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6109 Long-term monitoring of Halpha emission strength and photometric V magnitude of gamma Cas. (Pollmann, Vollmann, & Henry, 2014)

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

FROM THE DIRECTOR

ROGER PICKARD

Gary Poyner passes 270,000 visual variable star observations

In December 2014 Gary Poyner passed the 270,000 visual observations mark! John Toone pointed out that Gary was now 100,000 observations ahead of any other UK observer and only(!) 23,000 short of Danie Overbeek, the fourth most prolific observer of all time. John added; "visual observing remains important and we must overlap with the CCD data for as long as possible".

Congratulations to Gary.

Spectroscopy workshop

I am pleased to announce that there will be a workshop on spectroscopy on Saturday 10th October 2015 at the Norman Lockyer Observatory, near Sidmouth, Devon.

The provisional Programme is as follows:-

11:00 Welcome and introduction - David Strange / Roger Pickard

General Overview Of Spectroscopy

11:10 Why we do Spectroscopy, Olivier Thizy
12:10 How we do Spectroscopy: preparation, acquisition and data reduction, Robin Leadbeater
12:40 My initial steps with a L200 spectrograph, Andy Wilson

13:10 Lunch

Examples Of Work and Results

14:15 Low resolution slitless spectroscopy - observing a fast transient of a T Tauri star, Robin Leadbeater
14:45 Low resolution slit spectroscopy - Confirming and classifying a supernova, Robin Leadbeater

15:15 Tea

16:00 Observations with a LISA spectrograph, David Boyd
16:45 High resolution spectroscopy - Radial velocity measurements of Deneb, Robin Leadbeater
17:15 Be stars long term monitoring, BeSS database and general pro/am collaboration in spectroscopy, Olivier Thizy

17:45 Closing remarks

There may be general discussion and eventually live observations, if weather and venue allow. on either or both the Friday and Saturday evenings. It is also hopped to include some software demonstrations on these occasions.

The anticipated cost will be £13 for BAA members and £16 for non-members.

Note: There will not be a full VSS Members meeting this year but there will be one, probably in the spring of 2016.

POLAR V1432 AQUILAE

Editor's Note

A comment has been received from David Boyd concerning an item in the last issue of the Circular, No 162, on V1432 Aquilae. In the report of his talk on V1432 Aquilae (given at the York VSS Meeting in 2014) it was stated that "The accretion disc periodically occults the white dwarf ...."

David has pointed out that, in an otherwise excellent report of his talk, this point could be confusing, and should ideally read :
"The accretion stream periodically occults the white dwarf ...."
because in Polars, there is no accretion disc.

ECLIPSING BINARY NEWS - FEBRUARY 2015

Des Loughney

Epsilon Aurigae Campaign

The last EB News reported on the new Epsilon Aurigae Campaign, which included a call for measurements over the autumn and winter, from Dr Bob Stencel of the University of Denver. Figure 1 illustrates my 34 DSLR photometry measurements between September 2014 and February 2015. The magnitude is on the left showing a variation between 2.9 and 3.2 magnitude. The scale on the bottom is Julian Date (245)6900 to 245(7100).

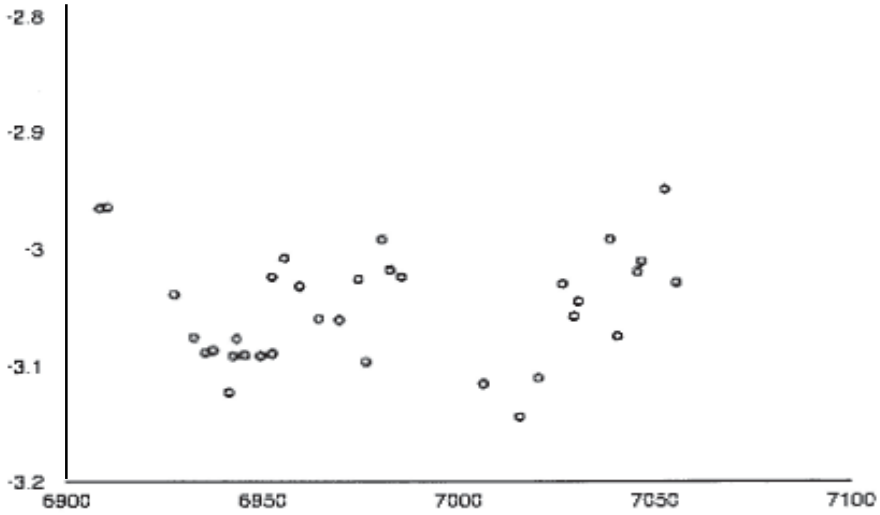
The measurements seem to suggest that there is an irregular pulsation taking place, sometimes with an amplitude of 0.1, and sometimes 0.2 magnitude. We have been informed by Dr Bob that they are awaiting the data from the Spitzer Space Telescope. A report will emerge in due course.

BAV (Bundesdeutsche Arbeitsgemeinschaft fur Veränderliche Sterne)

The BAV is the equivalent of the BAAVSS in Germany. Werner Braune from the BAV has been in contact to draw our attention to their much improved website which has English translations. The website address is:
<*http://www.bav-astro.de*>

The Lichtenknecker database on the website has some very useful up to data on eclipsing binaries. Have a look, for example, at the information on a favourite EB such as RZ Cas. The BAV publish a Circular, covering a year, on the ephermides of selected EBs. This is useful publication because, although the introduction and explanatory is in German it is clear, numerically, the date and time of eclipses of systems such as RZ Cas.

Figure 1 DSLR photometry measurements of Epsilon Aurigae



CW Cephei

In VSSC 160 we listed ten "Low Amplitude" Eclipsing Binaries which are suitable for DSLR photometry. One of these is CW Cephei. It is an EA class of eclipsing binary, a detached main sequence system. It is worth observing because the times of minima show some variation, due to the influence of a faint third companion [1].

Although it is an EA system it exhibits minima of similar depth around 0.4 magnitude. The amplitude of the eclipses is from 7.67 magnitude to 8.04. The minima are sharp meaning that the eclipses are partial with about 30% of each star being obscured. The two main component stars are bright, hot and massive.

This system, with two eclipses and with a short period of 2.729162 days, will give lots of opportunities for study. It will be available for most of the year. Each eclipse lasts for about 13 hours.

