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VARIABLE STAR SECTION CIRCULAR

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Contents

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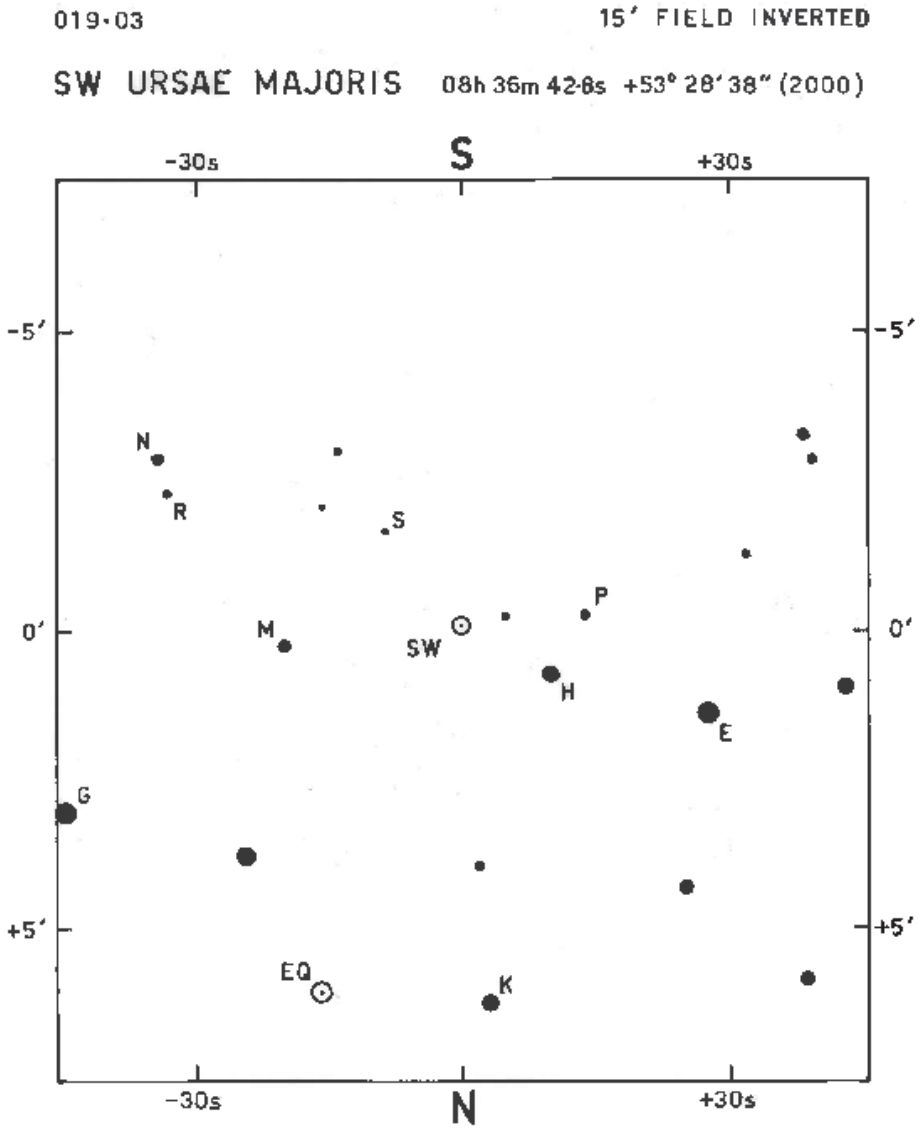
CHART FOR SW URSAE MAJORIS

JOHN TOONE



See article page 10

FROM THE DIRECTOR

ROGER PICKARD

VSS now on Facebook

Well, I received very few comments about the suggestion that the VSS should have a Facebook page, and those that I did receive were, shall we say, a little negative. But despite this, Tony Markham convinced me that in general it would be a good thing and hopefully draw in a few more people to the world of variable stars. You can find the VSS Facebook page either by searching for BAAVSS from the top bar of your own Facebook page or going directly via *www.facebook.com/BAAVSS* and logging in from there.

We anticipate announcing changes to the main BAA VSS web pages as can be seen if you scroll down the Wall, plus other incidental information not suitable for a baavss-alert.

I would like to thank Tony Markham for helping set up these pages, and also taking on the role of one of the Administrators.

We hope that you 'Like' the Facebook pages.

Introduction to Cataclysmic Variables

If you are in the habit of looking at the main VSS web page, and in particular either the "Latest News" or even the "Last updated" section, then you will be aware that items can be added from time to time of great interest but which are not immediately obvious. This was one of the reasons I agreed to start a Facebook page. In addition, it was also because we had recently received an excellent article entitled "*Cataclysmic Variables - an introduction to the evolution, variability and science of natures most dynamic stars*" by Philip Hall which Gary placed in the "Articles" section of the web site. But unless you looked in the above sections from time to time you would never have noticed it. So, do keep an occasional eye on these pages and also on our Facebook page for the announcement of anything that is not worthy of an "alert".

The Hewitt Camera Plate Archive

The Hewitt Camera Plate Archive comprises approximately 11,000 photographic plates taken from various locations within the UK and in Australia over a period of almost 30 years from approximately 1960 to 1990. Each plate covers a 10 degree field of view taken with a Schmidt camera designed by Joseph Hewitt. The plates were originally used to measure the orbits of satellites to infer information about the Earth's gravitational field. However, in the process much information was obtained on variable stars, typically to about magnitude 11 but occasionally to magnitude 13.

Following the transfer of the Royal Greenwich Observatory from Herstmonceux to Cambridge in the early 1990's, the Crayford Manor House Astronomical Society became the custodians of the Archive on behalf of the BAA VSS. The index for the

Archive is now available on-line at: *http://cmhas.wikispaces.com/HewittCameraArchive* and this makes it very easy to see which plates are available for a specific Right Ascension and Declination.

Not all areas of the sky have been equally observed, nor have they been observed in equal time spans. The accuracy of the photometry that can be obtained is typical of that from a photographic plate of around 0.2 magnitudes.

Full details of the project are available from the above link.

Hopefully, with more observers undertaking bright star photometry in the future, using DSLRs, etc. the resource will be increasingly utilised.

So, if you or anyone you know working on a specific project require observations within this time period then you are invited to download the Excel spreadsheet from the above web page and contact the Society Secretary, Dr. Mike Ruston as detailed thereon or alternatively, feel free to contact the Director.

Next VSS Meeting

The next VSS Meeting will be at Salford University (probably!) on either the 1st or 15th of October 2011. The main speaker will be Prof. Don Kurtz who, you may recall, spoke at our weekend meeting in Alston Hall in 2004. On this occasion he will be speaking about data he and his team have been analysing from the Kepler mission.

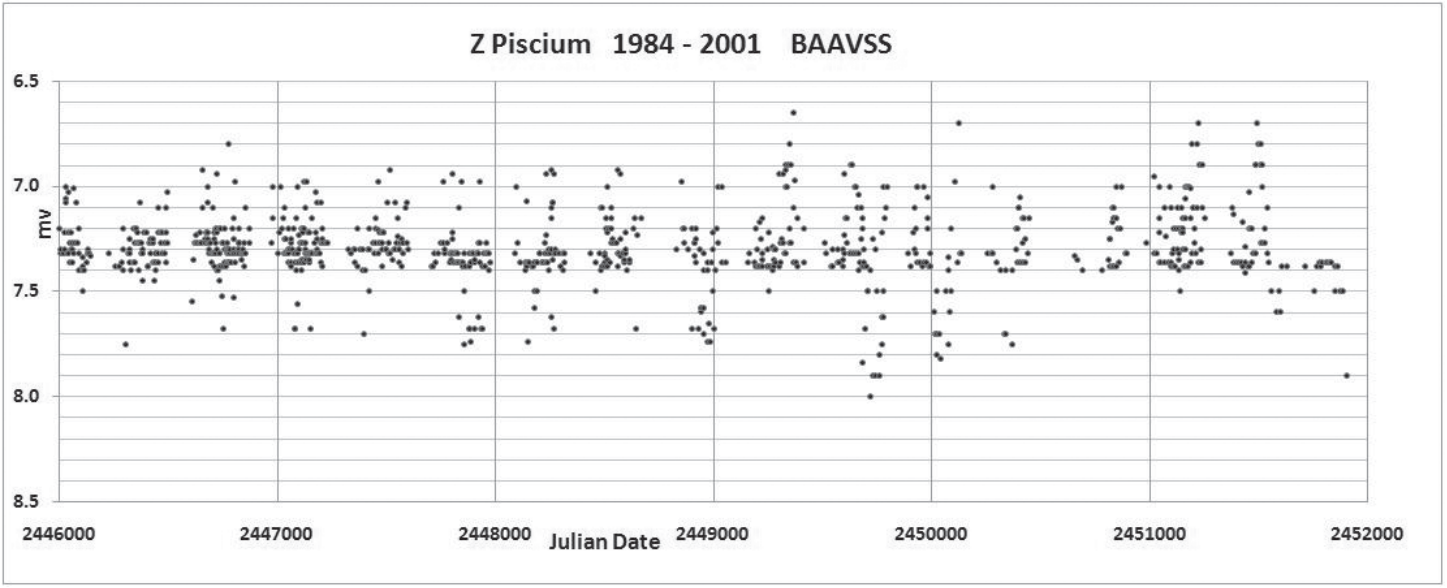
The meeting will be hosted by the Salford Astronomical Society and as soon as more details are know they will be announced on the web site and via our new Facebook pages.

Z PISCIUM (1984 - 2001)

MELVYN TAYLOR

RA 01h 16m Dec.+25° 26', (2000.0) SRB, 7.0-7.9, Period 144d (GCVS), C7(N0)

Extreme estimates from a single observer are mainly 6.7 to 7.9, the mean range 6.8 to 7.8. The average magnitude of all estimates in this light-curve is 7.55 (standard deviation 0.49). The star's mean variations where obvious, show a period of about 153 days and over all this time-scale the trend is a constant magnitude of 7.3. This object is worthy of continuous observation were possible since due to solar conjunction around 130 days (in this data) are lost, and this figure may be much reduced. (The plea for good coverage of objects is not lost on this and others in other 'dangerous', celestial positions). The chart sequence is 278.01 and is a 9° field drawn in 2004. Z Piscium is a very 'red' object visually and lies about mid-way between phi and upsilon Piscium.



Observers of the star in this interval are as below, typically using apertures of 35 to 80mm and with common binocular specifications. Albrighton, Allen, Baker, Barry, Bingham, Briden, Clayton, Collinson, Currie, Fraser, Freeman, Good, Gough,Hather, Henshaw, Hornby, Howarth, Isles, Jackson, Kendall, Markham, Middlemist, Morell, Nicholls, Pickard, Pickup, Pointer, Privett, Quadt, Saville, Saw, Smeaton, Srinivasan, Taylor, Toone, van der Bilt, Wise, and Yates.

