



VARIABLE STAR SECTION CIRCULAR

No 160, June 2014

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ISSN 0267-9272

Office: Burlington House, Piccadilly, London, W1J 0DU

RX LEPORIS CHART

JOHN TOONE

110-02

9° FIELD DIRECT

RX LEPORIS 05h 11m 22.9s -11° 50' 57" (2000)

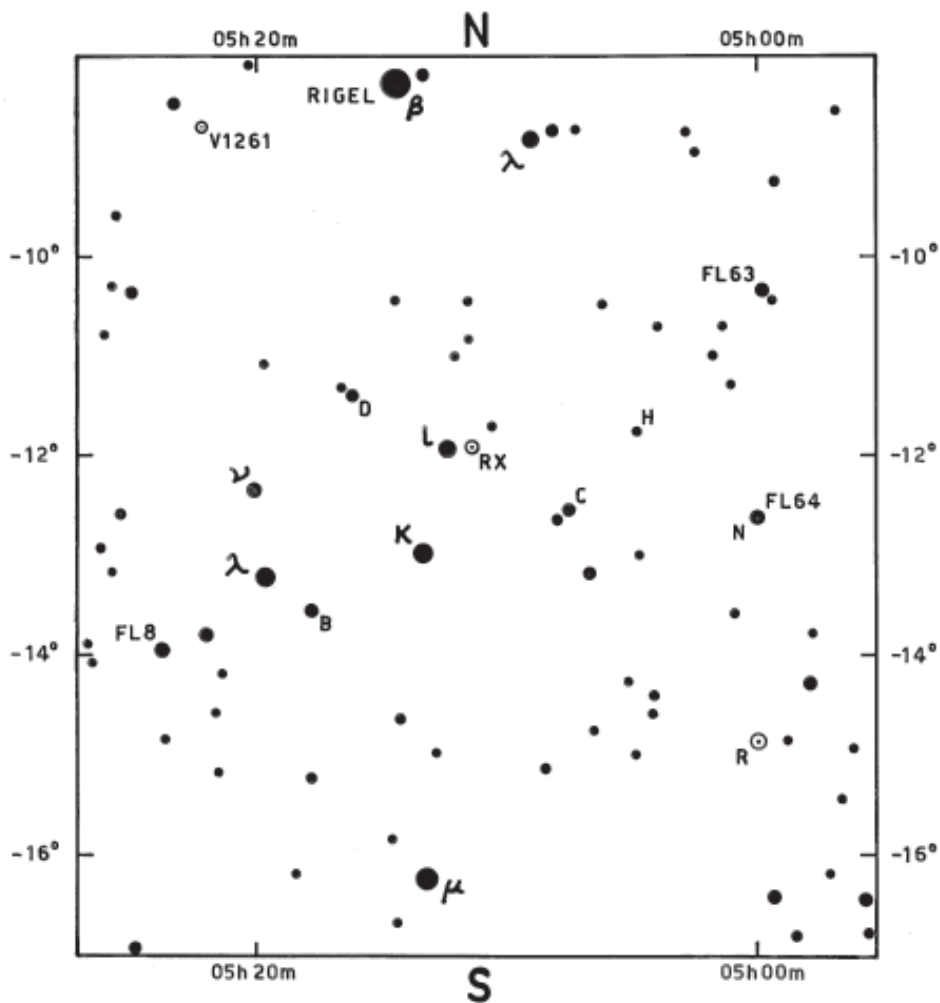


CHART:
ATLAS ECLIPTICALIS
SEQUENCE:
TYCHO 2 VJ

N 4.8 D 6.5
B 5.5 H 7.2
C 6.0

BAA VSS
EPOCH: 2000
DRAWN: JT 25-05-13
APPROVED: RDP

FROM THE DIRECTOR

ROGER PICKARD

VSS MEETING 2014

This will be held on June 21st at 15 Priory Street, York YO1 6ET, to commemorate the 250th anniversary of the birth of John Goodricke.

Programme

10:00 - 10:30 Doors Open. Refreshments available.

10:30 - 10:35 Roger Pickard, Director - "Welcome and Introduction."

10:35 - 11:20 Martin Lunn - "John Goodricke and Edward Piggot, the Fathers of Variable Star Astronomy."

11:20 - 11:50 John Toone - "The Life of Albert Jones."

11:50 - 12:10 Andy Wilson - "The VSS Database."

12:10 - 14:00 Lunch

14:00 - 15:00 Prof. Boris Gaensicke - "Eclipsing Binaries: Something Different."

15:00 - 15:30 Robin Leadbeater - "Nova Del 2013."

15:30 - 16:15 Tea Break

16:15 - 16:45 Dr David Boyd - "The asynchronous Polar V1432 Aquilae and its path back to synchronism."

17:00 - 17:30 Stan Waterman; Jeremy Shears - "Short Presentations."

17:30 - 17:35 Concluding Remarks, and Finish.

Entrance fee will be £7.00 for BAA members and £10.00 for non BAA members, with refreshments available throughout the day. Please pay when you sign in to the meeting.

Lunch is not provided but there are plenty of cafes and pubs local to the venue. Attendees may however wish to bring a packed luncheon with them, as York is extremely busy during the Summer period, especially on Saturdays, and waiting times in pubs and cafes may be unreasonable.

Nearby, you can visit The Treasurer's House, Goodricke's home marked with a bronze plaque, and the astronomical clock in York Minster, all within easy walking of each other.

Travelling

For those travelling by train, York Railway Station is less than 10 minutes' walk away. However, as car parking is likely to be very limited since the venue is being shared with others that day (although not our specific area!), it is suggested that those coming by car make use of the "Park and Ride" facility for just £2.70 http://www.york.gov.uk/info/200237/park_and_ride/367/park_and_ride

For attendees travelling from the South, St. George's car park is recommended. Access is off the A1036 Tower street, and does not involve driving through York on a busy Saturday. Exit back to the A19 is also easy, and again does not require passage through the centre of the city. The car park is a 10 to 15 minute walk from the venue. Other nearer car parks can be found on Nunnery Lane. See < http://www.york.gov.uk/info/200233/car_parks/324/car_parks >. Charges are usually £11.50 for all day parking, with blue badge parking is free.

Overnight accommodation

Should you want to stay overnight on either or both the Friday and the Saturday then the Premier Inn on Blossom Street is only 5 minutes' walk away and so is very convenient for our meeting. Some are staying at Heworth Court, YO31 7TQ and yet others at Brentwood Guesthouse.

VSS DATABASE

It has been evident for some time that when you browse the Database for some stars, there is a definite gap in the data. R And is a prime example. In this case there is no data between the late 1930s and the early 1970s. For the war years this is understandable, but for later years....? For other stars the main gaps seem to be between, variously, the 1970s and/or the 1980s. We plan to publish light curves of the more interesting stars with gaps, and make an appeal for observers to see if any of their own observations are missing, and if so to re-report them. I realise this could be a most tedious exercise but if an observation has been made it would seem such a waste to lose it.

* * *

ECLIPSING BINARY NEWS - MAY 2014

DES LOUGHNEY

Low Amplitude Eclipsing Binaries and DSLR Photometry

A new list is going to be added to the BAAVSS Eclipsing Binary Programme. This will be ten eclipsing binary systems of low amplitude magnitude changes. I consider that EB systems of low amplitude (under 0.5 magnitude of change) have mostly been ignored or neglected by visual observers because of the difficulty in following magnitude changes. Comparatively bright systems have been neglected by CCD practitioners.

There are many possible systems. The ten that have been chosen on a preliminary basis are all observable from the UK for a good part of the year. They are mostly EB and EW class systems so are constantly in eclipse and will be dynamic systems subject to period and other changes. The ten are:

1. AO Cas - maximum magnitude 6.102, depth 0.2 (primary and secondary), EW class, period 3.523493 days.
2. YZ Cas - maximum magnitude 5.653, depth 0.4 primary and 0.1 secondary, EA class, period 4.46722180 days.

3. CC Cas - maximum 7.15, depth 0.2 both primary and secondary, class EB, period 3.366308 days.
4. CQ Cep - maximum 8.87, depth 0.5 primary, 0.4 secondary, class EB, period 1.641243 days.
5. CW Cep - maximum 7.67, depth 0.4 primary and secondary, class EA, period 2.729162 days.
6. VW Cep - maximum 7.38, depth 0.4 primary, 0.3 secondary, class EW, period 0.2783093 days.
7. BW Dra - maximum 8.61, depth 0.4 primary and secondary, class EW, period 0.2921608 days.
8. V1425 Cyg - maximum 7.73, depth 0.4 primary and 0.3 secondary, class EB, period 1.2523878 days.
9. AW UMa - maximum 6.83, depth 0.2 primary and secondary, class EW, period 0.4387238 days.
10. V1061 Tau - maximum 8.03, depth 0.4 primary and 0.3 secondary, class EB, period 1.3852288 days.

Below are measurements by DSLR photometry of AW UMa in 2009 plotted as a phase diagram which indicates what can be achieved by precision DSLR photometry.

AW Ursae Majoris February - April 2009



We would welcome other suggestions for systems to be included on a low amplitude list. The list is preliminary as new working charts will have to be created for each system. The intention is to find at least three nearby comparisons. This will allow a form of ensemble photometry which should give good results perhaps enabling eclipses of 0.1 magnitude to be picked up. In future editions of the VSSC we will publish details of working charts and comparisons which will be incorporated into the online Eclipsing Binary Handbook which can be downloaded from the BAAVSS website.

It is possible that one of the systems may not have three suitable nearby comparisons. In that case an alternative system may be sought.

