British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

No 138, December 2008

Contents

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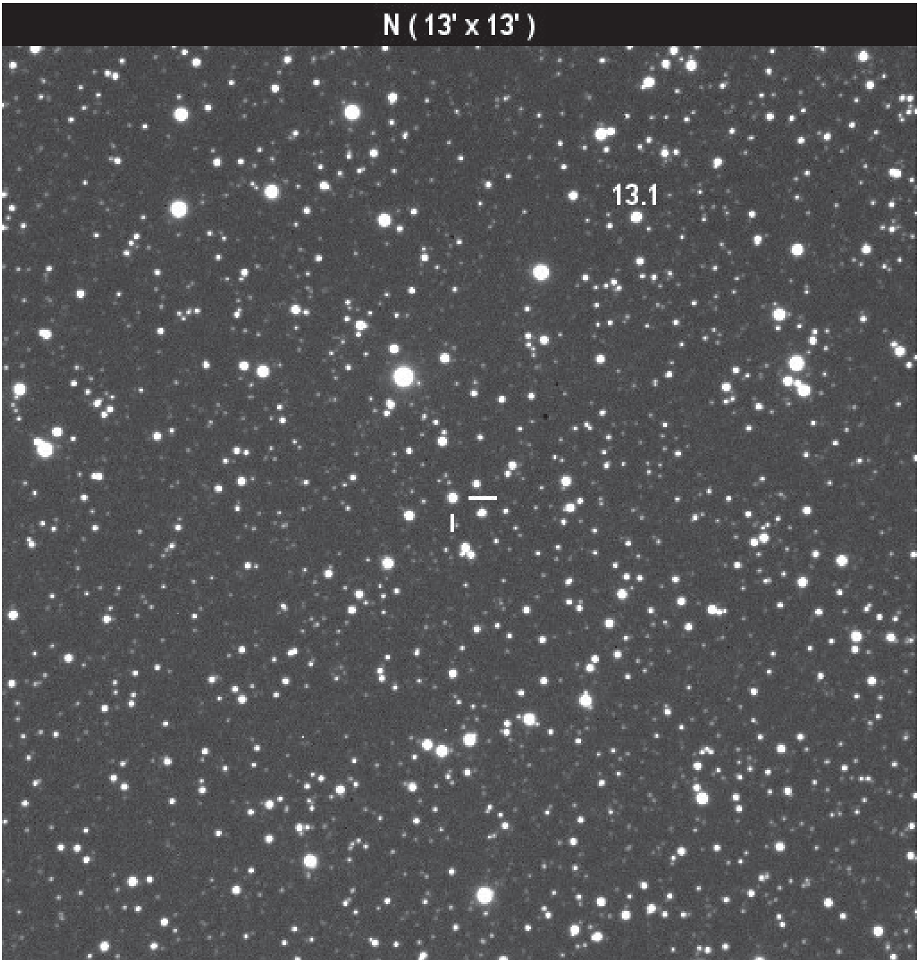
V1251 CYGNI OUTBURST, 22nd OCTOBER 2008

MARTIN MOBBERLEY



V1251 Cyg Outburst 2008 Oct 22.759 UT C14 @ f/7.7 + Paramount ME.
Unfiltered 60s mag (from above) = 13.7. Ref AAVSO VSP star 13.1 (shown).
V filtered 120s exp (Oct 22.763 UT) mag = 13.4. SBIG ST9XE + V filter.
M.P. Mobberley

See also KP Cassiopeiae outburst page 24.

FROM THE DIRECTOR

ROGER PICKARD

BAA Web Site Forum

There have been a number of postings, in recent times on this Forum, relating to variable stars. Now I will admit that I haven't been very good at logging into the Forum, and would only do so once or twice a year, or when Callum Potter (our web site Manager) advised me of a relevant posting!

However, following a number of discussions, I now realise that we should all pay at least a little more attention to the Forum, and here is why. I'd advised one subscriber that he could get advice directly from a Section Director, or even (in the case of the VSS) by joining the Mentoring Scheme. This was countered by the comment, that it suggested a lot of commitment, and that some members may have only a general interest and are unsure where their true interests lay. Reading and taking part in forums might suit and support these members better, until a specific interest for them comes to the fore.

I wonder therefore, if we might be able to pick up more Variable Star observers by following the postings on the Forum more carefully in future? I'd like to urge you all so to do.

Visual Observing Experiment

John Toone writes a note about his interesting experiment at the Edinburgh Workshop and adds: "It is worth noting that Roger Pickard turned out to be the only participant with a mean deviation of zero. So we now have evidence that the VSS Director should be used as the nominal calibration point for the visual (mv) photometric standard, (pity he mainly observes with a CCD nowadays)".

Well, I shall disregard the last comment except to note that I did enjoy making some visual estimates again (especially under comfortable conditions!) and shall make an effort to do more visual observing again in the future.

Now regardless of John's flippant statement about using me as the nominal calibration point, I wish to advise that on two or possibly three occasions I have had the opportunity to make a similar observation to that carried out at Edinburgh, but alongside Gary Poyner. The audiences consisted of both novice and experienced VS observers, but the scatter in the results was not very large. However, whilst Gary and I both deviated from the mean we both had exactly the same result. In light of John's experiment I can only assume that everybody else was wrong and that Gary and I were correct! (All that said, somewhat flippantly, I would emphasise that I'm not really trying to put myself in the same class as someone who has made over 200,000 observations).

Edinburgh Variable Star Workshop

Presentations from the Edinburgh Variable Star Workshop, 18th October 2008, can now be viewed on the BAA VSS website: *http://www.britastro.org/vss/*

My I take this opportunity to wish all members plenty of good Christmas cheer and much clearer skies in 2009.

(continued: page 32)

COLLOQUIUM ON STUDYING SOUTHERN VARIABLES

Preliminary Announcement

A colloquium on "Studying Southern Variables" will be held prior to the Royal Astronomical Society of New Zealand's 2009 Annual Conference, in Wellington, on Friday the 22nd May commencing at 10:30am and concluding at 5:30pm. The colloquium will consider the science of observing variable stars visually, photoelectrically and with CCD cameras.

The colloquium will be organised by Dr Tom Richards, Woodridge Observatory, Melbourne; Bill Allen, Vintage Lane Observatory, Blenheim; and Stan Walker, Wharemaru Observatory, Awanui; who are experienced variable star observers. While we expect many very interesting presentations from the CCD and PEP fields, one of our objectives is to encourage visual observations, a field which is very important over the long term.

The colloquium will consist of 20 minute talks and poster papers on any topic concerning variable stars and their observation including observing projects, equipment and techniques. Proposals for presentations should be submitted to any of the organisers.

The venue for the colloquium and the RASNZ conference is the Quality Inn, Cuba Street, Central Wellington – see *http://www.rasnz.org.nz/* for more information, and future announcements. We look forward to seeing you there.

Tom Richards *tom@woodridgeobsy.org*
Bill Allen *whallen@xtra.co.nz*
Stan Walker *astroman@paradise.net.nz*

Poster papers will be accepted.

ECLIPSING BINARY NEWS

DES LOUGHNEY

Beta Lyrae - First Resolved Images

The AAVSO drew our attention to a recent paper on the Beta Lyrae system. The full paper can be viewed on < http://arxiv.org/abs/0808.0932>. The title of the paper is: 'First Resolved Images of the Eclipsing and Interacting Binary Beta Lyrae'. The paper describes the first detection of photospheric tidal distortion.

The system is a familiar one to all variable star observers. It is often one of the first variables that the new observer looks at, and has been widely studied since its discovery in 1784 (Goodricke). The system has been described, as having a donor star which is losing mass to the gainer star. The donor, initially denser than the gainer, now has a mass of around 3 solar, while the gainer has a mass of about 13 solar.

It might be thought, that the higher mass gainer might be the brighter in visual wavelengths. This turns out not to be the case. The gainer is apparently "completely embedded in a thick accretion disk, with bipolar jet like structures perpendicular to the disk, which create a light -scattering halo above its poles.

The system was resolved using the CHARA array on Mt Wilson, which consists of six one meter telescopes. This is the longest optical/ IR interferometer array in the world, providing baselines up to 331 metres.

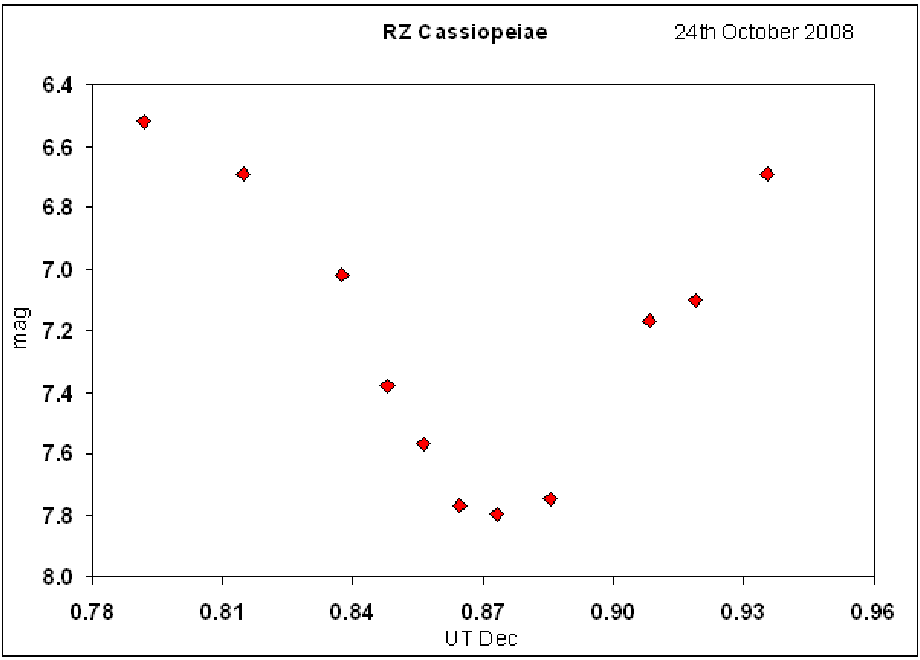
The paper displays amazing images of the system. Outside of actual eclipses both stars are resolved, and the gainer, embedded in the accretion disk has an elongated form.

The dramatic images show the interesting nature of the system, with its high mass stars. It is always worth monitoring. It has a high mass transfer rate, so the period is increasing year by year.

RZ Cassiopeiae

I have for some years been monitoring this familiar EB system. I was able to estimate mid eclipse in February 2008. Since then a clear sky never coincided with a convenient eclipse (one needs to observe over 4 hours) until 24th October 2008 when an eclipse was scheduled for 21.05 UT.

The eclipse was observed, though conditions were not ideal. It was very windy. Just after primary eclipse observations were interrupted by a sudden shower for 30 minutes. The observations were images taken with a Canon 350D DSLR, 800 ISO, f 2.8, exposure 2.5 seconds and a 200 mm lens. The observations are illustrated on the figure where each point represents the analysis of ten images using the AIP4WIN photometric tools.



The Krakow elements predicted the mid-eclipse to be at HJD 2454764.378712 (or 21.05 UT). The eclipse was observed 2454764.378049 HJD which represents a difference of around a minute which is well within the margin of error. The period does not seem to have changed at all this year.

Epsilon Aurigae

Everyone is encouraged to start observations of this system in preparation for the eclipse that starts next year. See the ‘Epsilon Aurigae Campaign 2009’ website at < http://www.hposoft.com/Campaign09.html>. I have been experimenting with the best settings for DSLR photometry to determine the V magnitude of Epsilon Aurigae. The best setting, for an undriven image, with an 85 mm lens, is ISO 200, f 4 and exposure 5 seconds. This length of exposure reduces scintillation problems.

AO Cassiopeiae

While trawling the internet I came across an EB system which seems very interesting. The catch with observing the continous eclipses is that the variation is only 0.2/0.3 magnitudes from 6.00 to 6.3. It is not a visual target but is a possible target for DSLR or CCD photometry. The period of the star is 3.52 days. It is an Over Contact Binary comprising two massive stars of 32 and 30 solar masses. Due to their closeness the stars are heavily distorted. The primary and secondary minima are of the same depth though the second is supposed to be displaced.

desloughney@blueyonder.co.uk

VARIABLE STAR WORKSHOP SATURDAY 18TH OCTOBER

James Clerk Maxwell Building, School of Physics and Astronomy, University of Edinburgh.