ECLIPSING BINARY NEWS

DES LOUGHNEY

Epsilon Aurigae

The out of eclipse variation continued into January 2011. Towards the end of the month the cycle seemed to stop and the system dimmed so that, at the time of writing in the middle of February, it is hovering around 3.8 magnitude. Observers are getting ready for the end of the 'totality' phase.

The end of the phase of deepest eclipse is scheduled to start on 19th March 2011 and be completed by the 13th May. There is no guarantee that epsilon will start brightening on that date. The change could be earlier or up to a month later. The predicted date is based on the obscuring cloud of dust and gas remaining the same apparent size as observed 27 years ago. Somehow, this seems unlikely.

Visual observations may well be important in picking up the start of the brightening if instrumental observations are rendered impossible by the weather.

On 11th January 2011 there was a special session on Epsilon Aurigae at the 217th Meeting of the American Astronomical Society in Seattle, Washington USA. Further information on the meeting can be obtained by visiting the international campaign website at <*http://www.hposoft.com/EAur09/AAS217PP.html*>. Included on the website are poster papers which summarise the measurements that have been made by the team of international observers.

"Polynomial Light Curves "

In the second half of 2010 I accumulated measurements of the eclipsing binary system V382 Cygni. All the measurements plus the latest Krakow elements were used to construct a phase diagram of the system where 1.0 represents the predicted primary eclipse and 0.5 represents the predicted secondary eclipse. All the measurements were corrected so that they took place at Heliocentric Julian Date time.

Within a modern spreadsheet programme, which can be Excel for PCs or Numbers for Macs, the HJD measurements can be used to calculate a Chart plotting magnitude against phase. This produced a very good light curve. Furthermore the Chart was refined to plot magnitude against phase between a phase of 0.9 and 1.10 which illustrates well the measurements around primary minimum. The Chart functions of these programmes allow a polynomial light curve to be plotted to the fourth order using the measurements between 0.9 and 1.10 phase. This produces an informative figure. The light curve for V382 Cygni is on page 5. This figure shows quite clearly that eclipses are occurring earlier than predicted. If the figure is printed off and a ruler is used to work out how early the eclipse is occurring it is found that eclipses are 20 minutes early. Not much of a change but it does suggest the period is decreasing after increasing from about 1960. The polynomial function seems a very good way of producing a best fit light curve which the computer calculates instantaneously.

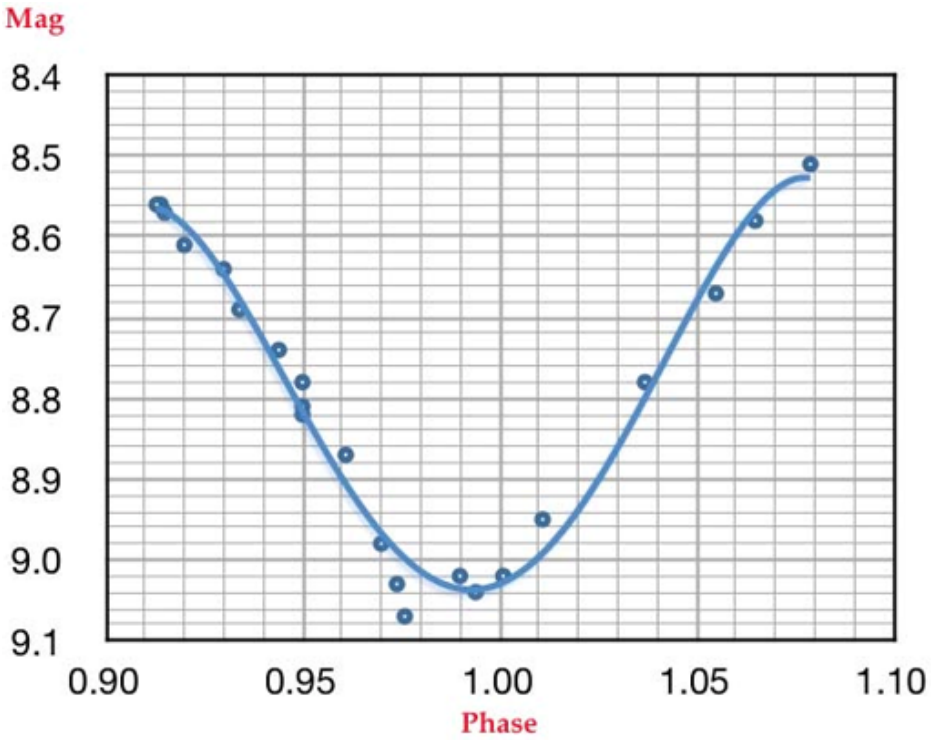


Figure 1: V382 Cygni

V566 Ophiuchi

My attention has been drawn to this interesting system. It is an EW class over contact binary. It varies from about 7.5 to 8.0 magnitude. It is therefore a straightforward binocular object and is suitable for DSLR photometry. It is in continuous eclipse so estimates can be made at anytime. The primary eclipse is 0.5 magnitude in depth and the secondary 0.4 magnitude. Its period is only 0.41 days so that it only takes about two and a half hours to go from maximum to minimum.

This system is on the BAAVSS list because the period is changing due to active mass transfer and the presence of a third star within the system. A chart can be obtained by contacting me at the email address below.

desloughney@blueyonder.co.uk

RECURRENT OBJECTS PROGRAMME SPRING 2011 UPDATE.

GARY POYNER

Three new objects have been added to the Recurrent Objects Programme, suitable for both visual and CCD monitoring: SDSS J150137.22+550123.4, 1RXSJ213807.1+261958, and MisV1443. At the same time three well observed stars have been removed: RXJ1715.6+6856, AW Sagittae, and TY Vulpeculae.

Nine outbursts of AW Sge have been observed since the star was added to the ROP in 1994, including two in 2010. The rate of outbursts detected has increased substantially with the increasing contribution of CCD observations to the programme, and indeed more outbursts may have been missed in the short seasonal winter gap. The UGSU nature of the object was confirmed in 2000 by Masi and Tosti, and results of further time series photometry were published in the JBAA [1].

TY Vul has been detected in outburst ten times since 1999, the last one being in November 2010. Its UGSU status was first identified during the 2003 Superoutburst by David Messier (CBA News). Further Superoutbursts have been reported since, allowing the Superhump period to be refined to 0.08048(7)d [2]. With the outburst period now known to be shorter than one year, (one of the ROP criteria is that the period should be greater than one year), and with good coverage from time series CCD observations, TY Vul has been removed from the ROP; but continued coverage for outbursts and further time series during outbursts is encouraged.

RXJ1715.6+6856 was only added to the ROP in 2007 and announced in the December 2007 Circular. Since that time ten outbursts have been detected (all CCD) by Ian Miller and Jeremy Shears. The ROP database reveals these to be regular outbursts, including four from July to October during a spell of good coverage in 2009 revealing an outburst period under 30d. At the time when it was added to the ROP, very little outburst information was known. Further observations are required to establish the sub-type.

The three stars added to the programme are…

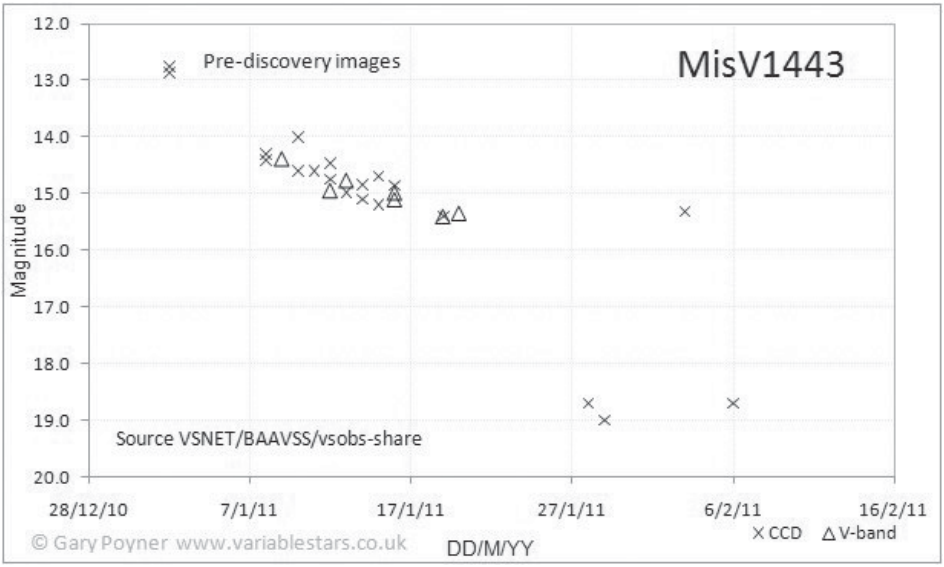
SDSS J150137.22+550123.4 was recommended for inclusion by Jeremy Shears. It's an eclipsing system with a P_orb of 81.8 minutes, and eclipse depth of 1.5 magnitudes. [3] Shears reported an outburst of this object in September 2010, which peaked at magnitude 14.6 (AAVSO LCG). The outburst was prolonged (2-3 weeks) and may well have been a superoutburst displaying post outburst brightenings. Unfortunately the outburst occurred too late in the season for time series observations, so plenty to look for in this object in the future. With a maximum of 14.6, this object is suitable for both visual and CCD monitoring. A chart and sequence is available from AAVSO.

1RXSJ213807.1+261958 (or VSXJ213806.5+261957) was announced on CBET 2273, AAVSO SN 208, and vsnet-alert 11971 in May 2010 as an optical transient discovered in Pegasus independently by Dae-Am Yi, and S. Kaneko, at magnitude 10.8C. Spectra obtained by Graham et al suggested a UGWZ type system in outburst [4]. Unusually for UGWZ outbursts, no post outburst brightenings were observed. Definitely one for both visual and CCD observers. An AAVSO chart and sequence is available.

MisV1443 was discovered as a new object in Orion by Y. Nakashima from his MISAO survey project [5] on 2011 January 8.59 at magnitude 14.4C, and announced on vsnet-alert 12580. Further investigations by Korotkiy and Sokolovsky of their images taken one week before on January 1st, reveal the object to be brighter at magnitude 12.76C (vsnet-alert 12592). Akira Arai reported on vsnet-alert 12598 that he had obtained a low resolution spectra of the new object on January 10 using the 1.3-m Araki telescope at Kyoto Sangyo University, indicating that the new object is a Dwarf Nova in outburst. Fully developed Superhumps (0.25-0.30 mag) were reported on vsnet-alert 12604 by Maehara, revealing a P_sh of 0.05732(3)d. This Superhump period was revised by observations by Itoh (vsnet-outburst 12193) on January 30th to 0.056711(9)d. A short duration post outburst brightening was detected by A. San Segundo on Feb. 3.956 at 15.32C, which had faded to <16.4C by Feb 4.598 (vsnet-outburst 12251).

A formal chart is not yet available, but a preliminary one is available from the co-ordinator on request.

MisV1443. Observers: H. Itoh, N. James, S. Kiyota, H. Maehara, I. Miller, E. Muyllaert, R. Pickard, G. Poyner, D. Rodriguez, M. Rodriguez, A. San Segundo, MISAO survey.