For ensemble DSLR photometry to work, magnitudes will have to be converted into Johnson V magnitudes using the green channel measurements of, for example, a Canon camera. This will require knowledge of the camera's transformation coefficient which is 0.08 for a Canon 550D.

desloughney@blueyonder.co.uk

* * *

THE LENGTHENING OUTBURST PERIOD OF SS AURIGAE.

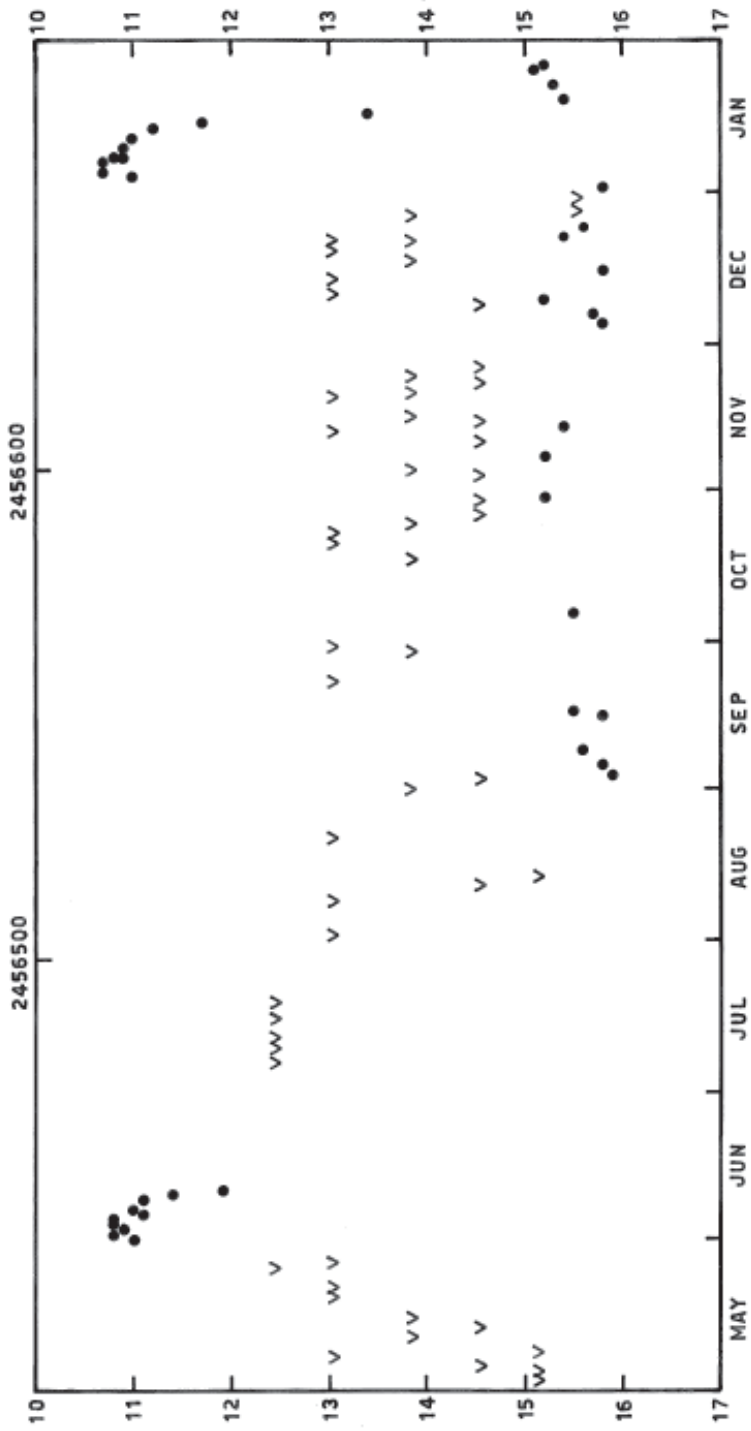
JOHN TOONE

SS Aur is catalogued as a UGSS star with a mean outburst period of 51 days according to BAAVSS data recorded between 1920 and 1969, or 56 days according to AAVSO data between 1907 and 1984. In recent years the outbursts have tended to be much less frequent with a reduced proportion of short (3-6 days >12.0 mag) outbursts. The last time there were outbursts close to the mean period of 51-56 days was in 2008.

Historically the longest recorded interval between outbursts was 147 days according to the AAVSO data, and 132 days according to the BAAVSS data. In 2013/14 there was a record 217 days between consecutive long (>9 days >12.0 mag) outbursts. There was a long outburst (>10 days brighter than mag 12.0) that commenced at the end of May 2013 and the next recorded outburst was not until January 2014 (12 days brighter than mag 12.0). There is an isolated observation at mag 13.6 on 17th July 2013 on the AAVSO LCG which could have indicated a rise or fall from an intermediate outburst but this is flanked by my own negative observations on the 14th and 18th July 2013, which mean it never got to full outburst.

SS Aur has undergone accelerated outburst behaviour in the past (in 1928/29 and 1970/71) but these intervals only lasted a few months. The current behaviour which appears to be an opposite effect has already lasted 5 years. Close monitoring is required to ensure we have an accurate record of all future outbursts so we can determine if the present trend is evolutionary or not.

SS AURIGAE 2013-2014 (217 DAYS BETWEEN SUCCESSIVE LONG OUTBURSTS)



OBSERVATIONS OF THE RECENT DEEP MINIMUM OF THE SEMI-REGULAR PULSATING VARIABLE Z URSAE MAJORIS.

DAVID BOYD

Z UMa is a semi-regular pulsating red giant with a period of approximately 196 days (Suchko, 1980). According to the AAVSO Variable Star Index (VSX), its normal magnitude range is 6.2 - 9.4V. This is consistent with the recent light curve in the BAA VSS database, Figure 1.

On 2014 March 31st, John Toone sent a message to the baavss-alert email group saying that the previous night he had recorded it visually at magnitude 10.0, the faintest he had ever seen it. I recorded spectra of Z UMa on April 1, April 14 and May 4 using a LISA spectrograph on a C11 scope. I also measured it by CCD photometry on the same dates at magnitude 9.33V, 9.06V and 8.45V respectively. Figure 2 shows the light curve of Z UMa for 2014 from the VSS database with the dates of these spectra and CCD observations marked. It appears that these V-band CCD measurements are somewhat brighter than the contemporaneous visual estimates, presumably because of the extreme redness of the star. According to SIMBAD it has a (B-V) colour index of 2.68.

SIMBAD gives the spectral type of Z UMa at mag 6.2 as M5III which corresponds to a surface temperature of about 3000K, although converting spectral type to surface temperature for giant stars seems to be an inexact science. The spectrum taken on April 1st is shown in Figure 3. Matching this against spectra in the MILES spectral library (Sanchez-Blazquez et al.) this is typical of a spectral type M7III star with surface temperature around 2700K, so it appears that at minimum the photosphere of Z UMa is about 300 degrees cooler than at maximum. The spectrum on April 14th is virtually identical to that on April 1, while the one on May 4 shows a reduction in intensity at the red end indicating a small increase in temperature. It will be interesting to see how the spectrum changes as Z UMa returns to maximum brightness.

Suchko M. K., JAAVSO, 9, 74, (1980)

Variable Star Index, <http://www.aavso.org/vsx/>

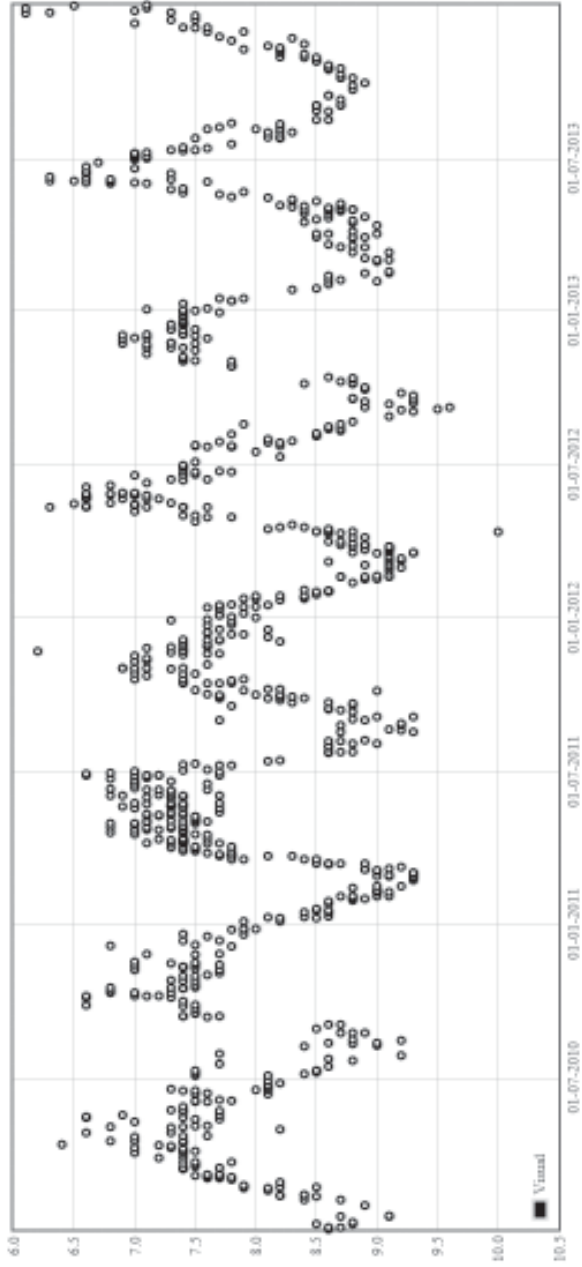
BAAVSS database, <http://britastro.org/vssdb/>

SIMBAD, <http://simbad.u-strasbg.fr/simbad/sim-fid>

Sanchez-Blazquez et al., Medium-resolution Isaac Newton Telescope library of empirical spectra, <http://mnras.oxfordjournals.org/content/371/2/703.full.pdf>

Figure 1. Light Curve of Z Ursae Majoris from the VSSBAA database.

