British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

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Contents

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IMAGE OF RECENT OUTBURST OBJECT ASAS - SN - 14JV

Message from **Denis Buczynski**

Sent: Sunday, November 9, 2014 6:26 PM
Subject: image of ASAS - SN - 14jv

“I imaged this Very Bright Optical Transient in the last few minutes in hazy skies and I attach the image.”

Editor’s Note: Denis’s Image was obtained within hours of the discovery.

For further details, see article “Images of two new Variables” in this Issue

FROM THE DIRECTOR

Roger Pickard

Missing Data

Not unexpectedly, we have not had a huge response to the request in the last Circular for any reports of missing data. Surely there must be more than the very few people we have received comments from so far? Please do give this request your consideration.

To help you I set out below the easy steps required to access your data on the web site.

Got to: *http://britastro.org/vssdb/*

Under "Review Data", click 'Standing Data and Summaries' (Stars / Observers / Sequences). Then under "Standing Data" click 'Observers' (inc. summary)

Under "List of Observers", find your name and click on the "Observer id" to the left of it. You should then be presented with a summary of your observations, and you can click on "Summary by Year and Month" or "Summary by Stars" for further study.

AAVSO New Director

The AAVSO Council have appointed Dr. Styliani (Stella) Kafka to be the Association's next Director. She takes over from Arne Henden on February 1st 2015. More can be read about her on the AAVSO website at:
http://www.aavso.org/aavso-director-search-results-are
(Yes, that address is correct, I have not missed anything!).

We congratulate Stella on her appointment and look forward to furthering ties between our two groups. We also wish Dr Arne Henden a long a happy retirement. Apparently, he is hoping to do a little visual observing!

roger.pickard@sky.com

* * *

IMAGES OF TWO NEW VARIABLES

Denis Buczynski

Denis reports that he has imaged two possible new variables very soon after their discoveries. His image of ASAS - SN - 14jv was obtained only hours after its discovery (see image inside front cover). Details of this object can be found at:

www.astronomerstelegram.org/?read=6676

The announcement from the above website is reproduced overleaf:

ASAS-SN Discovery of a Very Bright Optical Transient

ATel #6676; B. J. Shappee (Hubble Fellow, Carnegie Observatories), K. Z. Stanek, A. B. Davis, G. Simonian, T. W.-S. Holoien, C. S. Kochanek, U. Basu, J. F. Beacom (Ohio State), J. L. Prieto (Diego Portales; MAS), D. Bersier (LJMU), J. Brimacombe (Coral Towers Observatory), D. Szczygiel, G. Pojmanski (Warsaw University Observatory)

on 9 Nov 2014; 07:15 UT
Distributed as an Instant Email Notice Transients
Credential Certification: Benjamin Shappee < *shappee@astronomy.ohio-state.edu* >

Subjects: Optical, Cataclysmic Variable, Transient

During the ongoing All Sky Automated Survey for SuperNovae (ASAS-SN or "Assassin"), using data from the quadruple 14-cm "Brutus" telescope in Haleakala, Hawaii, we discovered a new transient source:

Object	RA (J2000)	DEC (J2000)	Disc. UT Date	Disc.	V mag
ASASSN-14jv	18:53:28.87	+42:03:43.59	2014 Nov 9.19	11.3	

ASASSN-14jv was present in two images obtained on 2014 Nov 9 but undetected (V>15.7) on 2014-11-07.2 and earlier. There is a nearby blue source in the Kepler Input Catalog (18:53:28.814, +42:03:43.57), with g=19.1, r=19.4, and i=19.6, 0.6" away from our nominal position in the discovery image (ASAS-SN image scale is 7.5"/pixel). Additionally, there is also a GALEX source 0.021' away from our nominal position. ASASSN-14jv is most likely a large-amplitude CV outburst, caught very early.

Follow-up observations are encouraged.

We thank LCOGT and its staff for their continued support of ASAS-SN. For more information about the ASAS-SN project, see the ASAS-SN Homepage < *http://www.astronomy.ohio-state.edu/~assassin/index.shtml* >, and the list of all ASAS-SN transients: < *http://www.astronomy.ohio-state.edu/~assassin/transients.html* >