The system is easy to find as it is near Rho Cas which is in same field of view when using a 100 mm lens. If you want to have look at this star I can send you a preliminary chart with three suitable comparisons.

Reference

1. M. Wolf et al, "Apsidal motion in eccentric eclipsing binaries: CW Cephei, V478 Cygni, AG Persei, IQ Persei". Astronomy & Astrophysics, Vol **456**, No 3, September IV , 1077 - 1083 (2006).

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UPDATE ON THE CAMPAIGN TO OBSERVE THE DWARF NOVA CSS 121005:212625+201948

JEREMY SHEARS

The observational campaign, announced in VSSC 160[1] and at the York meeting of the VSS in 2014 June[2], has attracted much interest. The aim was to obtain intensive observational coverage of a suspected dwarf nova identified by John Greaves, from his analysis of photometry from the Catalina Sky Survey (CSS). He noted that the star was very frequently in outburst and might possibly be a member of the ER UMa family.

The light curves in Figures 1-3 show its behaviour during 2014. The observers who reported data were :

David Boyd, James Boardman, Juan-Luis Gonzalez Carballo, Ian Miller, Ken Menzies, Roger Pickard, Gary Poyner, Richard Sabo, Pavol Dubovsky, Richard Sargent, Denis Buczynski, Jeremy Shears.

You can see that coverage got better as the campaign took off. The light curve is typical of an SU UMa system with frequent outbursts. There are four superoutbursts visible, plus many normal outbursts. Analysing the superoutburst times gives a fairly consistent ephemeris, with a period of 66.9 days, taking into account the four superoutbursts in 2014, one at the beginning of 2015, and an additional two in 2013; or 69.2 days if I only include the 2014 superoutbursts.

We also observed superhumps during several of the outbursts, definitely identifying this as an SU UMa system. Analysis of the photometry from the 2014 November superoutburst, the most intensively observed, yielded a superhump period of :

$$P_{sh} = 0.08838(18)\ d$$

Thus we have an SU UMa system with a very short supercycle of about 2 months (not an ER UMa as once postulated). Although this campaign is now finished (it was always designed to end in 2015 January, as the star slipped towards the western horizon), some people might like to continue to observe the star. My predictions (always dangerous for dwarf novae, where outbursts are only quasi-periodic!) are that there will be superoutbursts within a few days of 2015 April 5/7, June 14/5, August 22/23 and October 30/November 1.

I am currently preparing a paper on the campaign for submission to the BAA Journal.

Many thanks to everyone who has contributed to the campaign, which has met all its objectives. The feedback I have received is that many people like the idea of a focussed and time-bound campaign such as this was. Look out for more campaigns in the future!

References

1. J. Shears, VSSC **No 160**, 12 (June 2014)

2. *http://www.britastro.org/vss/York_June21_2014.htm*

Light Curves for 121005:212625+201948 during 2014

Figure 1: JD 2456740 - 2456840

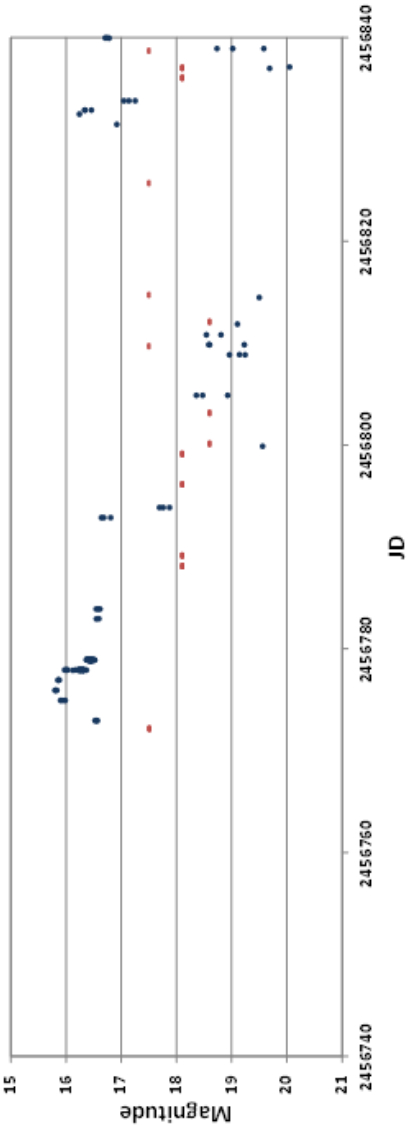
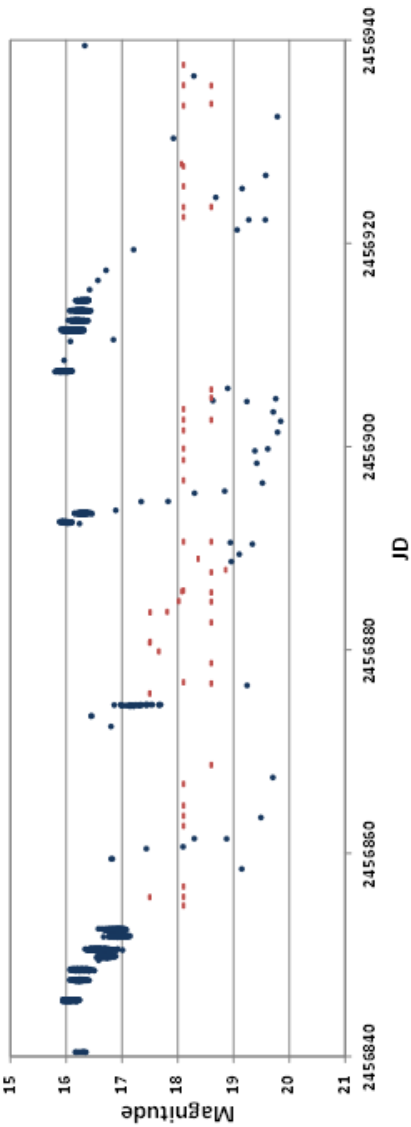