Light Curve for Z UMA

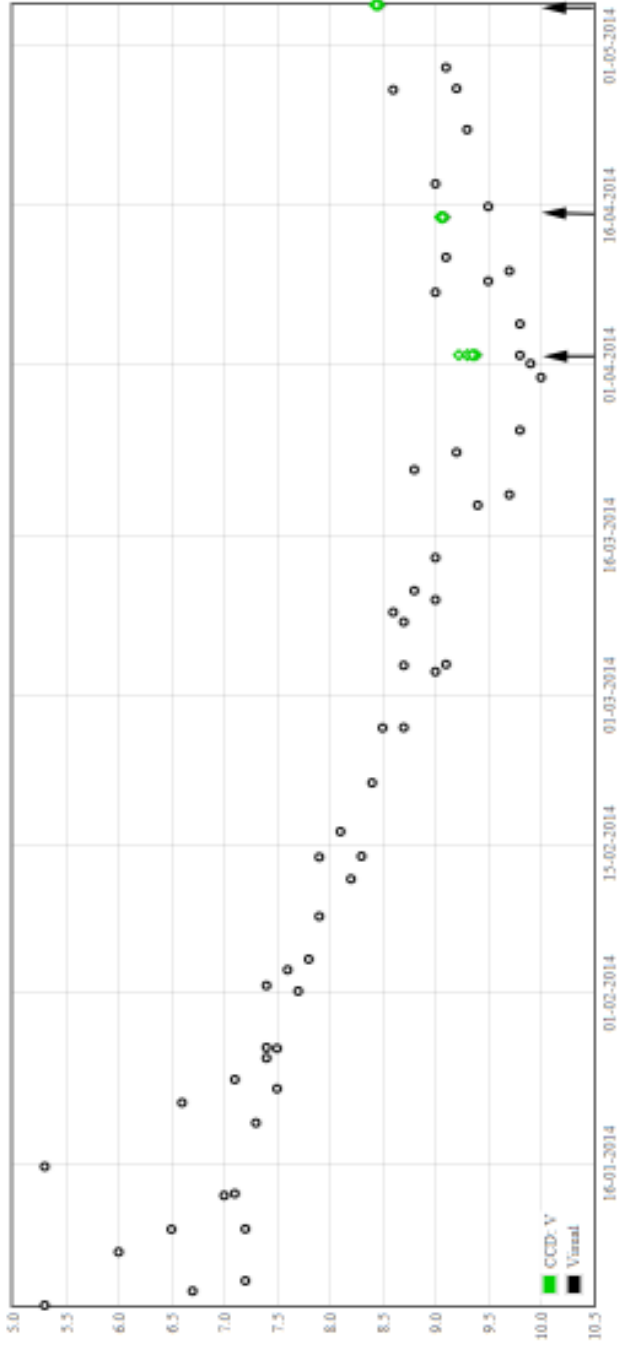


Symbol Key: Crosses = Negative observation, Triangle = Brighter than, Otherwise: Circle = Visual, Diamond = CCD, Square = Everything else

Contributors: B J Beasley, B MacDonald, C M Allen, C Mann, G M Hurst, G Stefanopoulos, J D Shaaklin, J Thorpe, J Toote, I K Brundie, M Barrett, N A Foster, N Foster, R B J Fraser, S W Altringham, T G Saville, T Markham

Figure 2. The Light Curve of Z Ursae Majoris for 2014 from the VSS database with the dates of spectra and CCD observations marked.

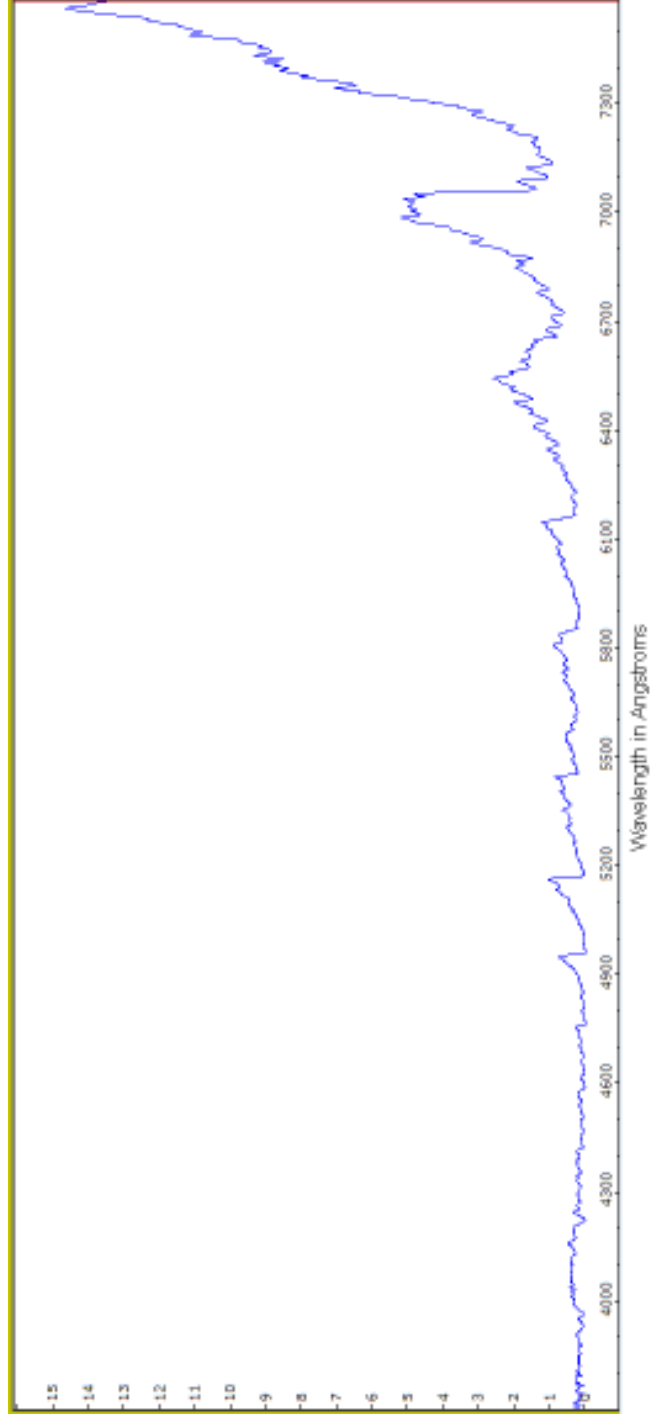
Light Curve for Z UMA



Symbol KEY: Crosses = Negative observations, Triangle = Brighter than, Otherwise: Circle = Visual, Diamond = CCD, Square = Everything else

Contributors: A.J Wilson, D Boyd, J D Shanklin, J Toone, M Barnett, T Mackham

Figure 3. The spectrum of Z Ursae Majoris taken on 1st April 2014, which is typical of a spectral type M7III star with surface temperature around 2700K



CAMPAIGN ON A POSSIBLE ER UMA DWARF NOVA FROM THE CATALINA REAL TIME SKY SURVEY.

JEREMY SHEARS

Background

In 2012, John Greaves announced that he had identified a possible dwarf nova from his inspection of light curves in the Catalina Real Time Sky Survey (CRTS) database. The star, CSS 121005:212625+201948, varies between magnitude 15.5 and >20.5 (it's below the CRTS detection limit) (1). The frequent outbursts suggest to John that it might be an ER UMa-type dwarf nova ("UGER").

UGER systems are a sub-set of the UGSU dwarf novae, but they have short supercycles (the time between superoutbursts) of 20-30 days during which they display characteristic superhumps. Typically they spend a third to half their time in superoutburst. They also show a rapid succession of normal outbursts every 4 days or so.

Several observers, including Roger Pickard, Ian Miller, Richard Sabo (AAVSO) and the author have monitored the star from late 2012 into 2014. We confirm frequent, short duration, outbursts to \sim mag 16. In addition there is evidence of long outbursts from time to time: for example in late April 2014 an outburst to 15.8V was detected which lasted at least 11 days. This might have been a superoutburst, but we were unable to obtain sufficiently long photometry runs to detect superhumps

Project aim

The aim of this project is to confirm whether or not CSS 121005:212625+201948 is an ER UMa dwarf nova. We would like to determine its outburst frequency and the length of its supercycle. This requires observing the star on as many nights as possible. If a possible superoutburst is found, then time resolved photometry is needed to look for superhumps.

Procedure and reporting

Although the star is usually pretty faint, it may well be accessible to visual observers during outburst. Otherwise, CCD photometry is the best route – unfiltered is acceptable considering the star's brightness range.

To maximise our coverage of the star's light curve, aim to observe it once every clear night (CCD observers might like to obtain a few photometric images). Report your observations to the BAA and/or AAVSO databases in the normal way. If you suspect a superoutburst (e.g. if it's about mag 16 or brighter for more than 2 days), then time resolved CCD photometry is desirable. You could use the *baavss-alert* email group to alert other observers.

An AAVSO chart and sequence are attached. Further charts may be obtained from the AAVSO web site.

Duration of campaign

This campaign starts now (2014 May) and will continue until the field is no longer accessible: probably 2015 January.

