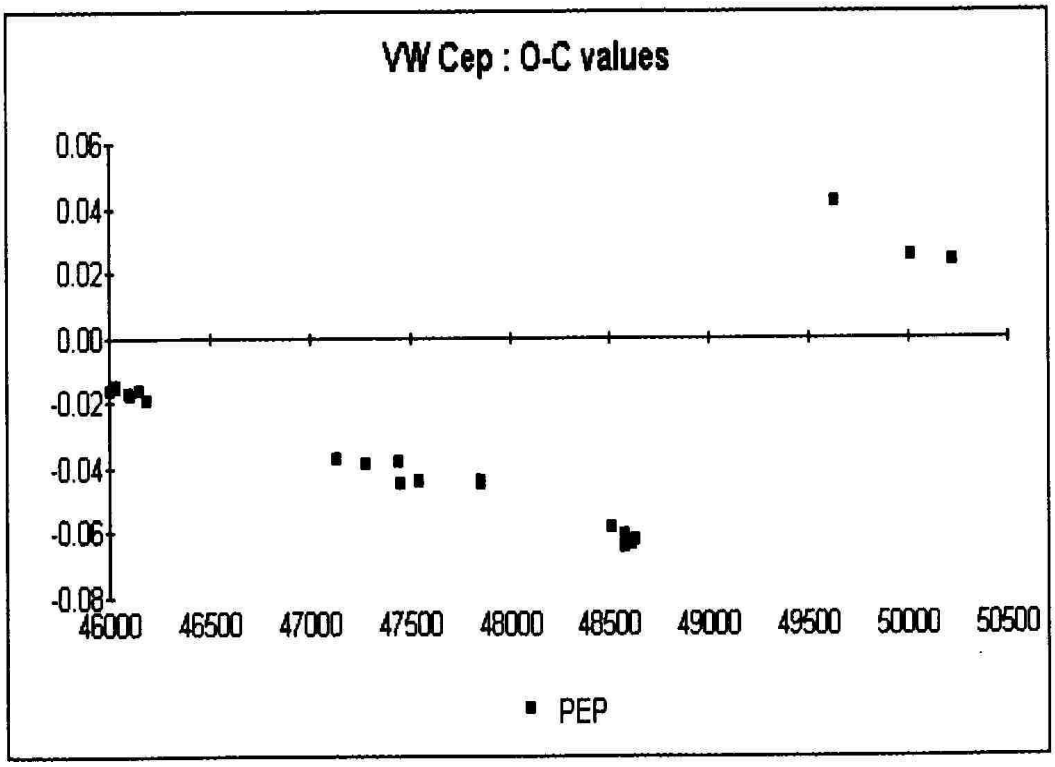


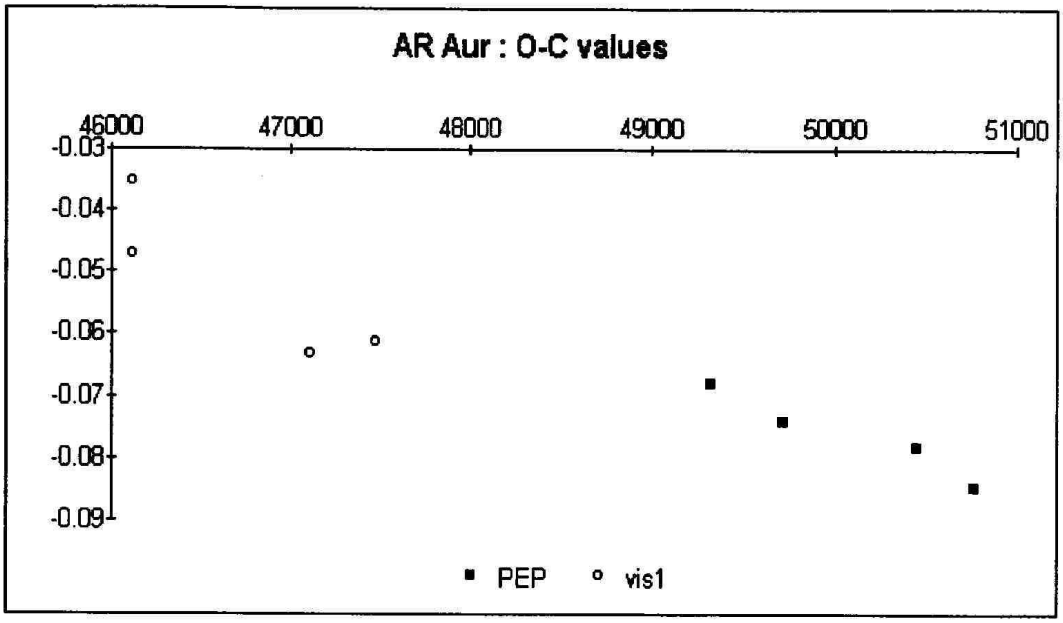
As can be seen, analyses based on visual observations of a single eclipse by a single observer show considerable scatter. However combining visual observations of several eclipses by several observers significantly reduces this scatter. Similarly PEP results show low scatter.