Figure 2: JD 2456840 - 2456940



Light Curve for 121005:212625+201948 during 2014

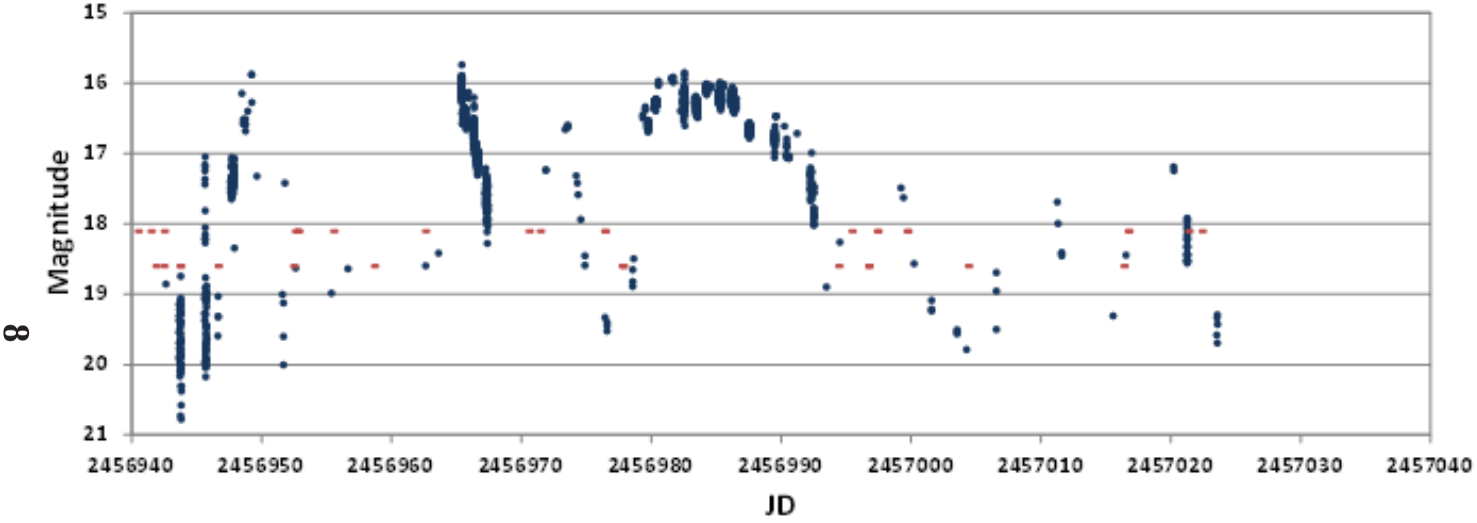


Figure 3: JD 2456940 - 2457040

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HOW VARIABLE STARS GET THEIR NAMES

DAVID GRIFFIN

When I was doing research for my article on AF Cyg [1], I was surprised at how difficult it was to find out when the star had been given its designation. I had assumed that there was a central body which gave the stars official names, but as the IAU was formed first in 1919, then obviously someone else had previously assumed this repsonsibility. To make life easier for anyone else who needs to find the official "christening" of a variable star, I have compiled a list of references to the appropriate publications* (See page 11: 'References to Naming of Variable stars' and '1948-1968 GCVS and supplements')

When English astronomer Edward Pigott compiled his list of known and suspected variables in 1786 [2], not all of them had designations, for example one star was named "Near the Swan's head". Admittedly the RA and declination were given, but this made it rather cumbersome for astronomers to refer to a particular star. Sixty years later, in 1844, when Argelander produced a catalogue of 18 variables in the German yearbook "Schumacher's Jahrbuch" this was still a problem [3]. Obviously Argelander realised this problem, because in May 1855 [4] he proposed the, now well known, standard for Variable Star naming, with the first star to be named being R Virginis. (The article is actually entitled "On the period of R Virginis").

Argelander's proposal caught on quite quickly. Robert Pogson published [5] his catalogue in 1856, and there several "R-designated" stars had already appeared (e.g. R Cancri, R Leonis), though several were still just labelled as "Hind's Crimson" or 43641 Lalande. Ten years later when George W. Chambers published his catalogue of 123 variable stars[6], almost all the stars in the catalogue had an appropriate designation (though star 116 was only designated "Star in Aquarius"). The following year when Schönfeld published his catalogue of 112 stars [7], the picture is the same, with most, but not all, of the variables having designations according to the Argelander scheme. Surprisingly this catalogue does not quite match that of Chambers; for example, the star with (RA 0h 36m 49s, Dec + 6 deg 30.4 min) is just called "Piscium", despite being designated as "U Piscium" by Chambers.

Another 22 years were to pass before anyone else did a proper update to Schönfeld's catalogue. In 1888, American astronomer Seth Chandler produced his catalogue of Variable Stars [8] which became the "official" successor to Schönfeld. Chandler later produced 2 more updates, in 1893 and 1896, before the German Astronomical Society "Astronomische Gesellschaft" took over the baton. Starting in 1904, their Variable Star Commission published yearly updates in their journal "Astronomische Nachrichten", and this was the official naming authority up until the outbreak of the second world war.

Most of the work of the German Variable Star Commission had been done by Richard Prager at the Berlin-Babelsberg observatory. However, Prager was Jewish and when the Nazi party came to power he was dismissed from the observatory in 1936, and imprisoned in Potsdam, which caused IAU vice president Sir Harold Spencer Jones to suggest that the IAU take over the naming of variable stars. Prager's successor at Babelsberg refused to give up the activity, and for a while it looked as though there would be a risk of duplication. Then the war intervened. Prager managed to move to Harvard observatory but died shortly before the end of the war.

At the IAU conference in Copenhagen in March 1946 it was decided that the USSR Academy of Science should take over the work, at Sternberg Astronomical Institute, under the supervision of B.V.Kukarkin and P.P.Parenago, under the auspices of Commission 27: Variable Stars, and so the GCVS was born with the first version appearing in 1948 (Russian) and 1949 (English) [9].

The Catalogue and its supplements now became the official naming authority, but as supplements were published infrequently there was often a long gap between discovery and a variable receiving its name. So from 1968, the IBVS (Information Bulletin on Variable Stars) was used, to regularly produce the Name Lists of Variable Stars [10]. This has continued up until the current day.

References

1. BAA VSS Circular, **No 147**, 20 (March 2011)

2. Philosophical Transactions of the Royal Society of London, **76**, 189 - 219 (1786)

3. "Schumacher's Jahrbuch" , 214 (1844)
   (in the second section, an Freunde der Astronomie)
   https://archive.org/stream/jahrbuchfr07unkngoog#page/n337/mode/1up
   page 338

4. Astronomische Nachrichten, **40**, No. 959 May, 361 (1855)

5. Radcliffe Observations (from 1854), **XV** , 281-282 (1856)

6. Astronomische Nachrichten, **63**, No. 10, 117 (1865)

7. Astronomische Nachrichten, **64**, No. 4, 161 (1866)

8. Astronomical Journal, **VIII** No. 179 - 180, 81-94 (1888)

9. Adriaan Blaauw, History of the IAU, Kluver (1994)

10. IBVS, Jubilee Issue No. 6000 (2011)

'References to Naming of Variable stars' and '1948-1968 GCVS and supplements' are on opposite page.