As with previous updates, it is advised that objects removed from the ROP should continue to be monitored as regularly as possible.

References

1. JBAA Vol. 118, No. 3 2008
2. Survey of Period Variations of Superhumps in SU UMa type Dwarf Novae. Kato et al PASJ 2009: *http://arxiv.org/abs/0905.1757*
3. On the evolutionary status of short period cataclysmic variables. Littlefair et al: *http://arxiv.org/abs/0806.1129*

4. Survey of Period Variations of Superhumps in SU UMa type Dwarf Novae II: The second year (2009-2010). Kato et al PASJ 2010: *http://arxiv.org/abs/1009.5444*
5. MISAO project *http://www.aerith.net/misao/*

THE DEEP FADE OF HR LYRAE ENDS.

JEREMY SHEARS AND GARY POYNER

HR Lyr was discovered as Nova Lyr on 1919 Dec 6, by Miss Mackie during the course of her systematic search for novae in the Milky Way on photographs taken at the Harvard College Observatory (HCO). The discovery announcement in the HCO Bulletin states [1]:

> "*Miss Cannon finds that [the star] has the characteristic spectrum of the early nova type. Between Dec 4 and 6 it rose rapidly from the 16th magnitude or fainter, to a maximum of about 6.5. Since that time it has undergone marked fluctuations in brightness. Its present magnitude is 8.5 (1920 Jan 6)* "

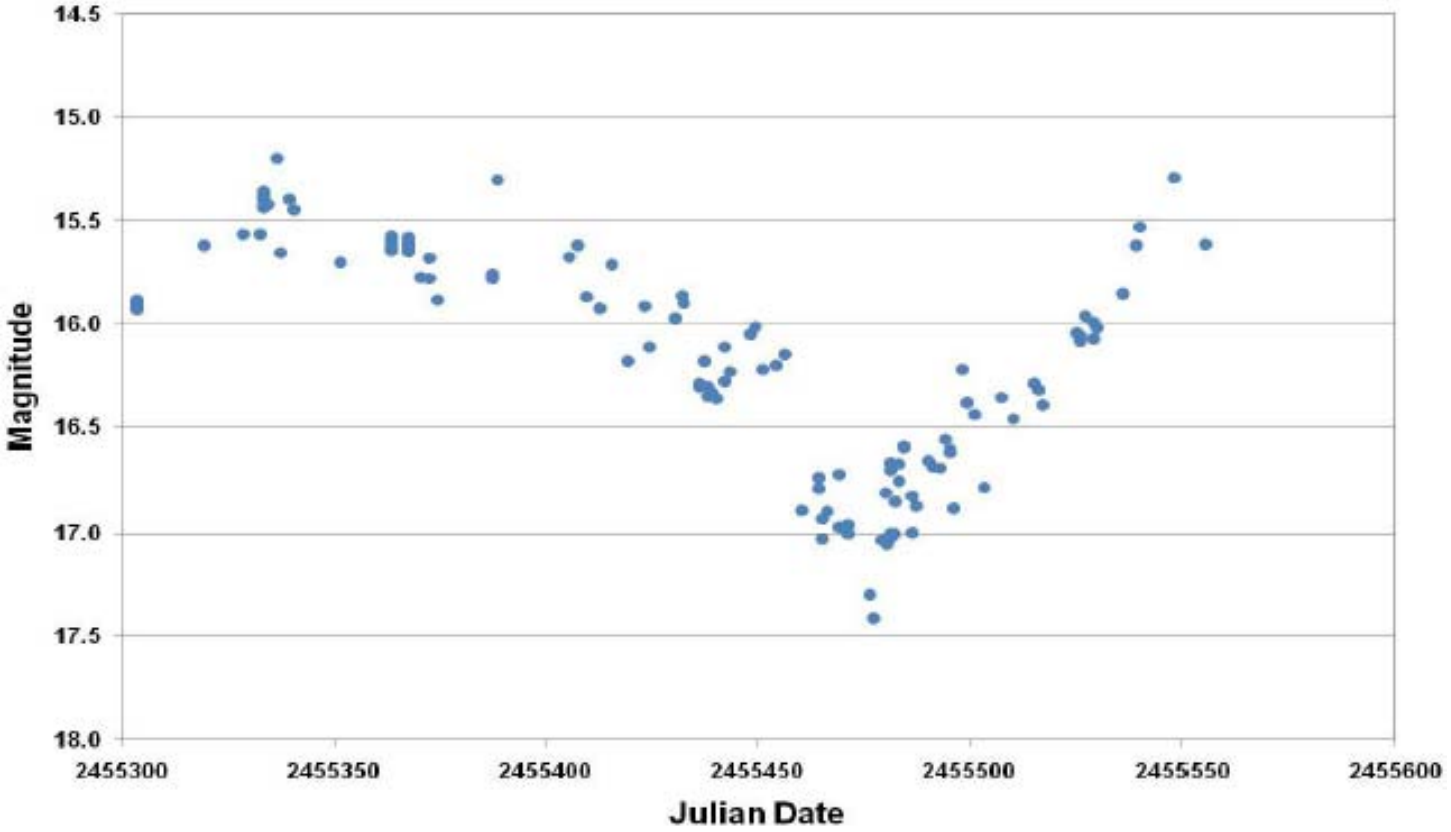
More information about HR Lyr can be found in reference [2]. The nova faded rapidly over six weeks following discovery and has remained below magnitude 15 ever since. It was a classical fast nova, probably of type B. The amplitude was at least 9.5 magnitudes and there has been some speculation in the past that it might be a recurrent nova. The star shows an active quiescence, with brightness variations on a variety of timescales. Visual observations over a period of ten years also reveal long periods when the star was around 15.4v, and others when it was close to 15.7v. HR Lyr is on the Section's Recurrent Objects Programme.

During the summer of 2010 HR Lyr began an unusually deep fade to an unprecedentedly faint level of magnitude ~17.0 to which we drew attention in the Observers' Forum in the 2010 December JBAA [3]. The accompanying light curve shows the behaviour of HR Lyr between 2009 June 29 and 2010 Dec 24, which shows that the star had recovered by year end. The fade lasted about 4½ months.

Will HR Lyr show further unusual behaviour? We encourage further observations of the star which should be sent to the BAA VSS and the AAVSO. An AAVSO chart and sequence is available at < *www.aavso.org* >.

References

1. Bailey S.I., Harvard College Observatory Bulletin 705 (1920).
2. Shears J. and Poyner G., JBAA, 117, 136-141 (2007).
3. Shears J. and Poyner G., JBAA, 120, 380 (2010).



HR Lyrae between 2010 April 17th and 2010 December 24th
Data from the BAA VSS, and the AAVSO International Database.

THE DECEMBER 2010 OUTBURST OF SW URSAE MAJORIS.

JOHN TOONE

Favourable weather conditions in New Mexico and Shropshire during December 2010, allowed Hazel McGee and myself to obtain good data runs on the most recent outburst of SW Ursae Majoris. Hazel obtained V measurements on a nightly basis from the remotely operated GRAS001 telescope in New Mexico, whilst I obtained visual estimates (mv) twice nightly when conditions permitted from Shropshire.

The rise was very rapid on 2nd December. On December 02.301 Hazel measured it still at minimum at magnitude 16.5 (Figure 1). On December 02.996 I saw it rising to outburst at magnitude 11.6, and put out a BAA VSS Alert message. Hazel's next measurement on December 03.301 at magnitude 11.7 confirmed the outburst (Figure 2). By the end of the night (at December 03.255) I recorded 11.1, and put out a further alert to announce that it was still rising.

Figure 1: SW Ursae Majoris at minimum.

A Chart for SW Ursae Majoris can be found on the inside front cover.

Between December 02.301 and December 02.996 (18 hours) most of the rise which was in the region of 4 magnitudes was accomplished. This time period sets the upper limit for the rate of rise because it may not have commenced when Hazel measured it at magnitude 16.5 on December 02.301.

SW Ursae Majoris peaked on 6th December at magnitude 10.5mv and 11.13V and started to fade in a linear fashion at 0.1 magnitude per day between the 8th and 12th December. From the 13th December the fade slowed down but there was then a gap in the data from the 17th to 22nd December and by the 23rd December SW Ursae Majoris was below 15th magnitude and approaching the end of the outburst.

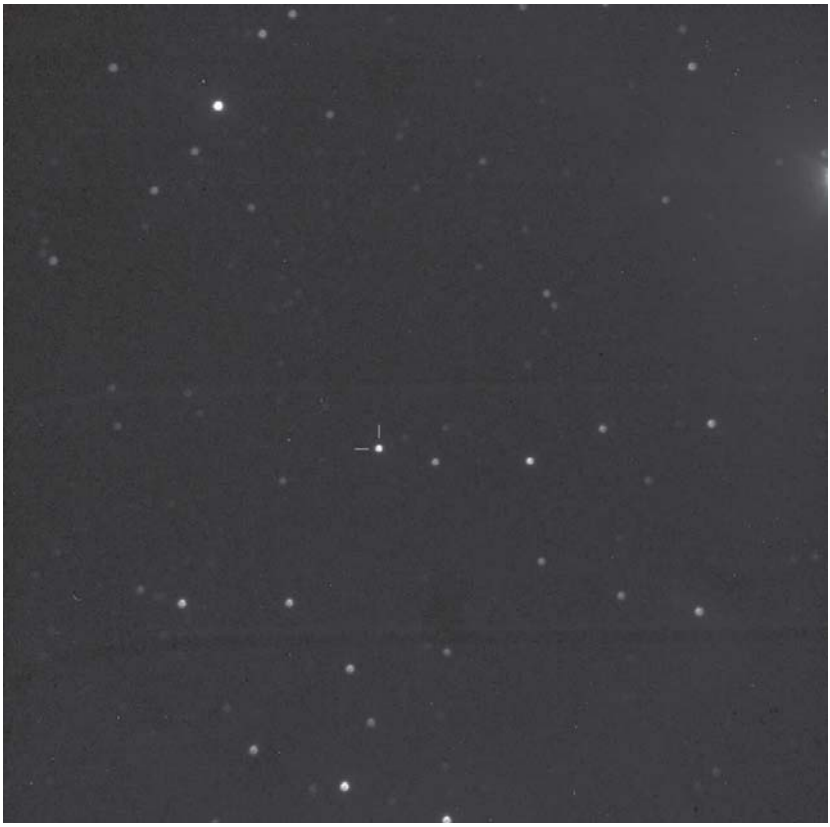


Figure 2: SW Ursae Majoris in outburst.

Figure 3.