WHY VARIABLE STARS

ROGER PICKARD

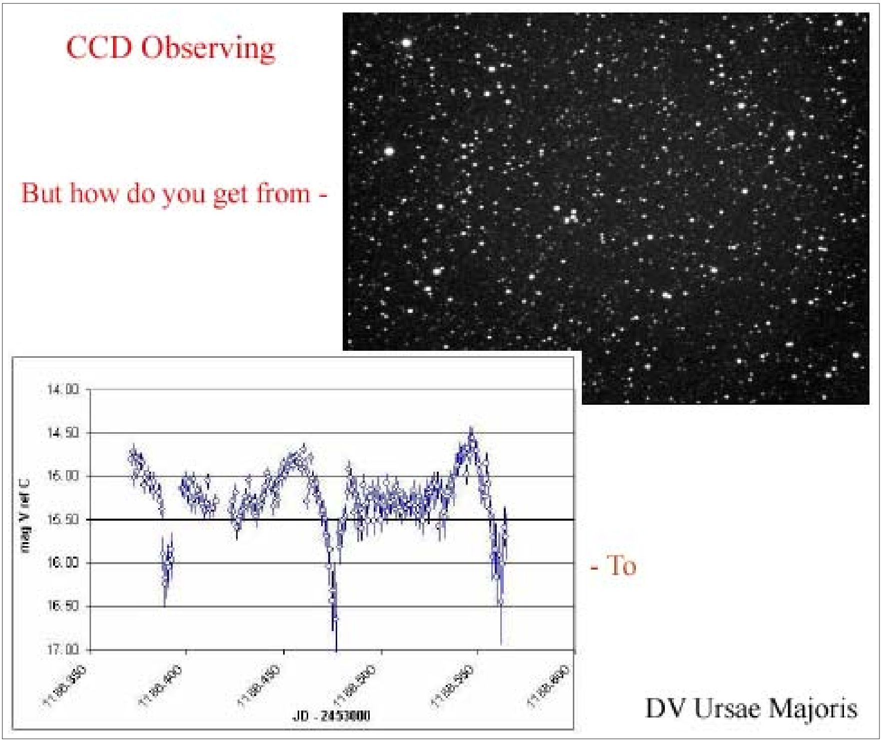
Following the Director's brief introduction; Roger showed how the discovery of variable stars had grown, almost exponentially, since the advent of photography. He showed some examples of typical variable star light curves such as R Coronae Borealis, Mira and SS Cygni.

He explained briefly, the equipment that was needed for variable star work from none (!), to binoculars, and telescopes. Roger then described his own very first variable star observations and how they were not very good. However, after gaining more experience, he had been able to put the seven stars of the Plough in the correct order of brightness on three separate occasions. He talked about the VSS in general terms taking the website as the example.

Roger then explained, that there were three main types of variable star observed by the Section: Pulsating, Eclipsing, and Eruptive, and went on to describe the broad characteristics of each type; finishing by explaining that the continued observation of variables stars was an important task, and it is one of the few areas where an amateur can make a contribution to science.

INTRODUCTION TO CCD OBSERVING

ROGER PICKARD



After showing some slides of his present set-up and explaining in outline how it worked, Roger explained briefly how it was possible to go from a number of images that have been downloaded to a computer, to a graph depicting the light curve of a variable star. This was done using the AIP4WIN software package, and the BAA VSS Excel spreadsheet developed by Andy Wilson, David Boyd, and Richard Miles.

He described the use of photometric filters, and in particular the UBVRI filter system, based in part on the Johnson-Morgan, or UBV photometric system set up in 1953; going on to explain about colour indices, and how it applies to stars, taking Antares and Spica as examples.

Roger talked about some of the Variable Star Section programmes set up for the CCD observers, and how they had been split into categories of Easy, Basic,and Time series. Finally he emphasized the continuing need for both visual and CCD observations, and how useful they both were to professional investigators.

VARIABLE STAR SPECTROSCOPY AND THE EPSILON AURIGAE ECLIPSE 2009-11

Robin Leadbeater

(Adapted from a presentation given at the BAA VSS Workshop, Edinburgh October 2008)

Spectroscopy is a key tool for the professional trying to understand the mechanisms which cause variability in stars. Amateur spectroscopists are rather thin on the ground though, as it is generally seen as too difficult, expensive or both.
In practise however, anyone who is currently digital astro-imaging or doing photometry with a CCD camera can get into simple (but still scientifically interesting) spectroscopy without breaking the bank. Additionally an increasing number of amateurs are tackling the challenges of high resolution spectroscopy, so much so that the AAVSO are planning to develop a database for amateur spectra of variable stars.

A good example of the progress made can be seen in the plans for the upcoming eclipse of the Epsilon Aurigae system. The eclipsing component is a poorly understood extended object which takes almost 2 years to pass in front of the primary star. The situation is further complicated as the F0 supergiant primary is itself variable. With a period of 27.1 years, opportunities for study are few and far between, but now for the first time amateurs equipped with high resolution spectrographs are joining the photometrists to track the changes in the spectrum throughout the 2009-11 eclipse. (The high brightness of the system, a potential nuisance for CCD photometrists is a boon for spectroscopists who can obtain high resolution, low noise spectra with modest apertures.)

Further information on Epsilon Aurigae and the amateur campaign can be found on Jeff Hopkins' website(1).

For more information on spectroscopy of variable stars, the presentation given at the October Edinburgh Variable Star Workshop can be downloaded in full from my website(2). It describes the equipment I use to take low and high resolution spectra, gives some examples of variable star phenomena which can be measured spectroscopically, and includes a walk through the procedure to turn a spectrum image into useful scientific data.

References

1. *http://www.hposoft.com/Campaign09.html*
2. *http://www.threehillsobservatory.co.uk/astro/spectroscopy_10.htm*
3. *http://www.threehillsobservatory.co.uk/astro/spectroscopy_11.htm*
4. Remarkable absorption strength variability of the Epsilon Aurigae H alpha line outside eclipse, Schanne L, IBVS5747 *http://www.konkoly.hu/cgi-bin/IBVS?5747*
5. Epsilon Aurigae. II - The shell spectrum, Ferluga, S.; Mangiacapra, D. Astronomy and Astrophysics vol. 243, no. 1, March 1991, p. 230-238 *http://adsabs.harvard.edu/abs/1991A&A...243..230F*

Figure 1: A low resolution spectrum of Epsilon Aurigae taken using a Star Analyser grating mounted in front of a DSLR camera with a 200mm lens.
Spectroscopy does not get much simpler than this!

Spectroscopic measurements of Epsilon Aurigae pre eclipse 2009-11.

(Spectra have been corrected to the heliocentric velocity, normalised to the continuum and displaced vertically for clarity)

Figure 2: A low resolution spectrum covering the visible wavelengths. (See ref. 3. for information on the technique used to produce this)

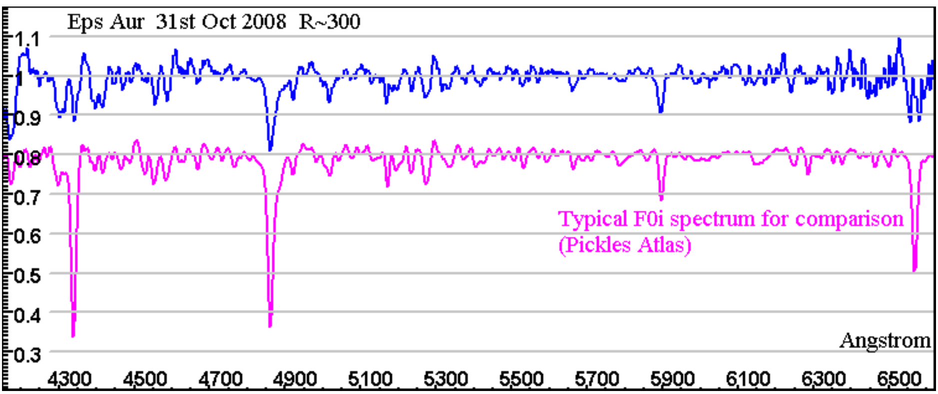


Figure 3: At high resolution, the Hydrogen alpha line profile shows significant changes even outside eclipse. (See also 4)

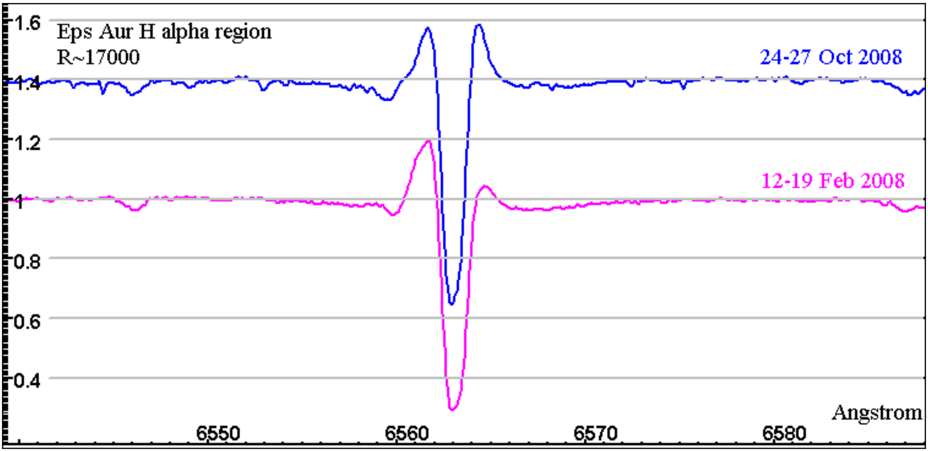
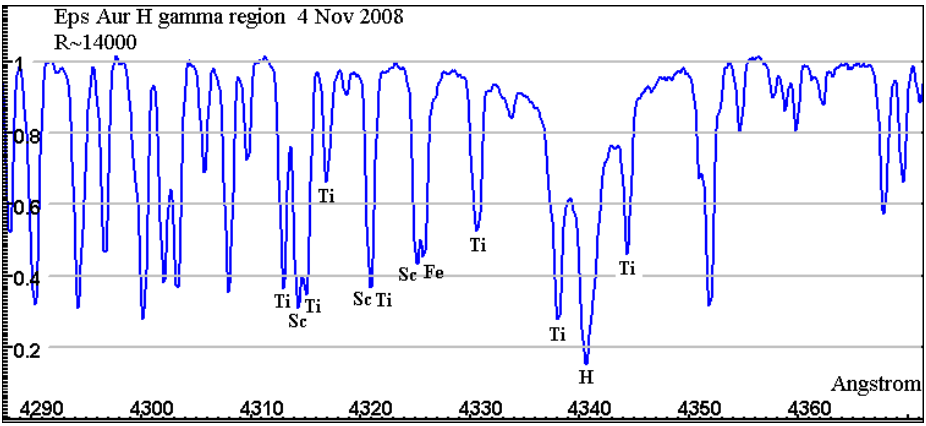


Figure 4: The forest of metal lines in the Hydrogen gamma region are expected to show significant changes as the extended object passes in front of the primary star. (See 5)



robin_astro@hotmail.com

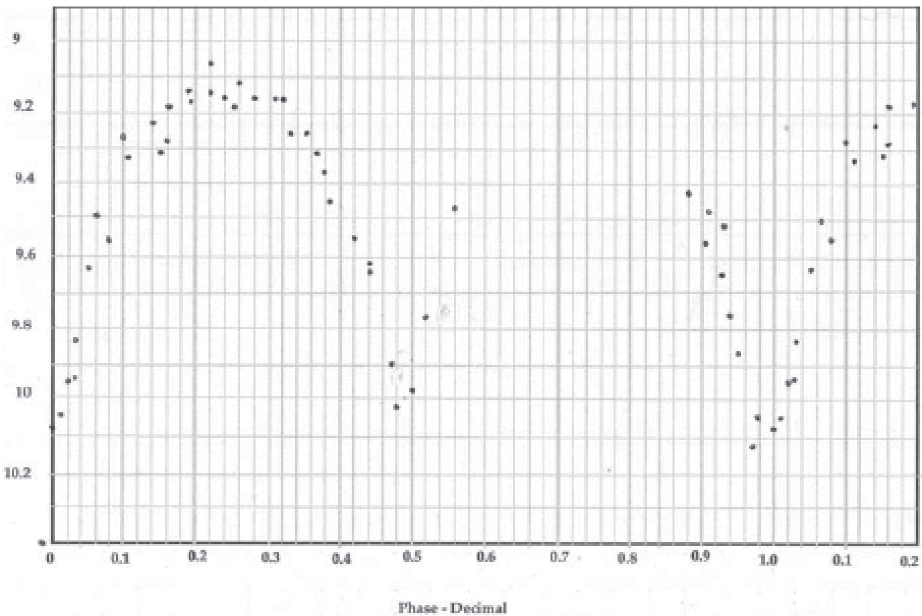
EW ECLIPSING BINARIES: CONSTRUCTING A LIGHT CURVE.

DES LOUGHNEY

Des Loughney, the Eclipsing Binary Secretary of the BAAVSS, gave a talk about the construction of 'phase diagrams'/ light curves of EB systems. The purpose of learning how to construct a phase diagram was to make the best use of observations in the context of standard British weather. Eclipses may last several hours. It may not be possible to observe a whole eclipse because of weather changes or just because the eclipse continues into the early hours. Days or weeks can elapse between observations. Des outlined the system for combining observations on different nights to arrive at a light curve across the whole period of the system. Lots of useful information can be derived from such a light curve. It is usually safe to combine observations over two or three months as the period of the eclipsing binary is unlikely to have changed over such a short period of time.