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REFERENCES TO NAMING OF VARIABLE STARS

Year	Where?	Volume	Number	Pages
1888	AJ	8	179	81-94
1893	AJ	13	300	89-110
1896	AJ	16	379	145-172
1904	AN	166	3984	369-378
1905	AN	170	4061	69-76
1906	AN	172	4127	361-366
1907	AN	176	4212	181-194
1908	AN	179	4278	85-92
1909	AN	182	4364	321-332
1910	AN	186	4457	273-286
1911	AN	190	4540	57-72
1912	AN	191	4579	341-358
1913	AN	195	4669	241-256
1914	AN	199	4758	65-88
1915	AN	202	4831	105-110
1918	AN	208	4973	57-68
1920	AN	212	5083	353-374
1921	AN	215	5143	185-194
1922	AN	217	5202	369-376
1924	AN	223	5331	41-56
1925	AN	224	5360	129-146
1926	AN	228	5468	353-358
1926	AN	227	5435	161-174
1927	AN	231	5630	161-172
1928	AN	234	5612	377-406
1928	AN	232	5565	353-366
1929	AN	237	5674	169-192
1930	AN	240	5751	233-272
1931	AN	244	5838	82-142
1932	AN	247	5911	121-152
1933	AN	251	6017	257-270
1933	AN	249	5967	253-272
1936	AN	260	6238	393-412
1936	AN	258	6178	161-206
1937	AN	263	6303	293-346
1939	AN	268	6419	165-188

1948-1968 GCVS and supplements

1968	IBVS	311	1981	IBVS	1921	1999	IBVS	4659
1970	IBVS	480	1981	IBVS	2042	2000	IBVS	4870
1972	IBVS	717	1985	IBVS	2681	2001	IBVS	5135
1973	IBVS	834	1987	IBVS	3058	2003	IBVS	5422
1975	IBVS	961	1989	IBVS	3323	2006	IBVS	5721
1975	IBVS	1068	1990	IBVS	3530	2008	IBVS	5863
1977	IBVS	1248	1993	IBVS	3840	2011	IBVS	5969
1978	IBVS	1414	1995	IBVS	4140	2011	IBVS	6008
1979	IBVS	1581	1997	IBVS	4471	2013	IBVS	6052

THE DISCOVERY OF THREE NEW VARIABLE STARS USING THE BRADFORD ROBOTIC TELESCOPE AND THE SOFTWARE PACKAGE MUNIWIN.

DAVID CONNER

I have been following a number of eclipsing binaries for some years with the Bradford Robotic Telescope (BRT). This has generated an archive of many images of a number of areas of the sky over time. (Images taken with the BRT are accessible to BRT subscribers via their website, and copyright remains with the BRT.)

Because of the magnitudes of my object stars these images have been taken with BRT's Cluster Camera. This consists of a Nikon 180mm f2.8 lens and a Finger Lakes Instrumentation (FLI) camera producing images approximately 4.3 degrees square. Many of these are unfiltered as my initial interest was determining the periods of the EBs. The images include not just the EB of interest, but many other variable stars as well. It seemed useful to go back through these images to see if there were any other variables that I might usefully follow.

AAVSO finder charts include many catalogued variables, and initially I was going to investigate each of these using AIP4WIN. However, I decided to come at it the other way round, and try to 'discover' these using the free software package Muniwin. I had become aware of this package through private communications with Josef Kalášek, an observer from the Czech Republic who is also using the BRT.

Muniwin can analyse all the star images in a sequence and indicate the range of 'variability' exhibited by each of them. Those which show a large range in brightness are obvious candidates for true variable stars, and Muniwin can plot a light curve for each of these at the click of a mouse. Those showing a smaller range in brightness can also be investigated for true variability, but this requires a certain amount of patience.

While not ideal for detecting EBs (BRT's cadence of one image every week or so means that phase plots also need to be constructed to pursue these), 'long period' variables leap out of the Muniwin graph, especially the brighter ones where their ranges are well above noise levels.

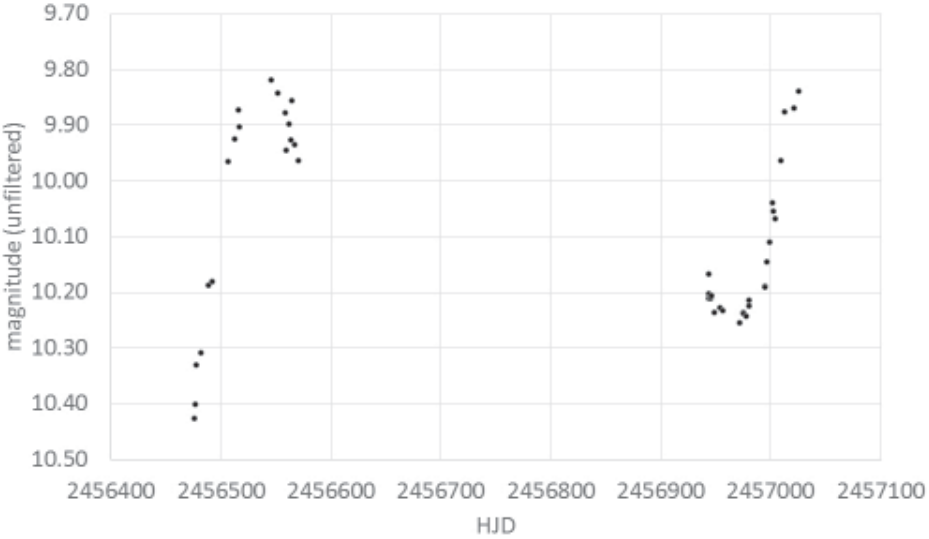
This method picks up many of the variables indicated on the charts, thankfully including my EBs of choice.