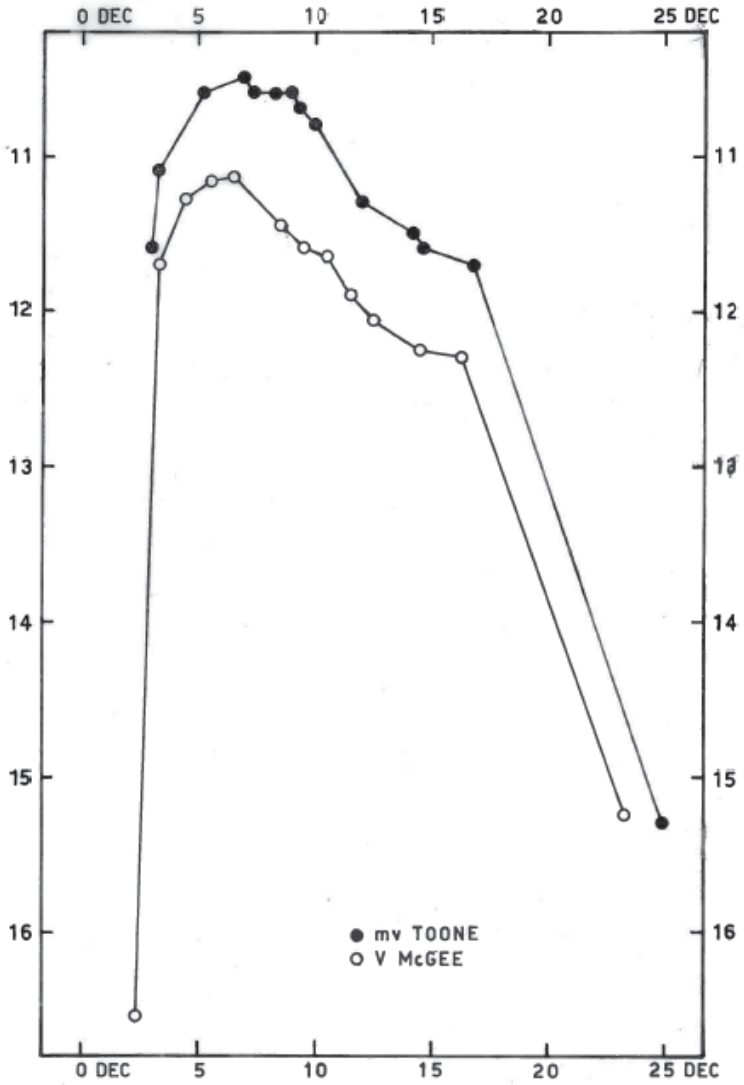
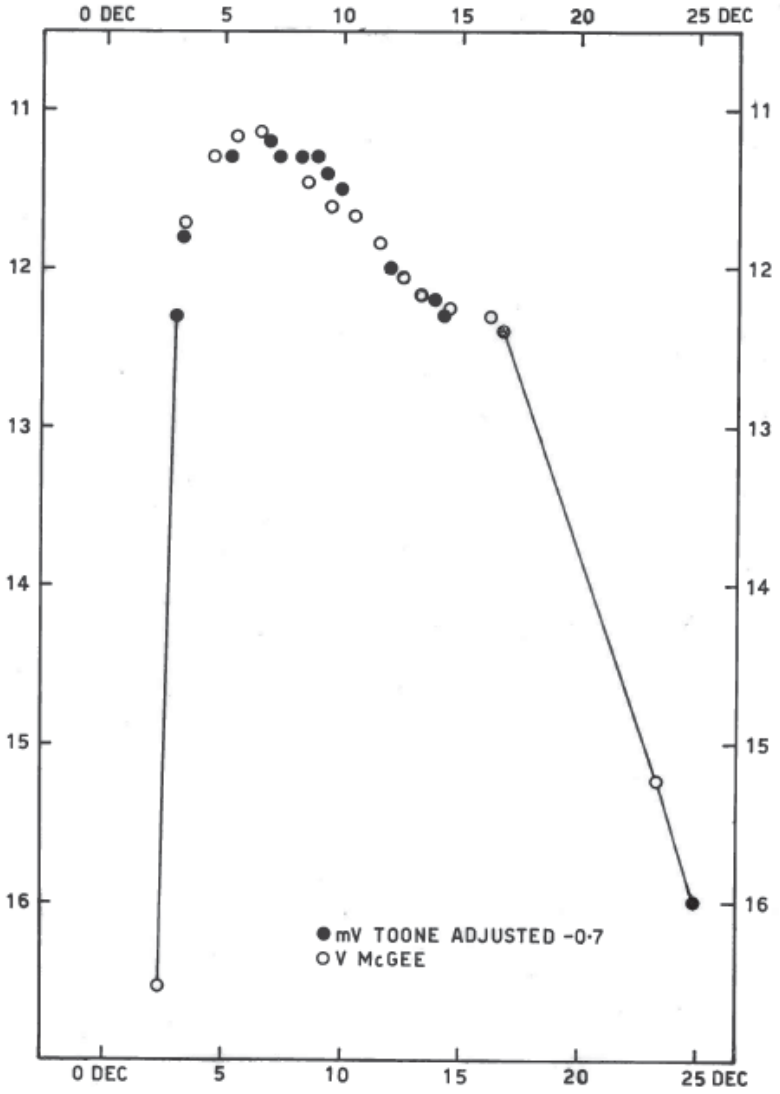


Figure 3 shows the light curve of the outburst in both mv and V uncorrected, as the data is stored in the VSS database. The mv data is systematically 0.7 magnitudes brighter than the V data and so one can apply a correction factor to convert the mv data to the V scale. The effect of this is shown in figure 4. The mv data is now within +/- 0.15 magnitudes of the V data which is very consistent considering that SW Ursae Majoris was probably undergoing superhump variation in the order of 0.2 magnitude at the peak of this outburst.

Figure 4.



This was the first outburst of SW Ursae Majoris observed since June 2008 and it occurred at a fortunate time of year with the long winter nights permitting good coverage. The outburst width was measured at 24 days which gave ample time for photometric study. The rise was astonishingly quick and despite the good coverage given here we still do not know what the maximum rate of rise actually is.

ST URSAE MAJORIS 1985 - 2005

MELVYN TAYLOR

RA 11h 28m Dec. +45° 11', SRB, M4-M5III.

This semi-regular star is found approximately half-way between chi and psi UMa, the nearest naked-eye (mag. 5.0, G8) star being Fl 56 UMa. The chart sequence is 102.2 and two mag. 6 stars conveniently identify the variable clearly. The large B-V index of this star (+1.507) may cause problems with visual estimation, a case when bright for defocusing, and using the fractional method with appropriate comparison stars. Typical variation of this star shows extreme estimates of 6.3 to 7.7 magnitude in this interval with a linear trend constant at 7.15. All estimates in this plot showed a mean magnitude of 7.00 with a standard deviation of 0.42 (mv). A strong period of about 94d operates with a small amplitude but longer cycles from 500d to 600d appear with a greater overall variation. The GCVS notes an uncertain period of 110d.

Figure 1.

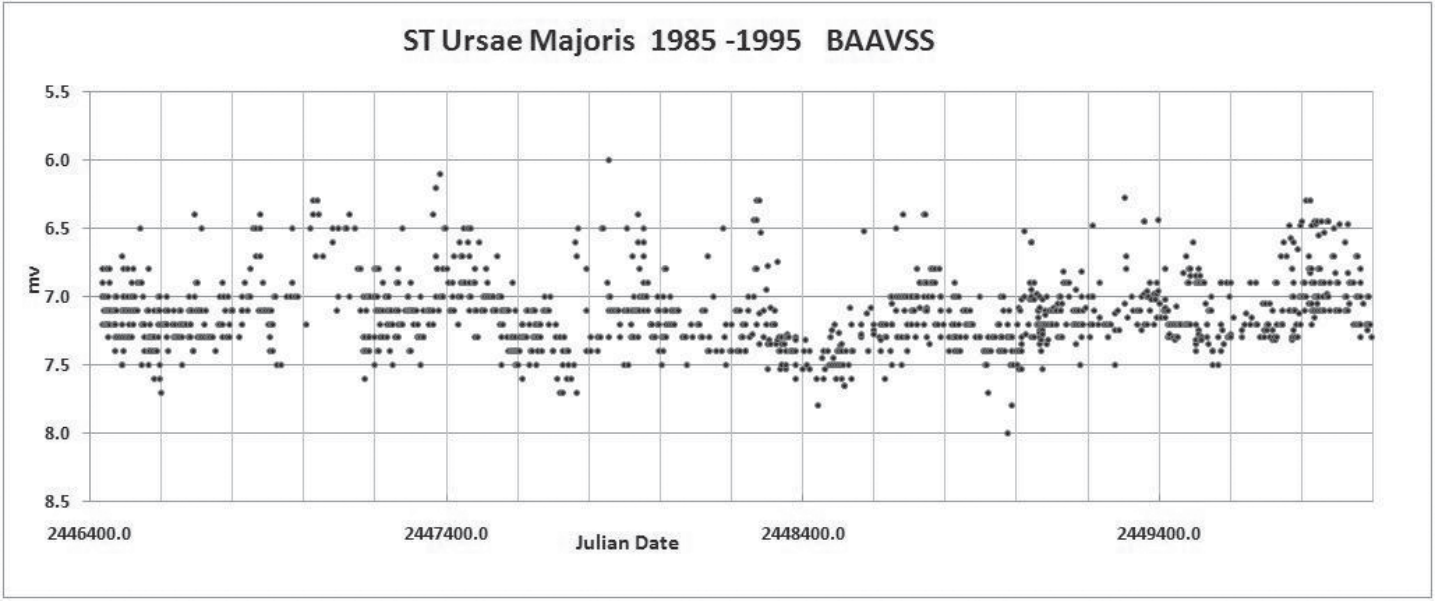
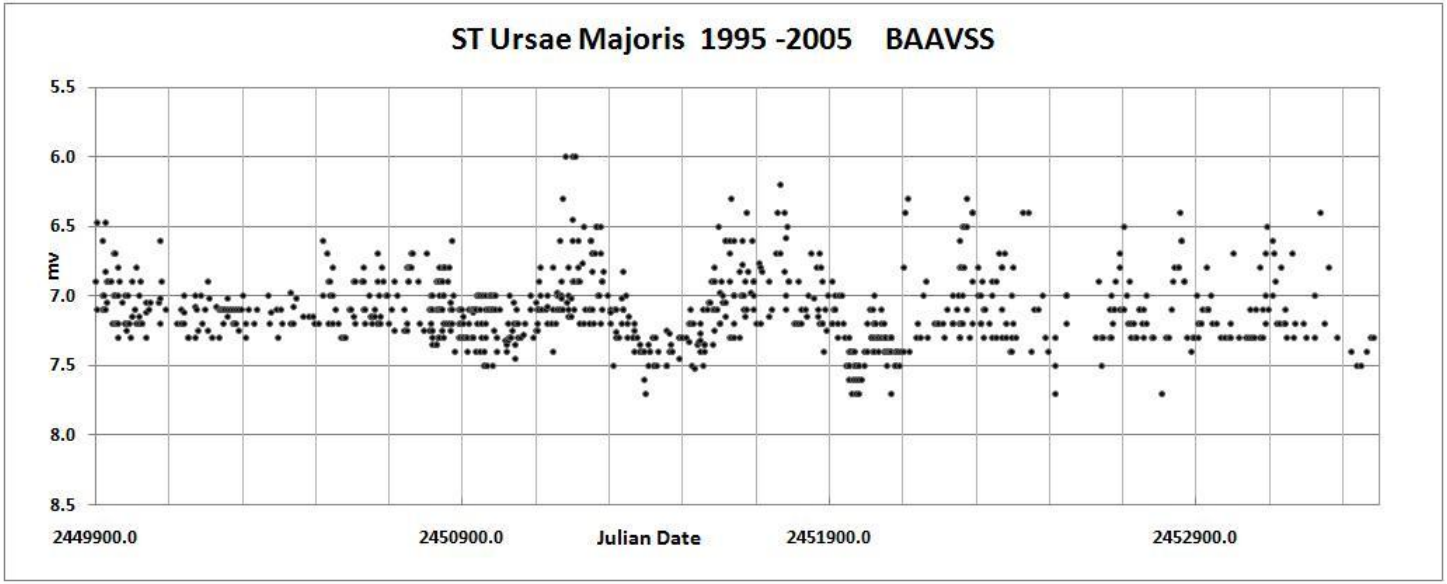


Figure 2.