Des illustrated his case with reference to his current observing campaign of OO Aquilae. His observations were recorded on a 'phase diagram' whose axes are magnitude and 'phase'. Phase is laid out as a decimal when 0.0 to 1.0 is the period of the system. An observation is recorded on an excel spreadsheet. The time and date of the observation is translated to a decimal representing where it occurs within the period of a system. If the observation is half way through a period then it occurs at 0.5. This is the point of mid minimum of the secondary eclipse if the period is correct. One is the point of mid minimum of the primary eclipse - if the period is correct.

OO Aquilae September/October 2008



Des referred to his phase diagram for OO Aquilae for September/ October 2008. OO

Aquilae is an EW system in continuous eclipse. Fifty six observations had been plotted which gave a good picture of the light curve. Such is the British weather that no observations could be made between 0.7 and 0.9 on the light curve. However, the minima were well illustrated. There was a 0.1m difference in depth of the minima which is a reflection of the different brightness's of the two stars in the system. Both minima were a little bit to the left of their theoretical places at 0.5 and 1.0. This did not mean the period was slightly wrong. Once the observations were corrected to Heliocentric Julian Date the position of both minima were correct for the current period as specified by the Krakow database. The scientific value of the OO Aquilae campaign is that it is shown that the period has not changed in 2008. This is useful information for the astronomical community whether one records visual, CCD or DSLR observations.

Des would be happy to supply phase diagrams and excel spreadsheets that are customised for specific EB systems to BAA VSS members.

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Photograph: Des Loughney (page 4. Roger speaking at the Edinburgh VS Workshop.)

Speakers presentations are available on the BAA VSS website:
http://www.britastro.org/vss/

Articles from John Toone and Melvyn Taylor, will appear in a later circular.

EFFECTS OF VARYING OBSERVING CONDITIONS ON OBSERVING STELLAR MAGNITUDES.

RON LIVESEY

Arising from a discussion between observers as to who had determined the correct magnitude of a particular variable star, I decided to investigate the effects of various observing conditions. My normal practice is to use a 65mm diameter x 33 magnification Russian Alcor reflector, alt-azimuth mounted with a theoretical limiting magnitude of 11.0 visual. Normally images are observed in focus and for comparison I also made some observations out of focus.

Additional observations were made using a stop down mask, with a 25mm square aperture offset to avoid the secondary mirror. Alternatively a light blue camera filter was placed in front of the eyepiece to simulate a difference in red sensitivity. From experience I appear to be red sensitive to red variables and tend to a bright magnitude estimate.

The stars chosen for the investigation were UU Aurigae, V465 Cassiopeiae, WZ Cassiopeiae, and Y Tauri, and the observations were made in January to April 2001. Melvyn taylor has since analysed the results which are given with this note, for which many thanks. My experience with the Purkinje effect, while observing the N class variable S Cephei with a 150mm diameter aperture x 100 magnification, appeared in JBAA 76, 2, p. 135, 1966.

Standard deviations to mean magnitudes in various methods of observation:				
	◆	■	●	▲
method	65mmx33 in focus s.d.	65mmx33 unfocussed s.d.	65mm stopped to 25mmx33 s.d.	65mm blue filter s.d.
WZ Cas	0.17	0.15	0.23	0.25
Y Tau	0.10	- -	0.00	0.10
UU Aur	0.11	0.10	0.13	0.11
V465 Cas	0.14	0.16	0.14	0.14

Mean observed magnitudes using four different methods of observation.
The symbols relate to the method as noted in the table of standard deviations and in the text. The linear trend of each method (except Y Tauri) is shown and for V465 Cassiopeiae the trend is virtually coincident on two levels.

Figure 1.

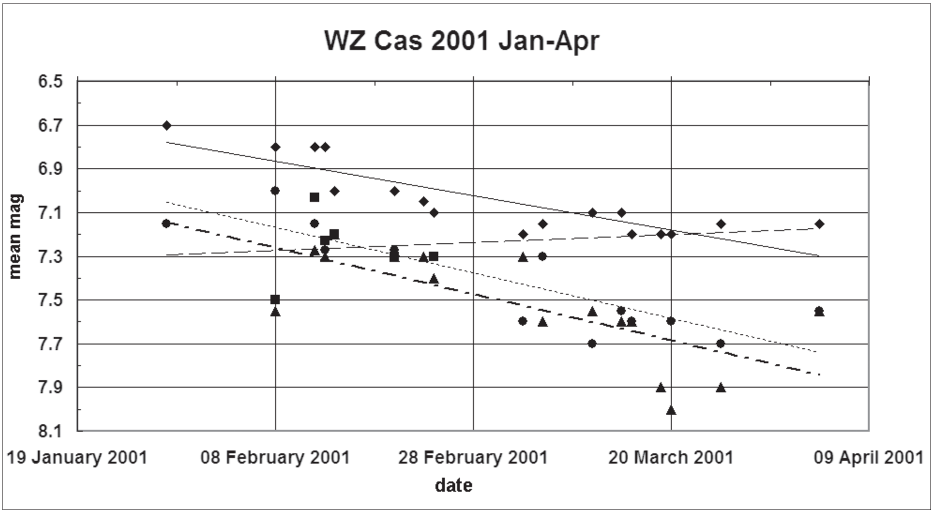


Figure 2.

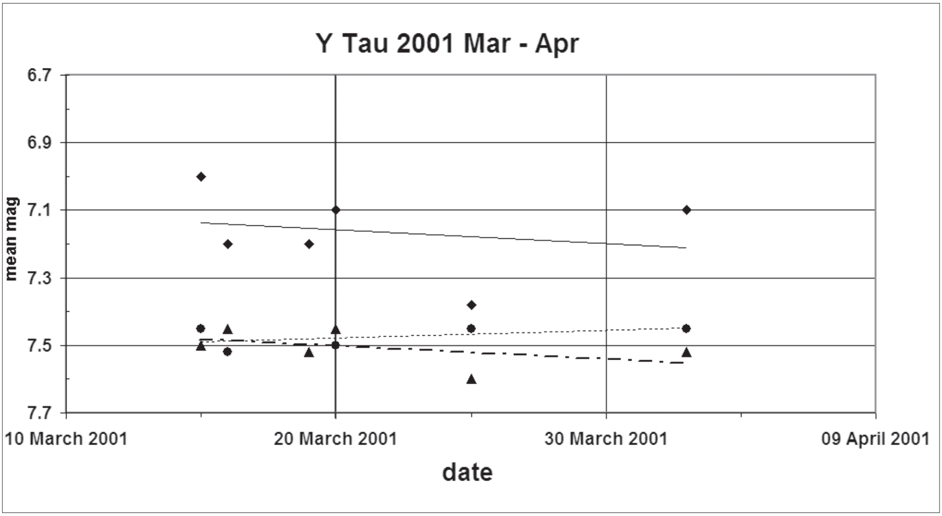


Figure 3.

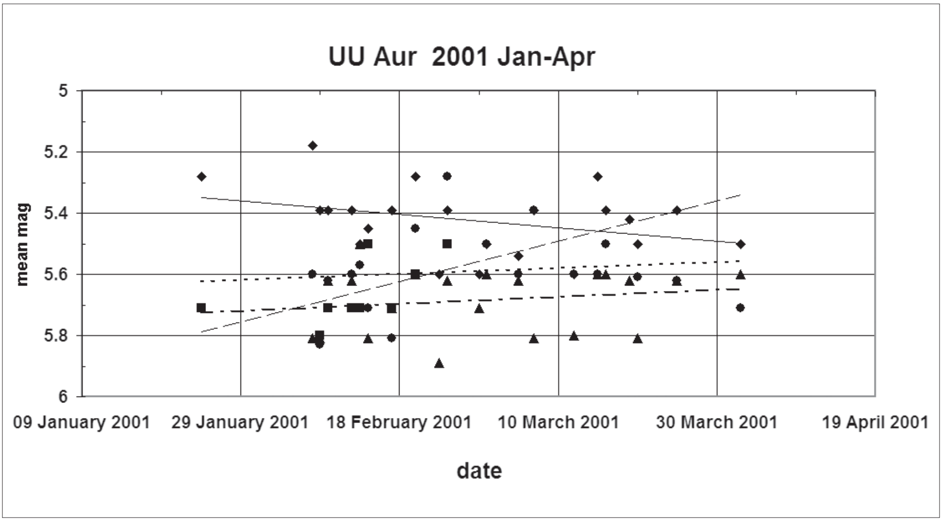
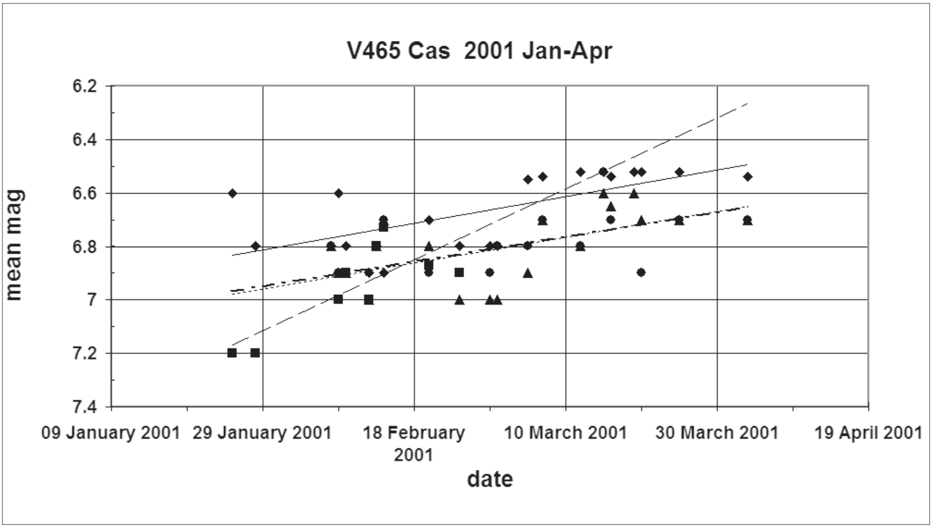


Figure 4.



THE HISTORICAL OUTBURSTS OF T CORONAE BOREALIS REVISITED

John Toone

No one has ever seen the recurrent nova T Coronae Borealis on the rise to a major outburst. The two recorded outbursts of T Coronae Borealis have both commenced with such rapidity, that each time the star has reached naked eye prominence, before being noticed by chance by a number of astronomers. When reviewing modern popular literature on variable stars, it is not readily clear which individuals were the very first to detect these spectacular outbursts. Therefore by examining source documentation, both published and unpublished, immediately following each outburst, I set out to establish in each case who was the first to sight it blazing away with the naked eye. My findings indicate that in both cases it was first seen by amateur astronomers in the British Isles, and then closely followed by North Americans on the same night, with the longitude difference being the deciding factor.

The first recognised outburst of T Coronae Borealis was detected independently by a number of observers in Europe and North America in the middle of May 1866. The earliest authenticated sighting was that of John Birmingham, from Tuam in County Galway, Ireland; who wrote the following account:

"On my way home from a friend's house, on the night of May 12th, I was struck with the appearance of a new star in Corona Borealis. It seemed at least fully equal to Alpha of that constellation in size, and was superior to it in brightness. Its colour appeared

to me nearly white, with a bluish tinge; and, during the two hours that I continued to observe it, I detected no change in its light or in its magnitude. It shone quite like the neighbouring stars, without any particular unsteadiness or flashings. I could not be sure of the exact time of my first seeing it, as I was then on the road, some distance from home; but I am certain it was between 11.30 and 11.45 P.M. Tuam time."

Over the course of the next three nights it was detected independently by Farquhar in Washington, Schmidt in Athens, Chandler in Altona, and Baxendell in Manchester. Farquhar's detection was on the same night as Birmingham's, but several hours later as the late spring night-time shifted from Europe to America. Birmingham's description of it being superior in brightness to Alpha Coronae Borealis, meant that it was brighter than magnitude 2.2 at mid-night on the 12th/13th May 1866. It is highly likely that Birmingham caught T Coronae Borealis right at the peak of its outburst, because Schmidt at Athens observed some variable stars in Corona Borealis the same night, but approximately five hours earlier than Birmingham, and noticed nothing unusual. The nova started to fade almost immediately, and Baxendell already had it at magnitude 3.7 on the evening of the 15th May. By 26th June it had virtually returned to its normal minimum of magnitude 10. Then in late August it began to slowly rise to magnitude 7.5, where it stayed throughout September and October, before gradually fading again to magnitude 10.

In the years following the end of the 1866 outburst, a number of observers continued to monitor T Coronae Borealis, and remarkably good series of visual observations were obtained by Backhouse, Steavenson and Peltier. The minimum brightness level of magnitude 10 also ensured that it was recorded on many photographic plates. It is therefore unlikely, that any major outburst accompanied by a subsidiary rise, occurred unnoticed during the period 1866-1946.

