British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

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Contents

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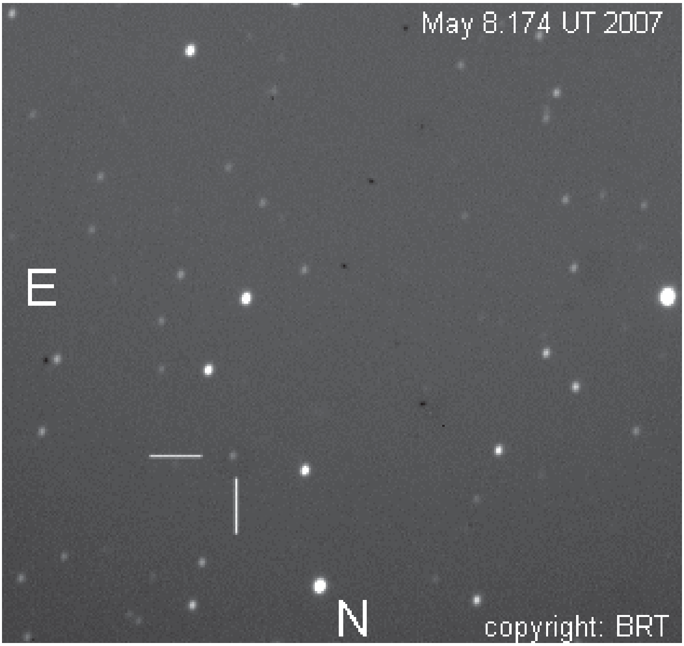
HS 1857+7127, A DWARF NOVAE IN DRACO

GARY POYNER

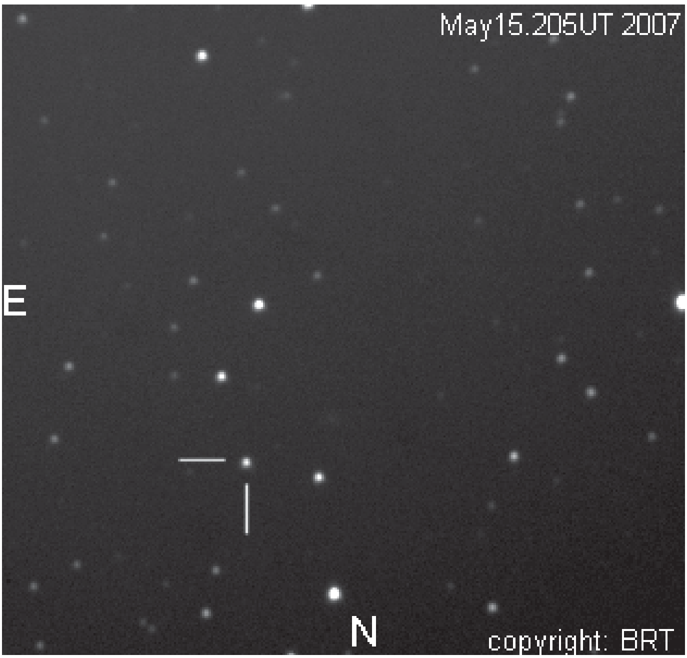
The subgroup of this dwarf nova has yet to be established. It could be a UG or UGZ. It displays a partial eclipse.



Here are two images of HS1857+7127 in quiescence and outburst. Both images taken with the Bradford Robotic Telescope. Dates and times on the image. Magnitudes are:

May 08.174 UT
16.84C

May 15.215 UT
14.44C



The field of view on the images is ~7 arc minutes. Both have been cropped from the original 25’x25' field from the BRT image.

FROM THE DIRECTOR

ROGER PICKARD

Frank Bateson: It is sad to report that at the grand old age of ninety eight, Frank Bateson has quietly passed away. See the obituary later in this Circular.

200,000 Variable Star Observations! On April 17th 2007 at 2 hours 55 minutes UT, Gary Poyner made his 200,000th visual variable star estimate when he estimated DW Cnc at magnitude 15.1 using his 35 cm SCT. The only observers to have accomplished this amazing feat include Albert Jones with some 500,000 and still observing; Danie Overbeek who made around 285,000 and Wayne Lowder who made some 209,000 observations. From the UK only two other observers have done 100,000 (half Gary's total) John Toone with 122,000 and still counting and Charles Butterworth who made some 106,000. We warmly congratulate Gary on achieving this truly outstanding milestone and applaud the tremendous effort over a sustained period of time required to accomplish it.

Polars: This long term monitoring programme was instigated in Circular 129 for September 2006 with an article by Dr Boris Gaensicke of Warwick University. Gary Poyner, who is co-ordinating observations, has reported that to date, the response has been abysmal. This is an important area of research, and whilst it may not lead to any high profile research papers, we won't know unless we observe these stars. Therefore, please consider adding just one or two of these stars to your observing programme.

Revised Eclipsing Dwarf Novae Programme: Similarly, this programme, which Bill Worraker instigated back in 2000 to detect eclipses in dwarf novae, has received little support in more recent years. Bill has now updated it and the revised programme can be found later in this Circular. Please give this programme some consideration as it would be nice to be able to conclude it in a positive way.

Old charts: John Toone has reported that several observers responded to his appeal in the last Circular for old charts. Sadly, only one person had charts that John has not already got, but that is better than none. However, if you've forgotten to respond to this appeal, it is not too late to let John know if you have any old charts.

VSS Meeting, May 5th, Edinburgh: I'm delighted to say this event was very successful, and my sincere thanks go to Des Loughney and his team for organising it. We had some fifty five delegates in all, who enjoyed, not just the talks, but the tours of the ROE facilities and telescopes. Reports on all the talks will follow in future Circulars.

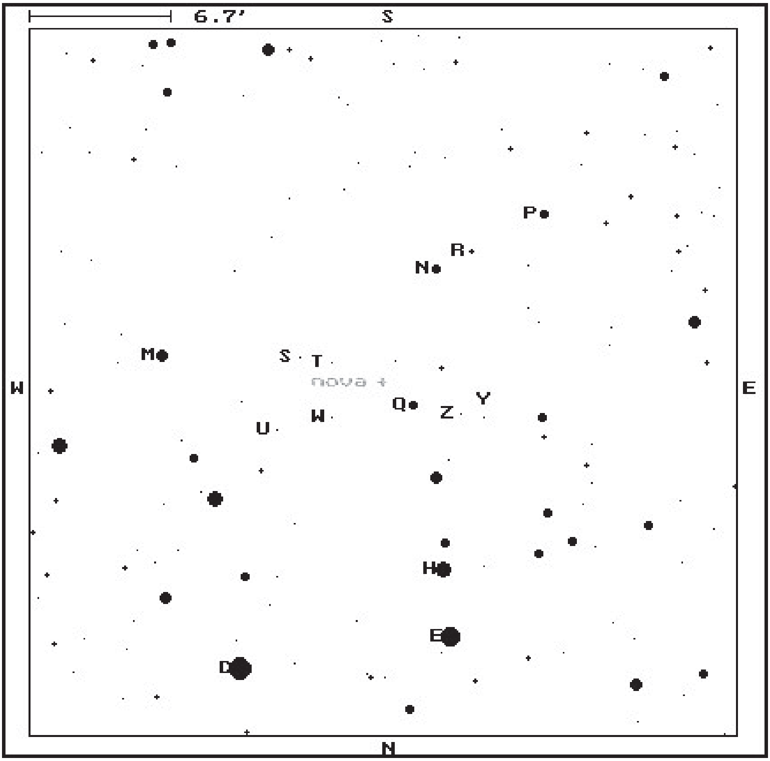
Photographs: Some members have said in the past they would like to see more photographs of the Officers in the Circulars, so that they are more easy to recognise at meetings. Therefore, Janet has made a start in this Circular with Des, and more will follow. In addition, we are hoping to include some photos from the recent Section Meeting.

V2467 CYGNI (=NOVA CYGNI 2007)

Guy Hurst

This nova was discovered by A.Tago on 2007 Mar 15 mag 7.4 and was announced on The Astronomer EWC 182 and E-Circular 2315. By late April it had faded to below magnitude 11 (although noticeably much brighter in unfiltered and R images). It is hoped the chart below will help observers obtain further estimates. Please send to the undersigned on a weekly basis, preferably by e-mail.

V2467 Cygni (=Nova Cyg 2007)
RA 20h 28 13s DEC +41 48 37" (2000)
Magn: 7.4V – [12?
Type: Nova



Sequence: Arne Henden (V)

Chart: G.Hurst

D	7.31	P	11.04	U	13.33
E	7.66	Q	11.28	W	13.69
H	8.59	R	12.30	Y	14.13
M	9.96	S	12.70	Z	14.49
N	10.81	T	13.15		

G.M.Hurst 070410

BAAVSS Sequence: N/052.01

Observations please to Guy Hurst ... ***guy@tahq.demon.co.uk***

ECLIPSING BINARY NEWS

Des Loughney

Des wearing his digital voice recorder which he uses to avoid using a light when recording observations, thus preserving dark adaptation. His binoculars are Opticron 10x50 SR.GA which he finds excellent for astronomical purposes.

RS Canum Venaticorum

Two editions ago I suggested that members could observe RS CVn (VSSC 130 p 2) to try to pick up the possible effect of star spots which might cause the system to vary in between eclipses and might cause irregularities in the eclipse light curves.

From the observations I have received, it seems that RS CVn is rarely at its maximum magnitude of 7.9. The magnitude, in the spring of 2007, seems to vary between 8.0 and 8.3. Variations over this range of 0.3 seem to occur within a few hours.

Eclipses have been observed. The light curves leading to minimum do seem to show irregularities. The data on eclipses have shown that the elements used to predict the mid point of eclipses are well out of date. The data from the spring of 2007 suggests that mid eclipse is two and half hours ahead of the predicted time.

A paper on the RS CVn system (1) estimates that it has a star spot cycle similar to the solar cycle. The period of the RS CVn cycle is estimated to be 19.7 years which means the next maximum of the RS CVn cycle is expected to occur in 2007/ 2008. The paper suggests that 37% of the surface of one of the stars in the system may be covered by star spots. As the star spot cycle could possibly now be at maximum, if the predictions are correct, then it might well be possible that the irregularities observed this year could be due to increased star spot activity within the RS CVn system.