Observers of the star in the interval were: Albrighton, Allen, Baransky, Bibbings, Bone, Chapman, Charleton, Clayton, Collinson, Currie, Day, England, Evans, Farrer, Fraser, Freeman, Gardner, Gough, Granslo, Griffin, Harpur, Hather, Henshaw, Hornby, Horton, Hoste, Houchen, Howarth, Hufton, Hurst, Hutchings, Isles, Jobson, Johnston, Kendall, Kucinskas, Livingstone, Lubek, Markham, Middlemist, Mormyl, Nartowicz, Newman, Nicholls, O'Halloran, Pickup, Pointer, Quadt, Ramsey, Roberts, Robinson, Saville, Smeaton, Smith, Stephanopoulos, Swain, Taylor, Toone, Wildey, Wilson, Wise, Young, and Yusuf. Binoculars of 40mm to 80mm were commonly used.

2010 LIGHT CURVES

TONY MARKHAM

V Canum Venaticorum

The GCVS lists V CVn as a semi-regular (SRA) variable, with a period of 191.89 days – the rises and falls in this 2010 light curve seem to be in line with this. However, longer term light curves suggest that an additional period is probably also present, with the combination of the two periods leading to an "irregularity" slowly moving through the light curve from one cycle to the next – this light curve suggests the presence of a "hump" on the rising branch, changing position between the two cycles.

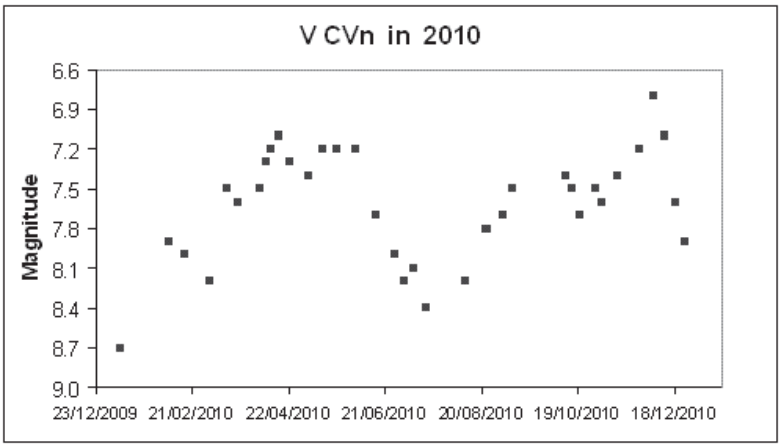


Figure 1: V Canum Venaticorum

Y Canum Venaticorum

Y CVn is a very red variable and this can lead to large systematic differences between the brightness estimates of different observers. In the GCVS, it is listed as a semi-regular (SRB) variable with a period of 157 days. No periodicity with this short a timescale is evident in this 2010 light curve.

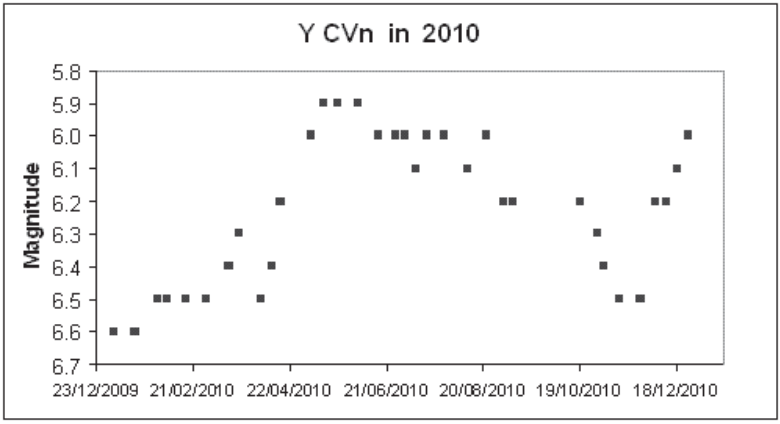


Figure 2: Y Canum Venaticorum

WZ Cassiopeiae. WZ Cas is listed in the GCVS as a semi-regular (SRB) variable with a period of 186 days. The variations shown by this light curve seem to be largely in line with this. There is also a hint of irregularities near the maxima.

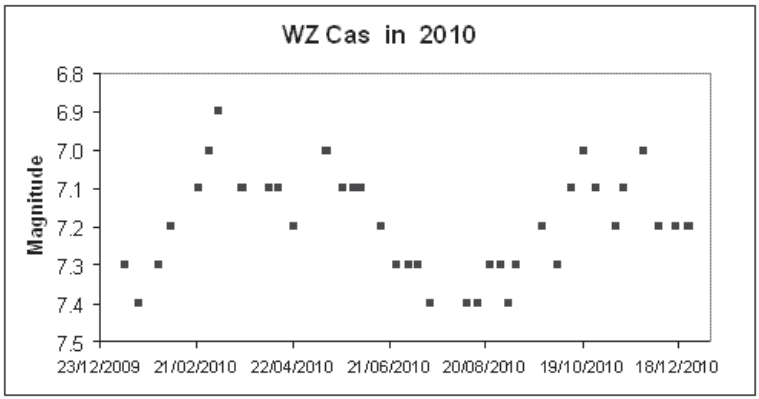


Figure 3:WZ Cassiopeiae

AF Cygni. The GCVS lists AF Cyg as a semi-regular (SRB) variable with a period of 92.5 days. However, this light curve suggests that a longer period, possible close to double this was more dominant during 2010.

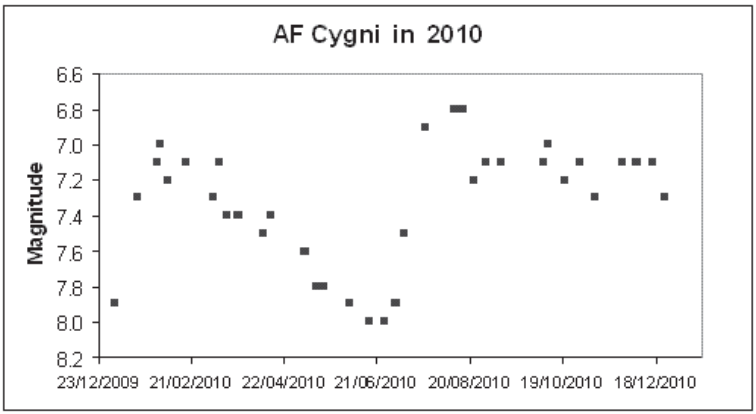


Figure 4: AF Cygni

W Cygni. In many years I see W Cyg vary in brightness with a range of only about half a magnitude. It was much more active in 2010 – the largest range I've ever seen in one year - the interval between the June and December minima in this light curve is noticeably longer than the GCVS listed period of 131.1 days.

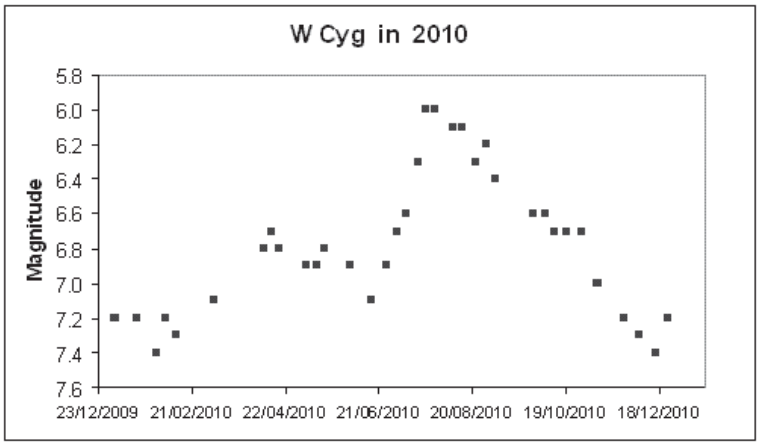


Figure 5: W Cygni

RY Draconis

The most distinctive aspect of RY Dra during 2010 was its deep fade – in over 30 years' observing I have never before seen it go so faint. The GCVS lists RY Dra as a semi-regular (SRB) variable with a period of approx 200 days. A 12 month light curve is not sufficient to confirm or deny this - although with RY Dra brightening again in early 2011, the behaviour from July onwards would fit in with a period of around 200-250 days.

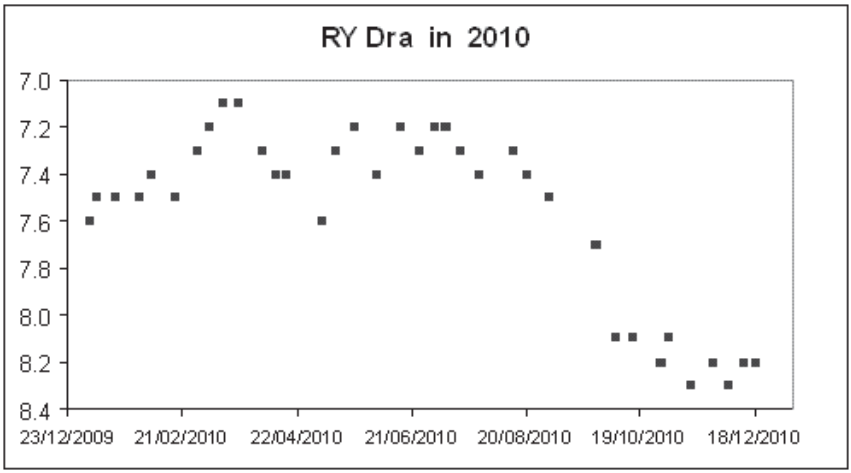


Figure 6: RY Draconis

XY Lyrae

XY Lyr is listed in the GCVS as an irregular (LC) variable. Brightness estimates can be tricky due to the presence nearby of Vega. A longer term light curve would need to be drawn in order to establish whether the fall and rise seen during 2010 was part of a longer term periodicity.