The second outburst of T Coronae Borealis occurred in February 1946, whilst Corona Borealis was still largely a morning constellation. Leslie Peltier who had been closely following T Coronae Borealis since the 1920's, bemoans a chill feeling that prevented him from undertaking morning observing, at the critical time when T Coronae Borealis was peaking. The actual discovery was originally credited to Armin Deutsch atYerkes Observatory who reported seeing it at magnitude 3.2 at 08:30 UT on the morning of the 9th February. However, the independent discovery by Variable Star Section observer N. F. H. Knight, on the same morning several hours ahead of Deutsch's discovery, deserves special attention. Knight's letter dated 10th February 1946 to VSS director W. M. Lindley reads as follows:

"I beg to make known to you Monsieur le Directeur (as I believe Holborn has already informed you), that before dawn yesterday morning (1946 Feb 8d 17h40m, GMAT), just as I was about to observe R CrB, as is my custom, I was suddenly struck – literally struck right in my eyes! – by the presence of a 3m nova in the constellation CrB, situated about a degree south of and slightly following, the 4m star Epsilon CrB; and, a little afterwards (following a telephone call which I made to the Royal Observatory, where unfortunately only a night watchman was on duty) I made the further discovery that this nova appeared to be situated in the very same position as Nova (T) CrB 1866."

On 13th February 1946, BAA Circular No 259 (copy reproduced opposite) was issued announcing Knight's discovery and mentioning Yerkes confirmation.

British Astronomical Association Circular

No. 259 — 1946 — February 13

T CORONAE BOREALIS

Mr. N. F. H. Knight, Stoneleigh, Epsom, discovered that this star was about magnitude 3 on Feb. 9d 5h 30m. The star was a nova in 1866, but faded to about 9th magnitude. Mr. F. M. Holborn, Mr. W. M. Lindley and Dr. W. H. Steavenson have verified the observation and suspect that it is fading.

A telegram from Yerkes confirms its magnitude as 3 and states that its expansion velocity is 4,000 kilometres per second.

COMET PINNERS

Dr. W. H. Steavenson obtained an observation of this comet on Feb. 9d 19h 45m. It was close to Theta Urs. Maj., and observed through the 30-inch reflector it seemed sensibly round with a marked central condensation about 2′. Owing to moonlight it was impossible to see its tail, assuming that it still exists. Further observations are hoped for so that an orbit can be computed.

In *Circular* No. 258 the motion in declination was preceded by the sign of division, owing to a printer's error. The plus sign was intended to be used.

M. Davidson.

Holy Trinity Vicarage,
Canning Town, E.16.

On the same day the Times newspaper published the following account:
"A Stellar Outburst – From our Astronomical Correspondent.
The telescopic star T, in the constellation Corona Borealis, has suddenly increased in brightness several hundred-fold and is now visible to the naked eye. A previous and even more violent outburst took place 80 years ago, when T reached the brightness of the Pole Star, and first attained the status of a 'nova.' It then faded rapidly and has remained of its original brightness, until last Friday night, when it was first noted as a naked-eye object by Mr. N.F.H.Knight, an amateur astronomer living at Stoneleigh, near Epsom. Corona Borealis, which rises to the left of Arcturus, is high enough to be observed from about 11p.m. onwards, and the nova is on its south-eastern fringe, just outside the horse-shoe curve of stars that forms the constellation."

From his VSS report form and further letters to Lindley, it is possible to reconstruct Knight's activities immediately following seeing T Coronae Borealis in outburst, on the morning of the 9th February 1946 (all times are GMT):

05:40 Discovery of nova made when about to observe R CrB.

05:45 Telephone call to Royal Observatory, Greenwich; but night-watchman responds that all observers were in bed, and that efforts to arouse them were unsuccessful.

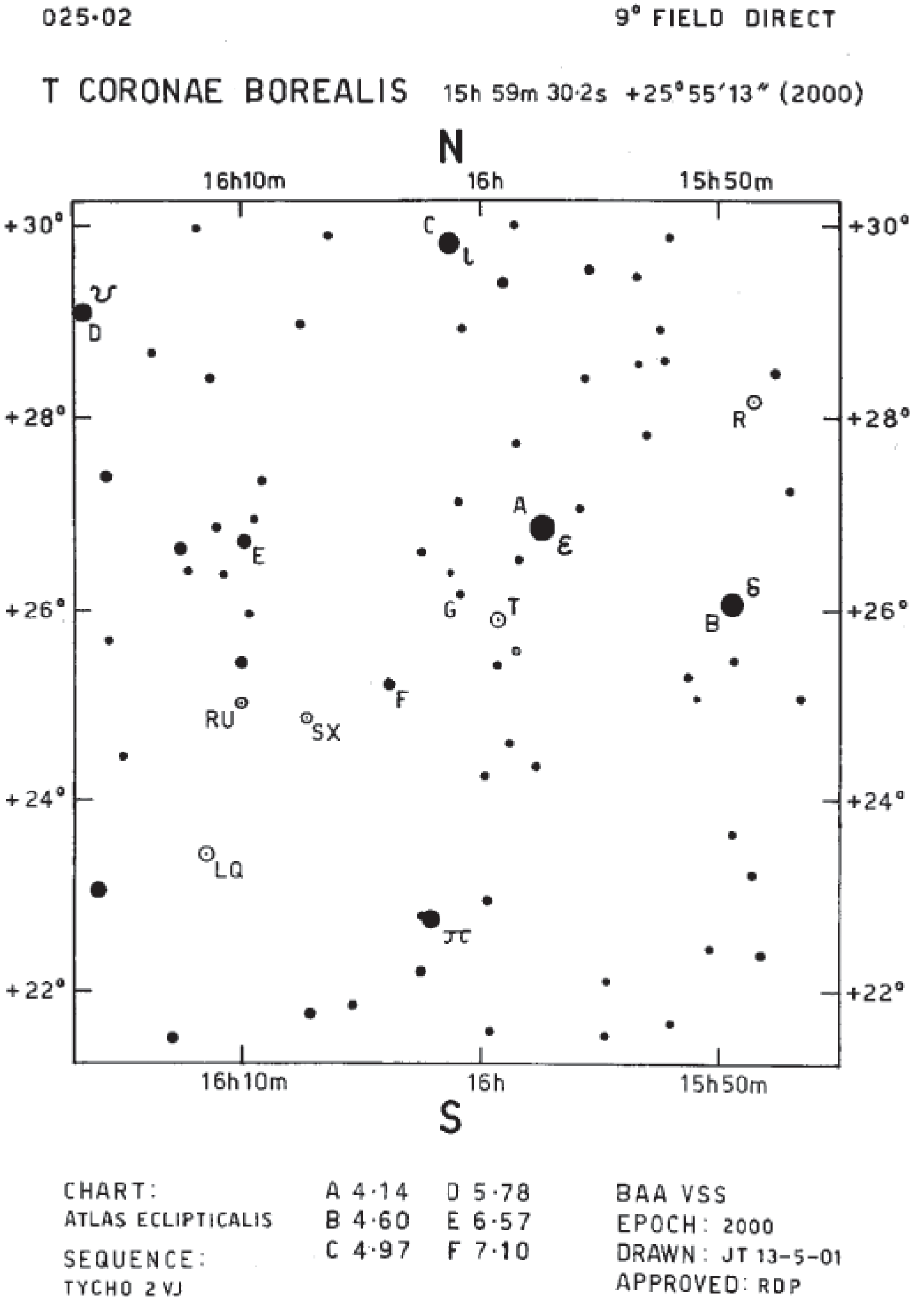
06:15 Early dawn, but sky very clear, and conditions excellent for naked-eye observations. Detailed magnitude estimate made:
Zeta Her – 4, Delta Her (1) V (1) Eta Her = 3.4 (can be corrected to magnitude 3.3 when applying modern Hipparcos magnitudes for the comparison stars).

09:00 Royal Observatory given details of the discovery by telephone.

So the Royal Observatory finally received the details of Knight's discovery approximately thirty minutes after Deutsch's discovery at Yerkes, but by that time it was full daylight making official confirmation from Europe impossible.

It is quite likely that T Coronae Borealis was already fading on the morning of the 9th February 1946, because unlike in 1866 there were no reports of negative sightings (or minimum observations) for several nights beforehand. As in 1866, T Coronae Borealis faded very quickly and within a month it was down to magnitude 9.7. Three months after the onset of the outburst it began to rise again in a similar fashion to the 1866 event but this time peaking at just above magnitude 8. By the end of 1946 this faithful secondary event had ceased and the star was back at its minimum magnitude of 10 where it has remained ever since.

It is now nearly 63 years since the last spectacular outburst of T Coronae Borealis, and the next outburst is eagerly awaited, and could happen at any time. The next outburst will be intensely monitored by an array of scientific instruments aboard spacecraft, which was something quite unthinkable in 1866, and considered rather far fetched in 1946. However, due to the rapidity of the onset of these outbursts, it is conceivable that yet again amateur astronomers equipped with nothing more than the naked eye, may still be the first to detect the next one. If so, the first person to see it will require a clear sky and most importantly, a favourable longitude just as Birmingham and Knight had, in 1866 and 1946 respectively. Whatever happens, thanks to the various internet alert groups, I doubt that next time the discovery announcement will be delayed by snoozing professional astronomers.



W CEPHEI   RA 22H 37M, DEC +58°26' (2000) SRC

Melvyn Taylor

A long-term light curve, of this variable supergiant from the Variable Star Section CD database, shows the overall extreme variation is from magnitude 6.8 to 9.1. With a mean value over this interval of 7.9, the standard deviation of this mean is 0.39 mag. There is a very long term trend in variation of about 0.6 mv over several thousands days. From 1975 to 1983 10-day mean magnitudes (only) highlight the catalogued period of about 350 days. The current chart has a sequence number 312.01 and also indicates RW Cephei.

Figure 1.

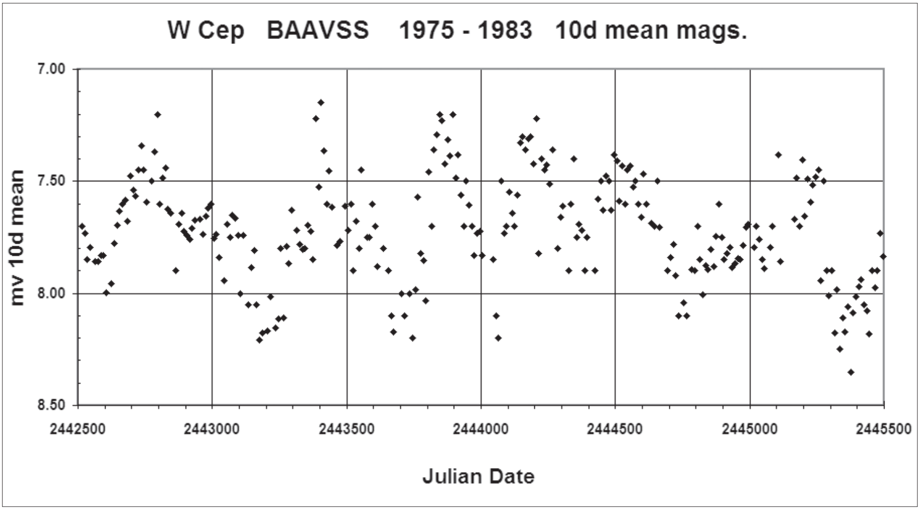
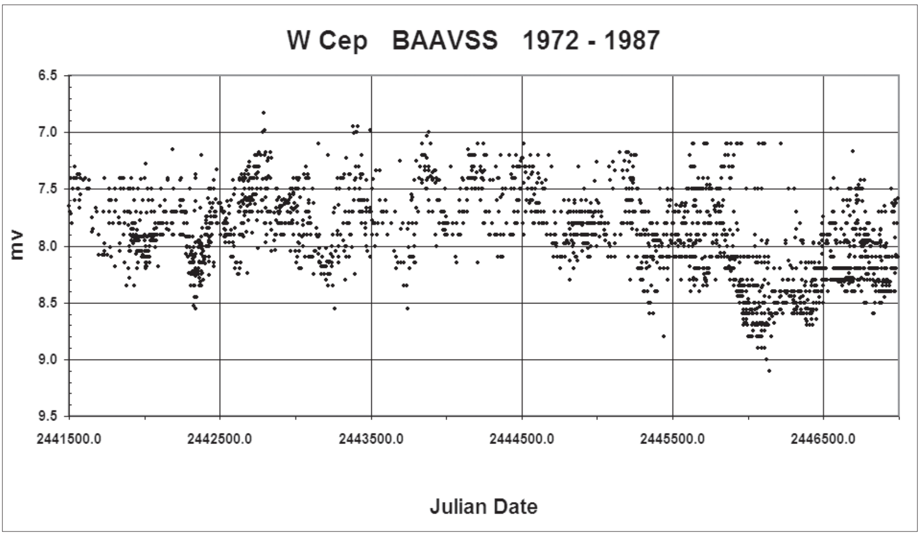


Figure 3.