1. The CRTS light curve is available at: <http://nesssi.cacr.caltech.edu/catalina/20121005/1210051211094121504p.html>.

CSS 121005:212625+201948

N

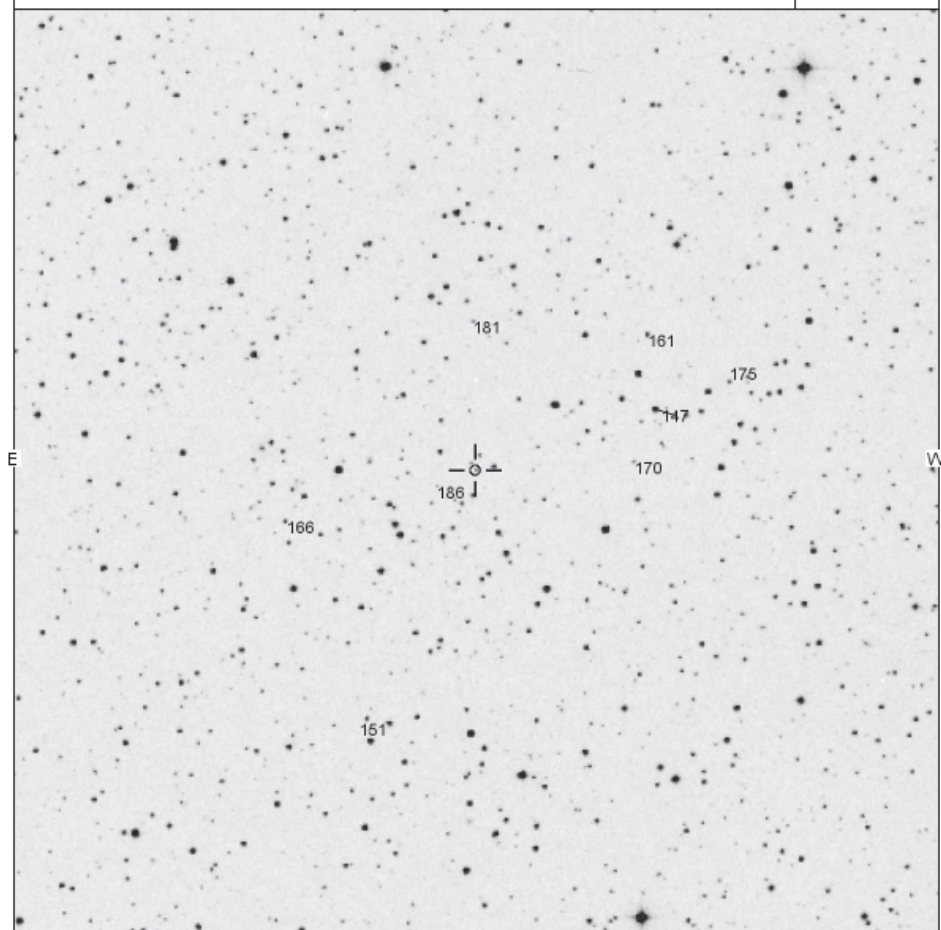
Magn: 15.5 - <20.7 CV
Period:
Type: UG
Spec:

CSS 121005:212625+201948

(2000) 21:26:25.08 +20:19:46.4

AAVSO
Chart

13422CBG



FOV = 20.0'

Please use the photometry table for CCD observations.

<http://www.aavso.org/isp/>

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S

Data includes all comparison stars within 0.16667° of RA: 21:26:25.08 (321.60450) & Decl.: 20:19:46.40 (20.32956).

AUID	RA.	Dec.	Label	U	B	V	B-V	Rc	Ic	J	H	K	Comments
000-BKS-154	21:26:08.55 [β 21.53561d]	20:21:05.7 [20.35158d]	147	16.203 (0.087) ²¹	15.629 (0.071) ²¹	14.702 (0.050) ²¹	0.927 (0.087)	14.148 (0.071) ²¹	13.625 (0.087) ²¹	-	-	-	
000-BKS-155	21:26:33.06 [β 21.63776d]	20:14:17.9 [20.23831d]	151	15.832 (0.087) ²¹	15.741 (0.071) ²¹	15.102 (0.050) ²¹	0.639 (0.087)	14.727 (0.071) ²¹	14.319 (0.087) ²¹	-	-	-	
000-BKS-157	21:26:09.31 [β 21.53879d]	20:22:42.8 [20.37856d]	161	17.146 (0.087) ²¹	16.867 (0.071) ²¹	16.131 (0.050) ²¹	0.736 (0.087)	15.701 (0.071) ²¹	15.252 (0.087) ²¹	-	-	-	
000-BKS-158	21:26:42.66 [β 21.6776d]	20:18:40.7 [20.31131d]	166	17.412 (0.087) ²¹	17.238 (0.071) ²¹	16.553 (0.050) ²¹	0.685 (0.087)	16.151 (0.071) ²¹	15.720 (0.087) ²¹	-	-	-	
000-BKS-162	21:26:10.54 [β 21.54391d]	20:19:57.5 [20.33264d]	170	17.822 (0.087) ²¹	17.686 (0.071) ²¹	17.015 (0.050) ²¹	0.671 (0.087)	16.617 (0.071) ²¹	16.190 (0.087) ²¹	-	-	-	
000-BKS-159	21:26:01.70 [β 21.50708d]	20:21:41.4 [20.36150d]	175	18.140 (0.087) ²¹	18.139 (0.071) ²¹	17.508 (0.050) ²¹	0.631 (0.087)	17.118 (0.071) ²¹	16.666 (0.087) ²¹	-	-	-	
000-BKS-160	21:26:25.37 [β 21.60571d]	20:23:00.1 [20.38336d]	181	18.970 (0.087) ²¹	18.827 (0.071) ²¹	18.105 (0.050) ²¹	0.722 (0.087)	17.656 (0.071) ²¹	17.159 (0.087) ²¹	-	-	-	
000-BKS-161	21:26:28.71 [β 21.61963d]	20:19:26.3 [20.32397d]	186	20.389 (0.087) ²¹	19.586 (0.071) ²¹	18.601 (0.050) ²¹	0.985 (0.087)	18.044 (0.071) ²¹	17.374 (0.087) ²¹	-	-	-	

Report this sequence as: **13422C BH** in the *ckzr* field of your observation report

AG VIRGINIS : AN O'CONNELL EFFECT ECLIPSING BINARY.

LAURENT CORP

(AAVSO - GEOS - BAA VSS)

In most cases when we observe eclipsing binaries, we watch for the moment when the minimum occurs. But I would like to suggest that you observe this star continuously.

AG Vir (HIP 58605 , SAO 99908) is an EW type eclipsing Binary with a maximum of mag 8.35V, and a minimum of mag 9.11V. It is spectral type A7 - A9V.

Here are the details in order to establish the ephemerids.

JD: 2452500.288

Period: 0.6426494 days with a separation of less than 0.02 arc seconds (measured with the 6 metre BTA telescope (Caucasus mountains) by Malogolovets (2010))

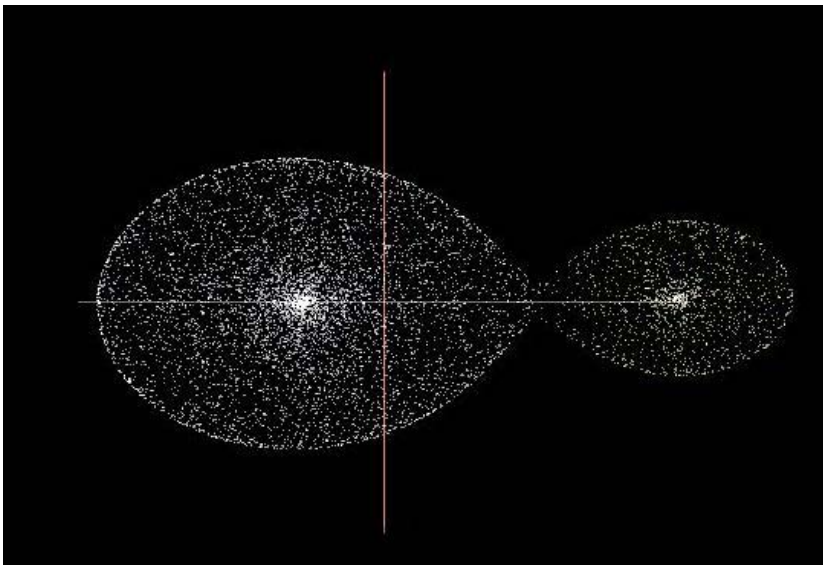
Coordinates: RA: 12h 01m 03.50s and Dec: 13° 00 ' 30.0 ''

This star is not part of the BAA VSS Binary Eclipse Programme. There has been no reliable data since 2009 in the AAVSO database.

Chart

You can download the AAVSO chart on the following link < <http://www.aavso.org> >
(A copy of the AAVSO chart of AG Vir, can be found on page 17.)

3D Model of a Binary.