For **RZ Cas**, the trend is for the O-C values to become increasingly positive, indicating that the true orbital period is slightly longer than the GCVS value. For **AR Aur** and **AR Lac**, the opposite is true.

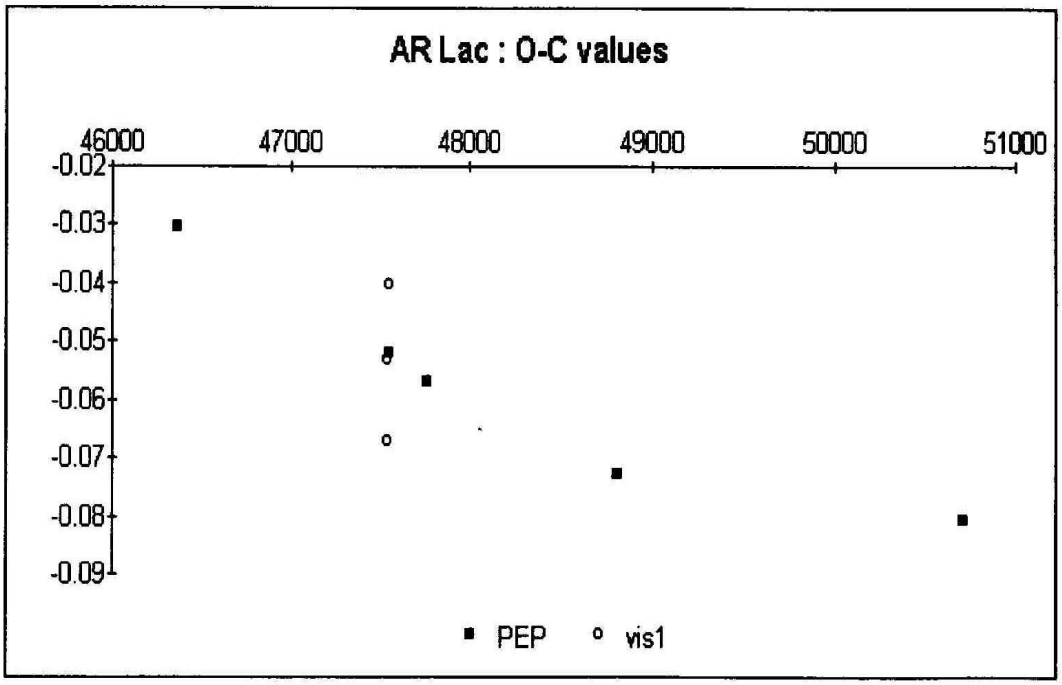
For **VW Cep**, the situation is more confusing. All analyses claim to have used the elements from the GCVS 4th edition, but there is an apparent jump in O-C values after JD (24)49500. Results published in IBVS circulars confirm the negative values prior to this date, but unfortunately they include no published O-C values for after this date.

There may be a simple explanation however which doesn't require unusual behaviour in **VW Cep** itself. VW Cep is an EW type variable with a period of approx 0.278 days. Since both stars in such systems are very similar, it isn't straightforward to say whether an observed eclipse is a primary or a secondary eclipse. The interval between primary and secondary eclipses in VW Cep will be approx half of the orbital period - i.e. approx 0.139 days. Thus by JD 24(48500) the primary eclipse was occuring so early that it was more than half of the way to the predicted time of the preceding secondary eclipse.