The system should be monitored over the next year for variations outside eclipses. This is fairly straightforward using binoculars. Observations every half hour over time periods of a few hours would be welcome.

Beta Lyrae

This system is often seen as an ‘entry level’ object for observation as it is bright and circumpolar. That does not mean that it is not worthy of detailed observation. Because of the physical distortions of the stars in the system and variations in the thickness of the accretion disc enveloping the secondary star (2) there may be irregularities in the light curve during one period.

Because of the usual UK weather, it is of course very difficult, to get a significant number of observations for one period of 12.94 days, that would allow the construction of a light curve for that period.

It is proposed to study in September, in detail, one period of Beta Lyrae. I plan to carry out observations on La Palma, in the Canaries, where most nights are usually clear between the 1st and the 22nd September. Supporting observations from the UK, or elsewhere, would be welcome during this period.

The supporting observations required are from a DSLR gathering 'RAW' images of Beta Lyrae and its nearest comparison, Gamma; chart reference: 'T. Brelstaff 1993 Dec 03.' The exposure for each image required will be around 2 seconds in sets of ten all taken within one minute. A set of ten should be done every couple of hours. I am hoping this might allow a light curve accurate to 0.05 magnitude to be constructed. For each set of images on a particular night there should be a set of ten dark frames. If anyone is interested in helping in this campaign please get in touch so that we can discuss the details of the images required.

RZ Cassiopeiae

In a paper published in this circular (3) it was suggested that the period trend of the RZ Cas system changed early in 2006. Instead of the period increasing it perhaps had started to decrease. The last observation listed in the paper was 4/5/06. Since then eleven further estimates of mid eclipse have been received including four in 2007. All of these estimates suggest that the period is, in fact decreasing. In the autumn of 2006 mid eclipse seemed to be about six minutes earlier than predictions. The latest estimates in 2007 suggest about 13 minutes earlier than predictions.

A recent JAAVSO paper on RZ Cas (4) describes how the period has lengthened over the last 30 years. Within this general trend there are fluctuations when the period decreases for a year or two. At the moment we may be witnessing a fluctuation.

1. 'Starspot evolution, activity cycle and orbital period variation of the prototype active binary RS Canum Venaticorum': Rodono, M.; Lanza, A. F.; and Catalano, S. Astronomy and Astrophysics, v.301, 75-88 (09/1995)
2. AAVSO vsots, Summer 2005, Beta Lyrae.*
3. VSSC 129, September 2006 pp 14-18
4. JAAVSO Vol 34, 1 (2005) pp 46 - 53

Eclipsing Binary Secretary
desloughney@blueyonder.co.uk

*** The following paper on Beta Lyrae is reproduced by kind permission of Arne Henden, Director the American Association of Variable Star Observers. It is from their Variable Star of the Season Archive...** ***http://www.aavso.org/vstar/vsots/***

BETA LYRAE

AAVSO Variable Star Of The Season Summer 2005

By kind permission of Arne Henden.

β Lyrae, known as Sheliak to the ancient Arabs and Tsan Tae to the ancient Chinese, was discovered to be a variable star by John Goodricke in 1784, about two years after his successful explanation of the light variations of Algol. In the more than two centuries since its discovery, β Lyrae has played a game of cat and mouse with astronomers attempting to unlock its secrets. Only slowly have some of those secrets been revealed.

We know that β Lyrae is an eclipsing binary system with an orbital period of about 12.9 days and the period is increasing at a rate of about 19 sec/year. The O-C diagram (Kreiner, Kim and Nha, 2005) of eclipse timings seen in Figure 1 shows a beautifully parabolic shape, indicating a constant rate of period change.

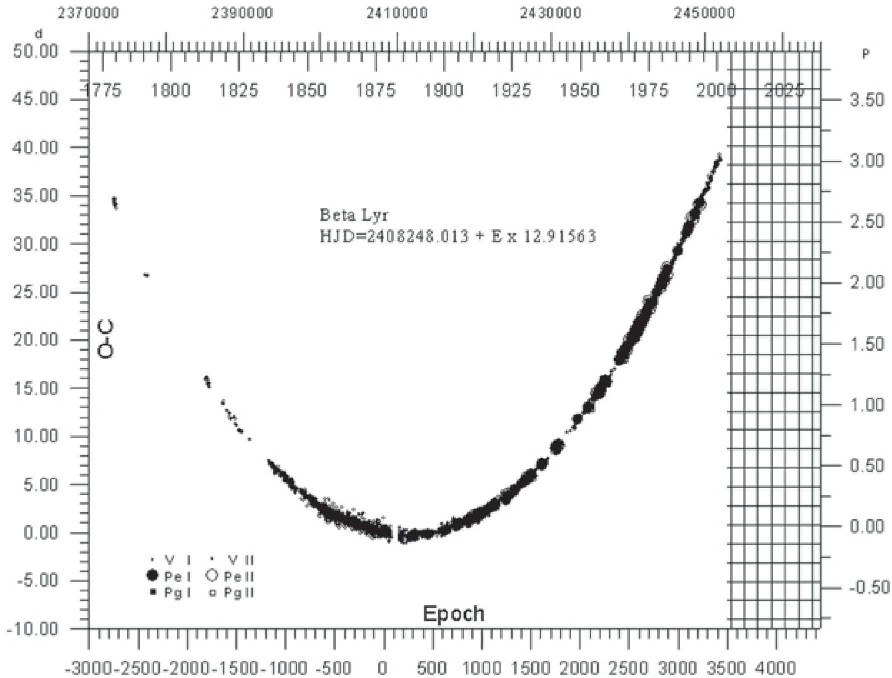


Figure 1. O-C Diagram for β Lyrae eclipse timings from Kreiner, Kim, and Nha.

β Lyrae's light curve in the visible part of the spectrum serves as the prototype of the EB light curve classification: rounded maxima and broad minima with different depths. Figure 2 shows the V light curve of the system with data from 1987 to 1994 published by Van Hamme, Wilson and Guinan (1995). Note the rather large scatter in the light curve which, at first, is rather surprising given that the system is rather bright. It turns out that the large scatter is a result of intrinsic variability and not observational error. The large rate of period change and the intrinsic variability are clues that β Lyrae is a very active system.

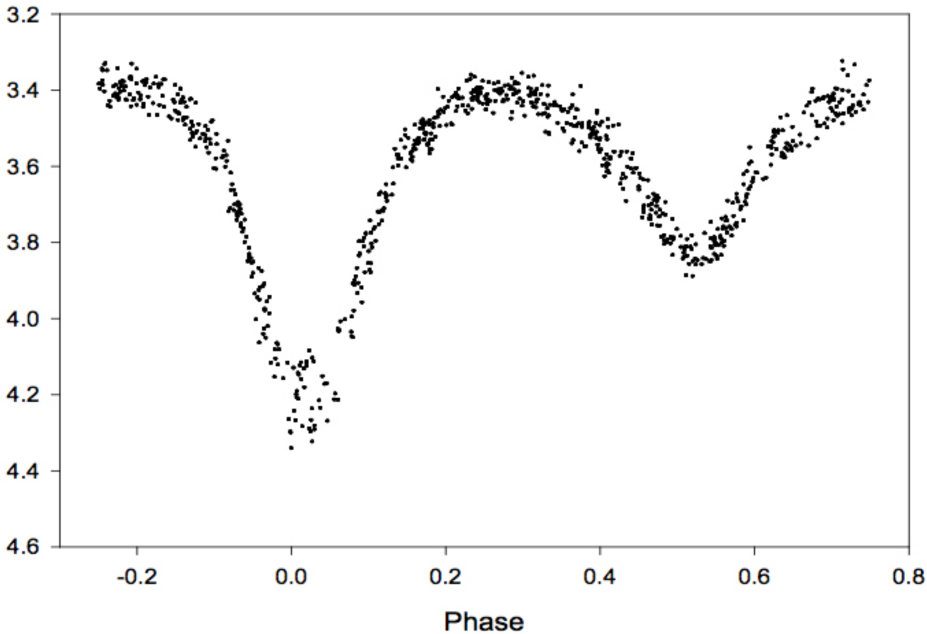


Figure 2. Visual Light Curve. V band light curve of β Lyrae from Van Hamme, Wilson and Guinan (2005).

Observations of β Lyrae in the ultraviolet show a very different behavior: almost no variation in brightness over the orbital period at wavelengths shorter than about 1200 Å. Stated another way, when viewed in the ultraviolet β Lyrae doesn't look like an eclipsing binary at all. Figure 3 shows the light curve of β Lyrae in the ultraviolet at wavelengths of 955 Å and 1475 Å as measured with the Voyager Ultraviolet Spectrometers (Kondo, et al., 1994). At 1475 Å the light curve exhibits a form similar to that of the optical light curve but at 955 Å, the light curve is remarkably flat. That rather strange dependence of the light curve on wavelength is another clue that β Lyrae is not your average eclipsing binary.

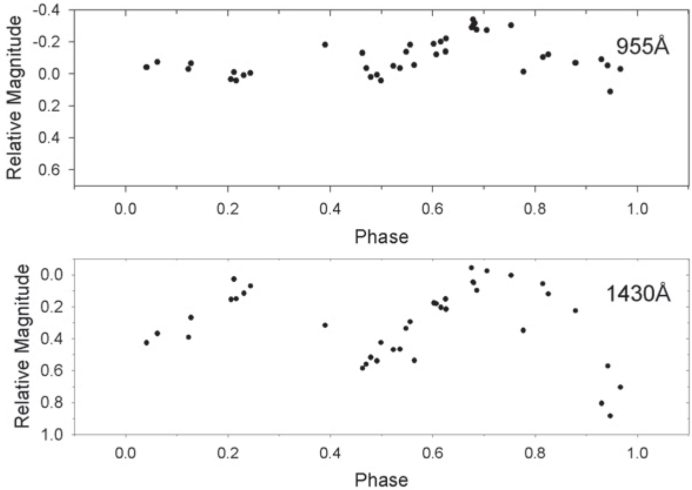


Figure 3. β Lyrae Light Curves at 955 Å and 1475 Å from Kondo et al. (1994). Note the lack of eclipses at 955 Å

β Lyrae has long been known to show emission lines in its complicated spectrum (Struve, 1958), yet another indication of activity in the system. Although the spectrum of β Lyrae is quite complicated, consisting of at least six distinct sources (Bisikalo, et al. 1999), one easily recognized source does stand out: the absorption lines of a star with a spectral type of B6II to B8II. This star is the one eclipsed at primary minimum in the optical light curves and I will refer to it as the primary star. The primary is, therefore, a giant with an effective temperature of about 12,000 K. The nature of the primary star is the subject of little dispute.