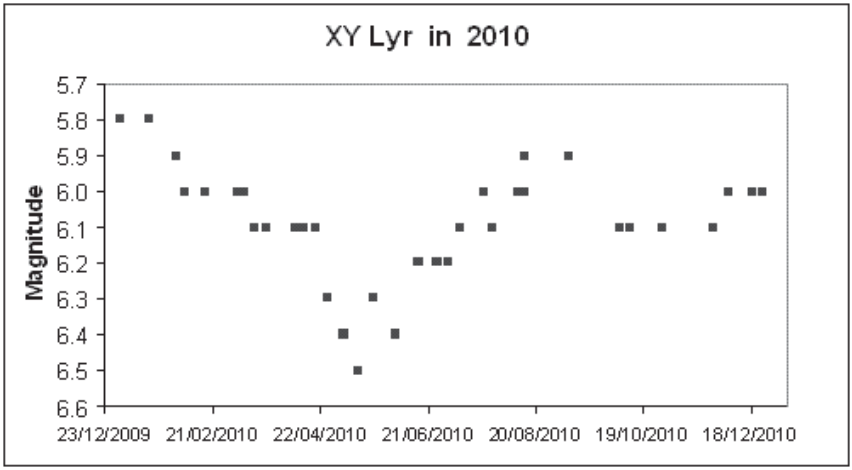


Figure 7: XY Lyrae

R Scuti. R Scuti is listed as a RV Tauri (RVA) type variable in the GCVS, with a period of 146.5 days, and usually shows one deep minimum and one shallow minimum in each cycle, with the depth of the deep minimum varying (periodically?) from one cycle to the next. One deep minimum during the autumn is obvious, but there was no correspondingly deep minimum a cycle earlier. R Scuti passes through conjunction at the start of January - my final brightness estimate on Dec 24 was the latest I have ever seen R Sct during an apparition (a few years ago I spotted it in the morning sky as early as Jan 12).

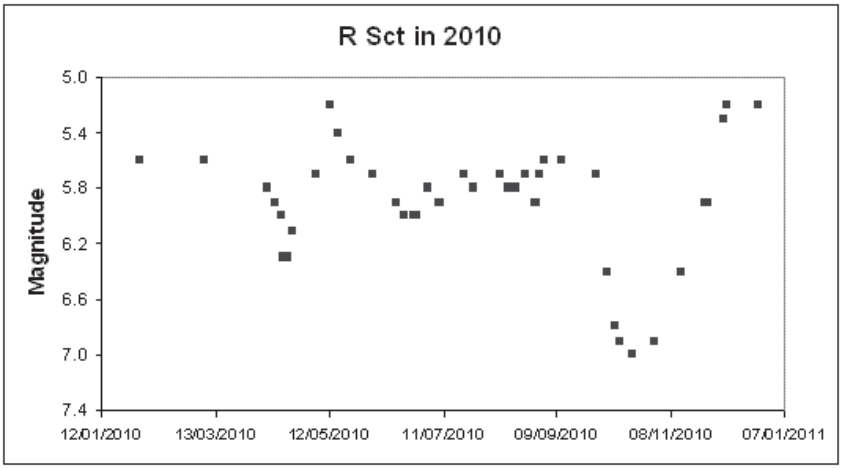


Figure 8: R Scuti

Z Ursae Majoris. Z UMa is listed in the GCVS as a semi-regular (SRB) variable with a period of 195.5 days – the rises and falls in this 2010 light curve seem largely in line with this. However, more recent studies have identified an additional period of around 205 days – the combination of the two periods leads to an "irregularity" slowly moving through the light curve from one cycle to the next. Unfortunately I did not make enough observations around Aug-Sep to establish whether the "hump" seen on the rising branch in March moved/recurred during the next cycle.

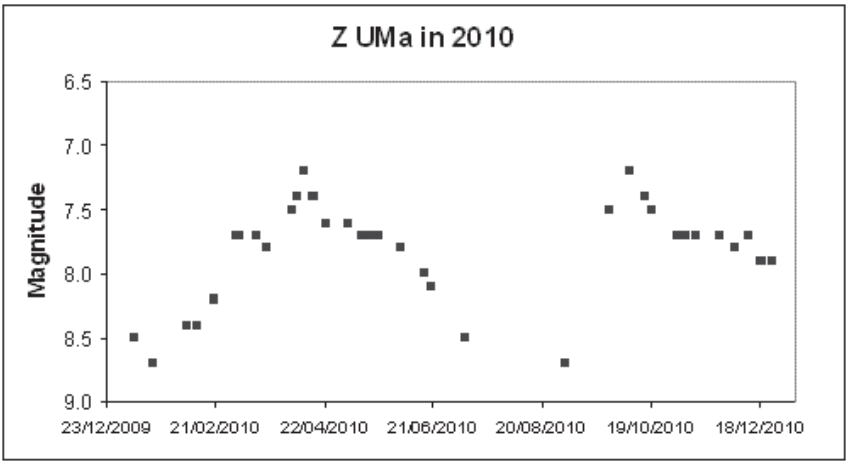


Figure 9: Z Ursae Majoris

Full sets of Tony Markham's light curves can be found at:

Eclipsing Binaries 2010
http://www.flickr.com/photos/tigertonym/sets/72157625783943166/
[also *http://bit.ly/fG9Uem*]

Variable Stars 2010
http://www.flickr.com/photos/tigertonym/sets/72157625828987304/
[also *http://bit.ly/fHDsHo*]

and in photo albums on his Facebook account [*http://facebook.com/tigertonym*]

SOME HISTORY OF OBSERVATIONS OF AF CYGNI

DAVID GRIFFIN (Stockholm)

AF Cygni was one of the first stars I put on my list when I returned to variable star observing in 2003, as it is a variable perfect for observing with binoculars. It is easy to find, being an extension to the right hand side of the Northern Cross, has a magnitude range made for 8x40 binoculars, and varies noticeably on a timescale of a few weeks. It has been on the VSS Binocular Priority List from the start and a chart is available from the Variable Star Section.

The star was first discovered to be variable over a century ago by the Rev. T. E. Espin FRAS, one of the founders of the Liverpool Astronomical Society. However, he did not use binoculars to discover it, but used his 17 1/4" Calver equatorial reflector with a magnification of x200 to photograph it. His first observation of AF Cygni was in 1886 (1), and a further 10 observations were made during the next 8 years before he published his conclusions in 'Astronomische Nachrichten' (2) in 1898 (in English). The discovery was made as part of his spectral survey of red stars, found in the 'Bonner Durchmusterung'star catalogue, using a spectroscope of his own design. All of his observations were made from Wolsingham until December 1888, and thereafter from nearby Tow Law (where he was Vicar) not far from Newcastle. The magnitudes, which were deduced from photographs taken with his stellar camera, were between 7.0 and 7.4. At this point the star was still "suspected" and so he gave it his own designation as star no. 180 on his list of Stars with remarkable Spectra. The star was one of more than thirty variables which he discovered.

Confirmation was slow in coming, and it was not until 1910 when Mrs Fleming published the results of observations made at the Harvard College Observatory between 1900 and 1908. The Harvard designation was star 192745 and the variability was announced as between 7.3 and 9.0 magnitude, with the spectrum as Mc5 (3). This work was done as part of the Henry Draper Memorial, a project which was set up by Henry Draper's widow in 1886 with the intention of continuing her husband's work of photographing stellar spectra. Edward Pickering, who was the director of the Harvard Observatory, had encouraged women into astronomy and employed almost 40 of them during the time he was in charge. Williamina Fleming, who had moved with her husband

to the States from her native Dundee a couple of years earlier, was first employed as a maid in the Pickering household. However, he quickly recognised that she was far too well educated and intelligent for such a job and soon gave her a job at the observatory. She quickly became one of Pickering's most able assistants and was later promoted to "Curator of Astronomical Photographs" at the observatory. In 1906 she was elected an honorary member of the RAS, a distinction shared by only three other women at that time [4].

This confirmation meant that the star could at last be given an official name. At the time this was done by the German 'Astronomischen Gesellschaft' and at the end of 1910 they christened it AF Cygni[5] using the information provided by Fleming.

The first analysis of observations of AF Cygni was done by Shigeru Kanda of the Tokyo Observatory in 1924[6]. This is the same Kanda who is commemorated in minor planet 2248. As well as being a leading source of inspiration and encouragement to amateur astronomers in Japan, he published several papers and books in various areas of astronomy, but is probably best known outside of Japan for his independent discovery of Nova Cygni 1920[7]. He analysed observations of AF Cygni made by himself and his brother with a two inch telescope during 1922 and 1923, together with earlier observations at Harvard and other places. He came to the conclusion that a period of 94 days was fine up until 1915, but not afterwards, and concluded that the period varied from 79.4 to 97.4 days whilst the brightness varied from 6.4 to 8.0 magnitude.

Since then many attempts have been made to find a period or periods which can explain the light curve of AF Cygni but no one has been completely successful and in 1983 the Russian I A Klyus[8] concluded that the light variation is stochastic. Using AAVSO observations from between 1925 and 1956 he found three periods of about 90 days, 180 days and 1000 days, though these do vary quite considerably. The star thus lives up to its designation as a Semi-regular variable. Klyus finishes by saying "The star warrants a comprehensive analysis drawing upon the entire arsenal of astronomical instrumentation". Unfortunately this does not yet appear to have been done and the physical nature of AF Cygni is still uncertain. This uncertainty is not really mirrored in the GCVS[9] entry which states:

Max: 7.4 Min: 9.4 Period: 92.5 days spectrum: M5e-M7

When the Binocular Sky Society was formed in 1969, AF Cygni was amongst the first stars to be put on their observing list, and when the BSS was merged into the BAA VSS section in 1974 the star followed and has been continuously observed by members of the BAA since then.

References

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3. Stars Having Peculiar Spectra. 38 New Variable Stars. Harvard College Observatory Circular, vol. 158, pp.1-3.
4. The Harvard College Observatory 1839-1919 - Jones and Boyd 1971
5. Astronomische Nachrichten Vol. 186, p. 273-286 Benennung von neu entdeckten veränderlichen Sternen.

6. Japanese Journal of Astronomy and Geophysics Vol I No. 6 pp 211-218
7. The Observatory, Vol. 43, p. 365 (1920)
8. Soviet Astronomy V27 No. 1 p56, 1983
9. N. N. Samus, et al., General Catalogue of Variable Stars (Samus+ 2007-2009), 2009yCat....102025S

This research has made use of NASA's Astrophysics Data System

OLD THEORIES ABOUT NOVAE (from BAA Journals 1892)

TONY MARKHAM

In the 19th century, the knowledge of nuclear fusion and the binary nature of nova systems was yet to come to light. The cause of Novae was therefore a mystery and many different theories were put forward.

The 1892 February issue quotes a theory put forward by Norman Lockyer and refers to other older theories:

New stars were once though to be "old stars", namely, stars of the ordinary kind raised by some process to a state of fervent heat. Recent spectroscopic researches have shown that there is no fixed dividing line between stars, comets, and nebulae, and Mr Lockyer suggests that the phenomena of all new and many "variable" stars may be explained by the collision of a meteor swarm with a similar swarm, or with a nebula, comet, or star. Other theories have at different times been advanced. Tycho Brahe believed that the cosmical vapour of the Milky Way became sufficiently condensed; Zollner, that on cooling, the stars became coated with a non-luminous crust, whose elements combined at a sufficiently low temperature, with evolution of heat and light; Drs Huggins and Miller, that hydrogen burnt by combination with some other element, and so furnished the bright line spectrum; Mr Johnstone Stoney, that the outer constituent (hydrogen) of the atmosphere of two stars was raised to incandescence by friction.