It is probably the case therefore that the three points with positive O-C values were actually observations of secondary eclipses occuring early. If we make this assumption then the last 3 points (+0.0422, +0.0251, +0.0239 days) instead become -0.0969, -0.1140, -0.1152 days, and hence shift below the axis to continue the downward trend of the earlier years.



IBVS's 4951 - 5080

GARY POYNER

4951 CCD Photometry of the eclipsing binary **HV Aqr**. (Petr and Marek, 2000)
4952 BV Photometry of the binary star **VW LMi**. (Dumitrescu, 2000)
4953 UBV observations of **AG Dra** in the end of the latest active phase and after it. (Tomov and Tomova, 2000)
4954 CCD Light curve and revised period for the RRc Variable **AP Ser**. Blattler, 2000)
4955 **1432-0033**: A new eclipsing SU UMa type dwarf nova. (Vanmunster et al, 2000)
4956 First determinations of photoelectric minima, real period and study of the period of **NP Pav**. (Cerruti, 2000)
4957 Nova **CI Aql** in decline. (Schmeja et al, 2000)
4958 On the variability of early K stars. (Adelman, 2000)
4959 On the variability of K5-M stars. (Adelman, 2000)
4960 2000 BVRI photometry of **FK Comae**. (Tas and Evren, 2000)
4961 New times of minima and light elements of **KR Cygni**. (Sipahi and Gulmen, 2000)
4962 New CCD Observations of **UU Sagittae** and **V477 Lyrae**. (Kiss et al, 2000)
4963 **P Cygni** in 1987-1993. (Zsoldos, 2000)
4964 Three Delta Scuti stars in the open cluster **NGC 2506**. (Kim and Chun, 2000)
4965 CCD Light curves of ROTSE1 variables, I: **GSC 3099.905 Herculis** (Blattler and Diethelm, 2000)
4966 CCD Light curves of ROTSE1 variables, II: **GSC 3100.1616 Herculis** (Blattler and Diethelm, 2000)
4967 CCD times of minima of eclipsing binary systems. (Biro et al, 2000)
4968 On the variability of late B III-V stars. (Adelman et al, 2000)
4969 On the variability of A3-F0 luminosity class III-V stars. (Adelman, 2000)
4970 An SX Phe star in the globular cluster **M15**. (Jeon et al, 2000)
4971 The orbital period of **LV Herculis**. (Torres, 2000)
4972 **GSC 156.1365**, a new EB eclipsing binary star in Monoceros. (Gomez-Forrellad et al, 2000)
4973 **NSV 01756**: A red variable in Eridanus. (Gomez-Forrellad and Henden, 2000)
4974 **NSV 11766**: A new short period pulsating variable. (Garcia-Melendo and Nomen-Torres, 2000)
4975 CCD Light curves of ROTSE1 variables III: **GSC 2625.1563 Herculis**.(Blattler and Diethelm, 2000)
4976 CCD Light curves of ROTSE1 variables IV: **GSC 2636.1753 Lyrae**.(Blattler and Diethelm, 2000)
4977 BVRI Observations of **V516 Cygni** in outburst. (Spogli et al, 2000)
4978 BVRI Observations of **KT Persei** in outburst. (Spogli et al, 2000)
4979 Broad band photometry of **CG Cygni.** (Afsar and Ibanoglu, 2000)
4980 Three colour photometry of **IN Comae**. (Afsar and Ibanoglu, 2000)
4981 **GSC 2293.1021**: A newly discovered W UMa variable. (Liu et al, 2000)
4982 CCD Light curves of ROTSE1 variables V: **GSC 3131.476 Lyrae, GSC 2646.1938 Lyrae.** (Blattler and Diethelm, 2000)
4983 Discovery of eclipsing binary nature of **SAO 31628 = BD+49°2997,** common comparison star for **CH Cygni.** (Sokoloski and Stone, 2000)
4984 On the variability of A0-A2 luminosity class III-V stars. (Adelman et al, 2000)
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4986 **UY Piscium**: 1990-1992. (Zsoldos, 2000)
4987 Stromgren photometry of the T Tauri star **SU Aurigae**: Multi timescale light variations. (Nadalin et al, 2000)
4988 First photometry observations of **GQ Draconis**. (Atay et al, 2000)
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4993 On the variabilty of G0-G9 stars. (Adelman et al, 2000)
4994 **V383 Velorum**, a new Dwarf Nova. (Williams, 2000)
4995 CCD Light curves of ROTSE1 Variables VII: **GSC 3564.3059 Cygni, GSC 3121.1799 Lyrae**. (Blattler and Diethelm, 2000)
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4998 Light elements and a preliminary solution for the light curve of the eclipsing binary **GSC 1534.0753** (Lubcke et al, 2000)
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5014 The EUV source **HD 52452:** Discovery of a likely triple system.(Messina et al, 2001)
5015 Historical archive photometry of **μ Cephei**. (Skiff, 2001)
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classified as type E. (Diethelm, 2001)