The nature of the secondary object is, on the other hand, still the subject of some debate. Astronomers had struggled without success for decades to explain the secondary component as a star of approximately spectral type F. In 1963, however, came the critical piece of the puzzle. Huang (1963) proposed that the primary was, in fact, less massive than the secondary which was embedded in a geometrically and optically thick disk. This interpretation was truly a turning point in our understanding of β Lyrae because it explained the shape of the light curve and the absence of the spectral lines of the secondary in the spectrum in a simple and intuitive way. Wilson (1974) explored the disk model in a quantitative fashion and showed that it must be geometrically and optically thick. Later he produced detailed models of the structure of the disk (Wilson, 1981; 1982).

The Huang model has survived the test of time. After over forty years, the core ideas of the model form the basis of the modern interpretation of the system. Although there are disagreements about the detailed nature of the disk (see Wilson and Terrell, 1992 and Hubeny, Harmanec and Shore, 1994), almost everyone agrees with the idea that the secondary is a stellar object embedded in a thick disk.

So, the obvious question is "How did β Lyrae end up in its current state?" In the past, β Lyrae had been considered a unique object and understanding the evolutionary history of a unique object can be difficult. About 25 years ago, Plavec (1980) showed that β

Lyrae was a rare but certainly not unique object. Using the International Ultraviolet Explorer (IUE) satellite, he showed that there were a handful of systems that had similarities to β Lyrae. Now we could begin to see patterns. These systems, which he termed the W Serpentis stars, all showed strong emission lines in the IUE spectra, indicative of large-scale mass transfer between the two stars.

The current view of β Lyrae is that it is nearing the end of the rapid phase of mass transfer (RPMT) that results when the more massive star in a binary reaches its Roche lobe and transfers mass to the lower mass star. Readers familiar with the resolution of the "Algol Paradox" will recognize this explanation. When the more massive star reaches its Roche lobe and begins to transfer matter to the other star, the Roche lobe shrinks because the star is losing mass and the separation between the stars decreases. This, of course, leads to more mass loss and a still smaller Roche lobe. We have a classic runaway feedback situation and the mass loss proceeds on a very rapid timescale, over thousands of years, as opposed to the much longer nuclear timescales of billions of years on which stars usually evolve.

Now consider what happens to the initially lower mass star (let's call it the gainer) as all of this mass comes pouring towards it. If the gainer's radius is small compared to the separation of the two stars, the matter stream will not impact it directly but form a disk around the gainer. Viscosity will cause the disk to spread out and some of the material will accrete onto the gainer while smaller amounts are lost to the system via jets perpendicular to the disk (Harmanec, et al 1996). If the gainer's radius is large compared to the separation, the matter stream will impact the surface of the gainer and spin it up, like water sprayed onto a pinwheel. Stars adjust structurally on timescales larger than the rate at which mass is being transferred in this RPMT stage, so the material tends to build up and form a thick accretion disk that engulfs the gainer. SV Centauri is believed to be a system in this rapid, and hence rare, stage (Wilson and Starr, 1976) and Figure 4 shows that it has a decreasing period as expected.

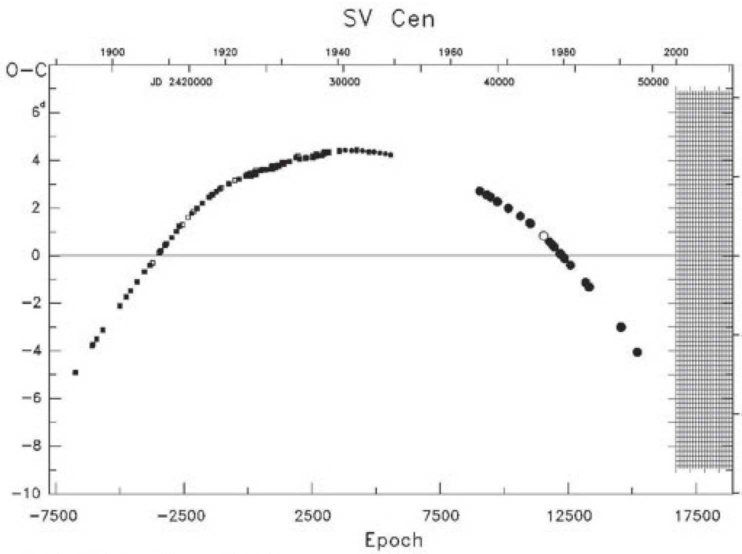


Figure4. SV Centauri O-C Diagram of eclipse timings from Kreiner, Kim and Nha (2005)

Note that the parabola is reversed from the one for β Lyrae, indicating that the period is decreasing. Eventually enough mass is transferred that the once lower mass star is now the higher mass star and the mass transfer slows considerably. Since mass is now being transferred from the lower mass star, the period increases. β Lyrae is believed to be at this stage.

As the mass transfer slows, the accretion disk continues to settle onto the gainer. Eventually the disk will disappear (primarily via accretion) and the gainer will reappear as a relatively normal but now much more massive star. It will also be rapidly rotating, perhaps at the centrifugal limit, making it a double contact binary as defined by Wilson (1979). RZ Scuti and U Cephei are probably examples of such systems, frequently referred to as the Rapidly Rotating Algols.

Eventually, tidal forces will synchronize the rotation of the gainer with the orbit and the system will be a classical Algol, like Algol itself. Once the system reaches the Algol stage, its evolution proceeds at the more leisurely nuclear timescale.

Thus β Lyrae, once seen as a unique "freak" among binary stars, is now thought to be an example of one stage in the evolution of certain close binaries. Many details of this evolution remain to be determined and new computer codes capable of modeling stars in three dimensions on massive computing clusters with hundreds or thousands of CPUs are being developed to more fully test our current ideas. Most importantly, β Lyrae continues to be observed. As the late Brad Wood once told me, "The more a system has been observed, the more it should be observed." The AAVSO is contributing valuable data on β Lyrae, especially the infrared photometry team led by Doug West. Using the Optec SSP-4, we are observing β Lyrae in the J and H photometric bands, providing valuable data at wavelengths rarely used in studying the system. But all observations of β Lyrae are valuable, be they infrared photometry, optical photometry or times of minimum. They will enable astrophysicists a century hence to uncover more secrets about this enigmatic binary that sits high in the northern summer sky and slowly reveals its secrets to those who invest the effort in prying them loose.

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This *Variable Star Of The Season* was prepared by **Dr. Dirk Terrell**.

ECLIPSING DWARF NOVAE PROGRAMME UPDATE

MAY 2007

ROGER PICKARD

I'm grateful to Bill Worraker for providing the following update to this programme. There are now only 13 stars left on this programme and it would be nice if observers (both visual and CCD) could supply some concentrated coverage to see if any of these stars are eclipsing dwarf novae.

Below are notes on current programme stars. Those to be dropped from now on are marked:

AR And 4.0 hours photometry received to date, no sign of eclipses.
FO And 1.68 hours photometry (Thorstensen et al 1996), no eclipses.
KV And 3 orbits covered (Kato et al 1994), no eclipses > DROP
TT Boo Many orbits covered (Olech et al 2004), no eclipses > DROP
AT Cnc 1orbit + 2 part orbits covered (Nogami et al 1999), no eclipses (also deduced to have low inclination.) > DROP
CC Cnc Many orbits covered (Kato et al 2002), no eclipses > DROP
GX Cas 3-4 orbits covered (Nogami et al 1998, Nick James), no eclipses > DROP
KU Cas No data (not even an orbital period), published or unpublished.
SV CMi No photometry.
V516 Cyg 4.1 hrs photometry (Nick James), no eclipses.
V1060 Cyg No data, published or unpublished.

ES Dra 1.5 orbits (Misselt+Shafter 1995), 1.4+1.6 orbits (CBA Belgium 2001). No eclipses, but flickering noted - keep on programme as outburst behaviour is uncertain and P_orb has been revised downward to approximately 3 hours (type SU UMa?)
AW Gem 4 orbits covered (Kato 1996), no eclipses > DROP
SX LMi Many orbits covered (Nogami et al 1997, Wagner et al 1998), no eclipses/low inclination > DROP
CY Lyr Bits of photometry (0.6+0.4 orbits), no eclipses.
LL Lyr No photometry.
V344 Lyr 4 orbits covered (Kato et al 1993), no eclipses > DROP
V426 Oph 0.9+0.75orbits covered (Hollander et al 1993); no eclipses (inclination 59+/-6 deg, Hessman 1988), but a strange object which deserves some attention.
HX Peg No photometry.
TZ Per 0.9+0.8 orbits covered (Nick James; Mumford 1966), no eclipses > DROP
PY Per No photometry;
CI UMa 4 orbits covered (Nogami+Kato 1997), no eclipses > DROP
HS Vir Some orbital photometry (Kato et al 1998), no eclipses -> DROP
VW Vul Some orbital photometry (Kato 1999), no eclipses > DROP
FY Vul No data, published or unpublished.

The Programme therefore becomes:

Object Name **Altern.Name**	**Coordinates** **(J2000)**	**Type**	**Min**	**Max**	**T1** **T2**	**P_orb(h)** **P_shu(h)**
AR And (DS2)	01 45 03.27 +37 56 33.3	UG?	16.9	11.0	25	3.91
FO And	01 15 32.1 +37 37 36	SU	17.5	13.5	15-23	1.7186 1.779
KU Cas (DS)	01 31 02.6 +57 54 12.3	UG	18p	13.3p	??	??
SV CMi	07 31 08.5 + 05 58 47	ZC	16.3	13	16	3.74
V516 Cyg (DS)	20 47 09.9 +41 55 26	UG	16.8p	13.8p	??	??
V1060 Cy (DS)	21 7 42.3 +37 14 08.3	UG	18p	13.5p	??	??
ES Dra (DS2) PG 1524+622	15 25 31.8 +62 1 00.1	DN?	16.3p	13.9p	??	4.238
CY Lyr (DS2)	18 52 41.41 +26 45 29.9	UG?	17	13.2	??	3.82

LL Lyr (DS2)	18 35 12.91 +38 20 04.3	UG?	17.1	12.8	??	??
V426 Oph	18 7 51.8 +05 51 48	ZC	13.4	11.5	17-55	6.847
HX Peg PG 2337+123	23 40 23.8 +12 37 41	ZC	16.6	12	9	4.819
PY Per	02 50 00.2 +37 39 22	ZC	19.8	13	8	3.715
FY Vul (DS)	19 41 40 +21 45 59	ZC	15.3B	13. 4B	??	??