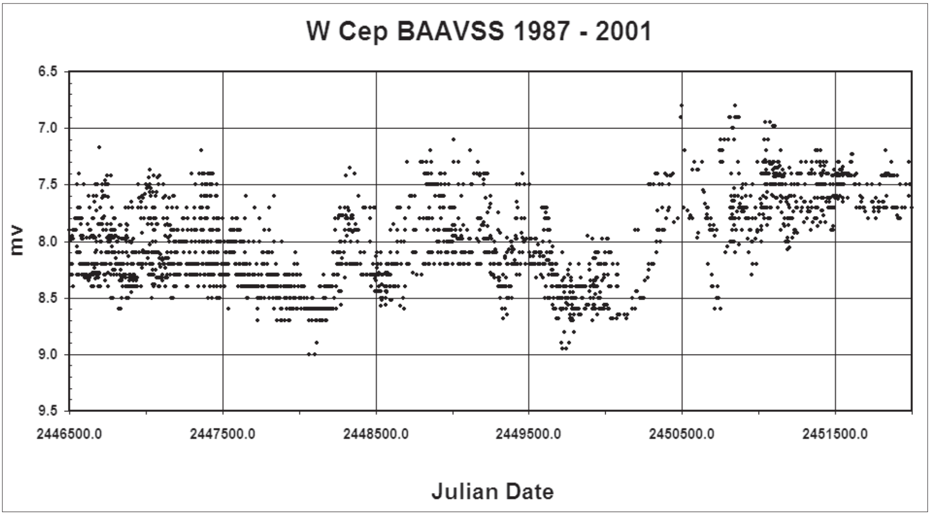


Figure 3.

Observers contributing to the plots are as follows:

Albrighton, Allen, Baransky, Beesley, Beveridge, Billington, Brelstaff, Bullivant, Clayton, Cook, Currie, Day, Devoy, Fleet, Fraser, Gardner, Gavine, Geddes, Good, Gough, O'Halloran, Hather, Henshaw, Hollis, Hornby, Horsley, Hufton, Hurst, Hutchings, Isles, Johnston, Koushiappas, Lubek, Markham, Mason, Matthews, McNaught, Middlemist, Miller, Mormyl, Nartowicz, Newman, Nicholls, Parkinson, Pickup, Pointer, Porter, Poxon, Pratt, Price, Quadt, Ramsey, Reid, Rothery, Smeaton, Smith, Swain, Taylor, Thompson, Toone, Volodymir, West, Worraker, Young, and Yusuf.

CHART NEWS

JOHN TOONE

Those members who attended the joint meeting with the AAVSO, in Cambridge, April 2008, will be aware of the AAVSO policy of introducing many new sequences with improved V photometry, and relying solely on their automatic chart plotter for the production of future charts. The improvement of the quality of the sequences is especially welcome, as the quality of the data that variable star observers accrue is largely dependant upon the quality of the sequence used.
From a BAA VSS perspective this development is a golden opportunity to correct some of our poorly calibrated and non linear sequences with accurate photometry. Not only will this mean better quality data being produced in the future, but it also means that the historical data going back to 1900 can also be easily re-reduced within the database, and aligned with the latest very accurate sequences. To remind everyone, the future policy for BAA VSS charts is to update only the existing sequence files and charts where:

1. We have a long series of data.
2. We are currently accruing a lot of data.
3. For special observing projects.
4. There is no AAVSO sequence available.

For sequences that are revised to incorporate the improved photometry, we will be retaining where possible the same comparison stars and their associated letter ident's to ensure the absolute minimum disruption to observers. This will mean that AAVSO and BAA VSS sequences may differ in terms of some comparison stars used, but they will be derived from the same photometry source, and hence the data acquired by both organizations will be compatible.

The following new charts for stars on the telescopic programme are now posted to the VSS web site and are available in paper form from the Chart Secretary:

053.02 R Andromedae
New 6 degree, 1 degree, and 20 minute field charts replace chart 053.01. Comparison stars B, D, F (variable), K, N, R, S, U, W, EE and FF have been dropped ,and comparison stars KK and LL have been added. The new sequence consists of V measurements from Tycho and SRO. The previous sequence was poorly calibrated, especially below magnitude 14, and did not cover the full range of the variable star.

035.02 W Andromedae
New 6 degree, 30 minute, and 7.5 minute field charts replace chart 035.01. Comparison stars A, B, E, G, M, P, R, U, W, BB, DD and FF are dropped, and comparison stars HH and KK have been added. The new sequence consists of V measurements from Tycho and SRO. The previous sequence was poorly calibrated in certain areas, especially below magnitude 14.

001.04 RX Andromedae
New 1 degree, and 20 minute field charts replace chart 001.03. Comparison stars A, C, H and N have been dropped and comparison stars Z and W have been added. The new sequence is a combination of V measurements taken from Tycho and SRO. The sequence has been extended at both the bright and faint ends, to better cover the extreme range of the variable star.

054.02 S Cassiopeia
New 3 degree, 40 minute, and 10 minute field charts replace chart 054.01. Comparison stars A, K, Q, R (very red), Z, AA and BB have been dropped, and comparison stars CC and DD have been added. The new sequence is a combination of V measurements taken from Tycho and SRO. The previous sequence was poorly calibrated below magnitude 13.5.

186.04 IP Pegasi
A new 15 minute field chart replaces chart 186.03. Comparison stars A, I and J have been dropped, and comparison stars K, L and M have been added. The new sequence is V measurements from Henden, and has been extended at the faint end to better cover the range of the variable star.

033.02 R Serpentis
New 9 degree, and 50 minute field charts replace chart 033.01. Comparison stars A, M, Q and X have been dropped, and comparison stars Y and Z have been added. The new sequence is drawn from V measurements by Tycho, Pickard and SRO. The previous sequence had insufficient comparison stars covering the extreme minima of the variable star.

THE CURRENT PERIOD OF OO AQUILAE

DES LOUGHNEY AND LAURENT CORP

Introduction

OO Aquilae is an EW Eclipsing Binary which has been described[1] as an overcontact binary, since both stars share a common envelope of material. The system varies from 9.2 to 10.2. The primary minimum is 0.8 magnitude in depth and the secondary minimum 0.7 magnitude in depth. The most up to date Krakow elements[2] are JD 2452500.2614 + E 0.5067934 and therefore eclipses occur nearly twice in one day. It was well placed for observation between August and October 2008.

Observations of this system were made by Des Loughney, Edinburgh, Scotland, and by Laurent Corp[4], Rodez, Massif Central, France. Both sets of observations suggest that the period remains the same as expressed in the Krakow elements. The observed times are virtually the same as the predicted times. The observations support the conclusion[1] that the period has remained stable over the past five years.

Contrasting and different methodologies were used to make (and reduce) the observations (not to mention from different latitudes), but the outcomes remain the same.

CCD Observations

Laurent Corp's observations were made using a CCD SBIG ST7 camera, and a 135mm lens. All exposures were between 20 and 60 seconds, they were guided to obtain a SNR > 50. Darks, bias and flats were made for each observing session. Estimates were acquired using CCDSIFT v5.00.188[6], and analysed using AIP4WIN V2.2.00.

The telescope used was an 8 inch diameter, mounted on a fork mount, in a roll on/ roll off home observatory. Before the observations, the time minima predicted was computed by the software "Ebmin 19" (Bob Nelson)[3], and the web page of Krakow[2]. An example of the observations is given in Figure 1, though this diagram refers to the secondary eclipse of 20/9/08. The observations were reduced using the freeware Minima V2.5c (by Bob Nelson)[3] and a time for mid minimum calculated. Three primary mid minima were obtained. These were:

A.	28th August 2008, 20.12 UT	JD: 2454707.34175	HJD: 2454707.3461
B.	29th August 2008, 20.32 UT	JD: 2454708.35538	HJD: 2454708.3594
C.	6th October 2008, 20.51 UT	JD: 2454746.36899	HJD: 2454746.3704

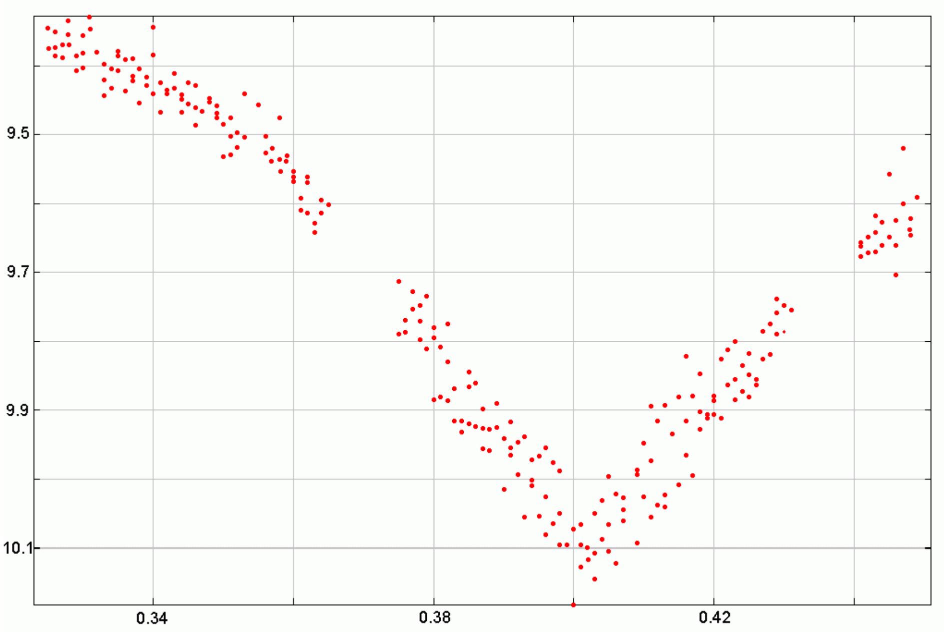
The predicted HJD times of primary mid eclipse using the Krakow elements were:

A. HJD: 2454707.3466
B. HJD: 2454708.3602
C. HJD: 2454746.3698

It can be seen the time difference is insignificant being around a minute.

The comparisons used were taken from the AAVSO's 1013BBL chart. Two comparisons were selected from the comparisons 84, 98 and 102 marked on that chart.

Figure 1: Secondary Eclipse of OO Aquilae, 20th September 2008. Laurent Corp.



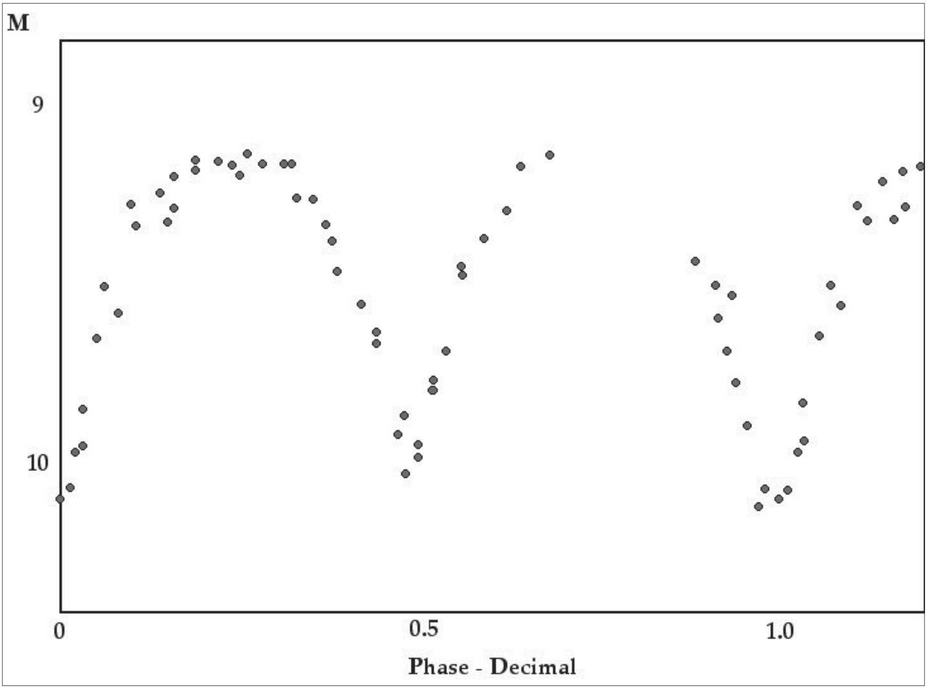
DSLR Observations

The equipment used by Des Loughney was a Canon DSLR 350 D with a 200 mm lens, undriven, on a tripod. The settings were: ISO 800, F2.8, exposure 2.5 seconds. RAW Images of the OO Aquilae system were analysed with AIP4WIN's photometric tools. The comparison star used was 97 as listed in the AAVSO Chart 8/01,1943+09 (c) OO Aquilae.

Figure 2, illustrates the results of observing this star in September/October 2008. Fifty six estimates have been plotted. Each point on the diagram is the average of the estimates from ten images taken one after the other representing 25 seconds of exposure in under a minute. The estimates are plotted as a phase diagram, assuming the Krakow elements are correct, when 0.5 will coincide with the secondary minimum and 1.0 will coincide with the primary minimum. The observations of nearly two months combined in this way, can be acceptable if the period is not changing by a significant amount within this time. A phase diagram is often the only way to construct a light curve of an EW system given the likely pattern of weather in Scotland, and the limited window of opportunity when the system is sufficiently above the horizon at night.