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TRISTRAM BRELSTAFF

Reconnaisance of Suspected Old Novae, J. W. Robertson et al, Astron. J., 119, 1365-1374 (2000) - The following old novae are identified at minimum: **SV Ari, V465 Cyg, SS LMi, V2104 Oph, GR Ori, V529 Ori, UW Per, UW Tri.**

The Cessation of Eclipses in SS Lacertae: The Mystery Solved, G. Torres and R. P, Stefanik, Astron. J., 119, 1914-1929 (2000) - **SS Lac** is listed in the GCVS as a 10th mag, 14.4d eclipsing binary and lies in the open cluster NGC 7209. However, its eclipses have not been seen since the 1930's. The present authors use radial velocity measurements to show the presence of a 3rd body in a 679d orbit. Perturbations by this 3rd body are the cause of the disappearance of the eclipses. The authors also reanalyse published times of eclipse and show the presence of apsidal motion with a period of around 1000 years.

Analyses of the Currently Non-eclipsing Binary SS Lacertae or SS Lacertae's Eclipses, E. F. Milone et al, Astron. J., 119, 1405-1423 (2000) - Remeasure Harvard plates and reanalyse all available data to show that the eclipses of **SS Lac** probably started occurring in 1885, reached maximum amplitude in 1911 and stopped occurring in 1937. Modelling suggests that the components are both early A-type stars with masses of 2.6 solar masses. The distance is about 900pc and membership of NGC 7209 is confirmed.

ECLIPSING BINARY PREDICTIONS

TONY MARKHAM

The following predictions, based on the latest Krakow elements, 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 (UT-12h). D and L are used to indicate where daylight and low altitude respectively prevent part of the eclipse from being visible. The variables (charts available on BAAVSS web page) covered by these predictions are :

Star	Mag Range	Star	Mag Range	Star	Mag Range
RZ Cas	6.18 - 7.72 V	S Equ	8.0 - 10.08 V	U Sge	6.45 - 9.28 V
U Cep	6.75 - 9.24 V	RW Gem	9.53 - 11.76 V	HU Tau	5.9 - 6.7 V
SS Cet	9.4 - 13.0 v	V640 Ori	11.2 - 13.5 p	RW Tau	7.98 - 11.59 V
SW Cyg	9.24 - 11.83 V	Z Per	9.7 - 12.4 p	X Tri	8.88 - 11.27 V
Z Dra	10.8 - 14.1 p	ST Per	9.52 - 11.40 V	TX UMa	7.06 - 8.80 V
TW Dra	8.0 - 10.5 v	Y Psc	9.44 - 12.23 V	Z Vul	7.25 - 8.90 V

2001 Oct 1 Mon
U Sge D06(01)06
Z Per D06(08)13
SW Cyg 09(15)17D
RW Gem L10(07)12
TX UMa 12(17)17D
Z Dra 12(15)17D

2001 Oct 2 Tue
ST Per D06(04)09
U Cep D06(09)14
Z Vul D06(09)14L
RW Tau L08(07)11

2001 Oct 3 Wed
RZ Cas D06(05)07
TW Dra D06(09)14

2001 Oct 4 Thu
Z Dra D06(08)10
Z Per D06(09)14
U Sge D06(10)13L
RZ Cas 07(10)12
Y Psc 11(16)16L
TX UMa 14(18)17D
ST Per 16(20)17D
U Cep 16(21)17D