Symbols:

DS Data taken from Downes and Shara, PASP 105, 127 (1993)
DS2 Data taken from Downes, Webbink and Shara, PASP 109, 345 (1997)
p photographic magnitude
T1 Normal outburst interval (days)
T2 Superoutburst interval (days)
DN Dwarf Nova
UG Dwarf Nova, U Gem type
ZC Dwarf Nova, Z Cam type
SU Dwarf Nova, SU UMa type

ONE YEAR ON

Clive Beech

It is one year since my name appeared on the back of the VSSC in the role of Secretary. It has been a year that represents for me a combination of interest, education, challenge and exasperation in an approximate ratio of 40,30,20,10%. However, I think of the first three all as forms of pleasure. Of course, there would be no pleasure at all if I didn't receive the regular input of visual observations and so I would like to thank all those who have sent me their reports. If you have sent me observations but I have not acknowledged them then please check the email address that you have used. The VSSC originally stated my email address incorrectly as *clive.beech@blueyonder.co.uk*. There should be NO DOT between clive and beech. My email address is ***clivebeech@blueyonder.co.uk*** If you think that your email might have gone astray then please check the email address that was used and resend it to me. Note, using the incorrect email address does not return an undelivered mail message. I guess that somewhere there is another Clive Beech who is trying to decipher a set of apparently extra-terrestrial coded messages.

As the data arrives I have processed it to generate files ready to add to the database. Towards the end of 2006 I discovered that the quantity of observations that I feed into the VSS database programme does not usually match that which comes back out in the processed form. It has become something of a quest to track down all the lost data and some of the common causes for loss are:

- Incorrect calculated magnitudes in the report.
- Typographical errors. E.g. D(1)v(2(E that should read D(1)v(2)E.
- Estimates of the form: D+0.2 rather than D+2.
- Use of / within an object name or extra / where it should not be.
- Use of Sept instead of Sep or July instead of Jul.

Please keep the data coming and please feel free to call or email me. I will report a summary for all 2006 in the next VSSC.

clivebeech@blueyonder.co.uk

ROYAL OBSERVATORY, EDINBURGH VSS MEETING 2007, Part 1

SIZING UP EXTRASOLAR PLANETS WITH SMALL TELESCOPES

PROFESSOR ANDREW COLLIER CAMERON

Andrew Collier Cameron, FRSE, Professor of Astronomy at the University of St. Andrews has kindly provided a synopsis of his excellent talk.

Andrew Cameron began with a brief overview of the history of exoplanet discoveries. Since Mayor and Queloz announced the discovery of 51 Pegasi b in October 1995, the number of planets found around other stars in radial-velocity surveys has grown to over 200. This planet finding method relies on the reflex wobble of a star about its common centre of mass with an unseen, orbiting planet. The wobble increases with the mass of the planet and decreases as the planet gets further from the star. Also, conventional Jupiters take over a decade to complete one orbit, so it shouldn't come as too much of a surprise that the first kind of planet to come to light was an entirely new class, the so called "hot Jupiters".

The existence of gas-giants in close orbits around their parent stars presented a challenge to the conventional wisdom of planet formation. In the standard "bottom-up" picture, planetesimals clump together to form the cores of planets. Close to the star, there is only enough rocky material to build small terrestrial planets. Further out, however, it's cold enough for icy mantles to form on dust grains, allowing icy planetesimals to form and clump together hierachically to form giant planet cores. If they attain masses 10 to 30 times that of the Earth before the gaseous protoplanetary disk disperses, the gravitational attraction on the surrounding gas is strong enough to accrete the gaseous envelope of a fully-fledged gas-giant planet. It now seems that as it forms, a gas-giant planet opens up a tidal gap in the disc. If the disc is massive enough, unbalanced forces cause the planet to spiral in towards the star.

How can we test such theories? One way is to measure the densities of gaseous exoplanets, which tells us the mass ratio of the rock-ice core to the outer hydrogen-helium envelope. The small but growing number of planets that transit their parent stars gives us direct access to their radii. The dip in light that occurs as a planet passes between us and its star gives a direct measure of the fraction of the star's disc obscured by the planet. Several groups worldwide are now using arrays of small-aperture telescopes to scan large areas of sky to find transiting planets around stars bright enough to allow detailed follow-up work. The SuperWASP camera arrays atop La Palma in the Canary Islands and at Sutherland in South Africa were built by a consortium of UK universities (Belfast, Keele, St Andrews, Leicester, the Open University and Cambridge) and the host observatories. Each installation comprises eight 200mm f/1.8 commercial camera lenses backed by 2048x2048-pixel CCDs. The eight 7.8-degree square fields of view combine to cover roughly one hour in RA by 30 degrees in declination per exposure. By rastering in one-hour intervals 3 or 4 hours to either side of the meridian, we cover some 8% of the sky every 7 to 8 minutes in each hemisphere.

Reducing the data is a formidable task. Each Super WASP Installation amasses some 70 GB of images per night. Automated data reduction pipelines developed at St Andrews and running at Keele and Belfast perform field identification, aperture photometry and differential photometric calibration, before the data are uploaded to a database at Leicester. Pattern-matching routines then search the millions of light curves in the database for objects that dip periodically in brightness by 1 or 2 percent for 2 to 3 hours.

Although the survey cameras count as small telescopes in their own right, there is another dimension to transit hunting that already involves the Variable star observing community. One similar project, XO project led by Peter McCullough, has pioneered a pro-am collaboration in which individuals with automated backyard telescopes then perform follow up photometry. Differential photometry obtained with instruments with 20 to 40 cm apertures backed by commercially available CCD systems can, with suitably careful data analysis, yield light curves with scatter of order 2 to 3 mmag and much more rapid sampling than the survey cameras achieve. This allows the duration of ingress and egress to be measured reliably, enabling the inclination of the orbit and the radii of the star and companion to be disentangled. This information helps the survey teams to decide which objects should be followed up on larger telescopes, in order to determine their companion masses from their reflex-velocity amplitudes.

Over the next 2 to 3 years we aim to complete a transit survey of the entire sky down to V=13. With help from the variable-star observing community, we should be able to speed up the process of sifting genuine planets from stellar binaries considerably. The inventory of several dozen planets that will emerge from the survey will help us to determinethemass-radius relation for gas giant planets. In this way we aim to uncover the the range of formation histories that leaves gas-giant planets parked in 3 day orbits around their stars.

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There was much interest in Robin Leadbeater's Poster Paper at the Edinburgh VSS meeting, on which the following article was based.

LOW RESOLUTION SPECTRA OF GSC 3656-1328 (VAR CAS 06)

Robin Leadbeater
robin_astro@hotmail.com

Chris Lloyd has already discussed the unexpected brightening and subsequent return to quiescence of GSC 3656-1328 in November 2006, and the likelihood that it was a rare example of a near field gravitational microlensing event [1]. Fig 1 shows an updated light curve which, thanks to contributions from a number of amateur astro-imagers and some forensic and detective work by several sources [3,4], has additional pre-event points which strengthen the argument that the rise to maximum did indeed mirror the decay, as would be the case for a micolensing event. (The pre-event curve is a best fit to the post event data, mirrored about the estimated time of maximum JD 2454040)

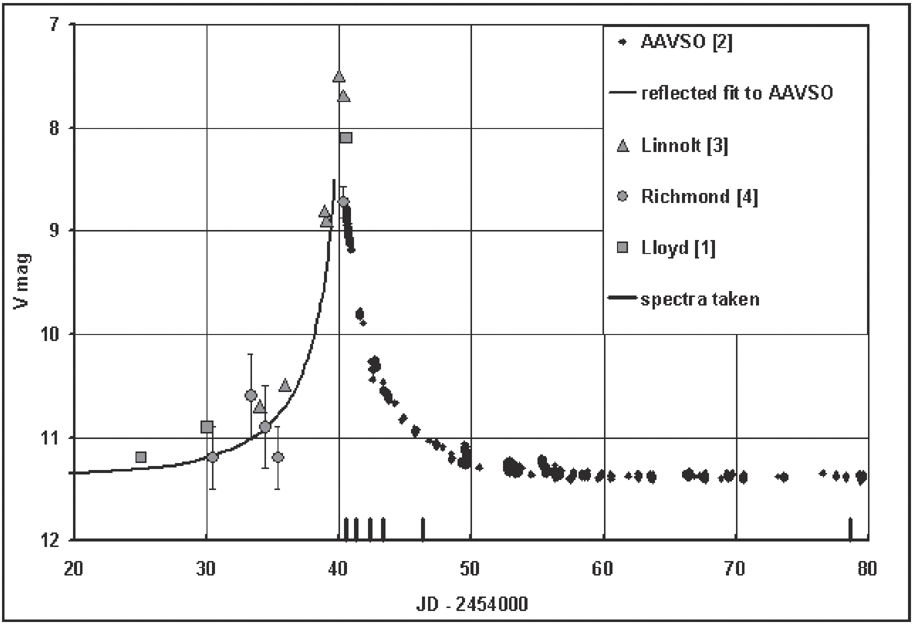


Figure 1: Updated light curve

My own part during this unfolding event was to take a series of spectra using a modified webcam and 100 lines/mm "Star Analyser" [5] transmission diffraction grating mounted in the converging beam of a 200mm Vixen Cassegrain telescope. This simple technique only produces a low resolution spectrum (R~80). It does have the advantage however that relatively faint objects can be recorded using a modest aperture. Spectra were taken starting within a few hours of the announcement (close to maximum) and continuing over the next 6 days as the star faded. A final spectrum was taken at quiescence 38 days after maximum.

The spectra are plotted in fig 2 and all show the same characteristics of an A type star with pronounced Hydrogen Balmer absorption lines. There are no emission lines characteristic of Cataclysmic Variables. The continuum is a best fit to an A5 star, though no allowance has been made for any reddening due to interstellar material. Some variations are seen between spectra, particularly at the blue end but these are in line with the estimated errors in the technique*.