The model was obtained using the “Binaryview” software written by Alexander Hobbs, which can be downloaded from this address: < <http://www.physics.sfasu.edu/astro/binstar/software/BinaryView.zip> >

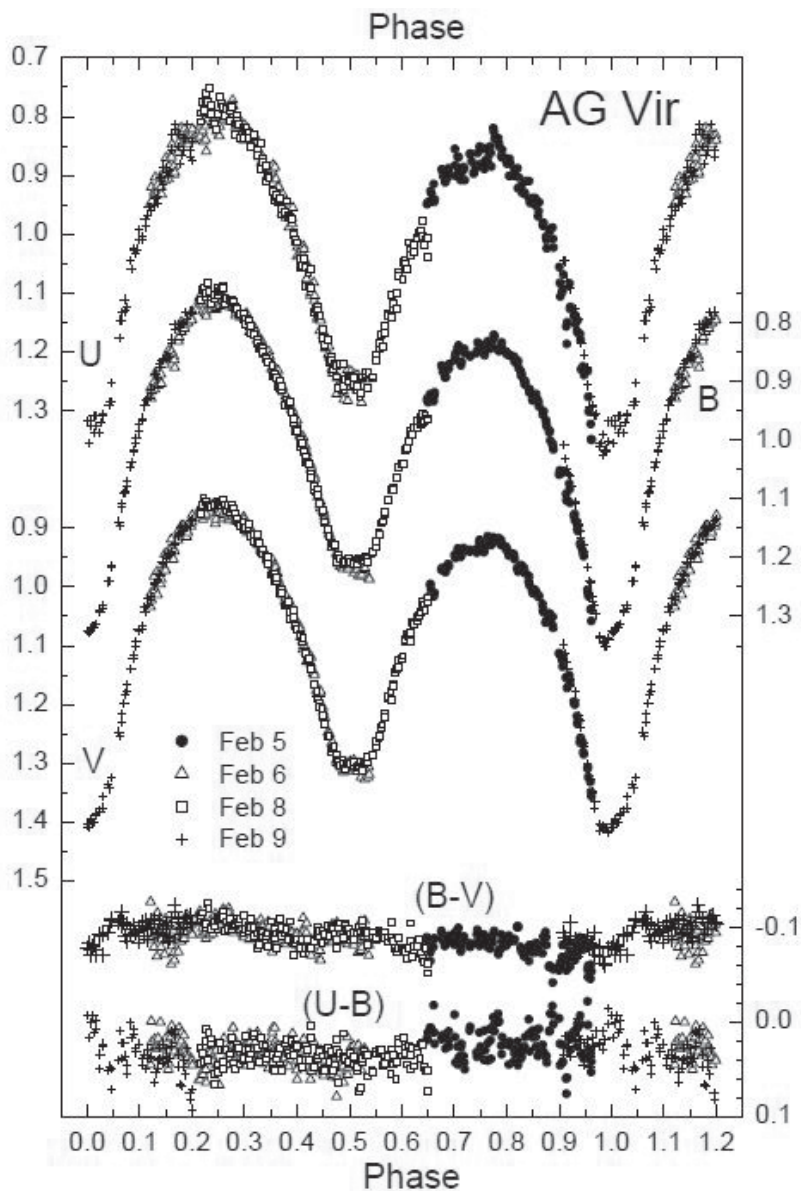


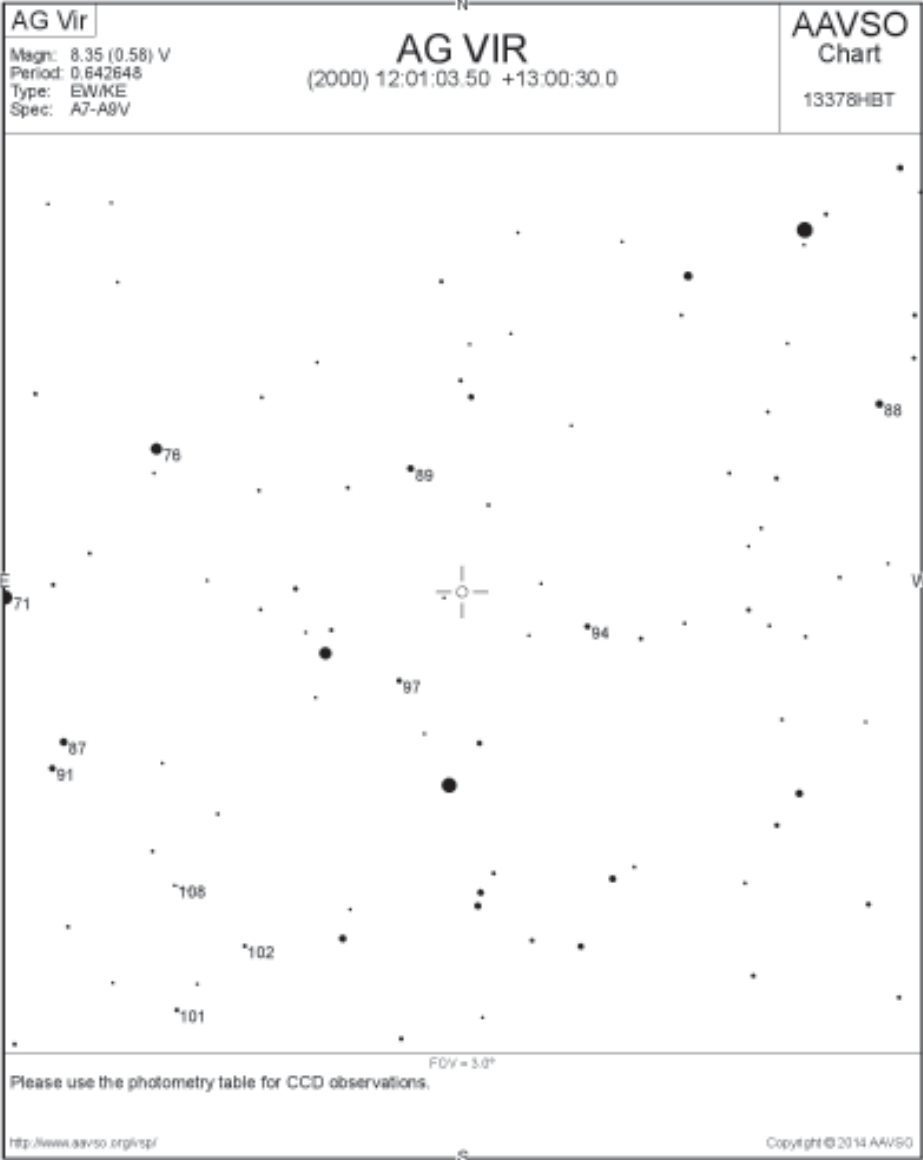
Fig.1 *UBV* light curves and corresponding color indices of DU Boo (*top*), and AG Vir (*bottom*), obtained at the Stará Lesná Observatory.

Source: “O’Connell effect* in early-type contact binaries: DU Boo and AG Vir.”

T. Pribulla, M. Vanko, D. Chochol, L. Hambalek, & S. Parimucha, 11 Jul 2011.

< http://www.ta3.sk/~akucera/foto/foto/oponetura_skopal/rada_oponetury_0038/adc-2.pdf > * See page 18.

AAVSO Chart for AG Virginis



Please use the photometry table for CCD observations.

<http://www.aavso.org/vsp/>

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What is the O’Connell effect?

The O’Connell effect is the name given by Wesselink and Milone (Milone 1968) to the difference in height between the two maxima in light curves of certain eclipsing binaries. O’Connell (in 1951) was the first person to study eight eclipsing binaries in enough detail to see this.

What causes the O’Connell effect?

Without going into too much detail here are at least 3 possible causes.

- Bright spots on the companion star.
- Circumstellar gas and dust clouds.
- Hot spots caused by the high speed transfer of matter.

As AG Vir has a period of almost 16 hours, it is important, if possible, to take measurements over several consecutive nights in order to show the differences between the maxima.

laucorp@wanadoo.fr
http://www.astrosurf.com/lcorp

TX DRACONIS (1971 – 2010)

MELVYN TAYLOR

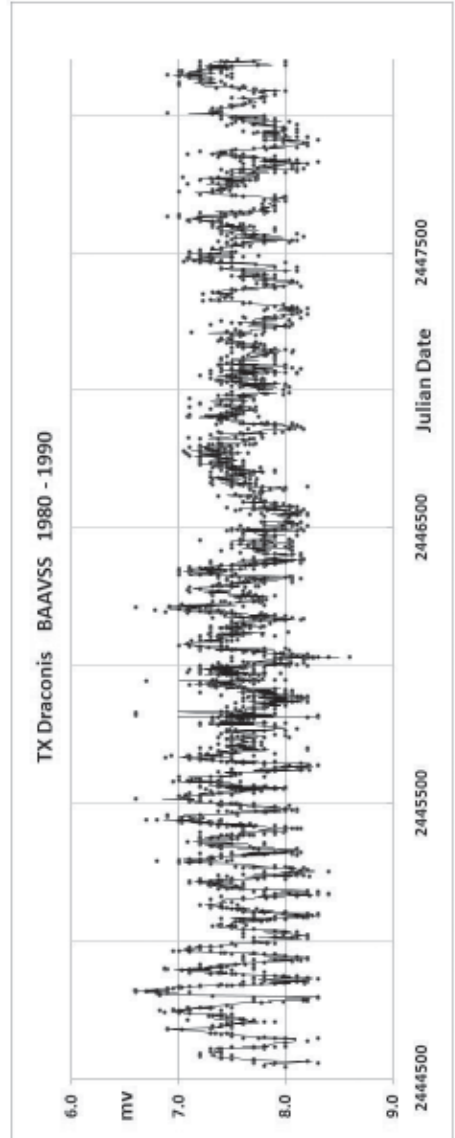
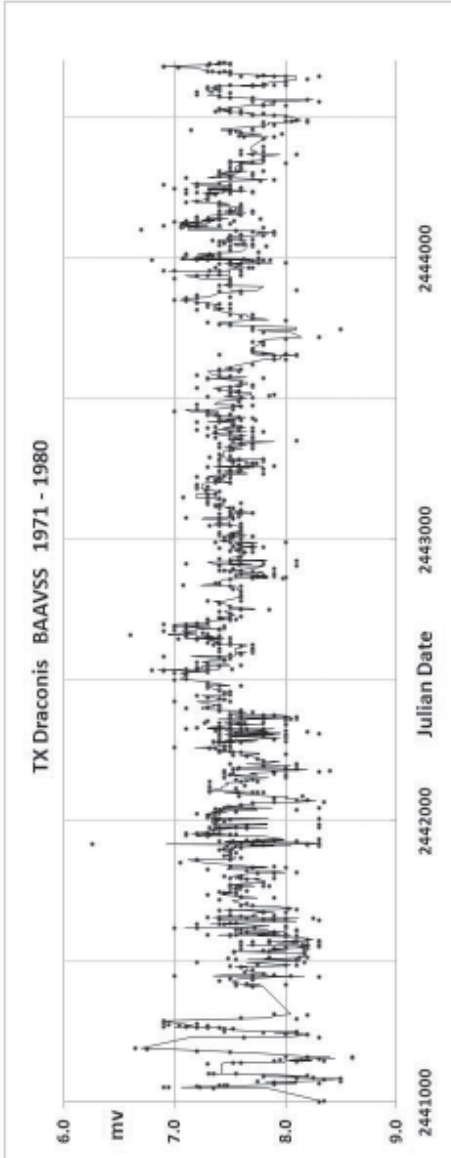
RA 16h 35m Dec. +60° 28, 7.9 – 10.2p, SRB, M4-M5, period 78d uncertain (GCVS)