2001 Oct 5 Fri
RZ Cas 12(14)17
Z Dra 14(16)17D

2001 Oct 6 Sat
TW Dra D06(04)09
SW Cyg D06(04)10
RZ Cas 17(19)17D

2001 Oct 7 Sun
Z Vul D06(07)13
U Cep D06(09)14
S Equ D06(10)13L
Z Per D06(10)15
ST Per 08(12)16
RW Tau 15(19)17D
TX UMa 15(20)17D

2001 Oct 8 Mon
Y Psc D06(10)14
Z Dra 07(09)12
X Tri 17(19)17D

2001 Oct 9 Tue
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U Cep 16(21)17D
X Tri 16(19)17D
RW Gem 16(21)17D

2001 Oct 10 Wed
ST Per D06(03)07
RZ Cas 07(09)12
Z Per 07(12)17
RW Tau 09(14)17D
SW Cyg 12(18)17D
X Tri 15(18)17D
TX UMa 17(21)17D

2001 Oct 11 Thu
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HU Tau L08(07)11
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X Tri 15(17)17D

2001 Oct 12 Fri
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U Cep D06(09)14
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ST Per 15(19)17D
RZ Cas 16(19)17D

2001 Oct 13 Sat
RW Tau L07(08)13
HU Tau L08(08)12
Z Per 08(13)17D
X Tri 13(16)17D

2001 Oct 14 Sun
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ST Per 06(10)14
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X Tri 12(15)17
V640 Ori L12(10)12

2001 Oct 16 Tue
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Z Dra 11(13)15

X Tri 11(14)16
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U Cep D06(08)13
TW Dra D06(09)15
HU Tau L08(11)15
X Tri 11(13)16
RZ Cas 11(13)16
S Equ 12(17)12L
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SS Cet 17(21)17D
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SS Cet 16(21)18D
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RZ Cas 10(13)15
HU Tau 11(15)18D
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Z Dra 14(16)18D
RZ Cas 15(17)18D
U Cep 15(20)18D
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TW Dra 14(20)18D
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2001 Nov 3 Sat
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2001 Nov 5 Mon
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2001 Nov 8 Thu
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2001 Nov 12 Mon

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2001 Nov 13 Tue

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2001 Nov 14 Wed

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2001 Nov 15 Thu

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2001 Nov 20 Tue

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RW Gem 16(21)18D

2001 Nov 22 Thu

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2001 Nov 23 Fri

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2001 Nov 26 Mon

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2001 Nov 27 Tue

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2001 Nov 28 Wed

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2001 Nov 29 Thu

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2001 Nov 30 Fri

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2001 Dec 1 Sat

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TW Dra D05(07)12
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Z Per 06(11)16
HU Tau 13(17)19L
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2001 Dec 2 Sun

ST Per D05(02)07
RW Tau D05(04)09
X Tri D05(05)08

2001 Dec 3 Mon

RZ Cas D05(04)06
X Tri D05(04)07
RW Gem L06(08)13
SS Cet 07(12)15L
U Cep 12(17)19D
HU Tau 14(18)18L

2001 Dec 4 Tue

TW Dra D05(03)08
X Tri D05(04)06
U Sge D05(06)09L
RZ Cas 06(09)11
Z Per 07(12)17
Z Dra 07(10)12
SW Cyg 09(15)14L
ST Per 14(18)19D
SW Cyg L16(15)19D
RW Tau 18(23)18L

2001 Dec 5 Wed

X Tri D05(03)05
Z Vul D05(05)09L
RZ Cas 11(13)16
HU Tau 15(19)18L
Z Dra 16(18)19D

2001 Dec 6 Thu

X Tri D05(02)05
U Cep D05(05)10
RW Gem L06(05)10
SS Cet 07(11)15L
RZ Cas 16(18)19D
TW Dra 17(22)19D

2001 Dec 7 Fri

Z Dra D05(03)05
ST Per 05(10)14
Z Per 09(13)18
Y Psc 12(16)12L
RW Tau 13(17)18L
HU Tau 17(21)18L

2001 Dec 8 Sat

S Equ D05(06)09L
TX UMa L07(02)07
Z Dra 09(11)14
U Cep 12(17)19D

2001 Dec 9 Sun

RZ Cas D05(04)06
SW Cyg D05(05)11
RW Gem L06(02)07
SS Cet 06(11)14L
TW Dra 12(17)19D
Z Dra 18(20)19D