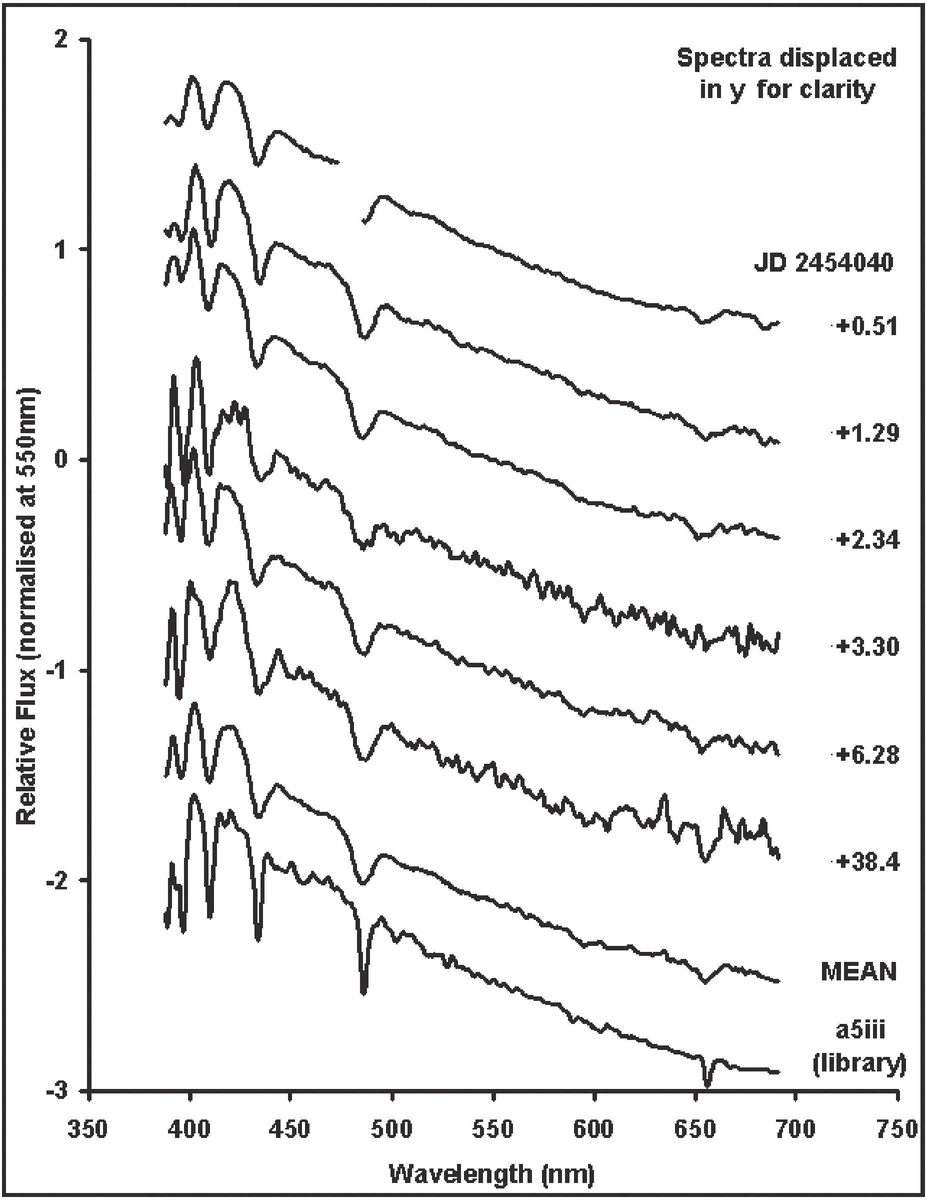


Figure 2: Low resolution spectra

For this to be a gravitational microlensing event the spectrum would be expected to be unchanged throughout the event. This appears to have been the case within the errors of the technique used.

* In this type of slitless setup, the spectrum image is projected against the essentially undispersed sky background. This means that at the extreme ends of the spectrum where the CCD sensitivity falls off, the signal/noise deteriorates significantly. Any systematic errors in background subtraction are also exaggerated in these regions. The result is that error is wavelength dependent. This effect was estimated by taking several repeat spectra during one observing run and plotting the variability against wavelength. The errors rise rapidly at short wavelengths. This tendency is also seen in the variations between the spectra taken during the decay back to quiescence.

References

[1] THE MICRO-LENSING EVENT OF GSC 3656-1328
Christopher Lloyd, BAA VSS Circular 130 Dec 2006 p 12
[2] AAVSO Database (raw data)
[3] M. Linnolt http://www2.hawaii.edu/~linnolt/VCAS06.html
[4] M. Richmond http://spiff.rit.edu/richmond/tass/other_cas_06/other_cas_06.html
[5] Paton Hawksley Education Ltd http://www.patonhawksley.co.uk/staranalyser.html

IBVS 5736 - 5756

Gary Poyner

5736 New times of minimum of some eclipsing binary systems. (Csizmadia et al,2006)
5737 The optical counterpart of the possible brightest transient X-ray source in M31 is found. (Smirnova et al, 2006)
5738 Plate archive search for the progenitor of Nov Cyg 2006. (Jurdan, Sepic & Munari, 2006)
5739 Discovery of 19 new historical Nova candidates in M31. (Henze et al, 2006)
5740 First simultaneous photometric and spectroscopic analysis of the active star IT Com. (Biazzo et al, 2006)
5741 CCD times of minima of selected eclipsing binaries. (Zejda et al, 2006)
5742 Photometry of the Algol type binary Z Draconis. (Terrell, 2006)
5743 CCD photometry of the multi mode delta Scuti star GSC 1730-1858. (Bernhard et al, 2006)
5744 Newly discovered variable stars in the globular cluster NGC 1261. (Salinas et al, 2007)
5745 Precise times of minimum light of neglected eclipsing binaries. (Smith & Caton, 2007)
5746 New times of minimum of some eclipsing binary stars. (Dogru et al, 2007)
5747 Remarkable absorption strength variability of the epsilon Auriga Ha line outside eclipse. (Schanne, 2007)
5748 Detection of a large flare in FR Cnc (=1RXSJ083230.9+154940). (Golovin et al, 2007)
5749 BVRI photometry of VW Vul and new comparison stars. (Capezzali et al, 2007)

5750 A new long period U Gem variable identified with the X-ray source 1RXS J224334.2+305526. (Bernhard et al, 2007)
5751 Spectroscopy of the faint old Novae V Per and V500 Aql.. (Haefner & Fiedler,2007)
5752 Photometry of 39 pms variables in the Taurus-Auriga region. (Grankin et al, 2007)
5753 New times of minima of eclipsing binary systems. (Biro et al, 2007)
5754 Photoelectric minima of some eclipsing binary stars. (Senavchi et al, 2007)
5755 Spectroscopic detection of a spectacular flare on DX Cnc. (Meusinger et al, 2007)
5756 Long term optical light variations of the peculiar massive runaway star HD 108. (Barannikov, 2007)

The Information Bulletin on Variable Stars (IBVS) can be accessed through the WWW in HTML format at the following URL.... *http://www.konkoly.hu/IBVS/IBVS.html*

FRANK M. BATESON (OBE FRAS FRASNZ) 1909-2007

Roger Pickard

It is with deep regret that I advise of the sad passing of one of the worlds greatest contributors to the study and science of variable stars, Frank Maine Bateson.

Frank was born on the 31st October 1909 in Wellington, New Zealand. He organised variable star observing in New Zealand, providing leadership to the field in the Southern Hemisphere for 78 years.

Frank made his first observations of meteors in 1923 and then variable stars in 1924. He joined the BAA (New South Wales) in 1927, and founded the Variable Star Section (VSS) of the New Zealand Astronomical Society (later the Royal Astronomical Society of New Zealand) the same year. He served continuously as Director of the Section for the next 78 years. He contributed at least three articles to the BAA Journal back in about 1948-1953.

Under his leadership, the number of active observers increased as did the number and types of variable stars covered, most notably the dwarf novae. He established close working links with professional astronomers and provided them with data obtained through the extensive network of observers. He developed methods that allowed the observational results to be rapidly communicated.

In the late 1950's he began promoting his vision of a professional observatory in New Zealand in collaboration with Frank B. Wood of the University of Pennsylvania. Frank conducted an extensive site-testing survey and recommended the site at Mount John near Tekapo. The Mount John Observatory was established with the University of Canterbury in 1965 and Frank served as Astronomer-in-Charge until his retirement in 1970.

Frank's research in variable stars has achieved international recognition, particularly from the professional astronomers who made extensive use of the results he collated. Over one million observations have been recorded and these have been published in hundreds of publications. Over 1000 charts of southern variable stars have been published (most with Mati Morel). In addition, he has personally authored over 300 scientific papers.

Frank Bateson was elected as a Fellow of the Royal Astronomical Society of New Zealand (RASNZ) in 1963, and had been a member of the Society for over 80 years. He served on the Council for many years and was a past President (1966-67). He was also an Honorary Member of numerous astronomical societies both within NewZealand and around the world.

Over his long career, Frank was honoured by many major prizes and awards. He was elected to full membership of the International Astronomical Union and served as the first New Zealand representative. He received the Jackson-Gwilt Medal and Prize of the Royal Astronomical Society in 1960 and an honorary doctorate from the University of Waikato in 1979. He was awarded the Order of the British Empire (OBE) in 1970 for services to astronomy and the Amateur Achievement Award of the Astronomical Society of the Pacific in 1980. The asteroid 2434 Bateson was named in his honour. With justification, he has been widely recognised as the father of modern New Zealand astronomy. His autobiography "Paradise Beckons" was published privately in 1989.

In 2004, at a meeting to honour Frank's retirement, John Toone presented Frank with a plaque of the very first observations he submitted to the BAA VSS (NSW Branch) in 1926. Altogether, Frank made approximately 150,000 observations of variable stars and historically he was the second person to achieve the 100,000 observations milestone.

Frank died peacefully in the company of his family, on the 16th April 2007, in Tauranga, New Zealand.

I'm grateful to Grant Christie of Stardome Observatory, New Zealand who compiled the obituary from which I have extracted most of the above.