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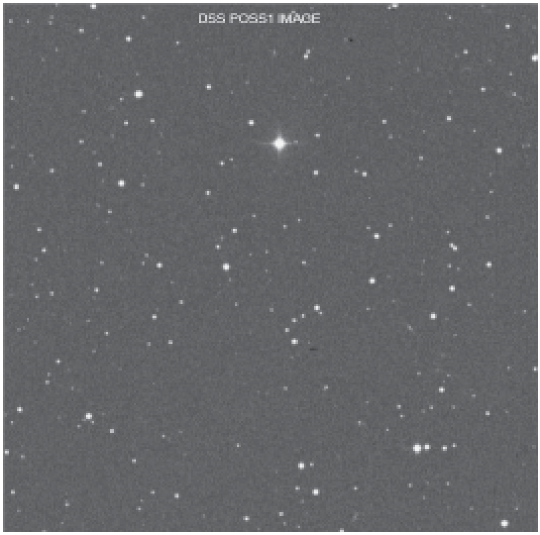
PNV J03093063+2638031

The other image obtained, on November 03, was of PNV J03093063+2638031, discovered on October 29. (see facing page).

Details of the discovery and subsequent confirmation can be found at:
http://cbat.eps.harvard.edu/unconf/followups/J03093063+2638031
Details from the website are given on page 6.

Figure 1.
Pre-discovery
Image.



Images of PNV
J03093063+2638031

Figure 2.
Post-discovery Image,
by Denis Buczynski.

CBAT "Transient Object Followup Reports"

PNV J03093063+2638031

PNV J03093063+2638031 2014 10 29.630 * 03 09 30.63 +26 38 03.1 11.2 U Ari 0 0

2014 10 29.630
Discovered by S. Ueda, Hokkaido, Japan, on three 30-s frames (limiting magnitude = 12.9) using 0.25-m f/3.4 reflector + Nikon digital camera, who confirmed the star has no motion on three frames taken on 2014 Oct. 29.815 and then star was mag.= 11.0. Nothing is visible at this location on his recent frames (limiting mag.= 13) taken on 2014 Oct. 22 and 27 UT using same telescope.

2014 10 30.2816
I took confirmation image of this PNV with 0.25m (f/3.4) Reflector + SBIG ST-10XME CCD at Mayhill, NM, USA of iTelescope.NET, remotely. Photometric results were B=10.83, V=11.02 and Ic=10.92. Position end figures were 29.86 and 04.49 in R.A. and Dec. My image is available at *http://meineko.sakura.ne.jp/ccd/PNV_J03093063+2638031.jpg*
Seiichiro Kiyota (Kamagaya, Japan)

2014 10 30.471
Mag.= 11.2, position end figures 29s.77, 04".3 observed by T. Noguchi, Chiba-ken, Japan, using 0.23-m f/6.3 Schmidt Cassegrain + unfiltered CCD, who found a star (mag.= 16.7) located on almost same position on DSS (POSS2/UKSTU Red; 1989 Dec. 23). See an image at *http://park8.wakwak.com/~ngc/images/PNVinAri.jpg*.

2014 10 30.81
G. Masi and P. Catalano performed low-res spectroscopy of this transient, remotely using the 14" robotic unit part of the Virtual Telescope in Italy. 300-seconds exposures were taken on 30.8125 Oct. UT, using a 100 lines/mm grating, with a dispersion of 34.5 angstroms/pixel: we do NOT see evidence of strong H-alpha emission. With the same telescope, we also performed time-resolved photometry of the source, found at mag 11.1 (R, unfiltered), seeing a 0.05 large modulation (early superhumps?).

2014 10 30.9157
This transient was observed on 2014 10 30.91575 by M.Caimmi - C92 Valdicerro Observatory - Loreto (AN) Italy using 0.24-m f/6.5 SCT - CCD Atik 314L. Stack of 15 unfiltered frames of 15 sec exposure, show the source at 11.0 mag. End figures for astrometry were AR. 29.77s DEC. 04.6" position was measured from reference stars USNO-B1.0 catalogue. Image of this observation is available *http://www.oav.name/public/PNV_J03093063+2638031_20141030.jpg*

2014 10 30.808
P. Berardi (ARAS Spectroscopy Group) obtained a low-resolution optical spectrum of this transient using a 0.23-m Schmidt-Cassegrain telescope, Lhires III spectrograph configured for low-resolution (400-720 nm, res. 1 nm). Blue continuum, narrow H-alpha line profile and broad absorptions for the other members of Balmer lines suggest that the object is a dwarf nova in outburst. Spectrum of Oct, 30.808: *http://quasar.teoth.it/html/spectra/PNVJ03093063+2638031.png*

buczynski8166@btinternet.com

ECLIPSING BINARY NEWS*

DES LOUGHNEY

** Editor's Note: my sincere apologies to Des Loughney, somehow the Eclipsing Binary News for September's Issue, though sent before the deadline, still escaped making it into the Circular. The article that follows covers the period from August to November. The original News for the September Issue ended with CC Cassiopeiae.*

Low Amplitude Eclipsing Binaries and DSLR Photometry

In VSSC 160 a list of ten systems was published. One of the systems has been discovered to be inappropriate. The system that has to be dropped is BW Dra. When the system was studied in the summer the magnitudes measured were higher than predicted. A study of the literature showed that what was being observed was the combined light of two systems that are very close together as seen from Earth. The light from BV Dra is combined with the light from BW Dra.