An analysis of the position of secondary minimum and primary minimum suggests that the eclipses are occurring about 0.01 of a period in advance of the predicted time. If the times of the estimates are corrected for Heliocentric Julian Date (HJD), then the eclipses are taking place at the predicted times (0.01 of the period is 7.3 minutes, the HJD correction was 6.3 minutes at the beginning of October).

Phase Diagram showing observations of OO Aquilae during September and October 2008. Des Loughney.



Conclusion

Two sets of observations from different locations and using different methodologies have reached the same conclusion that the period of OO Aquilae is currently stable.

For discussion that OO Aquilae is a quadruple system see (5).

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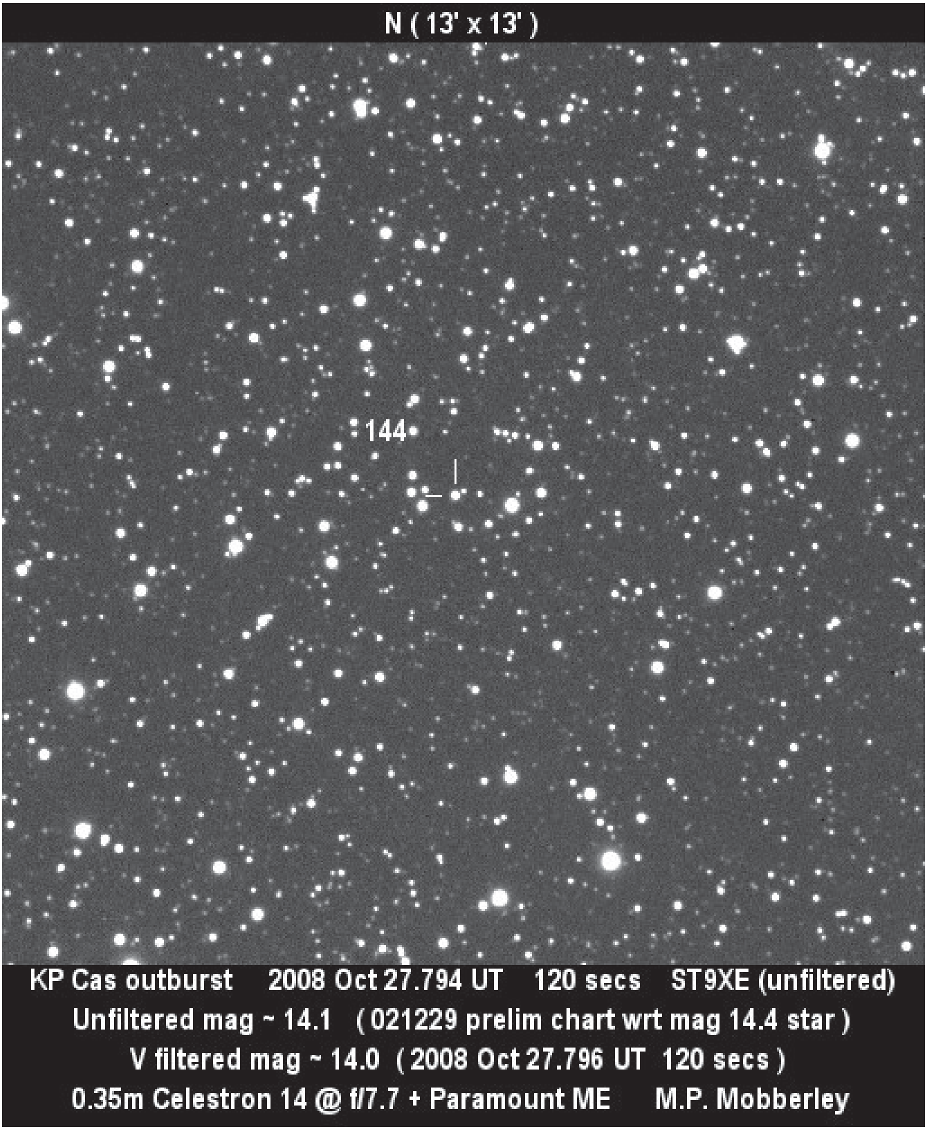
laucorp@wanadoo.fr

References:

1. 'CCD Times of Minima for the W UMa Binary System OO Aquilae' JAAVSO Volume 34, 2006.
2. An Atlas of O-C Diagrams of Eclipsing Binary Stars :Kreiner, Jerzy M.; Kim, Chun-Hwey; Nha, Il-Seong, 2001.
3. Ebmin 19, Minima 25c: *http://members.shaw.ca/bob.nelson/software1.htm*
4. *http://www.astrosurf.com/lcorp*
5. 'Possible Quadruple Stellar System OO Aql' by P Zasche; *http://www.mff.cuni.cz/veda/konference/wds/contents/pdf05/WDS05_077_f1_Zasche.pdf*
6. *http://www.bisque.com*

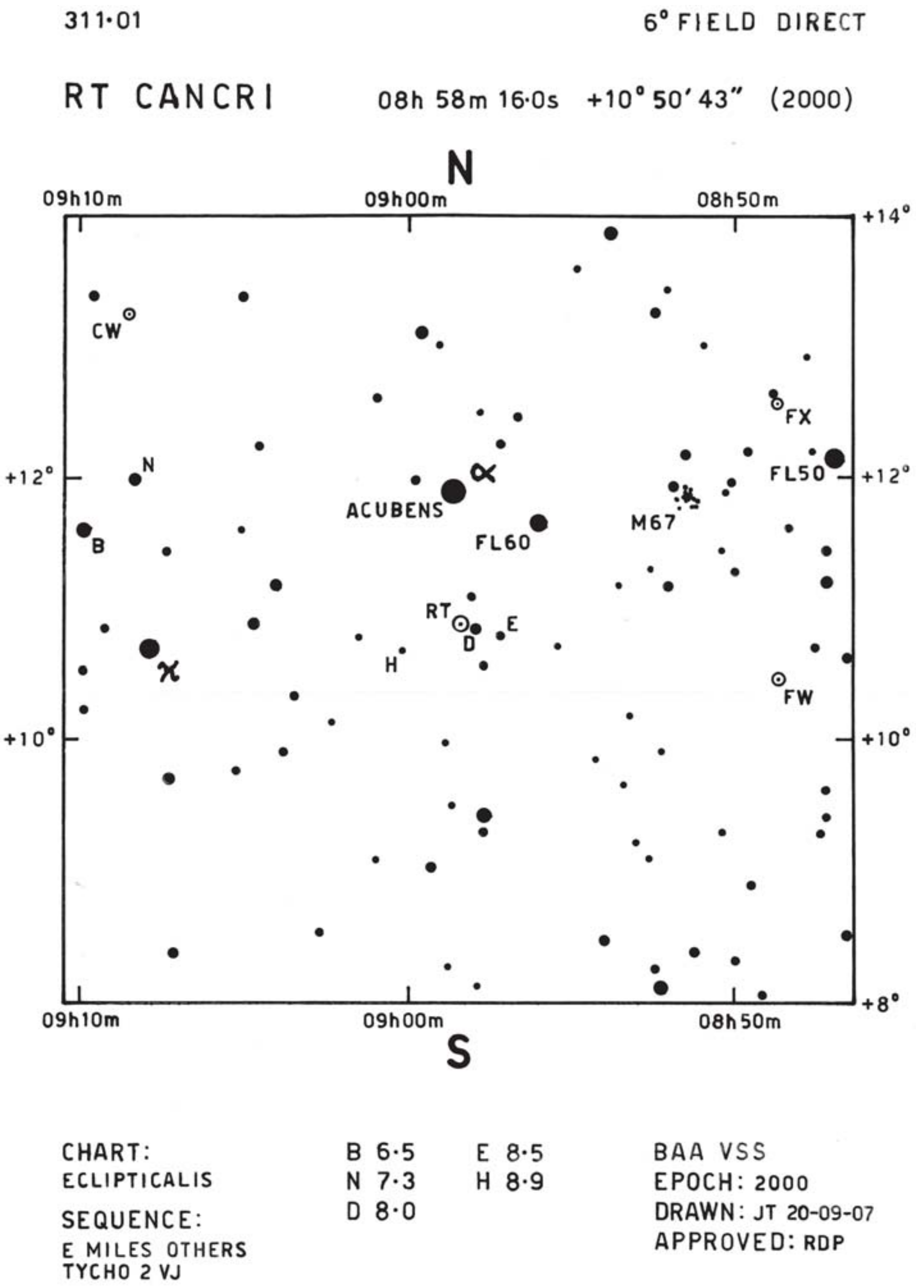
KP CASSIOPEIAE OUTBURST, 27th OCTOBER 2008

MARTIN MOBBERLEY



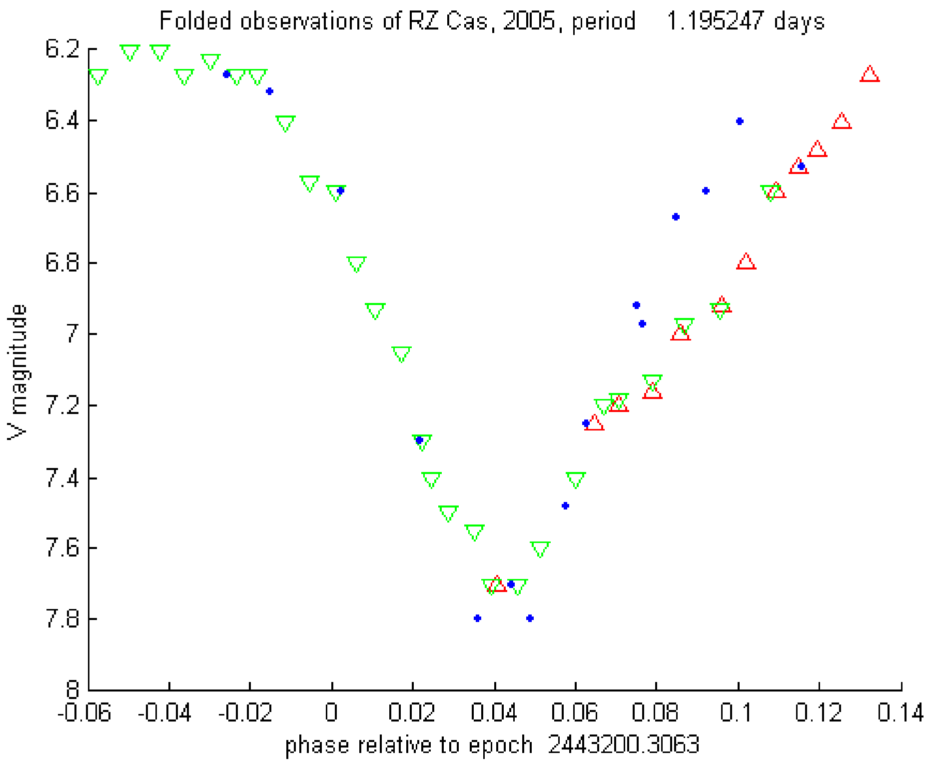
NEW CHART

John Toone



RZ CASSIOPEIAE PHASE DIAGRAM 2005

JOHN HOWARTH



Upward facing triangles............... 27th February 2005
Downward facing triangles.......... 6th March 2005
Dots.. 12th March 2005

The elements were from Sky Catalogue 2000.0 Volume 2, editors A. Hirshfeld and R. W. Sinnot, 1985. The data is understood to be from the GCVS.

The mid minimum when corrected for heliocentricity was approximately 0.04 of phase past the predicted mid minimum, which made it about 1 hour and 9 minutes later than predicted.