Z URSAE MINORIS

Gary Poyner

The unusual RCB star Z UMi has now reached it's faintest level yet recorded. CCD observations obtained with the Bradford Robotic Telescope reveal that the deep minimum has reached below magnitude 17.5 for the first time. At the time of writing, the magnitudeon May 7.148 UT is 17.55C. Previous minima have reached magnitude 16.3 visual on two occasions - July 1997 and July 2001. The current minimum began in January 2007. By March 18th, Z UMi had reached 16.6 visual - already a record faint level. Previous deep mimima (those below magnitude 14.0) have lasted between two and three months. Usually with Z UMi the deeper the minimum brightness, the longer time spent at minimum. Brighter minimum are always briefer events (<28d). Rise to maximum from deep minima usually takes between three and four months, somewhat faster than classical RCB stars, and adding a certain symmetry to the light curve profile. The same phenomenon is more evident in DY Per.

It will be interesting to see if this 'brightness/recovery' relationship continues with the present fade.

Figure 1: Ursae Minoris June 2006 - May 2007 showing present fade.

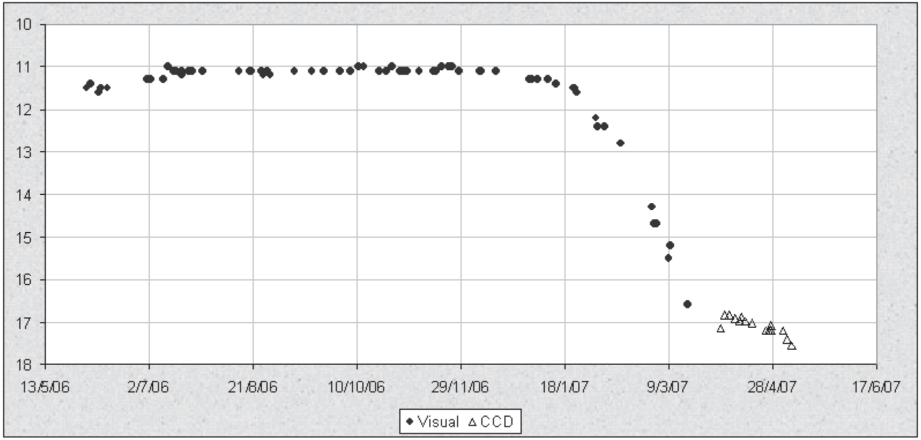
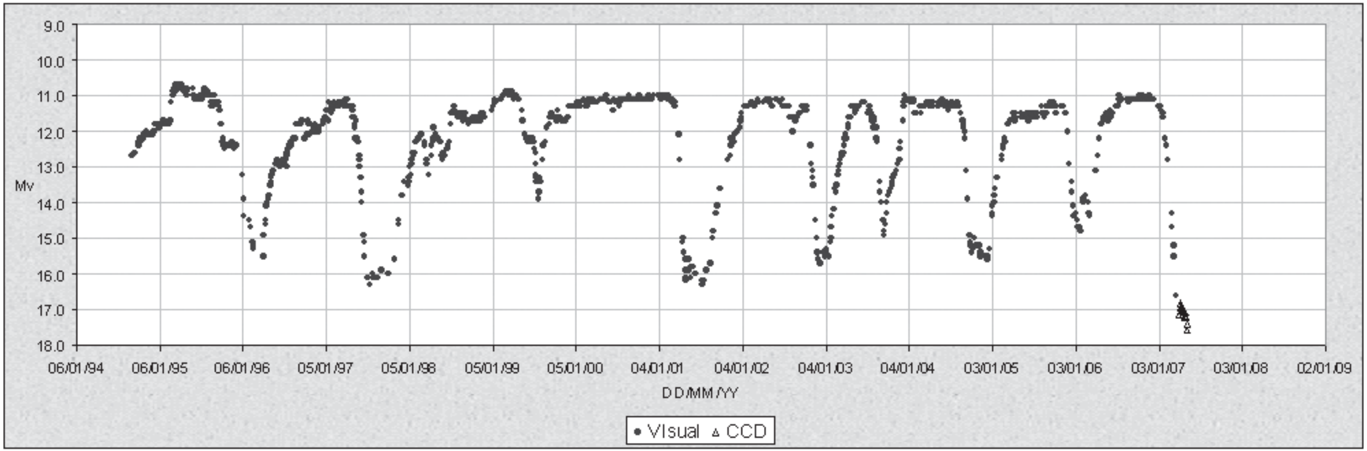


Figure 2: Ursae Minoris 1995 - 2007



VARIABLE STAR SECTION CIRCULAR NOTES FOR AUTHORS

KAREN HOLLAND

This is a list of guidelines to follow if you are preparing an article for possible publication in a Variable Star Section Circular. This outlines the preferred format for articles which maximises ease of transfer into the publishing package that is used; speeds up the process of generating a circular; and minimises the risk of mistakes. However, please do not be dissuaded from sending articles and graphics on paper, or in other formats if that is the only format that you are able to provide; it is the quality of article that is most important, and we do not want to deter potential contributors.

Article Content

The Circular is designed to be a Newsletter for the Variable Star Section of the British Astronomical Association. As such, it includes a wide range of articles including news about the Section and variable star observing, members projects and discoveries, requests for observation of particular targets, and many other topics. If you have any doubt that your article is suitable for the Circular, then please contact the editor in advance of writing the article, for guidance regarding the content and level, or for advice concerning more appropriate publications.

Use of English

Please check your article carefully for errors before sending it to Janet. English spellings are used in the Circular, rather than US spellings eg *accretion disc*, not *accretion disk*, *materialise* rather than *materialize*, *centred* rather than *centered*.

Avoid unnecessary abbreviations such as mag (for magnitude) and the use of & instead of 'and'.

Please put two spaces after full stops.

Text Format

Text should be sent in **raw text** form. Please **do not** send articles as Word documents. You *ma*y include a Word document purely for the purpose of illustrating the formatting of complicated columns or tables, but the document MUST be sent as raw text for importing into the circular. Include the reference to each figure, together with your figure caption in the body of the text, roughly where it is to appear, eg:

The graph below shows the light curve for RZ Cas.

Figure 1, Graph for RZ Cas showing.......

text continues

Image Format

Images must be sent individually, and labelled as <AuthorSurnamefig1.bmp/tiff/pcx> etc. The preferred formats are TIFF, PCX and BMP, but other common formats such as GIF can also be accepted. The images should be of a good resolution, and must be saved as black and white images, with no colour information. The simplest method for doing this is to open the image using Adobe Photoshop, and simply select Image>Mode>Grayscale, and when prompted 'this will discard all colour information - continue' hit return. If you are unable to do this, then please inform Janet when you send the image, and she will convert to black and white for you.

Images, graphs etc may be sent on paper for scanning if you are unable to do this.

Images of Plots

Please ensure that any text that you have on graphs and images is large. One of the commonest problems with producing the Circular is that axis labels and text on graphs is too small, and once reproduced it becomes almost unreadable. If you have any doubt, send Janet a trial plot well in advance of the deadline (or the Excel file if used), so that she can advise if the text is too small, and then remember the settings for the next time.

Use a plain background for any graphs if possible.

Don't include the figure caption in the image. Include figure captions with your figure references in the raw text file.

Circular Deadline

The deadline for articles for a Circular will be the seventh day of the month preceding the month that the Circular is to appear e.g. the September Circular deadline will be 7th August. Any changes to this will be clearly noted in the preceding Circular. The vast majority of Circulars have been formatted for the printer by a week after the deadline, and the acceptance of a late article involves the reformatting of the whole document, and is therefore strongly discouraged. However, it may occasionally be possible for Janet to accept late articles (if she is late starting the document due to holidays etc), but only if she knows about this in advance; if you think you are able to produce an article, but that it might be late, please contact Janet to enquire if this will be possible. If it is possible, then she will need to have a good idea of the length of the article so that she can leave enough space at the appropriate point, to avoid having to reformat the whole Circular to include it.

Copyright

You must only send figures, images and drawings for which you own copyright; the copyright will remain yours after the article is published in the Circular. Please note that if you have already had the item published elsewhere, the copyright may no longer be yours, and in this case we would need to seek permission from the publishers, to reproduce it in the Circular. Please check if this is the case before sending figures; if you do not own copyright, it may be simpler to regenerate a new image that is slightly different to the previous one. Please do not send webpage content, unless you are sure that you own the copyright, or you have sought permission to use the item in your article, in which case the owner should be acknowledged; please send me information supporting your copyright, or permission to use.

Article Submission

Articles should preferably be sent by email to: *batair@hotmail.co.uk*. Paper articles will be accepted if this is the only format that you are able to produce; send to: *Janet Simpson, Lower Goatfield Cottage, Lower Goatfield, Furnace, Argyll, PA32 8XN.*

Author Details

If you are happy for your name and contact details to be published, then you may include them at the bottom of your article, so that readers may contact you direct, regarding your contribution.

A NOTE FOR BINOCULAR OBSERVERS: P CYGNI

JANET SIMPSON

Binocular observers may be interested in the AAVSO Special Notice #47 of 19th May 2007:

http://www.aavso.org/publications/specialnotice/47.shtml

about increased activity in P Cygni. The AAVSO chart for P Cygni is available from:

http://www.aavso.org/cgi-bin/searchcharts3.pl?name=P%20CYG

Arne Hendon said in the Special Notice that a German spectroscopist, Ernst Pollman has observed that recently the star has been showing increased H-alpha activity. He suggested that AAVSO PEP observers and visual observers give it high priority this season, and that the increased activity could be a precursor for an outburst.

This is an S Dor type star. These are eruptive, highly luminous stars with irregular magnitude changes; typically connected with diffuse nebulae and surrounded by possibly an expanding shell of gas, thought to be resulting from the outer layers of the star being thrown off when in outburst.

P Cyni has a range of 3-6V and is typically around 4.8.

ECLIPSING BINARY PREDICTIONS

Des Loughney

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 UT, with a value greater than 24 indicating a time after midnight. D indicates that the eclipse starts/ends in daylight; L indicates low altitude at the start/end of the visibility and << indicates that mid eclipse occurred on an earlier date.

Please contact the EB secretary if you require any further explanation of the format.