2001 Dec 10 Mon

ST Per D05(01)05
Z Vul D05(03)08
RZ Cas 06(08)11
RW Tau 07(12)16
Z Per 10(15)19D

2001 Dec 11 Tue

U Sge D05(01)06
Z Dra D05(05)07
U Cep D05(05)10
Y Psc 06(10)12L
TX UMa L07(04)08
RZ Cas 10(13)15
RW Gem 17(22)19D

2001 Dec 12 Wed

SS Cet 06(10)14L
TW Dra 08(13)18
Z Vul 09(14)09L
Z Dra 11(13)16
ST Per 13(17)18L
RZ Cas 15(18)19D
Z Vul L19(14)19D

2001 Dec 13 Thu

RW Tau D05(06)11
Z Per 11(16)19L
U Cep 12(17)19D
SW Cyg 13(19)14L
SW Cyg L15(19)19D

2001 Dec 14 Fri

U Sge D05(10)08L
TX UMa L06(05)10
RW Gem 14(19)19D

2001 Dec 15 Sat

Z Vul D05(01)06
S Equ D05(03)08
RZ Cas D05(03)05
Y Psc D05(05)09
Z Dra D05(06)09
TW Dra D05(08)13
ST Per D05(08)12
SS Cet 05(10)14L

2001 Dec 16 Sun

RW Tau D05(01)05
HU Tau D05(02)06
U Cep D05(04)09
RZ Cas 05(08)10
Z Dra 13(15)17
Z Per 13(17)18L

2001 Dec 17 Mon

TX UMa L06(07)12
Z Vul 07(12)09L
RZ Cas 10(12)15
RW Gem 11(16)19D
U Sge L19(19)19D

2001 Dec 18 Tue

HU Tau D05(03)07
TW Dra D05(03)09
SW Cyg D05(08)13L
SS Cet D05(09)14
S Equ 08(13)08L
U Cep 11(16)19D
RW Tau 14(19)18L
RZ Cas 15(17)19D
X Tri 15(17)15L

2001 Dec 19 Wed

Z Dra 06(08)10
Z Per 14(19)18L
X Tri 14(17)15L
Z Vul L18(23)19D

2001 Dec 20 Thu

HU Tau D05(05)09
TX UMa L06(08)13
RW Gem 08(13)18
ST Per 11(15)18L
X Tri 14(16)15L
Z Dra 14(17)19D
TW Dra 18(23)19D

2001 Dec 21 Fri

U Sge D05(04)08L
U Cep D05(04)09
SS Cet D05(08)13
RW Tau 09(14)17L
X Tri 13(15)15L

2001 Dec 22 Sat

S Equ D05(00)05
HU Tau D05(06)10
RZ Cas D05(07)09
Z Vul D05(10)08L
X Tri 12(15)15L
Z Per 15(20)18L
SW Cyg 16(22)19D

2001 Dec 23 Sun

ST Per D05(07)11
RW Gem D05(09)15
TX UMa L06(10)15
Z Dra 07(10)12
RZ Cas 09(12)14
U Cep 11(16)19D
X Tri 12(14)15L
TW Dra 13(18)19D

2001 Dec 24 Mon

HU Tau D05(07)11
SS Cet D05(08)12
RW Tau D05(08)13
U Sge 07(13)08L
X Tri 11(13)15L
RZ Cas 14(16)19
Z Dra 16(18)19D
Z Vul L18(21)19D
U Sge L18(13)19

2001 Dec 25 Tue

S Equ 05(10)08L
X Tri 10(13)15L
Z Per 17(22)18L
RZ Cas 19(21)19D

2001 Dec 26 Wed

Z Dra D05(03)05
U Cep D05(04)09
RW Gem D05(06)11
HU Tau 05(09)13
TX UMa 07(11)16
Y Psc 07(12)11L
TW Dra 09(14)19
X Tri 09(12)14

2001 Dec 27 Thu

RW Tau D05(02)07
SS Cet D05(07)12
Z Vul D05(08)08L
SW Cyg 06(12)13L
X Tri 09(11)14
Z Dra 09(12)14
SW Cyg L14(12)18
U Sge L18(22)19D