BINOCULAR PRIORITY LIST

MELVYN TAYLOR

(Includes *XX Cam*, *Mira*, *R CrB*, and *R Hya* which are also on the telescopic programme)

Variable		RA (2000) Dec	Range	Type	Period	Chart	Prog
AQ	***And***	00 28 +35 35	8.0-8.9	SR	346d	303.01	
EG	***And***	00 45 +40 41	7.1-7.8	ZAnd		072.01	
V	***Aql***	19 04 -05 41	6.6-8.4	SRb	353d	026.04	
UU	***Aur***	06 37 +38 27	5.1-6.8	SRb	234d	230.01	
AB	***Aur***	04 56 +30 33	6.7-8.4	Ina		301.01	
V	***Boo***	14 30 +38 52	7-12	Sra	258d	037.01	
RW	***Boo***	14 41 +31 34	7.4-8.9	SRb	209d	104.01	
RX	***Boo***	14 24 +25 42	6.9-9.1	SRb	160d	219.01	
ST	***Cam***	04 51 +68 10	6.0-8.0	SRb	300d?	111.01	
XX	***Cam***	04 09 +53 22	7.3-9.7	RCB		068.01	T/B
X	***Cnc***	08 55 +17 04	5.6-7.5	SRb	195d	231.01	
RS	***Cnc***	09 11 +30 58	5.1-7.0	SRc	120d?	269.01	
V	***CVn***	13 20 +45 32	6.5-8.6	SRa	192d	214.02	
WZ	***Cas***	00 01 +60 21	6.9-8.5	SRb	186d	1982Aug16	
V465	***Cas***	01 18 +57 48	6.2-7.8	SRb	60d	233.01	
γ	***Cas***	00 57 +60 43	1.6-3.0	GCAS		064.01	
Rho	***Cas***	23 54 +57 29	4.1-6.2	SRd	320d	064.01	
W	***Cep***	22 37 +58 26	7.0-9.2	SRc		312.01	
AR	***Cep***	22 52 +85 03	7.0-7.9	SRb		1985May06	
Mu	***Cep***	21 44 +58 47	3.4-5.1	SRc	730d	112.01	
O	***Cet***	02 19 -02 59	2.0-10.1	M	332d	039.02	T/B
R	***CrB***	15 48 +28 09	5.7-14.8	RCB		041.03	T/B
W	***Cyg***	21 36 +45 22	5.0-7.6	SRb	131d	062.03	
AF	***Cyg***	19 30 +46 09	6.4-8.4	SRb	92d	232.01	
CH	***Cyg***	19 25 +50 15	5.6-10.5	ZAnd+SR	97	089.02	
U	***Del***	20 46 +18 06	5.6-7.9	SRb	110d?	228.01	
EU	***Del***	20 38 +18 16	5.8-6.9	SRb	60d	228.01	
TX	***Dra***	16 35 +60 28	6.6-8.4	SRb	78d?	106.02	
AH	***Dra***	16 48 +57 49	7.0-8.7	SRb	158d	106.02	
NQ	***Gem***	07 32 +24 30	7.4-8.0	SR+ZAnd	70d?	077.01	
X	***Her***	16 03 +47 14	6.1-7.5	SRb	95d	223.01	
SX	***Her***	16 08 +24 55	8.0-9.2	SRd	103d	113.01	
UW	***Her***	17 14 +36 22	7.0-8.8	SRb	104d	107.01	
AC	***Her***	18 30 +21 52	6.8-9.0	RVA	75d	048.03	
IQ	***Her***	18 18 +17 59	7.0-7.5	SRb	75d	048.03	
OP	***Her***	17 57 +45 21	5.9-7.2	SRb	120d	1984Apr12	
R	***Hya***	13 30 -23 17	3.5-10.9	M	389d	049.02	T/B
RX	***Lep***	05 11 -11 51	5.0-7.4	SRb	60d?	110.01	
Y	***Lyn***	07 28 +45 59	6.5-8.4	SRc	110d	229.01	
SV	***Lyn***	08 84 +36 21	6.6-7.9	SRb	70d?	108.03	
U	***Mon***	07 31 -09 47	5.9-7.9	RVB	91d	029.03	
X	***Oph***	18 38 +08 50	5.9-9.2	M	328d	099.01	
BQ	***Ori***	05 57 +22 50	6.9-8.9	SR	110d	295.01	

Variable		RA (2000) Dec	Range	Type	Period	Chart	Prog
AG	***Peg***	21 51 +12 38	6.0-9.4	Nc		094.02	
X	***Per***	03 55 +31 03	6.0-7.0	GCas+Xp		277.01	
R	***Sct***	18 48 -05 42	4.2-8.6	RVA	146d	026.04	
Y	***Tau***	05 46 +20 42	6.5-9.2	SRb	242d	295.01	
W	***Tri***	02 42 +34 31	7.5-8.8	SRc	108d	114.01	
Z	***UMa***	11 57 +57 52	6.2-9.4	SRb	196d	217.02	
ST	***UMa***	11 28 +45 11	6.0-7.6	SRb	110d?	102.02	
VY	***UMa***	10 45 +67 25	5.9-7.0	Lb		226.01	
V	***UMi***	13 39 +74 19	7.2-9.1	SRb	72d	101.01	
SS	***Vir***	12 25 +00 48	6.9-9.6	SRa	364d	097.01	
SW	***Vir***	13 14 -02 48	6.4-8.5	SRb	150d?	098.01	

* *

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/time.

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	AI Dra	7.2 - 8.2	U Sge	6.45 - 9.28V
TV Cas	7.2 - 8.2V	Z Vul	7.25 - 8.90V	RW Tau	7.98 - 11.59V
U Cep	6.8 - 9.4	Z Dra	10.8 - 14.1p	HU Tau	5.92 - 6.70V
U CrB	7.7 - 8.8V	TW Dra	8.0 - 10.5v	X Tri	8.88 - 11.27V
SW Cyg	9.24 - 11.83V	S Equ	8.0 - 10.08V	TX Uma	7.06 - 8.80V
V367 Cyg	6.7 - 7.6V	Z Per	9.7 - 12.4p	Del Lib	4.9 - 5.9
Y Psc	10.1 - 13.1	SS Cet	9.4 - 13.0		

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.

January

2009 Jan 1 Thu
U CrB......L01(06)07D
TV Cas.......02(06)07D
AI Dra...........02(03)05
SW Cyg......L02(<<)03
U Cep........D17(14)19
TW Dra......D17(17)22
V367 Cyg...19(63)23L
X Tri............19(21)24

2009 Jan 2 Fri
V367Cyg.L05(39)07D
AI Dra........07(08)07D
Z Per..........D17(14)19
Z Vul.......D17(18)20L
Z Dra.........D17(19)22
U Sge.......D17(23)19L
V367Cyg.D17(39)23L
TX UMa....L17(22)26
X Tri............18(21)23
TV Cas..........21(25)29
HU Tau......22(26)28L

2009 Jan 3 Sat
del Lib........L04(<<)06
V367Cyg.L05(15)07D
V367Cyg.D17(15)23L
X Tri............17(20)22
U Cep.......... 21(26)31

2009 Jan 4 Sun
Z Dra...........01(04)06
V367Cyg.L05(<<)07D
V367Cyg.D17(<<)23L
TW Dra......D17(13)18
S Equ.......D17(17)19L
AI Dra........D17(18)19
X Tri..........D17(19)22
TV Cas.......D17(21)25
HU Tau......23(27)28L

2009 Jan 5 Mon
del Lib......L04(07)07D
V367Cyg.L05(<<)07D
SW Cyg......05(11)07D
Z Vul........L05(05)07D
RS CVn......05(12)07D
Z Per..........D17(15)20
X Tri..........D17(19)21
TX UMa......19(23)28
AI Dra..........21(22)24

2009 Jan 6 Tue
RW Tau....01(06)04L
U Sge.....L05(08)07D
U Cep......D17(14)19
TV Cas....D17(16)20
X Tri........D17(18)20
Z Dra..........19(21)23

2009 Jan 7 Wed
HU Tau 01(05)04L
AI Dra........02(03)05
TW Dra...03(08)07D
Z Vul.....D17(16)19L
X Tri........D17(17)20

2009 Jan 8 Thu
U CrB....L00(04)07D
Z Dra.......03(06)07D
AI Dra.....07(08)07D
X Tri........D17(17)19
Z Per........D17(17)22
RW Tau....19(24)28L
TX UMa....20(25)29
U Cep.........21(26)30

2009 Jan 9 Fri
HU Tau....02(06)04L
X Tri........D17(16)18
U Sge.....D17(17)19L
SW Cyg....19(25)24L
TW Dra...22(28)31D

2009 Jan 10 Sat
RS CVn....00(07)07D
SW Cyg....L02(01)07
TV Cas....03(07)07D
del Lib......L04(<<)05
Z Vul.....L05(03)07D
X Tri........D17(15)18
AI Dra.....D17(18)19
Z Dra..........20(23)25
Y Psc........20(25)22L

2009 Jan 11 Sun
HU Tau....03(07)04L
U Cep......D17(13)18
S Equ.....D17(14)19L
Z Per........D17(18)23
RW Tau....D17(18)23
AI Dra........21(22)24
TX UMa.22(26)31D
TV Cas.......23(27)31

2009 Jan 12 Mon
del Lib...L03(07)07D
Z Dra.......05(07)07D
Z Vul.....D17(14)19L
TW Dra...18(23)28

2009 Jan 13 Tue
AI Dra 02(03)04
U Sge L05(02)07D
Z Dra D17(16)18
TV Cas 18(22)26
U Cep 20(25)30

2009 Jan 14 Wed
AI Dra 07(08)07D
RW Tau D17(13)18
SW Cyg D17(14)20
Y Psc D17(19)21L
Z Per D17(20)24
RS CVn L21(26)31D
Z Dra 22(24)27
TX UMa 23(28)31D
U CrB L24(25)31D

2009 Jan 15 Thu
Z Vul L04(01)06
TV Cas D17(18)22
TW Dra D17(18)23

2009 Jan 16 Fri
U Sge 06(11)07D
Z Dra 07(09)07D
U Cep D17(13)18
AI Dra D17(17)19

2009 Jan 17 Sat
RW Tau 03(07)04L
del Lib L03(<<)05
Z Vul 06(12)07D
Z Dra D17(18)20
Z Per D17(21)26
AI Dra 21(22)23

2009 Jan 18 Sun
TX UMa 01(05)07D
U CrB 06(12)07D
TW Dra D17(14)19
Y Psc D17(14)18
U Cep 20(25)30
SW Cyg 22(28)23L
Z Dra 24(26)29

2009 Jan 19 Mon
SW Cyg L01(04)07D
AI Dra 02(03)04
del Lib L03(06)07D
TV Cas 05(09)07D
U Sge D17(20)18L
Z Vul D17(23)19L
RS CVn L21(21)27
RW Tau 21(26)27L

2009 Jan 20 Tue
AI Dra.........06(08)07D
Z Per..............17(22)27
V367Cyg..D17(54)22L

2009 Jan 21 Wed
TV Cas........00(04)07D
TX UMa.....02(07)07D
V367 Cyg..L04(30)07D
TW Dra.......04(09)07D
U Cep..........D17(13)18
HU Tau.......D17(14)18
Z Dra...........D17(19)22
S Equ........D17(22)18L
V367Cyg..D17(30)22L
U CrB..........L23(23)29

2009 Jan 22 Thu
V367 Cyg..L04(06)07D
Z Vul...........04(10)07D
V367Cyg..D17(06)22L
AI Dra.........D17(17)19
RW Tau.......D17(20)25
TV Cas...........20(24)28

2009 Jan 23 Fri
Z Dra.............01(04)06
V367Cyg..L04(<<)07D
U Sge.........L04(06)07D
V367Cyg..D17(<<)22L
HU Tau.......D17(15)19
SW Cyg....D17(18)23L
Z Per...........19(24)28L
U Cep.............20(25)29
AI Dra...........21(22)23
TW Dra.......23(28)31D

2009 Jan 24 Sat
del Lib.........L03(<<)05
TX UMa.....04(08)07D
TV Cas........D18(19)23
Z Vul.........D18(20)18L
RS CVn........L20(16)23

2009 Jan 25 Sun
AI Dra...........02(03)04
U CrB..........04(10)07D
RW Tau.......D18(15)19
HU Tau.......D18(17)21
Z Dra.............19(21)23

2009 Jan 26 Mon
del Lib.......L02(06)07D
AI Dra.........06(08)07D
TV Cas........D18(15)19
TW Dra..........19(24)29
Z Per...........20(25)28L

2009 Jan 27 Tue
Z Dra........03(06)07D
Z Vul......L04(07)07D
TX UMa..05(10)07D
HU Tau....D18(18)22
2009 Jan 28 Wed
X Tri.........00(03)01L
SW Cyg....02(08)07D
TV Cas.....06(10)07D
AI Dra......D18(17)18
S Equ.....D18(19)18L
U Cep..........19(24)29
U CrB.......L23(21)27
X Tri........24(26)25L
2009 Jan 29 Thu
RS CVn....05(11)07D
Z Vul......D18(18)18L
TW Dra....D18(19)24
HU Tau....D18(19)23
Y Psc.....D18(21)20L
Z Dra...........20(23)25
AI Dra.........21(22)23
Z Per.........21(26)28L
X Tri.........23(26)25L
2009 Jan 30 Fri
TV Cas.....02(06)07D
U Sge.........L04(00)05
X Tri.........22(25)25L
RW Tau.....23(28)27L
2009 Jan 31 Sat
AI Dra.........01(03)04
del Lib......L02(<<)04
Z Dra........05(07)07D
HU Tau....D18(21)25
TV Cas........21(25)29
X Tri.........22(24)25L

February

2009 Feb 1 Sun
U CrB.......02(08)07D
Z Vul......L03(05)07D
AI Dra......06(07)07D
TW Dra....D18(14)19
Z Dra........D18(16)18
SW Cyg..D18(21)22L
X Tri.........21(23)25L
Z Per.........23(28)27L