The variables covered by these predictions are :

RS CVn	7.9 - 9.1V	Z Dra	10.8 - 14.1p	RW Tau	7.98 - 11.59V
TV Cas	7.2 - 8.2V	TW Dra	8.0 - 10.5v	HU Tau	5.92 - 6.70V
U CrB	7.7 - 8.8V	S Equ	8.0 - 10.08V	X Tri	8.88 - 11.27V
SW Cyg	9.24 - 11.83V	Z Per	9.7 - 12.4p	TX UMa	7.06 - 8.80V
V367 Cyg	6.7 - 7.6V	U Sge	6.45 - 9.28V	W Ser	8.4 - 10.2
Z Vul	7.25 - 8.90V				

Note that predictions for RZ Cas, Beta Per and Lambda Tau can be found in the BAA Handbook.

For information on other eclipsing binaries see the website < http://www.as.ap.krakow.pl/o-c/index.php3>. Again please contact the EB secretary if you have any queries about the information on this site and how it should be interpreted.

2007 Jul 1 Sun	
X Tri	X00(01)02D
U Sge	D22(22)26D
TV Cas	D22(24)26D
SW Cyg	D22(27)26D
X Tri	L24(24)26D
2007 Jul 2 Mon	
Z Vul	D22(20)26
Z Dra	23(25)26D
X Tri	L24(23)26
2007 Jul 3 Tue	
del Lib	D22(17)24
RS CVn	D22(18)24
TV Cas	D22(20)24
W Ser	D22(55)26D
X Tri	L24(23)25
2007 Jul 4 Wed	
S Equ	D22(22)26D
W Ser	D22(31)26D
X Tri	L24(22)25
2007 Jul 5 Thu	
U Sge	01(07)02D
RW Tau	L02(06)02D
W Ser	D22(07)26D
U CrB	D22(19)25
del Lib	D22(25)24L
X Tri	L24(21)24
2007 Jul 6 Fri	
SW Cyg	D22(17)23
TW Dra	24(29)26D
2007 Jul 7 Sat	
Z Dra	00(03)02D
Z Vul	D22(18)24
2007 Jul 8 Sun	
RW Tau	L01(00)02D
2007 Jul 9 Mon	
U CrB	00(06)02D
Z Dra	D22(20)22
TW Dra	D22(24)26D
Z Vul	24(29)26D
2007 Jul 10 Tue	
del Lib	D22(17)23
TV Cas	D22(26)26D
2007 Jul 11 Wed	
SW Cyg	00(06)02D
Y Psc	01(06)02D
Z Dra	02(04)02D
S Equ	D22(19)25
U Sge	D22(25)26D
2007 Jul 12 Thu	
U CrB	D22(17)23
TW Dra	D22(19)24
TV Cas	D22(21)26
del Lib	D22(25)24L
V367Cyg	D22(56)26D
2007 Jul 13 Fri	
RS CVn	02(08)02D
TX UMa	D22(18)23
Z Dra	D22(22)24
V367Cyg	D22(32)26D
2007 Jul 14 Sat	
V367Cyg	D22(08)26D
Z Vul	D22(27)26D
Y Psc	L22(24)26D
2007 Jul 15 Sun	
S Equ	01(06)02D
SS Cet	L02(04)02D
V367Cyg	D22(<<)26D
SW Cyg	D22(20)26
U CrB	22(28)26D
2007 Jul 16 Mon	
TX UMa	D22(20)25
2007 Jul 17 Tue	
del Lib	D22(17)23
Z Per	D22(18)23
Z Dra	D22(23)26
RS CVn	D22(27)26L
W Ser	D22(59)26L

2007 Jul 18 Wed
SS Cet L02(04)02D
S Equ D22(16)22
U Sge D22(19)25
W Ser D22(35)26L
Y Psc L22(18)23

2007 Jul 19 Thu
RW Tau L01(02)02D
W Ser D22(11)25L
TX UMa D22(21)26L
del Lib D22(24)23L
Z Vul D22(25)26D
TV Cas 23(27)26D

2007 Jul 20 Fri
W Ser D22(<<)25L
Z Per D22(19)24

2007 Jul 21 Sat
TW Dra 00(05)02D
SS Cet L02(03)02D
TV Cas D22(23)26D
S Equ D22(27)26D
Z Dra 23(25)26D
U Sge 23(29)26D

2007 Jul 22 Sun
RW Tau L01(<<)01
RS CVn D22(22)26L
TX UMa D22(23)25L
U CrB D22(25)26D

2007 Jul 23 Mon
TV Cas D21(18)23
Z Per D21(21)25
TW Dra D21(25)27D

2007 Jul 24 Tue
SS Cet L02(02)03D
del Lib D21(16)22
Z Vul D21(23)27D
SW Cyg D21(24)27D

2007 Jul 25 Wed
TX UMa D21(24)25L

2007 Jul 26 Thu
Z Dra 00(03)03D
Y Psc 03(07)03D
TW Dra D21(20)25
Z Per D21(22)27D
del Lib D21(24)23L

2007 Jul 27 Fri
SS Cet L01(02)03D
RS CVn D21(18)24

2007 Jul 28 Sat
Z Dra D21(20)22
U Sge D21(23)27D
S Equ D21(24)27D
TX UMa D21(26)25L

2007 Jul 29 Sun
TV Cas 01(05)03D
X Tri 02(05)03D
Z Vul D21(21)26
U CrB D21(23)27L
Z Per D21(23)27D
Y Psc L21(25)27D
RW Tau L24(28)27D

2007 Jul 30 Mon
SS Cet L01(01)03D
X Tri 02(04)03D
Z Dra 02(05)03D
TV Cas D21(25)27D

2007 Jul 31 Tue
X Tri 01(04)03D
V367Cyg 01(46)03D
del Lib D21(16)22
V367Cyg D21(46)27D
TX UMa 23(27)25L
W Ser 24(63)25L

2007 Aug 1 Wed
X Tri 00(03)03D
Z Vul 02(07)03D
U Sge 02(08)03D
TV Cas D21(20)24
Z Dra D21(22)24
V367Cyg D21(22)27D
Z Per D21(25)27D
W Ser D21(39)25L
X Tri 24(26)27D
RW Tau L24(23)27D

2007 Aug 2 Thu
SS Cet L01(00)03D
V367Cyg D21(<<)27D
W Ser D21(15)25L
del Lib D21(24)22L
SW Cyg D21(27)27D
Y Psc L21(20)24
X Tri 23(26)27D

2007 Aug 3 Fri
W Ser D21(<<)24L
Z Vul D21(18)24
X Tri 22(25)27D

2007 Aug 4 Sat
TX UMa 00(05)01L
HU Tau L01(<<)01
TW Dra 01(06)03D
U Sge D21(17)23
S Equ D21(21)26
Z Per 21(26)27D
X Tri 22(24)27

2007 Aug 5 Sun
SS Cet L01(00)03D
U CrB D21(21)26L
Z Dra 21(23)26
X Tri L22(23)26

2007 Aug 6 Mon
Z Vul 00(05)03D
HU Tau L01(<<)03
TW Dra D21(26)27D
X Tri L21(23)25

2007 Aug 7 Tue
TV Cas 02(07)03D
TXUMa L03(07)03D
del Lib D21(15)22
SW Cyg D21(17)23
U Sge D21(26)27D
X Tri L21(22)25
Z Per 23(27)27D

2007 Aug 8 Wed
SS Cet L01(<<)03D
HU Tau L01(00)03D
S Equ 02(07)03D
Z Vul D21(16)22
X Tri L21(21)24
TV Cas 22(26)27D

2007 Aug 9 Thu
U CrB 02(08)02L
TW Dra D21(21)26
del Lib D21(23)22L
X Tri L21(21)23
Z Dra 23(25)27D

2007 Aug 10 Fri
HU Tau L01(01)03D
RW Tau 01(06)03D
TV Cas D21(22)26
RS CVn D21(27)24L
X Tri L21(20)23
Z Vul 22(27)27D
Z Per 24(29)27D

2007 Aug 11 Sat
SS Cet L00(<<)03D
S Equ D21(18)23
X Tri L21(19)22

2007 Aug 12 Sun
HU Tau L00(03)03D
SW Cyg 01(07)03D
TW Dra D21(16)21
TV Cas D21(17)21
Z Dra D21(18)21
U CrB D21(19)24
X Tri L21(19)21
RW Tau L23(24)27D

2007 Aug 13 Mon
Y Psc 23(27)27D

2007 Aug 14 Tue
SS Cet L00(<<)03
HU Tau L00(04)03D
Z Dra 01(03)03D
Z Per 01(06)03D
del Lib D21(15)21
U Sge D21(20)26
S Equ 23(28)27D

2007 Aug 15 Wed
RS CVn D21(22)24L
Z Vul D21(25)27D
W Ser D21(43)24L
RW Tau L23(19)23
U CrB 24(29)26L

2007 Aug 16 Thu
HU Tau 02(05)03D
W Ser D20(19)24L
Z Dra D20(20)23
SW Cyg D20(20)26
del Lib D20(23)21L

2007 Aug 17 Fri
SS Cet L00(<<)02
Z Per 03(07)03D
W Ser D20(<<)24L
Y Psc D20(21)26
TV Cas 23(28)27D
U Sge 24(30)27D

2007 Aug 18 Sat
TW Dra 02(07)03D
Z Dra 02(05)03D
HU Tau 03(07)03D
V367Cyg D20(60)28D

2007 Aug 19 Sun

U CrB D20(16)22
TV Cas D20(23)27
V367Cyg D20(36)28D
SS Cet L24(21)25

2007 Aug 20 Mon

V367Cyg D20(12)28D
RS CVn D20(17)24
Z Dra D20(22)24
Z Vul D20(23)28D
TW Dra 21(27)28D

2007 Aug 21 Tue

RW Tau 03(08)04D
V367Cyg D20(<<)28D
del Lib D20(14)21
U Sge D20(15)20
TV Cas D20(19)23
S Equ D20(25)28D

2007 Aug 22 Wed

U CrB 21(27)25L
SS Cet L24(20)25

2007 Aug 23 Thu

TW Dra D20(22)27
del Lib D20(22)21L
RW Tau L22(26)28D

2007 Aug 24 Fri

U Sge D20(24)28L
Z Dra 21(24)26

2007 Aug 25 Sat

TX UMa D20(16)20
Z Vul D20(21)26
SW Cyg D20(24)28D
SS Cet L23(19)24

2007 Aug 26 Sun

TW Dra D20(17)22
RW Tau L22(21)25

2007 Aug 27 Mon

TV Cas 01(05)04D

2007 Aug 28 Tue

Z Vul 02(08)04D
U Sge 03(09)03L
del Lib D20(14)20
TX UMa D20(17)22
S Equ D20(22)27
TV Cas 20(25)28D
Z Dra 23(25)28
SS Cet L23(19)23