The 1892 April issue reports a talk give by a Dr Huggins to the Royal Institute about Nova Aurigae 1892, in which he refers to many emission lines being accompanied by blue shifted absorption lines and suggests:

... a reasonable explanation of the sudden outburst of light and its rapid decline may be found in a theory put forward years ago by Klinkerfues, and recently developed by Wilsing. Two bodies travelling in opposite directions might well swing round each other after a close approach, in parabolic or hyperbolic orbits, in which case we might well have relative motions as rapid as those in the new star, and continuing for as long a time without any great change of velocity. Such a near approach might set up tidal disturbances, or deformations, producing sufficiently great changes of pressure to bring about enormous eruptions of the hotter layers of matter from the interior. Both bodies would thus give a greatly increased amount of light, both would have on the exterior abnormal areas of gases at different temperatures giving reversal phenomena, yet each would in the main retain its special characteristics. After passing one another the whole commotion would gradually subside, though with initial fluctuations, simply because it is only a commotion and not a real addition to the heat of either body.

THE FIRST REPORTS OF NOVA (GK) PERSEI 1901

(from BAA Journal March 1901)

TONY MARKHAM

This nova, the brightest of the 20th century, was discovered in the early hours of February 22nd 1901, from Edinburgh, by Thomas Anderson.

The first report received by the BAA VSS Director, Colonel E. E. Markwick, arrived the following evening, as he reported in the BAA Journal of 1901 March:

It happened that on Friday last, the 22nd inst., I had a social engagement which would prevent my observing variable stars, as is usual. In fact, a brother officer with whom I have been associated in duty for over two years was leaving Devonport next day for India, and was dining with me on the last evening we should be together. On that occasion astronomy had to give way to the claims of hospitality. All the same, I had noted it that was a very fine evening, and, before dinner, I caught the last glimpse of Mercury I should get for this season, as he was setting, a feeble point of light, into a stratum of reddish brown haze.
Well my friend and I were sitting over the fire with our cigars, when a telegram was handed to me to the following effect:

"Just seen a strange star left of Algol 6.40, what is it? Gregg, The Lindens, St Leonards".

I asked my friend, who was acquainted with my astronomical proclivities, to allow me to investigate for a few moments, as this was a matter demanding serious attention. Stepping outside my front door, which faces west, I at once noticed a brilliant star above and to the left of Algol which must be new ...

The same issue of the journal also included the account of Ivo F H C Gregg:

As probably one of the first in England to observe the Nova Persei, I should like to submit a few notes on this most interesting object to the Members of our Association. It appears that the star was first observed by Dr Anderson in Edinburgh, on the morning of February 22nd. It is also stated that it was simultaneously observed by Herr Grimmler at Erlangen Observatory, in Bavaria. I first observed it on the evening of February 22nd, about 16 hours after Dr Anderson first saw it.
I had been observing Mercury that evening from 6^h to $6^h\,30^m$, the planet being then a fairly conspicuous object in the western sky. Shortly after $6^h\,30^m$, the planet was lost in the haze on the western horizon, and at $6^h\,40^m$, I was surveying the sky, which was then very clear, when, on looking at the constellation of Perseus, then near the zenith, I was immediately struck by the appearance of a bright star shining between [beta] Persei (Algol) and [alpha] Persei, giving, of course, quite an unusual aspect to the familiar festoon of Perseus ...

… When I first caught sight of this new star, it was slightly below the 1st mag., but very little, being brighter than Aldebaran, and but little below Rigel in magnitude. It shone with a steady bluish-white light ...

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 (GCVS)	Period	Chart seq.	Prog
AQ	***And***	00 28 +35 35	8.8-9.0	SR	346d	303.01	
EG	***And***	00 45 +40 41	7.1-7.8	ZAnd		072.02	
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	230.02	
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?	111.02	
XX	***Cam***	04 09 +53 22	7.3-9.7	RCB		068.02	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	323.01	
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 30	4.1-6.2	SRd	320d	064.01	
W	***Cep***	22 37 +58 26	7.0-9.2	SRc		312.02	
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		041.04	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	5.6-9.5	ZAnd+SR	105d	089.03	
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	
WY	***Gem***	06 12 +23 12	7.2-7.9	Lc +E?		294.01	
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	048.04	
IQ	***Her***	18 18 +17 59	7.0-7.5	SRb	75d	048.04	
OP	***Her***	17 57 +45 21	5.9-7.2	SRb	120d	324.01	
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	229.02	
SV	***Lyn***	08 04 +36 21	6.6-7.9	SRb	70d?	108.03	
U	***Mon***	07 31 -09 47	5.9-7.8	RVB	91d	029.03	
X	***Oph***	18 38 +08 50	5.9-9.2	M	328d	099.02	
BQ	***Ori***	05 57 +22 50	6.9-8.9	SR	110d	295.01	

Variable		RA (2000) Dec	Range	Type (GCVS)	Period	Chart Seq.	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	
Z	***Psc***	01 16 +25 46	7.0-7.9	SRb	144d	278.01	
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	5.9-7.2	Lb		226.01	
V	***UMi***	13 39 +74 19	7.2-9.1	SRb	72d	101.02	
SS	***Vir***	12 25 +00 48	6.0-9.6	SRa	364d	097.01	
SW	***Vir***	13 14 -02 48	6.4-8.5	SRb	150d?	098.01	

Updated 2th February 2011, M.T.

* *

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	RZ Cas	6.3 - 7.9

Note that predictions for 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.

2011 Apr 1 Fri
AI Dra.....02(03)04D
TW Dra.....03(08)04D
Z Per.....D20(16)21
U Cep.....D20(20)25
X Tri.....D20(21)21L
del Lib.....23(29)28D
V367 Cyg.L23(22)28D

2011 Apr 2 Sat
RZ Cas.....01(03)04D
TV Cas.....04(08)04D
X Tri.....D20(20)21L
U CrB.....D20(21)27
RW Tau.....20(24)23L
V367 Cyg.L23(<<)28D

2011 Apr 3 Sun
X Tri.....D20(19)21L
TX UMa....D20(21)25
SW Cyg....L20(25)28D
TW Dra.....22(27)28D
Z Dra.....23(25)27
TV Cas.....24(28)28D

2011 Apr 4 Mon
U Cep.....03(08)04D
Z Per.....D20(17)22
X Tri.....D20(19)21L
Z Vul.....L23(28)28D

2011 Apr 5 Tue
RZ Cas.....D20(17)20
X Tri.....D20(18)20
RW Tau....D20(19)23L
RS CVn.....D20(22)28
TV Cas.....D20(23)27
AI Dra.....21(22)24

2011 Apr 6 Wed
U CrB.....02(08)04D
S Equ.....L03(<<)04
X Tri.....D20(17)20
Z Dra.....D20(18)21
U Cep.....D20(19)24
TX UMa....D20(22)27
TW Dra.....D20(23)28
RZ Cas.....20(22)25
del Lib.....L22(21)27

2011 Apr 7 Thu
AI Dra.....02(03)04D
Z Per.....D20(19)23L
TV Cas.....D20(19)23
U Sge.....L24(20)25

2011 Apr 8 Fri
Z Dra.....00(03)04D
RZ Cas.....00(03)04D
SW Cyg.....L20(14)20
del Lib.....22(28)28D

2011 Apr 9 Sat
U Cep.....02(07)04D
S Equ.....04(09)04D
HU Tau.....D20(17)21
TW Dra.....D20(18)23
U CrB.....D20(19)25
TX UMa.D20(24)28D
Z Vul.....L23(26)28D

2011 Apr 10 Sun
RS CVn.....D20(17)23
Z Dra.....D20(20)22
Z Per.....D20(20)23L
U Sge.....L23(29)28D

2011 Apr 11 Mon
HU Tau...D20(18)22L
U Cep.....D20(19)24
AI Dra.....21(22)23

2011 Apr 12 Tue
Z Dra.....02(05)04D
RZ Cas.....D20(22)24
TX UMa...21(25)28D
SW Cyg.....22(28)28D
U CrB.....24(30)28D

2011 Apr 13 Wed
TV Cas.....01(05)04D
AI Dra.....02(03)04D
HU Tau...D20(20)22L
Z Per.....D20(21)23L
del Lib.....L21(20)27
RW Tau.....21(26)22L
RZ Cas.....24(26)28D

2011 Apr 14 Thu
U Cep.....02(07)04D
Z Dra.....D20(22)24
TV Cas.....21(25)28D
Z Vul.....L23(23)28D

2011 Apr 15 Fri
TW Dra.....04(09)04D
HU Tau...D20(21)22L
del Lib.....22(28)28D
TX UMa...22(27)28D

2011 Apr 16 Sat
S Equ.....L02(06)04D
U CrB.....D20(17)22
U Cep.....D20(19)24
TV Cas.....D20(20)24
RW Tau....D20(21)22L
Z Per.....D20(23)23L

2011 Apr 17 Sun
Z Per.....L03(<<)03
SW Cyg.....D20(18)24
HU Tau....D20(22)22L
AI Dra.....21(22)23
U Sge.....L23(23)28D
TW Dra.....23(28)28D

2011 Apr 18 Mon
RZ Cas.....D20(21)23
Z Dra.....21(23)26
V367 Cyg..L22(60)28D
TX UMa.....24(28)28D

2011 Apr 19 Tue
AI Dra.....01(03)04D
U Cep.....02(07)04D
HU Tau....D20(24)21L
Z Per.....D20(24)22L
U CrB.....22(27)28D
V367 Cyg..L22(36)28D
Z Vul.....L22(21)27
RZ Cas.....23(26)28D

2011 Apr 20 Wed
RS CVn.....01(07)04D
Z Per.....L03(00)04D
TW Dra....D20(23)28D
del Lib.....L21(20)26
V367 Cyg..L22(12)28D

2011 Apr 21 Thu
U Sge.....02(08)04D
U Cep.....D20(18)23
HU Tau.....21(25)21L
V367 Cyg.L22(<<)28D

2011 Apr 22 Fri
TX UMa.....01(06)04D
SW Cyg.....01(08)04D
TV Cas.....03(07)04D
Z Vul.....03(08)04D
Z Per.....21(25)22L
del Lib.....21(28)28D
Z Dra.....23(25)28D

2011 Apr 23 Sat
S Equ.....L01(03)04D
Z Per.....L03(01)04D
TW Dra...D20(19)24
AI Dra.....21(22)23
TV Cas....22(26)27D

2011 Apr 24 Sun
U Cep.....01(06)03D
RZ Cas....D20(20)23
RS CVn.D20(26)27D
Z Vul.....L22(19)24
U Sge.....L22(17)23

2011 Apr 25 Mon
AI Dra.....01(03)03D
TX UMa.03(07)03D
Z Dra.....D20(18)21
TV Cas....D20(22)26
Z Per.....22(27)22L
RZ Cas....23(25)27D