2009 Feb 2 Mon
SW Cyg......L00(<<)03
del Lib......L02(06)07D
U Sge........L04(09)07D
Y Psc..........D18(15)20
TV Cas.......D18(21)25
RW Tau....D18(22)27L
HU Tau..........18(22)26
U Cep...........19(24)29
X Tri..........20(23)24L
Z Dra............22(25)27
2009 Feb 3 Tue
RS CVn.......00(06)07D
AI Dra........D18(17)18
X Tri..........20(22)24L
2009 Feb 4 Wed
TW Dra......05(10)06D
TV Cas.......D18(16)20
X Tri............19(21)24
HU Tau.......20(23)26L
AI Dra...........20(22)23
U CrB.........L22(19)24
2009 Feb 5 Thu
Z Per...........00(05)03L
TX UMa....D18(14)19
RW Tau.......D18(17)21
Z Dra.........D18(18)20
X Tri............18(21)23
2009 Feb 6 Fri
AI Dra..........01(03)04
Z Vul........L03(03)06D
SW Cyg......05(11)06D
X Tri..........D18(20)23
HU Tau.......21(25)26L
Z Dra............24(26)29
2009 Feb 7 Sat
TW Dra......00(05)06D
del Lib........L02(<<)04
AI Dra........06(07)06D
X Tri..........D18(19)22
U Cep...........19(24)28
RS CVn....L19(26)30D
U CrB.........24(29)30D
2009 Feb 8 Sun
Z Per..........02(06)03L
V367Cyg..L02(44)06D
TV Cas.......03(07)06D
S Equ........L06(02)06D
TX UMa.....D18(16)21
X Tri..........D18(19)21
V367Cyg..D18(44)20L
HU Tau...22(26)26L

2009 Feb 9 Mon
del Lib.......L02(05)06D
V367 Cyg..L02(20)06D
U Sge.........L03(03)06D
AI Dra.........D18(17)18
X Tri...........D18(18)20
Z Dra..........D18(19)22
V367 Cyg..D18(20)20L
TW Dra.........19(25)30
TV Cas........23(27)30D
2009 Feb 10 Tue
V367Cyg..L02(<<)06D
V367Cyg..D18(<<)20L
X Tri...........D18(17)20
SW Cyg........19(25)22L
AI Dra...........20(22)23
SW Cyg.....L24(25)30D
HU Tau........24(28)26L
2009 Feb 11 Wed
RW Tau........01(05)02L
Z Dra..........02(04)06D
V367Cyg..L02(<<)06D
Z Vul...........L03(01)06
X Tri...........D18(17)19
TX UMa.....D18(17)22
TV Cas..........18(22)26
U CrB.........L22(16)22
2009 Feb 12 Thu
AI Dra...........01(02)04
X Tri...........D18(16)18
TW Dra.......D18(20)25
U Cep............18(23)28
RS CVn........L19(21)27
2009 Feb 13 Fri
HU Tau........01(05)02L
AI Dra.........06(07)06D
TV Cas........D18(18)22
Y Psc........D18(22)19L
Z Dra............19(21)24
RW Tau........19(24)26L
SS Cet..........22(26)22L
2009 Feb 14 Sat
del Lib.........L01(<<)03
TX UMa.....D18(19)24
U CrB........L22(27)30D
2009 Feb 15 Sun
Z Dra..........03(06)06D
SW Cyg........D18(15)21
TW Dra.......D18(15)20

2009 Feb 16 Mon
del Lib...L01(05)06D
Z Vul.......L02(<<)04
U Sge.......L03(<<)03
RW Tau...D18(18)23
AI Dra........20(21)23
SS Cet......21(26)22L
2009 Feb 17 Tue
TV Cas....05(09)06D
Y Psc....D18(17)19L
TX UMa.D18(20)25
U Cep......D18(23)28
RS CVn....L19(16)22
Z Dra..........20(23)25
2009 Feb 18 Wed
AI Dra........01(02)04
Z Vul........04(10)06D
TW Dra...06(11)06D
S Equ.....L06(09)06D
2009 Feb 19 Thu
TV Cas....00(04)06D
U Sge.....L03(07)06D
Z Dra.......05(07)06D
AI Dra.....06(07)06D
SS Cet......21(25)22L
SW Cyg.L23(28)30D
2009 Feb 20 Fri
U Cep......06(11)06D
Z Dra.......D18(16)18
TX UMa.D18(22)27
TV Cas.......20(24)28
2009 Feb 21 Sat
del Lib.....L01(<<)03
TW Dra...01(06)06D
U CrB......21(25)30D
Z Dra..........22(25)27
2009 Feb 22 Sun
RS CVn....05(11)06D
TV Cas....D18(19)23
U Cep......D18(23)27
SS Cet......20(25)22L
AI Dra 20(21)23
2009 Feb 23 Mon
del Lib...L01(04)06D
Z Vul........02(07)06D
TX UMa....19(24)28
TW Dra.....0(25)30D

2009 Feb 24 Tue

AI Dra...........01(02)03
TV Cas.......D18(15)19
Z Dra.........D18(18)20
SW Cyg...D18(18)21L
RW Tau......21(26)25L
SW Cyg.....L23(18)24

2009 Feb 25 Wed

S Equ.......L05(06)06D
AI Dra........06(07)06D
U Cep........06(10)06D
U CrB........06(12)06D
del Lib........06(12)06D
SS Cet.........19(24)21L
Z Dra...........24(26)29

2009 Feb 26 Thu

U Sge.......L02(01)06D
Z Per..........D18(14)19
TW Dra......D18(21)26
V367Cyg.D18(58)19L
TX UMa.......20(25)30
RS CVn......24(30)30D

2009 Feb 27 Fri

V367Cyg..L01(34)06D
RW Tau......D19(20)25
U Cep........D19(22)27
V367Cyg.D19(34)19L

2009 Feb 28 Sat

del Lib........L00(<<)02
V367Cyg.L01(10)06D
Z Vul........L01(05)06D
TV Cas.......02(06)06D
V367Cyg.D19(10)19L
Z Dra.........D19(20)22
SS Cet.........19(23)21L
AI Dra...........20(21)22
U CrB.........L21(22)28

March

2009 Mar 1 Sun

V367Cyg.L01(<<)06D
SW Cyg......02(08)06D
U Sge..........04(10)06D
V367Cyg.D19(<<)19L
HU Tau......D19(16)20
Z Per..........D19(16)21
TW Dra......D19(16)21
TV Cas..........21(25)29
TX UMa....22(27)30D

2009 Mar 2 Mon

del Lib......L00(04)06D
AI Dra...........01(02)03
V367Cyg.L01(<<)06D
Z Dra..........02(04)06D
U Cep.........05(10)06D
RW Tau......D19(15)19

2009 Mar 3 Tue

AI Dra........05(07)06D
HU Tau.......D19(17)21
TV Cas.......D19(21)25
SS Cet......D19(23)21L
RS CVn......19(25)30D

2009 Mar 4 Wed

U CrB.........04(09)06D
S Equ........L05(03)06D
del Lib........05(12)06D
Z Per...........D19(17)22
U Cep.........D19(22)27
Z Dra............19(21)24
TX UMa....23(28)30D

2009 Mar 5 Thu

Z Vul........L01(03)06D
TV Cas.......D19(16)20
HU Tau......D19(18)22
SW Cyg...D19(22)20L
SW Cyg.......L22(22)28
X Tri...........22(25)22L

2009 Mar 6 Fri

Z Dra..........03(06)05D
SS Cet......D19(22)21L
AI Dra...........20(21)22
X Tri...........22(24)22L
del Lib.........L24(20)26

2009 Mar 7 Sat

TW Dra......02(07)05D
U Cep.........05(10)05D
Z Per...........D19(18)23
HU Tau......D19(20)24
U CrB.........L20(20)26
X Tri...........21(24)22L
RW Tau.......23(27)24L

2009 Mar 8 Sun

AI Dra...........01(02)03
TX UMa....01(06)05D
U Sge........L02(04)05D
RS CVn......D19(21)27
X Tri...........20(23)22L
Z Dra............21(23)25
del Lib......L24(27)29D

2009 Mar 9 Mon

TV Cas......03(07)05D
AI Dra.......05(07)05D
HU Tau...D19(21)24L
SS Cet.....D19(21)21L
U Cep.......D19(22)26
X Tri..........20(22)22L
TW Dra.....21(26)29D

2009 Mar 10 Tue

Z Vul.......L01(01)05D
Z Dra........05(08)05D
Z Per.........D19(20)25
RW Tau...D19(22)24L
X Tri..........19(22)22L
TV Cas......23(27)29D

2009 Mar 11 Wed

U CrB.......01(07)05D
TX UMa...02(07)05D
S Equ......L04(00)05D
del Lib.......05(11)05D
X Tri.......D19(21)22L
HU Tau..D19(22)24L

2009 Mar 12 Thu

U Cep.......05(09)05D
X Tri.......D19(20)22L
SS Cet.....D19(21)20L
TW Dra....D19(22)27
TV Cas.....D19(22)26
AI Dra..........20(21)22
Z Dra...........22(25)27

2009 Mar 13 Fri

RS CVn.....D19(16)22
RW Tau.....D19(16)21
X Tri.......D19(19)22L
Z Per.......D19(21)25L
HU Tau.....20(24)24L
del Lib........L23(19)26

2009 Mar 14 Sat

AI Dra..........00(02)03
TX UMa...04(09)05D
TV Cas......D19(18)22
X Tri..........D19(19)21
U Cep........D19(21)26
SW Cyg......19(25)20L
U CrB........L20(18)24
SW Cyg...L21(25)29D

2009 Mar 15 Sun

Z Vul.........L01(<<)04
U Sge........L01(<<)04
TW Dra....D19(17)22
Z Dra........D19(18)20
X Tri.........D19(18)21
SS Cet.....D19(20)20L
HU Tau.....21(25)24L
del Lib....L23(27)29D

2009 Mar 16 Mon

X Tri.........D19(17)20
Z Per.......D19(23)25L

2009 Mar 17 Tue

Z Dra...........00(02)05
V367Cyg...04(49)05D
U Cep.......04(09)05D
Z Vul.........04(10)05D
X Tri.........D19(17)19
HU Tau.....23(26)24L
U CrB.......23(29)29D
V367Cyg.L24(49)29D

2009 Mar 18 Wed

U Sge........02(08)05D
RS CVn.....04(11)05D
del Lib.......05(11)05D
TV Cas.....05(09)05D
SS Cet.....D19(20)20L
AI Dra.........19(21)22
V367Cyg.L24(25)29D

2009 Mar 19 Thu

SW Cyg..D19(15)19L
Z Dra........D19(20)22
U Cep.......D19(21)26
Z Per.......D19(24)24L
V367Cyg.L24(01)29D

2009 Mar 20 Fri

TV Cas.....00(04)05D
Z Vul.........L00(<<)02
AI Dra.........00(02)03
del Lib.......L23(19)25

2009 Mar 21 Sat

Z Dra........02(04)05D
TW Dra....03(08)05D
S Equ......L04(07)05D
SS Cet.....D19(19)20L
RW Tau..D19(24)23L
U CrB........L19(16)21
TV Cas........20(24)28

2009 Mar 22 Sun

Z Vul........02(08)05D
U Cep......04(09)05D
Z Per.........20(25)24L
del Lib....L23(27)29D
RS CVn....24(30)29D

2009 Mar 23 Mon

TV Cas.....D19(19)23
Z Dra.......D19(21)24
TW Dra....22(27)29D
SW Cyg....23(29)29D

2009 Mar 24 Tue

RW Tau......D19(18)23
SS Cet......D19(18)20L
U Cep........D19(21)25
AI Dra...........19(21)22
U CrB........21(26)29D

2009 Mar 25 Wed

U Sge.......L00(02)05D
Z Dra.........04(06)05D
del Lib........04(10)05D
Z Per...........22(27)24L

2009 Mar 26 Thu

AI Dra...........00(01)03
Z Per........L05(03)05D
TX UMa....D19(15)19
TW Dra......D19(22)27

2009 Mar 27 Fri

Z Vul.........00(05)05D
U Cep.......04(08)05D
SS Cet.....D19(18)19L
RS CVn..D19(25)29D
Z Dra...........21(23)25
del Lib.......L23(18)25

2009 Mar 28 Sat

S Equ......L03(04)05D
SW Cyg.....L21(18)24
Z Per..........23(28)24L

2009 Mar 29 Sun

TV Cas........02(06)05D
Z Per.........L04(04)05D
TX UMa.....D19(16)21
TW Dra.......D19(18)23
U Cep.........D19(20)25
del Lib.......L22(26)29D

2009 Mar 30 Mon

AI Dra........ D19(20)22
TV Cas........21(25)28D

2009 Mar 31 Tue

U CrB.........D19(24)29
Z Dra.............22(25)28
Z Vul............L23(27)31
U Sge...........L24(20)24
AI Dra............24(25)26

FROM THE DIRECTOR *(Continued from page 1)*

Web Master

For those of you who don’t look at the Section’s web pages very often (shame on you!), you’ll find them very different thanks to the efforts of Gary Poyner. As Gary is obviously so good at this, I asked both him and Callum if it might be an idea for Gary to take over the bulk of the work (which he’d been doing for a few months anyway). Callum was delighted with this idea as he is already the BAA’s web master as well as web master for a number of other observing sections within the BAA. So, thank you Callum (who has offered to assist Gary still with any technical issues) for your work in maintaining the VSS pages over the last four years or so, and welcome Gary.

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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 139) will be 7th February, 2009. All articles should be sent to the editor (details are given on the back of this issue).

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