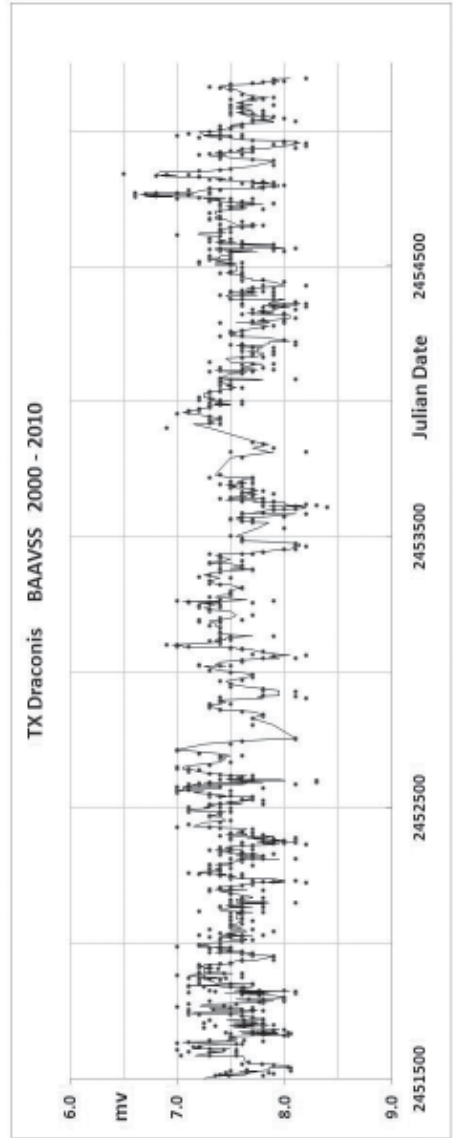
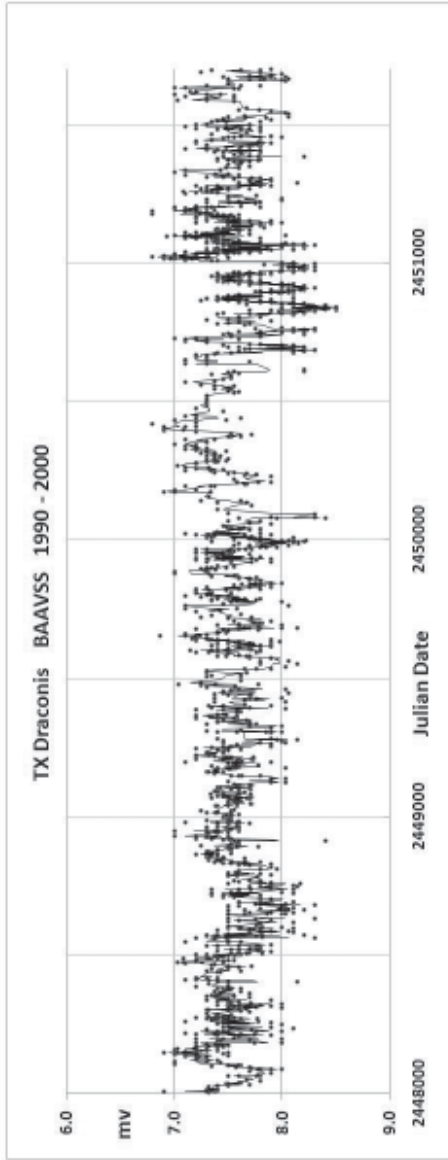
This binocular semi-regular is within 2° of eta Draconis and has AH Dra on the same chart, sequence number 106.03. The chart also shows other stars AT Dra (6.8-7.5p, LB), S Dra (10.5-11.5p, SRB) and WW Dra (8.3 – 9.1, period 4.63d, EA).

The 6200 magnitude estimates in the database give an extreme range from 6.7 to 8.2 and with a mean value of 7.58 (s.d. 0.31 mv). Periodic variations are interspersed with typical SR changes and show periods in the range 77d to 136d, mean value 103d. Many of the smaller variations have an amplitude of 0.6 to 0.7 magnitudes. The object is very ‘red’ with a B-V index of +1.50.

90 observers have contributed to the database on this object and are:

Agar	Charleton	Gill	Hoste	MacDonald	Pezzarossa
Albrighton	Clayton	Godden	Howarth	Mann	Phillips
Allen	Cook	Goodger	Hufton	Markham	Pickup
Allmand	Curie	Gough	Hurst	Matthews	Pointer
Baransky	Day	Granslo	Hutchings	McAdam	Poxon
Beaumont	Espey	Griffin	Isles	McCalman	Quadt
Beesley	Evans	Grundy	Januszewski	Metson	Ramsey
Betts	Farrer	Hather	Jobson	Middlemist	Robinson
Beveridge	Fleet	Henshaw	Johnston	Minty	Saville
Bibbings	J.Fraser	Hoare	Kendall	Mormyl	Saw
Britton	R. Fraser	Holland	Lashley	Nartowicz	Smeaton
Bullivant	Gardner	Hollis	Livingstone	Newman	Smith
Chaplin	Gavine	Hornby	Lubek	Nicholls	Spooner





FURTHER OBSERVATIONS OF GO CANCRI WITH THE BRADFORD ROBOTIC TELESCOPE.

DAVID CONNER

Following on from my recent article in VSS Circular No 159 (March 2014) regarding the need for more observations of the EA type eclipsing binary GO Cancri = HIP45597, the Bradford Robotic Telescope Cluster Camera has provided sufficient images in 2014 (69 to date) to generate a more informative light curve. Images are unfiltered and were analysed with AIP4WIN using the AAVSO chart for this star.

Figure 1. Phase diagram of GO Cancri.

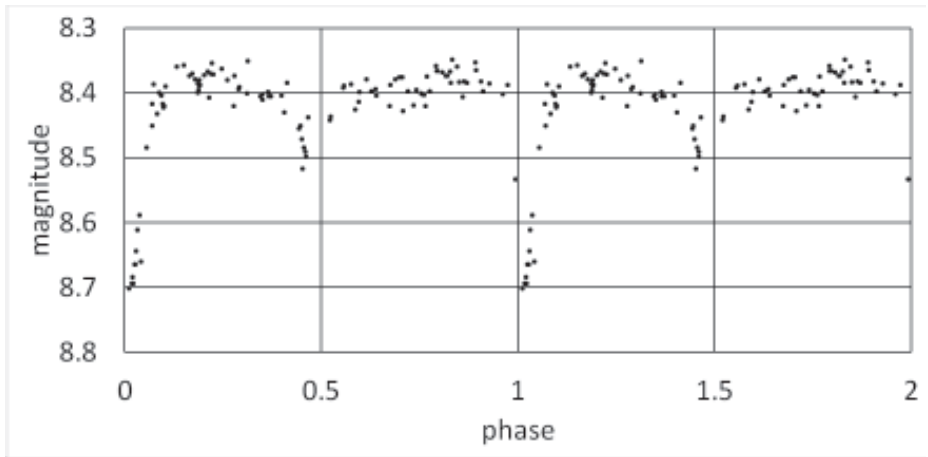


Figure 1 is a phase diagram derived from a total of 120 images taken with Cluster Camera between November 2012 and early May 2014. This is plotted using the best fit period of 3.6507 days derived by Peranso/Anova. This value compares favourably with the Hipparcos/AAVSO value of 3.6502 days, (there is no period given in the General Catalogue of Variable Stars). Analysis with Peranso suggests there was a primary minimum at or near to Heliocentric Julian Date 2456775.39.

Visual inspection of figure 1 suggests a slight displacement of the secondary minimum with regard to the primary minimum, which is indicative of an eccentric orbit, but this is in the opposite sense to that indicated in the 20 year old Hipparcos light curve. If real this would be consistent with apsidal motion, but more observations over an extended time are needed before drawing any conclusions about this.

The depths of the two minima, 0.3 and 0.1 magnitudes approximately, are similar in the BRT results and the Hipparcos plot. There is a slight slope of the maximum down towards the secondary minimum in the BRT results which is not evident in the Hipparcos light curve.