However, one of these 'obvious' variables in the field of AB Andromedae was not marked as such on the charts, and the catalogues and literature were investigated with the help of VizieR. With the invaluable help of the moderator at the International Variable Star Index (VSX) it transpired that this was a previously unknown variable star. This star is GSC 02763-02208 in Andromeda, and figure 1 shows the discovery light curve. (This and the other two light curves are based on photometry with AIP4WIN.)

While draughting this article I continued using Muniwin to search the region around BM Cassiopeiae, and discovered another two new variables within two days. Figure 3 is the discovery light curve of GSC 04024-01267.*

* Text continued on page 15

Figure 1: Light curve of GSC 02763-02208



RA 23h 06m 08.57s, Dec +36deg 20m 00.7s. A semi-regular variable of spectral type M4. V magnitude 11.48 at maximum, with an unfiltered range of 0.6 magnitudes.
(Data from VSX. Light curve based on photometry with AIP4WIN)

Figure 2 : Region of AB Andromedae, North down, East to the Right.

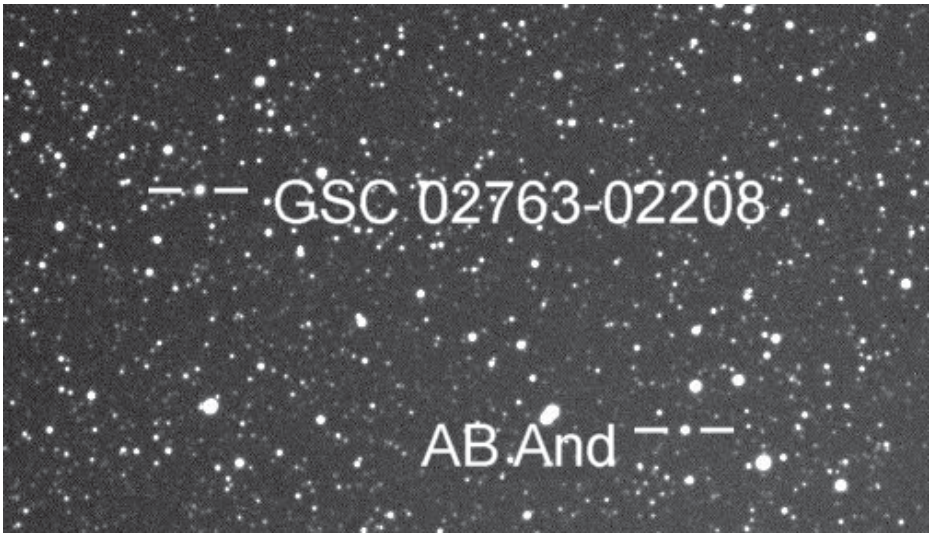
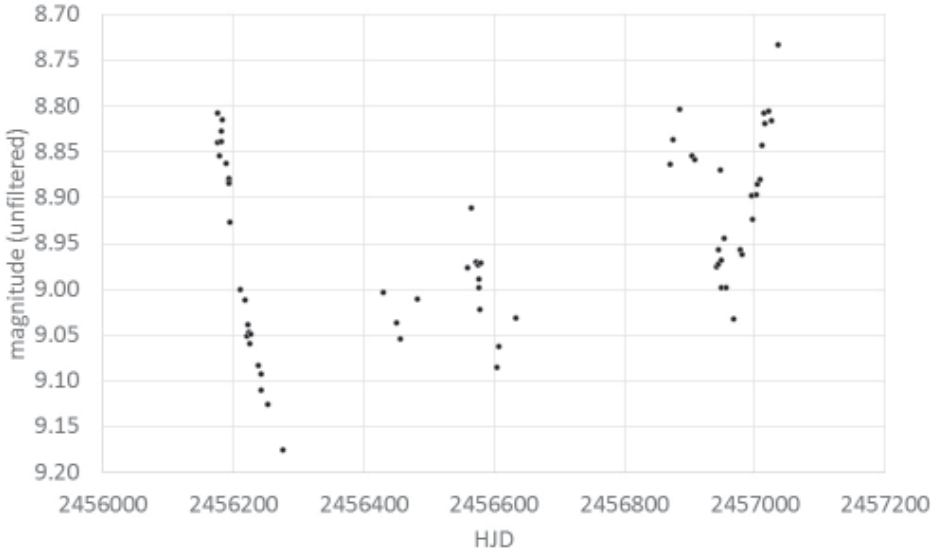
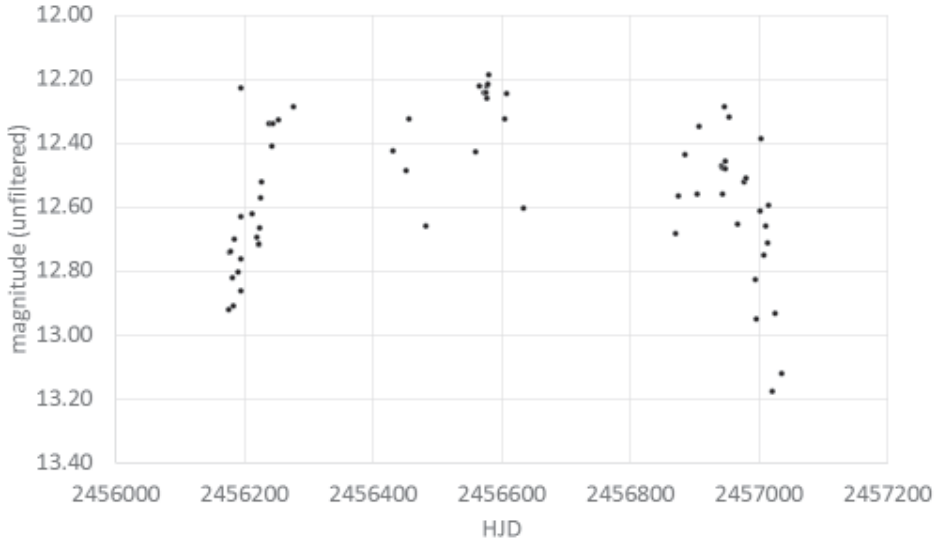


Figure 3, light curve of GSC 04024-01267



RA 00h 49m 10.64s, Dec +64deg 56m 19.0s. A semi-regular variable of spectral type M2-M6. V magnitude 9.97 at maximum, with an unfiltered range of 0.4 magnitudes.
(Data from VSX. Light curve based on photometry with AIP4WIN)