The separation of the two systems is 16 seconds of arc and it is thought that the two eclipsing binaries form a binary system with a period of around ten thousand years.

AH Cephei

A promising candidate to replace BW Dra is AH Cep. This is a system which is very near the bright star Iota Cephei (magnitude 3.5) and relatively near Rho Cas. The maximum magnitude is around 6.88V, the depth of the primary eclipse and the secondary eclipse is 0.2. The system is an EB class with a period of 1.7747474 days. Measurements can be made on any night. Two useful measurements can be made on a night if they are separated by about 4 hours.

UX Monocerotis

My attention has been drawn to a peculiar eclipsing binary system which has the classification of EA / DSCT. An explanation of the DSCT sub-classification is as follows:

'Variables of the Delta Scuti type. These are pulsating variables of spectral types A0-F5 III-V displaying light amplitudes from 0.003 to 0.9 mag in V (usually several hundredths of a magnitude) and periods from 0.01 to 0.2 days. The shapes of the light curves, periods, and amplitudes usually vary greatly. Radial as well as nonradial pulsations are observed. The variability of some members of this type appears sporadically and sometimes completely ceases, this being a consequence of strong amplitude modulation with the lower value of the amplitude not exceeding 0.001 mag in some cases.'

The system exhibits two types of variability:
UX Mon has a marked primary eclipse of depth 0.9 magnitude but a not-so-marked secondary eclipse. The secondary eclipse has a nominal depth of 0.2 magnitude but this can apparently be completely masked by the Delta Scuti variations. The period of UX Mon is 5.904483 days. Its classified out of eclipse magnitude is 8.22V. A recent draft paper (2013) on this system entitled "UX Mon as a W Ser Binary" can be downloaded from:

http://arxiv.org/abs/1103.1766

CC Cassiopeiae

Some preliminary work has been done on one of the new systems listed in VSSC 160. This is CC Cas which has a maximum of 7.15V, eclipses of depth 0.2, class EB and period of 3.366308 days.

The system is easy to find being very near bright stars in Perseus. Using a 100mm lens it is straightforward to centre the system in the field of view using the bright star Eta Persei which has a magnitude of 3.75.

A draft chart has been prepared using the suitable comparisons HIP16057 (7.56V), HIP15180 (7.59V) and HIP14738 (7.94V). The instrumental data has to be transformed into Johnson V measurements using the transformation coefficient for a Canon 550D DSLR. To get a good measurement 30 images have to be analysed. Several useful measurements per night are possible if they are separated by over two hours.

To get a reasonable amount of photons, experiments have been done with the settings of the camera bearing in mind the current altitude of the system just before midnight. As the system gets higher it may be possible to reduce the exposure to 5 seconds per image. At the moment the best settings seem to be (with a 100mm lens) exposure 6 seconds, ISO800, f3.2. Normally it might be considered that an exposure of 6 seconds would produce unacceptable trailing but this is not such a problem when you get relatively near the celestial north pole.

I am happy to forward on request an electronic copy of the draft chart.

Epsilon Aurigae

We have had a call for measurements of Epsilon Aur from Dr Bob Stencel who writes:

“I have asked the AAVSO to alert observers to a predicted ‘pulsational phase’ in eps Aur this autumn, per the following:

Studies of the long term out-of-eclipse photometry of the enigmatic binary, epsilon Aurigae, suggest that intervals of coherent pulsation occur at roughly 1/3 of the 27.1 year orbital period.
Based on this, Kloppenborg, et al. (reference):
(2012 JAAVSO 40, 647 = http://adsabs.harvard.edu/abs/2012JAVSO..40..647K)
who noted that “ stable variation patterns develop at 3,200-day intervals” imply that “the next dates when such events might happen are surrounding JD ~2457000 (2014 December).”

These out-of-eclipse variations have amplitudes of ~0.1 magnitude in U and ~0.05 in V with characteristic timescales of 60 - 100 days. The AAVSO light curve data up to the present may indicate this coherent phenomenon has begun, but we encourage renewed efforts by observers during this coming autumn and winter timeframe.”