Continued observation of this star, both with the BRT and from my home observatory, is now a long term project of mine in order to derive a better light curve and epoch and to see if there are any changes to the light curve over time.

References:

<http://www.telescope.org/>

<http://www.peranso.com/>

<https://www.rssd.esa.int/index.php?project=HIPPARCOS&page=index>

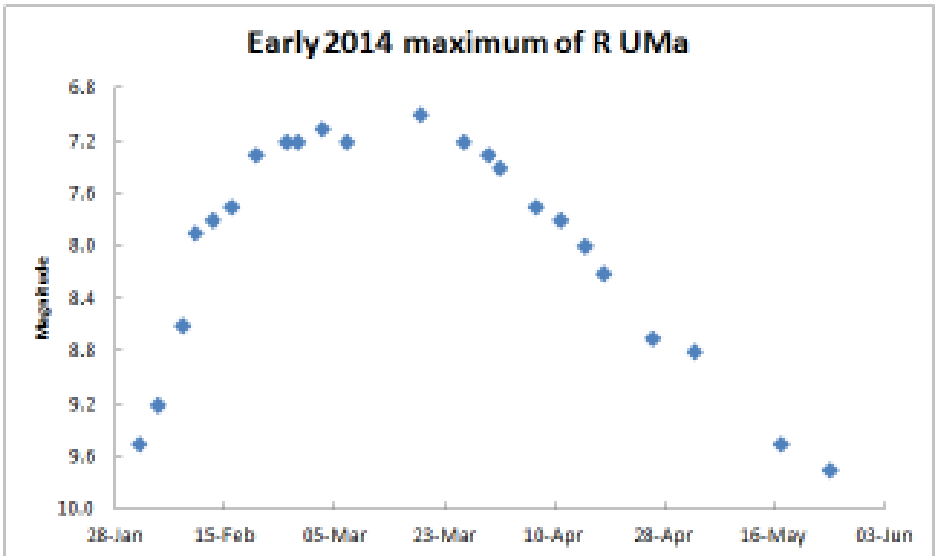
<http://www.rssd.esa.int/Hipparcos/curvespdf/A/45597.pdf>

david@somerbyconners.plus.com

* * *

LIGHT CURVE SHOWING THE EARLY 2014 MAXIMUM OF R URSAE MAJORIS.

TONY MARKHAM



BINOCULAR PROGRAMME

MELVYN TAYLOR

Priority level 1:

This list is as existing and as previously published, but it should be noted that V Boo, XX Cam, gamma Cas, R CrB, omicron Cet and R Hya are not shown as they are on the telescopic programme.

Star	RA (2000)	Dec	Type	Range	Period	Chart
<i>AQ And</i>	0028	+35 35	SR	8.0 - 8.9	346d	303.01
<i>EG And</i>	0045	+40 41	ZAnd	7.1 - 7.8		72.02
<i>V Aql</i>	1904	-05 41	SRb	6.6 - 8.4	353d	26.04
<i>UU Aur</i>	0637	+38 27	SRb	5.1 - 6.8	234d	230.02
<i>AB Aur</i>	0456	+30 33	Ina	6.7 - 8.4		301.01
<i>RW Boo</i>	1441	+31 34	SRb	7.4 - 8.9	209d	104.02
<i>RX Boo</i>	1424	+25 42	SRb	6.9 - 9.1	160d	219.02
<i>ST Cam</i>	0451	+68 10	SRb	6.0 - 8.0	300d?	111.02
<i>X Cnc</i>	0855	+17 04	SRb	5.6 - 7.5	195d	231.02
<i>RS Cnc</i>	0911	+30 58	SRc	5.1 - 7.0	120d?	269.01
<i>V CVn</i>	1320	+45 32	SRa	6.5 - 8.6	192d	214.02
<i>WZ Cas</i>	0001	+60 21	SRb	6.9 - 8.5	186d	323.01
<i>V465 Cas</i>	0118	+57 48	SRb	6.2 - 7.8	60d	233.02
<i>Rho Cas</i>	2354	+57 29	SRd	4.1 - 6.2	320d	64.01
<i>W Cep</i>	2237	+58 26	SRc	7.0 - 9.2		312.02
<i>AR Cep</i>	2252	+85 03	SRb	7.0 - 7.9		332.02
<i>Mu Cep</i>	2144	+58 47	SRc	3.4 - 5.1	730d	112.02
<i>RS CrB</i>	1559	+36 01	SRa	7.0 - 10.2	332d	220.02
<i>W Cyg</i>	2136	+45 22	SRb	5.0 - 7.6	131d	62.03
<i>AF Cyg</i>	1930	+46 09	SRb	6.4 - 8.4	92d	232.02
<i>CH Cyg</i>	1925	+50 15	ZAnd+SR	5.6 - 11.0	97d	089.03
<i>P Cyg</i>	2018	+38 02	SDor	3.0 - 6.0	6d	1972Jul29
<i>U Del</i>	2046	+18 06	SRb	5.6 - 7.9	110d?	228.02
<i>EU Del</i>	2038	+18 16	SRb	5.8 - 6.9	60d	228.02
<i>TX Dra</i>	1635	+60 28	SRb	6.6 - 8.4	78d?	106.03
<i>AH Dra</i>	1648	+57 49	SRb	7.0 - 8.7	158d	106.03
<i>X Her</i>	1603	+47 14	SRb	6.1 - 7.5	95d	223.02
<i>SX Her</i>	1608	+24 55	SRd	8.0 - 9.2	103d	113.02
<i>UW Her</i>	1714	36 22	SRb	7.0 - 8.8	104d	107.02
<i>AC Her</i>	1830	+21 52	RVA	6.8 - 9.0	75d	048.04
<i>IQ Her</i>	1818	+17 59	SRb	7.0 - 7.5	75d	048.04
<i>OP Her</i>	1757	+45 21	SRb	5.9 - 7.2	120d	324.01
<i>RX Lep</i>	0511	-11 51	SRb	5.0 - 7.4	60d?	110.01
<i>SV Lyn</i>	0804	+36 21	SRb	6.6 - 7.9	70d?	108.03
<i>Y Lyn</i>	0728	+45 59	SRc	6.5 - 8.4	110d	229.02
<i>U Mon</i>	0731	-09 47	RVB	5.9 - 7.9	91d	029.04
<i>X Oph</i>	1838	+08 50	M	5.9 - 9.2	328d	099.02
<i>BQ Ori</i>	0557	+22 50	SR	6.9 - 8.9	110d	295.01
<i>AG Peg</i>	2151	+12 38	Nc	6.0 - 9.4		094.02
<i>X Per</i>	0355	+31 03	GCas+Xp	6.0 - 7.0		277.01

<i>R Sct</i>	1848	-05 42	RVA	4.2 - 8.6	146d	026.04
<i>Y Tau</i>	0546	+20 42	SRb	6.5 - 9.2	242d	295.01
<i>W Tri</i>	0242	+34 31	SRc	7.5 - 8.8	108d	114.02
<i>Z UMa</i>	1157	+57 52	SRb	6.2 - 9.4	196d	217.02
<i>ST UMa</i>	1128	+45 11	SRb	6.0 - 7.6	110d?	102.02
<i>V UMi</i>	1339	+74 19	SRb	7.2 - 9.1	72d	101.02
<i>SS Vir</i>	1225	+00 48	SRa	6.0 - 9.6	364d	097.02
<i>SW Vir</i>	1314	-02 48	SRb	6.4 - 8.5	150d?	098.02

Priority level 2:

The following are regarded (in the main) as under-observed or having poor continuity, and several objects come to conjunction with the Sun so the light-curve is broken.

Star	RA(2000)Dec		Type	Range	Period	Chart
<i>RS And</i>	23 55	+48 38	SRa	7.0 - 9.1	136d	1977Sep10
<i>TZ And</i>	23 51	+47 31	SRb	7.6 - 9.0		1977Sep10
<i>V450 Aql</i>	19 34	+05 28	SRb	6.3 - 6.7	64d	70.02
<i>RV Boo</i>	14 39	+32 32	SRb	7.5 - 8.8	137d	104.02
<i>U Cam</i>	03 42	+62 39	SRb	7.7 - 8.8		100.02
<i>RY Cam</i>	04 31	+64 26	SRb	7.3 - 9.4	136d	1972Jul29
<i>Y CVn</i>	12 45	+45 26	SRb	5.2 - 6.6	157d	215.02
<i>TU CVn</i>	12 55	+47 12	SRb	5.6 - 6.6	50d	215.02
<i>V393 Cas</i>	02 03	+71 18	SRa	7.0 - 8.0	393d	1978May15
<i>RU Cep</i>	01 21	+85 08	SRd	8.2 - 9.8	109d	332.02
<i>RW Cep</i>	22 23	+55 58	SRd	6.2 - 7.6	346d?	312.02
<i>SS Cep</i>	03 50	+80 19	SRb	6.7 - 7.8	90d	315.01
<i>FZ Cep</i>	21 20	+55 27	SR	7.0 - 7.6		302.01
<i>RR CrB</i>	15 41	+38 33	SRb	7.1 - 8.6	61d	220.02
<i>RU Cyg</i>	21 41	+54 19	SRa	8.0 - 9.4	233d	302.01
<i>RV Cyg</i>	21 43	+38 01	SRb	7.1 - 9.3	263d	1983Sep18
<i>TT Cyg</i>	19 41	+32 37	SRb	7.4 - 8.7	118d	227.01
<i>RY Dra</i>	12 56	+66 00	SRb?	6.0 - 8.2	200?	225.02
<i>TU Gem</i>	06 11	+26 01	SRb	7.4 - 8.3	230d	294.01
<i>TV Gem</i>	06 12	+21 52	SRc	6.6 - 8.0	42d	294.01
<i>WY Gem</i>	06 12	+23 12	Lc+E?	7.2 - 7.9		294.01
<i>ST Her</i>	15 51	+48 29	SRb	7.0 - 8.7	148d	223.02
<i>V566 Her</i>	18 08	+41 43	SRb	7.1 - 7.8	137	324.01
<i>g(30) Her</i>	16 29	+41 53	SRb	4.3 - 6.3	89	224.02
<i>SX Lac</i>	22 56	+35 12	SRd	7.7 - 8.7	190	235.01
<i>CE Lyn</i>	07 44	+38 50	SR	7.8 - 8.7	?	108.03
<i>R Lyr</i>	18 55	+43 57	SRb	3.9 - 5.0	46?	330.01
<i>RV Mon</i>	06 58	+06 10	SRb	6.8 - 8.6	132	292.01
<i>SX Mon</i>	06 52	+04 46	SR	7.3 - 8.5	100	292.01
<i>W Ori</i>	05 05	+01 11	SRb	5.9 - 7.7	212	105.02
<i>GO Peg</i>	22 55	+19 34	Lb	7.1 - 8.3		103.01
<i>SU Per</i>	02 22	+56 36	SRc	7.0 - 8.5	533	1974Jan13
<i>AD Per</i>	02 21	+57 00	SRc	7.7 - 8.4	362	1974Jan13
<i>Z Psc</i>	01 16	+25 46	SRb	7.0 - 7.9	144	278.01
<i>TV Psc</i>	00 28	+17 54	SR	4.7 - 5.6	49	1972Sep09
<i>S Sct</i>	18 50	-07 54	SRb	7.0 - 8.2	148	26.04