2007 Aug 29 Wed

Y Psc 00(05)04D
U CrB D20(25)25L
W Ser D20(47)23L

2007 Aug 30 Thu

X Tri 04(06)04D
Z Vul D20(19)24
TV Cas D20(20)24
del Lib D20(22)20L
W Ser D20(23)23L

2007 Aug 31 Fri

X Tri 03(06)04D
W Ser D20(<<)23L
U Sge D20(18)24
Z Dra D20(18)21
TX UMa D20(19)23L

2007 Sep 1 Sat

X Tri 03(05)04D
TW Dra 03(08)04D
S Equ 03(08)04L
Y Psc D20(23)27

2007 Sep 2 Sun

Z Vul 00(05)04L
Z Dra 01(03)04D
X Tri 02(04)04D

2007 Sep 3 Mon

X Tri 01(04)04D
TX UMa D20(20)23L
RS CVn 20(27)23L
SW Cyg 21(27)28D
U Sge 22(27)27L
TW Dra 22(27)28D
RW Tau 23(28)28D

2007 Sep 4 Tue

X Tri 00(03)04D
del Lib D20(14)20
Z Per D20(15)20
Z Vul D20(16)22
S Equ D20(19)24
Z Dra D20(20)23
X Tri 24(26)28D

2007 Sep 5 Wed

TV Cas 02(07)04D
Y Psc D20(17)22
U CrB D20(22)24L
X Tri 23(26)28

2007 Sep 6 Thu

Z Dra 02(05)04D
del Lib D20(21)20L
TX UMa D20(22)22L
TW Dra D20(23)28
V367Cyg D20(51)28D
RW Tau L21(22)27
TV Cas 22(26)28D
Z Vul 22(27)27L
X Tri 22(25)27

2007 Sep 7 Fri

TX UMa L01(<<)02
Z Per D20(17)22
V367Cyg D20(27)28D
X Tri 22(24)27
HU Tau L23(20)24

2007 Sep 8 Sat

S Equ 00(05)03L
V367Cyg D19(03)28D
SW Cyg D19(17)23
TV Cas D19(22)26
RS CVn D19(22)22L
Z Dra 20(22)24
X Tri 21(24)26

2007 Sep 9 Sun

V367Cyg D19(<<)23
Z Vul D19(14)19
TW Dra D19(18)23
TX UMa D19(23)22L
X Tri 20(23)25
RW Tau L21(17)22
HU Tau L23(22)25

2007 Sep 10 Mon

TX UMa L01(<<)04
Z Dra 04(07)04D
TV Cas D19(17)21
Z Per D19(18)23
U Sge D19(22)27L
X Tri 20(22)25

2007 Sep 11 Tue

del Lib D19(13)19
S Equ D19(16)21
X Tri D19(22)24
Z Vul 20(25)27L
HU Tau L22(23)27

2007 Sep 12 Wed

U CrB D19(20)24L
X Tri D19(21)23
W Ser D19(51)22L
TX UMa 20(25)22L
Z Dra 21(24)26

2007 Sep 13 Thu

TX UMa L01(01)04D
SW Cyg 01(07)04D
Y Psc 02(06)04D
RS CVn D19(17)22L
Z Per D19(20)24
X Tri D19(20)23
del Lib D19(21)19L
W Ser D19(27)22L
HU Tau L22(24)28

2007 Sep 14 Fri

U Sge 01(07)02L
TV Cas 04(08)04D
W Ser D19(03)22L
X Tri D19(19)22
S Equ 21(26)27L

2007 Sep 15 Sat

RW Tau 01(06)04D
TW Dra 04(09)04D
Z Dra D19(17)19
X Tri D19(19)21
TX UMa 22(26)22L
HU Tau L22(26)28D
TV Cas 23(28)28D

2007 Sep 16 Sun

TX UMa L00(02)04D
X Tri D19(18)21
Z Per D19(21)26
Z Vul D19(23)27L
Y Psc 20(24)28D
Z Dra 23(25)28

2007 Sep 17 Mon

U Sge D19(16)22
X Tri D19(17)20
SW Cyg D19(21)27
TV Cas D19(23)27
RW Tau L21(24)29D
TW Dra 23(28)29D
HU Tau 23(27)29D

2007 Sep 18 Tue

X Tri D19(17)19

2007 Sep 19 Wed

TX UMa L00(04)05D
U CrB D19(18)23L
Z Dra D19(19)21
TV Cas D19(19)23
Z Per D19(22)27

2007 Sep 20 Thu

HU Tau 01(04)05D
Y Psc D19(19)23
del Lib D19(21)19L
TW Dra D19(24)29
U Sge 19(25)26L
RW Tau L20(19)23

2007 Sep 21 Fri

Z Dra 01(03)05D
Z Vul D19(21)26
S Equ D19(23)26L

2007 Sep 22 Sat

TX UMa 01(05)05D
HU Tau 02(06)05D
SW Cyg 04(10)05D
Z Per D19(24)28
U CrB 23(29)23L

2007 Sep 23 Sun

RS CVn L04(07)05D
TW Dra D19(19)24
Z Dra D19(20)23

2007 Sep 24 Mon

HU Tau 03(07)05D
V367 Cyg 20(65)29D

2007 Sep 25 Tue

TV Cas 01(05)05D
TX UMa 02(07)05D
Z Dra 02(05)05D
V367Cyg D19(41)29D
Z Per 20(25)29D

2007 Sep 26 Wed

RW Tau 03(08)05D
HU Tau 05(08)05D
TW Dra D19(14)19
U CrB D19(16)21
V367Cyg D19(17)29D
Z Vul D19(19)24
SW Cyg D19(24)29D
W Ser D19(55)21L
TV Cas 20(25)29

2007 Sep 27 Thu

V367Cyg D19(<<)29D
U Sge D19(19)25
W Ser D19(31)21L
Z Dra 20(22)24
RS CVn 20(26)21L

2007 Sep 28 Fri

Y Psc 03(08)05L
TX UMa 04(08)05D
RS CVn L04(02)05D
W Ser D19(07)21L
TV Cas D19(20)24
S Equ D19(20)26
RW Tau 21(26)29D
Z Per 21(26)29D

2007 Sep 29 Sat

Z Vul 00(06)02L
Z Dra 04(07)05D
TW Dra 05(10)05D
W Ser D19(<<)21L
U CrB 21(26)23L

2007 Sep 30 Sun

TV Cas D19(16)20
U Sge 23(28)24X

BINOCULAR PRIORITY LIST

MELVYN TAYLOR

Variable	Range	Type	Period	Chart
AQ And	8.0-8.9	SRC	346d	82/08/16
EG And	7.1-7.8	ZA		072.01
V Aql	6.6-8.4	SRB	353d	026.03
UU Aur	5.1-6.8	SRB	234d	230.01.
AB Aur	7.2-8.4	INA		83/10/01
V Boo	7-12	SRA	258d	037.01
RW Boo	6.4-7.9	SRB	209d	104.01
RX Boo	6.9-9.1	SRB	160d	219.01
ST Cam	6.0-8.0	SRB	300d?	111.01
XX Cam	7.3-9.7?	RCB?		068.01
X Cnc	5.6-7.5	SRB	195d	231.01
RS Cnc	5.1-7.0	SRC	120d?	84/04/12
V CVn	6.5-8.6	SRA	192d	214.01
WZ Cas	6.9-8.5	SRB	186d	82/08/16
V465 Cas	6.2-7.2	SRB	60d	233.01
γ Cas	1.6-3.0	GC		064.01
rho Cas	4.1-6.2	SRD	320d	064.01
W Cep	7.0-9.2	SRC		83/10/01
AR Cep	7.0-7.9	SRB		85/05/06
mu Cep	3.4-5.1	SRC	730d	112.01
O Cet	2.0-10.1	M	332d	039.02
R CrB	5.7-14.8	RCB		041.02
W Cyg	5.0-7.6	SRB	131d	062.1
AF Cyg	6.4-8.4	SRB	92d	232.01
CH Cyg	5.6-10.0	ZA+SR		089.02
U Del	5.6-7.5	SRB	110d?	228.01
EU Del	5.8-6.9	SRB	60d?	228.01
TX Dra	6.8-8.3	SRB	78d?	106.01
AH Dra	7.1-7.9	SRB	158d?	106.01
NQ Gem	7.4-8.0	SR+ZA	70d?	077.01
X Her	6.3-7.4	SRB	95d?	223.01
SX Her	8.0-9.2	SRD	103d	113.01
UW Her	7.8-8.7	SRB	104d	107.01
AC Her	6.8-9.0	RVA	75d	048.03
IQ Her	7.0-7.5	SRB	75d	048.03
OP Her	5.9-6.7	SRB	120d	84/04/12
R Hya	3.5-10.9	M	389d	049.01
RX Lep	5.0-7.4	SRB	60d?	110.01
SS Lep	4.8-5.1	ZA		075.01
Y Lyn	6.9-8.0	SRC	110d	229.01
SV Lyn	6.6-7.5	SRB	70d?	108.01
U Mon	5.9-7.8	RVB	91d	029.03
X Oph	5.9-9.2	M	328d	099.01
BQ Ori	6.9-8.9	SR	110d	84/04/12
AG Peg	6.0-9.4	NC		094.01.
X Per	6.0-7.0	GC+XP		84/04/08
R Sct	4.2-8.6	RVA	146d	026.03
Y Tau	6.5-9.2	SRB	242d	84/04/12
W Tri	7.5-8.8	SRC	108d	114.01
Z UMa	6.2-9.4	SRB	196d	217.01
ST UMa	6.0-7.6	SRB	110d?	102.01
VY UMa	5.9-7.0	LB		226.01
V UMi	7.2-9.1	SRB	72d	101.01
SS Vir	6.9-9.6	SRA	364d	097.01
SW Vir	6.4-7.9	SRB	150d?	098.01

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If you are unsure if the material is of a suitable level or content, then please contact the editor for advice.

The **deadline for contributions** to the next issue of VSSC (number 133) will be 7th August, 2007. All articles should be sent to the editor (details are given on the back of this issue)

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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 01284 828431.

Variable Star Alerts Telephone Gary Poyner (see above for number)