Figure 4, light curve of GSC 04024-00551



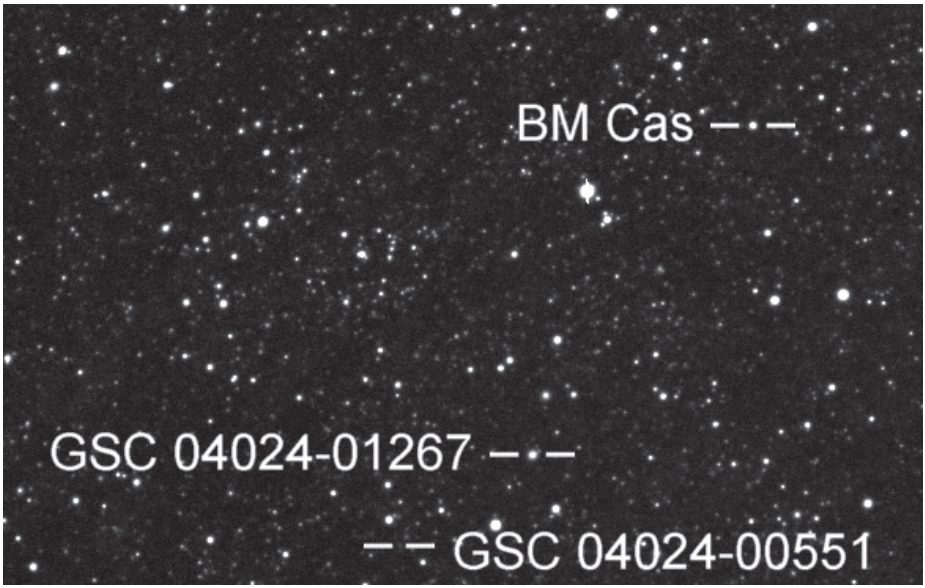
RA 00h 45m 47.42s, Dec +65deg 09m 43.7s. A semi-regular variable of spectral type C. V magnitude 13.5 at maximum, with an unfiltered range of 0.8 magnitudes.
(Data from VSX. Light curve based on photometry with AIP4WIN)

Figure 4 is the discovery light curve of GSC 04024-00551. The data shown in figures 3 and 4 has been obtained from images exposed for the magnitude 9 star BM Cassiopeiae. GSC 04024-00551 (figure 4) is fainter than magnitude 12, and there is consequently a lot of scatter in the data points; error bars have been omitted for clarity.

These new variables have been discovered with what is essentially a two and a half inch refractor. There is still much work to be done including, needless to say, more observations of these three stars.

This research has made use of the VizieR catalogue access tool, CDS, Strasbourg, France. The original description of the VizieR service was published in Astronomy and Astrophysics.

Figure 5: Region of BM Cassiopeiae, North down, East to the right



References

Muniwin: *http://c-munipack.sourceforge.net/*

The International Variable Star Index: *http://www.aavso.org/vsx/index.php*

VizieR: *http://vizier.u-strasbg.fr/viz-bin/VizieR*
Astronomy and Astrophysics, **143**, 23 (2000)

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FY LIBRAE – A FIRST LOOK AT THE BEHAVIOUR DURING 2014

Peter Williams

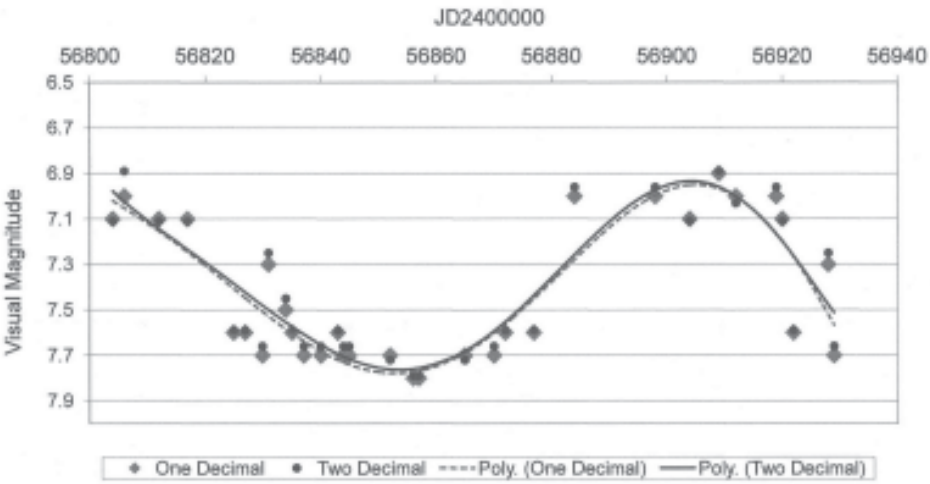
FY Lib is catalogued as a small amplitude semi regular red variable of class SRB, located at RA: 14 57 46.55 Dec: -12 26 15.3 (J2000). Attention was directed to this star by an email issued through the baavss-alert mailing list on 2014 May 26, in which John Toone noted FY Lib at visual magnitude 6.9 and thus considerably brighter than his earlier occasional observations obtained during the previous 15 years. These earlier observations had shown FY Lib typically ranging not much beyond magnitude 7.6 to 7.9.

The results of visual monitoring at Heathcote New South Wales, Australia, through to the end of the 2014 observing season, are presented here.

For FY Lib the GCVS lists a range of magnitude 7.06V to 7.78V, and a questionable period, near to 120 days. Updated information from the Variable Star Index (VSX) held by the AAVSO gives an expanded range of magnitude 6.5V to 7.78V, and a period of 179.7 days with an additional period of 103.5 days.

FY Lib was added to the author's working list of binocular variables following the above notification. It is easily located a little northward from the bright star Alpha Librae, but as it also lies close to the ecliptic, the field is unobservable for several nights each lunation when the moon transits this area of sky. A total of 32 observations were obtained over the 125 days between May 26 and September 28, after which this field was lost in the evening twilight from the author's observing location at Heathcote NSW, on the southern outskirts of Sydney, Australia.

Figure 1: FY Librae 2014 WPX Visual Data



These observations are presented in the light curve shown as Figure 1. Here, each individual observation is shown twice, with diamonds representing the traditional visual estimate to 0.1 magnitude, and circles representing the estimate to two decimals based on unit steps of 10 between the comparison stars of Tycho-V magnitudes to two decimals.