2011 Apr 26 Tue
Z Per.....L03(03)03D
U Cep.....D20(18)23
SW Cyg.D20(21)27D
U CrB...D20(25)27D

2011 Apr 27 Wed
Z Dra.....01(03)03D
Z Vul.....01(06)03D
TV Cas.....D20(17)21
RW Tau.D20(22)21L
del Lib.....L21(19)26
U Sge.....L22(26)27D

2011 Apr 29 Fri
U Cep.....01(06)03D
Z Per.....L02(04)03D
Z Dra.....D20(20)22
RS CVn.D20(21)27D
AI Dra.....D20(22)23
del Lib.....21(27)27D
Z Vul.....L22(17)22

2011 Apr 30 Sat
S Equ.....L01(00)03D
RW Tau.D21(17)21L
RZ Cas....D21(20)22

2011 May 1 Sun
AI Dra.....01(02)03D
Z Dra.....02(05)03D
U Cep.....D21(18)23
RZ Cas.....22(25)27
Z Vul.....23(28)27D
TW Dra.....24(29)27D

2011 May 2 Mon
Z Per.....L02(05)03D
TV Cas.....24(28)27D

2011 May 3 Tue
RZ Cas.....03(05)03D
Z Dra.....D21(22)24
U CrB.....D21(23)27D

2011 May 4 Wed
U Cep.....01(06)03D
RS CVn.....D21(17)23
del Lib.....D21(19)25
TV Cas...D21(23)27D
TW Dra..D21(24)27D
U Sge.....L22(21)26

2011 May 5 Thu
Z Per.....L02(07)03D
AI Dra.....D21(22)23
SW Cyg..D21(25)27D

2011 May 6 Fri
U Cep.....D21(17)22
TV Cas.....D21(19)23
RZ Cas.....D21(19)22
del Lib.....D21(27)27D
Z Vul.....L21(26)27D

2011 May 7 Sat
S Equ.....L01(<<)02
AI Dra.....01(02)03D
TW Dra.....D21(20)25
V367Cyg.D21(51)27D
Z Dra.....21(24)26
RZ Cas.....22(24)26

2011 May 8 Sun
U Sge.....00(06)03D
V367Cyg.D21(27)27D

2011 May 9 Mon
U Cep.....01(05)03D
RZ Cas.....02(05)03D
V367Cyg.D21(03)27D

2011 May 10 Tue
S Equ.....02(08)03D
V367 Cyg..D21(<<)23
U CrB.....D21(20)26

2011 May 11 Wed
U Cep.....D21(17)22
del Lib.....D21(18)25
AI Dra.....D21(21)23
Z Vul.....D21(24)27D
Z Dra.....23(25)27D

2011 May 12 Thu
TV Cas.....01(05)03D
Y Psc.....L03(02)03D
RZ Cas.....D21(19)21

2011 May 13 Fri
AI Dra.....01(02)03D
TX UMa....D21(17)21
RZ Cas.....21(23)26
TV Cas....D21(25)27D
del Lib.....D21(26)27D

2011 May 14 Sat
U Cep.....00(05)03D
RS CVn.....00(07)03D
U CrB.....02(07)03D
U Sge.....L21(24)27D
SW Cyg.....22(28)27D

2011 May 15 Sun
RZ Cas.....02(04)03D
TV Cas.....D21(20)24

2011 May 16 Mon
Z Dra.....01(03)03D
TW Dra.....01(06)03D
U Cep.....D21(17)22
TX UMa....D21(18)23
Z Vul.....D21(21)27D
S Equ.....L24(28)27D

2011 May 17 Tue
U CrB.....D21(18)24
AI Dra.....D21(21)23

2011 May 18 Wed
del Lib.....D21(18)24
Z Dra.....D21(20)23
TW Dra..D21(25)26D
RS CVn..D21(26)26D
U Cep.....24(29)26D

2011 May 19 Thu
AI Dra.....01(02)02D
SW Cyg....D21(18)24
TX UMa..D21(20)24
RZ Cas.....D21(23)25

2011 May 20 Fri
Z Dra.....02(05)02D
del Lib...D21(26)26D
U CrB.....23(29)26D

2011 May 21 Sat
RZ Cas.....01(04)02D
U Sge.....D21(18)24
Z Vul.....D21(19)25
TW Dra....D21(20)25

2011 May 22 Sun
TX UMa..D21(21)26
Z Dra.....D21(22)24
TV Cas.....22(26)26D

2011 May 23 Mon
RS CVn..D21(21)26D
AI Dra.....D21(21)22
S Equ.....L23(25)26D
U Cep.....23(28)26D

2011 May 24 Tue
Z Vul.....01(06)02D
SW Cyg....02(08)02D
U CrB.....D21(16)22
TV Cas.....D21(22)26
U Sge.....22(28)26D

2011 May 25 Wed
AI Dra.....01(02)02D
del Lib.....D22(18)24
RZ Cas.....D22(22)25
TX UMa..D22(23)26D
V367 Cyg..D22(65)26D

2011 May 26 Thu
Z Vul.....D22(17)22
Z Dra.....D22(24)26
V367 Cyg..D22(41)26D

2011 May 27 Fri
RZ Cas.....01(03)02D
Y Psc.....L02(04)02D
V367 Cyg..D22(17)26D
del Lib.....D22(25)26D
U CrB.....D22(27)26D

2011 May 28 Sat
V367 Cyg.D22(<<)26D
RS CVn.....D22(16)23
SW Cyg....D22(22)26D
TX UMa..D22(24)26D
Z Vul.....23(28)26D
U Cep.....23(28)26D

2011 May 29 Sun
X Tri.....L02(04)02D
AI Dra.....D22(21)22

2011 May 30 Mon
TW Dra.....01(07)02D
X Tri.....L02(04)02D
S Equ.....L23(22)26D
Z Dra.....23(25)26D

2011 May 31 Tue
AI Dra.....00(02)02D
Y Psc.....L01(<<)02D
X Tri.....L02(03)02D
RZ Cas.....D22(22)24
U Sge.....D22(22)26D
TX UMa..D22(26)26D
TV Cas.....24(28)26D

2011 Jun 1 Wed
X Tri.....L02(02)02D
del Lib.....D22(17)23
TW Dra.D22(26)26D
2011 Jun 2 Thu
RZ Cas.....00(02)02D
X Tri.....L02(02)02D
TV Cas..D22(23)26D
Z Vul.....D22(26)26D
U Cep.....23(28)26D
2011 Jun 3 Fri
X Tri.....L02(01)02D
U CrB...D22(24)26D
del Lib...D22(25)26D
TX UMa..22(27)26D
2011 Jun 4 Sat
Z Dra.....01(03)02D
U Sge.....01(07)02D
X Tri.....L02(00)02D
TV Cas.....D22(19)23
AI Dra.....D22(21)22
TW Dra.D22(21)26D
2011 Jun 5 Sun
Z Per.....L00(<<)01
X Tri.....L02(00)02D
2011 Jun 6 Mon
AI Dra.....00(02)02D
Z Dra.....D22(20)23
RZ Cas....D22(21)24
SW Cyg.D22(25)26D
S Equ.....L23(19)25
TX UMa..24(29)26D

2011 Jun 7 Tue
RS CVn.....00(07)02D
Z Vul.....D22(24)26D
U Cep.....23(27)26D
RZ Cas.....23(26)26D
Z Per.....L24(22)26D
2011 Jun 8 Wed
del Lib.....D22(17)23
2011 Jun 10 Fri
S Equ.....00(06)02D
TV Cas.....01(05)02D
TX UMa.....02(06)02D
AI Dra.....D22(21)22
Z Dra.....D22(22)24
U CrB.....D22(22)26D
del Lib.....D22(25)26L
U Sge.....D22(25)26D
Z Per.....L24(23)26D
2011 Jun 11 Sat
Y Psc.....01(05)02D
TV Cas.....D22(25)26D
RS CVn.....D22(26)26D
2011 Jun 12 Sun
AI Dra.....00(01)02D
RZ Cas.....D22(21)23
Z Vul.....D22(22)26D
U Cep.....22(27)26D
2011 Jun 13 Mon
TV Cas.....D22(20)24
V367 Cyg..D22(55)26D
RZ Cas.....23(25)26D
Z Per.....L23(24)26D
2011 Jun 14 Tue
Z Dra.....D22(24)26D
V367 Cyg..D22(31)26D

2011 Jun 15 Wed
Y Psc.....L00(00)02D
V367Cyg.D22(07)26D
del Lib.....D22(16)23
TW Dra...D22(27)26D
SW Cyg.....23(29)26D
2011 Jun 16 Thu
V367Cyg.D22(<<)26D
RS CVn...D22(21)26D
S Equ.....D22(27)26D
Z Per.....L23(26)26D
2011 Jun 17 Fri
Z Vul.....D22(19)25
U Sge.....D22(19)25
U CrB.....D22(20)26
del Lib.....D22(24)25L
U Cep.....D22(27)26
2011 Jun 18 Sat
AI Dra.....00(01)02D
RZ Cas.....D22(20)22
TW Dra...D22(22)26D
Z Dra.....23(25)26D
2011 Jun 19 Sun
RZ Cas.....22(25)26D
Z Per.....L23(27)26D
2011 Jun 20 Mon
Z Vul.....01(06)02D
SW Cyg.....D22(18)24
TV Cas.....22(26)26D
U Sge.....23(29)26D
2011 Jun 21 Tue
U CrB.....01(07)02D
RS CVn.....D22(16)22
TW Dra.....D22(17)22

2011 Jun 22 Wed
del Lib.....D22(16)22
Z Vul.....D22(17)23
TV Cas...D22(22)26D
U Cep.....D22(26)26D
Z Per.....24(28)26D
2011 Jun 23 Thu
Z Dra.....01(03)02D
S Equ.....D22(24)26D
AI Dra.....24(25)26D
2011 Jun 24 Fri
U CrB.....D22(18)23
del Lib.....D22(24)25L
Z Vul.....23(28)26D
2011 Jun 25 Sat
Z Dra.....D22(20)23
RZ Cas...D22(24)26D
2011 Jun 26 Sun
Z Per.....01(06)02D
2011 Jun 27 Mon
U Sge.....D22(23)26D
U Cep.....D22(26)26D
U CrB.....23(28)26D
2011 Jun 29 Wed
SW Cyg..D22(22)26D
Z Dra.....D22(22)25
Z Vul.....D22(26)26D
TW Dra.....22(28)26D
Y Psc.....L23(25)26D
TV Cas.....24(28)26D
AI Dra.....24(25)26D
2011 Jun 30 Thu
S Equ.....D22(21)26D
RS CVn.....24(30)26D

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The **deadline for contributions** to the next issue of VSSC (number 148) will be 7th May, 2011. All articles should be sent to the editor (details are given on the back of this issue).

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