2001 Dec 28 Fri

RZ Cas D05(06)09
HU Tau 06(10)14
X Tri 08(11)13
ST Per 10(14)17L
U Cep 11(16)19D
Z Dra 18(20)19D

2001 Dec 29 Sat

RW Gem D05(03)08
TW Dra D05(09)14
X Tri 07(10)12
TX UMa 08(13)18
RZ Cas 09(11)14
RW Tau 16(21)17L
Z Vul L17(19)19D

2001 Dec 30 Sun

Z Dra D05(05)07
Y Psc D05(06)10L
SS Cet D05(06)11
X Tri 07(09)12
HU Tau 08(12)15
RZ Cas 13(16)18

2001 Dec 31 Mon

U Cep D05(03)08
ST Per D05(06)10
U Sge D05(07)07L
X Tri 06(09)11
V640 Ori L07(05)07
Z Dra 11(13)16
RZ Cas 18(21)19D

258·01 15′ FIELD INVERTED

CP DRACONIS 10h 15m 39·9s +73° 26′ 05″ (2000)

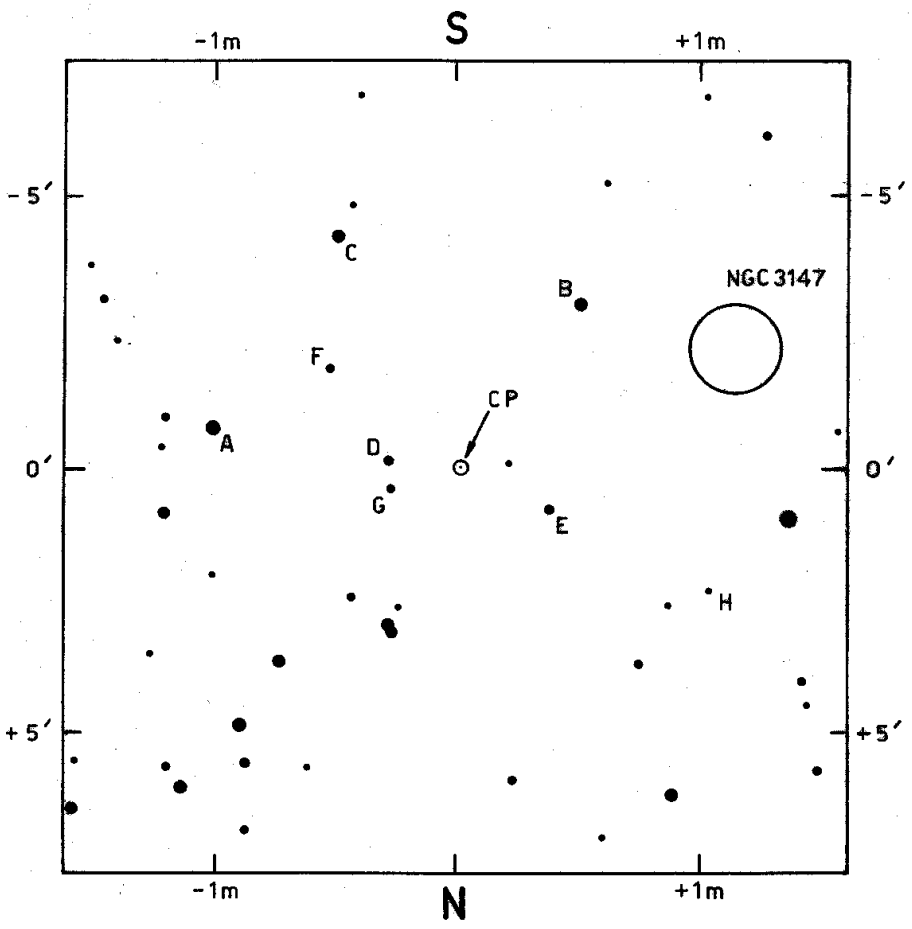

CHART: FROM POSS	A 12·7	E 14·9	BAA VSS
	B 13·6	F 15·2	EPOCH: 2000
SEQUENCE: A.HENDEN	C 14·1	G 15·7	DRAWN: JT 10-7-01
	D 14·7	H 16·4	APPROVED: RDP

The deadline for contributions to the 110th issue of VSSC will be 7th November, 2001. 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.

Printed by RAMPrint 01604 233677

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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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