The estimating to two decimals was trialled here as an extension to a program on southern Cepheids, as currently being trialled through Variable Stars South, of the Royal Astronomical Society of New Zealand (RASNZ).

A 6th order polynomial curve has been added to each of the two observation Series and from this it can be seen there is only marginal difference between the two magnitude sets.

Based on a visual inspection of the light curve it is apparent that just over one pulsation cycle near 100 days has been recorded. This is close to the 103 day period given in the VSX and, taking an arbitrary epoch based on the observed maximum of JD 2456905, each set of magnitudes is shown in the phase plot presented as Figure 2.

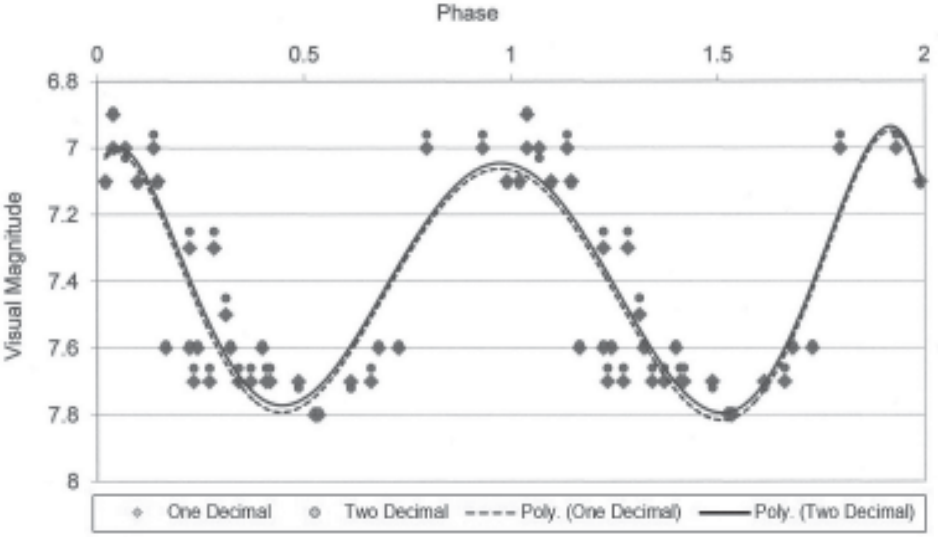


Figure 2: FY Librae Phase Plot P = 103 Days

Given the short time span covered and limited number of observations available, the phase plot produces a surprisingly good fit, which in turn suggests FY Lib is currently pulsating with a 103 day cycle. It is, however, not uncommon for semi regular red variables to switch between pulsation periods and not too much should be read into this.

The limited observations presented here do suggest that FY Lib may be an interesting star for regular long term study and perhaps catch the star as it changes periods. The small amplitude of its variations do, however, make it a challenging target for the visual observer who should exercise care when determining its brightness.

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FY LIBRAE GOES ACTIVE AND REAFFIRMS THE HOWARTH AND BAILEY FORMULA

JOHN TOONE

In early 1999 I prepared a set of charts of southern binocular variables intended for use during a trip into the Australian Outback. One of the last charts I prepared on the 6th March 1999 (I departed for Australia two days later) was for FY Librae, which had been recorded to vary 0.5 magnitude by the Hipparcos mission in 1989-1992. The sequence was drawn from the recently released Tycho catalogue and the comparison stars selected were:

Ident	Star	Tycho V mag	B-V mag
A	SAO158935	6.60	+0.01
B	SAO158835	7.13	+0.47
C	SAO158959	7.28	+0.40
D	SAO158927	7.80	+0.07
E	SAO158875	8.04	+0.55
F	SAO159007	8.40	+0.27

The colour (B-V index) range of the comparison stars was not much more than 0.5 magnitude, so I had confidence that the Tycho V magnitudes would actually look right when undertaking visual photometry. FY Lib is a red star with a B-V of +1.41 according to Tycho, so this meant I was comparing a red star with a non-red sequence. The result would be a small offset between the visual observations and the V scale (which would not usually be the case when the colour of the comparison stars matches that of the variable) but I felt this was unimportant considering that the primary objective was to detect and record genuine variation within the variable star.

The trip to Australia was successful [1,2] , and I made my first observation of FY Lib on the 23rd March 1999 at magnitude 7.7.

FY Lib at declination -12 degrees is actually visible from the UK during the months of December to June, so I continued to observe it on an occasional basis to see what type of variation it exhibited. Variation was certainly detected, but it did not amount to much and most visual estimates ranged between 7.6 and 7.9. The extreme range recorded was between magnitude 7.4 (29th April 2001) and magnitude 8.2 (2nd May 2008). Then to my surprise on 24th May 2014 I recorded an estimate of magnitude 6.9, and decided to put out the following BAA VSS Alert message:

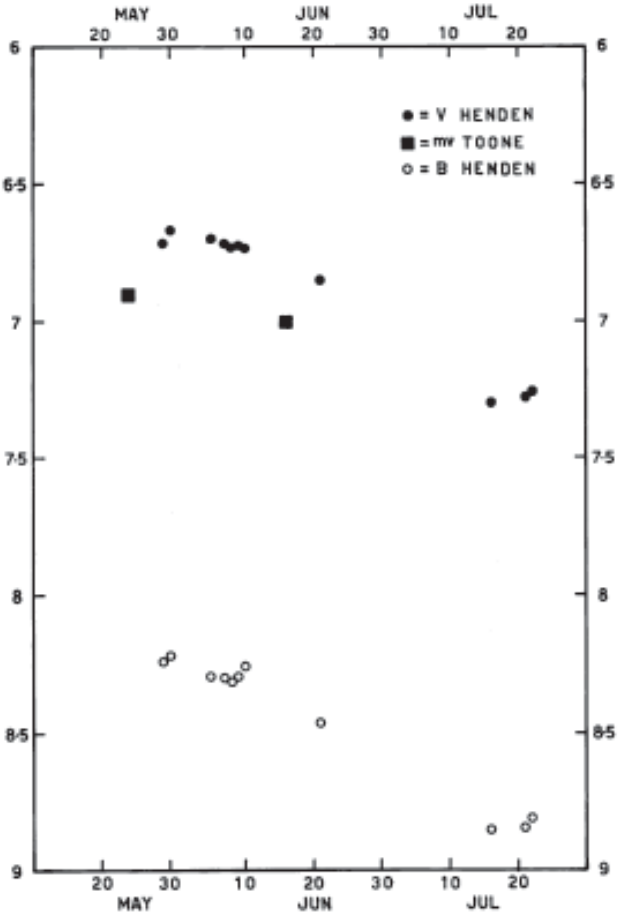
"I would be grateful if someone could make an electronic measurement of FY Lib. I have been monitoring this star occasionally for the past 15 years and it has not done much beyond 7.6–7.9. However, last night I recorded 6.9".