<i>t4 Ser</i>	15 36	+15 05	SRb	5.9-7.4	100	209.01
<i>TT Tau</i>	04 52	+28 32	SRb	8.1-8.8	166	301.01
<i>BU Tau</i>	03 49	+24 08	GCas	4.8-5.5		1983Oct03
<i>RY UMa</i>	12 21	+61 19	SRb	6.7-8.3	310?	217.02
<i>TV UMa</i>	11 46	+35 54	SRb	6.8-7.3	42	271.01
<i>VW UMa</i>	10 59	+69 59	SR	6.9-7.7	610	226.01
<i>BK Vir</i>	12 30	+04 25	SRb	7.3-8.8	150?	270.01

Priority level 3:

Stars that have been queried by period and/or type.

Star	RA(2000)	Dec	Type	Range	Period	Chart
<i>V Ari</i>	02 15	+12 14	SRb	7.8-8.8	77?	1984Oct26
<i>W Boo</i>	14 43	+26 32	SRb?	4.7-5.4	450?	Undated
<i>UV Cam</i>	04 06	+61 48	SRb	7.5-8.1	294?	1972Jul29
<i>RT Cnc</i>	08 58	+10 51	SRb	7.1-8.6	60?	311.01
<i>V460 Cyg</i>	21 42	+35 31	SRb	5.6-7.0	180?	1983Sep18
<i>V973 Cyg</i>	19 45	+40 43	SRb	6.2-7.0	40?	232.02
<i>UX Dra</i>	19 22	+76 34	SRa?	5.9-7.1	168	1982Nov07
<i>U Hya</i>	10 38	-13 23	SRb	4.3-6.5	450?	109.01
<i>RX Vir</i>	12 05	-05 46	SRd?	8.0-8.6	200?	317.01

Priority level 4:

Not all the 'red-irregulars' are included here. These are considered unlikely to reveal further relevant data other than a trend of the variation and the overall mean range. Many of these stars would make a suitable longer term project for observers with a DSLR camera.

Star	RA(2000)	Dec	Type	Range	Chart
<i>SU And</i>	00 05	+43 33	Lc	8.0-8.5	1977Sep10
<i>BZ And</i>	00 38	+45 36	Lb	7.5-8.4	1982Aug16
<i>Psi1 Aur</i>	06 25	+49 17	Lc	4.8-5.7	1973Jul14
<i>ZZ Cam</i>	04 18	+62 21	Lb	7.1-7.9	1972Jul29
<i>W CMa</i>	07 08	-11 55	Lb	6.4-7.9	213.02
<i>V391 Cas</i>	01 57	+70 12	Lb	7.6-8.4	1978May15
<i>DM Cep</i>	22 08	+72 46	Lb	6.9-8.6	Undated
<i>UWDra</i>	17 58	+54 40	Lb	7.0-8.2	1974Jul27
<i>BU Gem</i>	06 12	+22 55	Lc	5.7-8.1	294.01
<i>XY Lyr</i>	18 38	+39 40	Lc	5.8-6.4	331.01
<i>BL Ori</i>	06 26	+14 43	Lb	6.3-7.2	211.01
<i>KK Per</i>	02 10	+56 34	Lc	6.6-7.9	1974Jan13
<i>PR Per</i>	02 22	+57 52	Lc	7.6-8.3	1974Jan13
<i>TX Psc</i>	23 46	+03 29	Lb	4.8-5.8	276.01
<i>VY UMa</i>	10 45	+67 25	Lb	5.9-7.0	226.01
<i>RW Vir</i>	12 07	-06 46	Lb	6.7-7.6	317.01

The Binocular Secretary is always willing to assist in the choice of stars to follow. In addition he would like to hear from the Variable Star Section's observers of any possible new additions which could be added to the programme.

ECLIPSING BINARY PREDICTIONS – WHERE TO FIND THEM

DES LOUGHNEY - desloughney@blueyonder.co.uk

The publication of Eclipsing Binary Predictions is now discontinued in the VSS Circular. Predictions for RZ Cas, Beta Per and Lambda Tau can still be found in the BAA Handbook. Predictions, completed on a monthly basis, are available on the BAA VSS website at:

<http://www.britastro.org/vss/dpredict.html>

If readers require paper copies of the predictions please contact me.

The best source for predictions for Eclipsing Binaries is the Mt. Suhora Astronomical Observatory, Cracow Pedagogical University website (known as the Krakow website)at:

<http://www.as.up.krakow.pl/o-c/index.php3>

Click on ‘Constellation List’, choose your constellation and then choose your system.

A webpage will then appear with lots of useful information regarding the system. In the section entitled ‘Light Elements’ there is a link entitled ‘current minima and phase’. When you click on this link, in the example of Beta Lyrae, you get predictions of primary and secondary eclipses for a period of three months. For systems with very short periods such as RZ Cas the predictions are for one week. For a system such as SW Cyg, with a period of around 4.57 days, the predictions are for a month.

The Krakow website does not tell you how much of an eclipse will be observable at a particular time of the year at your latitude and longitude. However, it has some useful literature references for each system, although they may not necessarily be up to date. Nor are references to the ‘Information Bulletin on Variable Stars’ included, but these can be found at:

<http://www.konkoly.hu/IBVS/IBVS.html>

Although the Krakow website lists the depth of eclipses it does not list the actual V magnitudes at maximum and minimum. For an indication of these magnitudes you will need to visit the ‘General Catalogue of Variable Stars’ website at:

<http://www.sai.msu.su/groups/cluster/gcvs/gcvs/>

Click on ‘GCVS Query Form’, type in a designation such as SW Cyg, and click on ‘Search’. The resulting information displayed shows that maximum is 9.24V, primary minimum 11.83V, and secondary minimum 9.30V. These magnitudes, however, may have been determined some time ago.

The GCVS website gives SW Cyg a period of 4.57313411 days but the Krakow website lists the period of SW Cyg as 4.572986 days. The latter is more likely to list the most up to date period. It must always be borne in mind that small changes in a period can result in significant changes in the times of minima if the period was determined a few years ago.

CHARGES FOR SECTION PUBLICATIONS

The following charges are made for the Circulars. These cover one year (4 issues). PDF format subscriptions are £3.00 per year. Make cheques out to the BAA, and send to the Circulars editor (address on back cover); or you can now pay on-line.

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* * *

The charges for other publications are as follows. Make cheques out to the BAA and please enclose a large SAE with your order, [for items below, but not for the Circulars]

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Eclipsing Binary Charts	Chart Secretary	Free
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Observing Guide to Variable Stars	BAA Office	£5.00
CCD Guide	BAA Office	£7.50
Binocular Booklet	Director or BAA Office	£2.50
CD-ROM of the last 3 items	BAA Office	£7.50

Charts are downloadable from the VSS web pages at
<http://www.britastro.org/vss/chartcat/wfb.php>

For more information, please visit our web pages at <http://www.britastro.org/vss>

CONTRIBUTING TO THE CIRCULAR

If you would like to prepare an article for consideration for publication in a Variable Star Section Circular, please read the *Notes for Authors*, published on the web pages at:

<http://www.britastro.org/vss/circons.htm>; reproduced in full in VSSC132 p 22, or contact the editor (details on back cover) for a pdf copy of the guidelines.

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 161) will be 7th August 2014. All articles should be sent to the editor (details are given on the back of this issue).

Whilst every effort is made to ensure that information in this Circular is correct, the Editor and Officers of the BAAVSS cannot be held responsible for errors that may occur; nor will they necessarily always agree with opinions expressed by contributors.

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Nova and Supernova discoveries

First telephone the Nova/Supernova Secretary, Guy Hurst: 01256 471074
If only answering machine response, leave a message and then try the following:
Denis Buczynski 01862 871187,
Glyn Marsh 01624 880933, or
Martin Mobberley 01284 828431.

Variable Star Alerts

Telephone Gary Poyner: 07876 077855