I had positive responses from Graham Darlington, Arne Henden, Colin Henshaw and Peter Williams, and the latter three were all in more favourable positions than myself to monitor FY Lib, which was approaching the end of the apparition from the UK. Both Graham Darlington and Colin Henshaw reported V measurements of 6.5 on the 26th May thus confirming the bright nature of the object. Peter Williams' account of his intensive visual work on FY Lib in 2014 is described elsewhere in this Circular so the remaining part

of this article focusses on Arne Henden's photometry and how it stacked up against my visual estimates.

Arne Henden used the Bright Star Monitor (BSM) South (located in Australia) to record B and V measures of FY Lib on 11 nights from 29th May to 22nd July 2014. There was a clear fading trend from the end of May to mid-July which is illustrated in the light curve shown below, and also inside the front cover of this Issue.
The brightest measurement was magnitudes 6.66V and 8.23B on 30th May and the faintest

Light curve of FY Librae



measurement was magnitudes 7.30V and 8.85B on 16th July (greater than the range recorded during the three year Hipparcos mission). If these measurements represented a maximum and minimum then the approximate period would be in the order of twice the time interval between themwhich was 48 days. The B and V measurements also confirmed the red nature of the star with an average B-V value of +1.55. Also plotted on the light

curve (see inside front cover) are the final two visual estimates that I made before the star was lost in the solar glare:

24th May: A(1)V(1)B = 6.9
16th June: A(1)V(2)D = 7.0

As expected there is an offset between the visual estimates and the V measurements, and I felt that with good B and V photometry and a limited colour range sequence, this was a good opportunity to check the reliability of the Howarth and Bailey formula [3]:

$$m_v = V + 0.159\,(B\text{-}V)$$

Where m_v is the visual magnitude.
The mean B-V value of the comparison stars used was +0.18 and the variable had a B-V of +1.55, therefore the difference in the colour of the stars I was estimating was equivalent to a B-V of +1.37. If this value is inserted into the formula you get:

$$m_v = V + 0.218$$

Therefore you would expect the visual magnitude to be in the order of 0.22 mag fainter than the V measurements. To test this I compared the two visual estimates with the V measurements made on the nearest dates:

6.9mv (24th May) and 6.72V (29th May), difference = 0.18
7.0mv (16th June) and 6.73V (10th June) = 0.27 & 6.85V (21st June) = 0.15; mean difference = 0.21

The mean of 0.18 and 0.21 is 0.20 and I consider it to be quite remarkable to get to within 0.02 of the calculated result on such a small sample especially when the visual estimates were rounded to 0.1 mag.

In conclusion the Howarth & Bailey formula can still be regarded as a reliable guide for comparing visual and V photometry of red stars when the colour of the variable is known and there is not a large colour spread amongst the comparison stars used. This can be considered a key factor when converting legacy visual data of red stars to the Johnson V scale in the future. More immediately important though, it seems that FY Lib entered a more active phase in terms of variability in 2014, and I shall be monitoring this star more often in the future.

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1. John Toone, "Variable Stars Down Under - Part 1", VSSC **No 101**, 9 - 14 (Sept 1999)

2. John Toone, "Variable Stars Down Under - continued", VSSC **No 102**, 15 - 19 (Dec 1999)

3. Ian D. Howarth and Jeremy Bailey, "Photoelectric and Visual Comparison Star Sequences-II", J. Brit. Astron. Assoc., **90**, 265 (1980)

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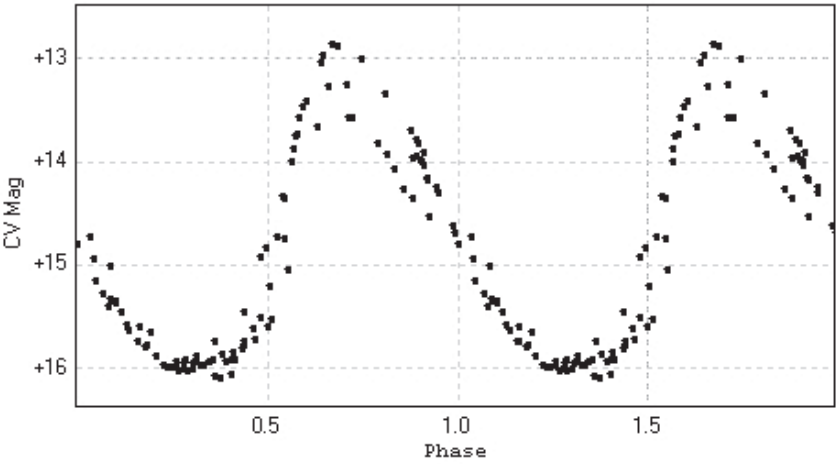
REFINING THE PERIOD OF V505 SCUTI

IAN MILLER

Further observations, carried out at Furzehill Observatory between November 27th 2006 and September 2nd 2012, have shown that V505 Scuti, a new Mira-type star first reported in an earler edition of this Circular[1], has a period near 325 days (figure 1). The diagram was produced by the ANOVA method in the Peranso[2] light curve and period analysis software.

Figure 1: Clear filtered (CV) observations of V505 Sct folded on 324.7 days



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1. Ian Miller, "A New Infrared Variable in Scutum", VSSC **No 134**, 22 (December 2007)

2. *http://www.peranso.com/*

furzehillobservatory@hotmail.com

BINOCULAR PROGRAMME

MELVYN TAYLOR

The various Priority levels of the Binocular Programme can now be found on the VSS web site at:

http://www.britastro.org/vss/bin_prog_priority_191013.htm

or for a full listing in constellation order at:

http://www.britastro.org/vss/chartcat_binoc.htm

In addition, these listings can be obtained in paper format from both Melvyn Taylor and Roger Pickard, and of course they can be viewed in Circulars 157 - 160.

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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.

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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/circs.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 164) will be 7th May 2015. All articles should be sent to the editor (details are given on the back of this issue).

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