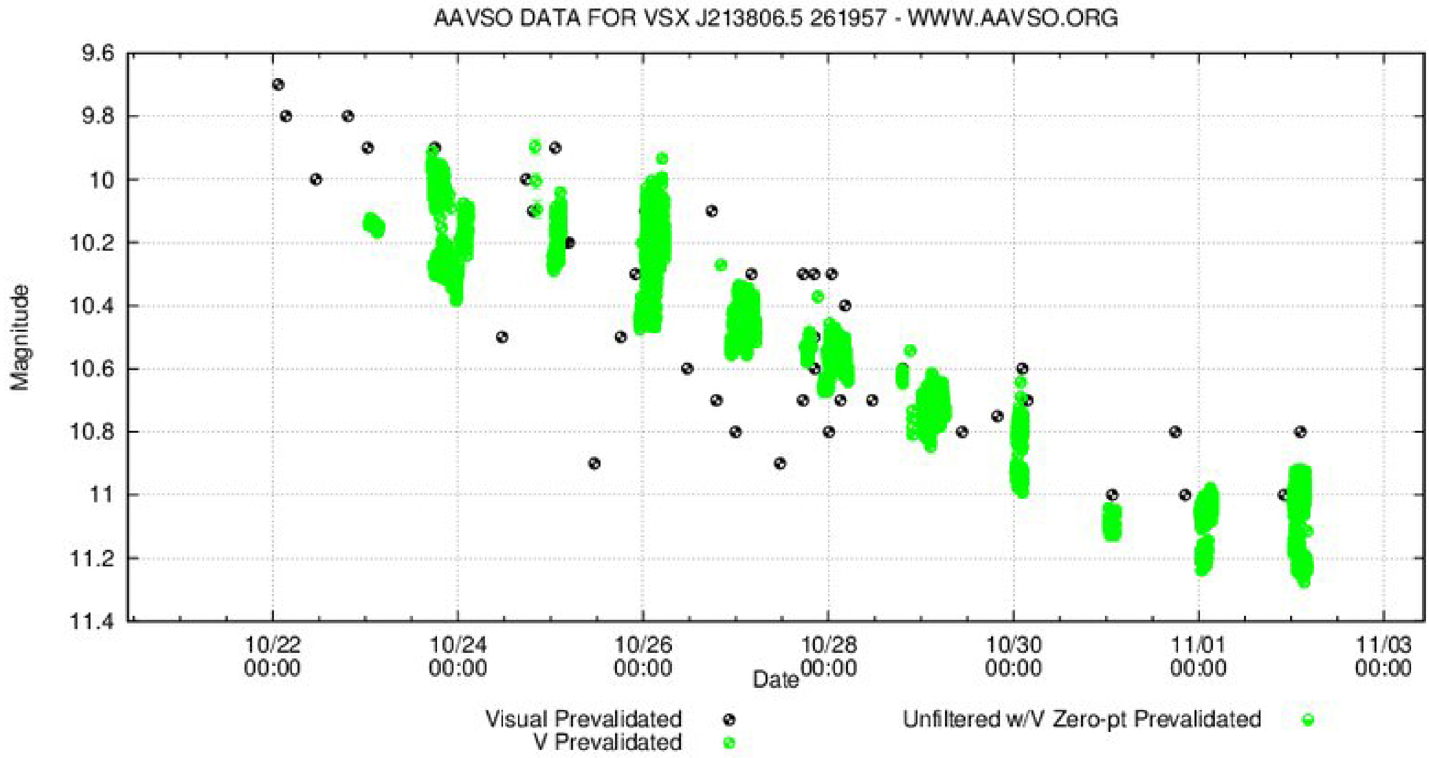
Dr.Bob Stencel, University of Denver Astronomy Program

desloughney@blueyonder.co.uk

RECURRENT OBJECTS NEWS

Gary Poyner

Text on page 10.



An *unexpected* outburst of the UGWZ star 1RXSJ213807.1+261958 was detected by AAVSO observer Carey Chiselbrook on October 22.059 at visual magnitude 9.7 (AAVSO SN #388). The previous outburst occurred in May 2010. The outburst is unusual in so much as a 4.5 year recurrence time is very short for UGWZ stars. The 2010 outburst was also notable in that there was a complete absence in any post outburst brightenings, or echo outbursts, often seen in stars of this short orbital extreme class of CV. This was duly noted in VSSC 147, March 2011 when the object was announced as being added to the Recurrent Objects Programme.

Observations reported to date (Nov 3) show developing superhumps clearly seen on the AAVSO light curve [1], and a general fade from peak brightness to magnitude 11.0 in 12 days. Further details will be announced in the March 2015 Issue of theVSSC.

Reference

1. *www.aavso.org/lcg*

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* * *

RZ VULPECULAE

GARY POYNER

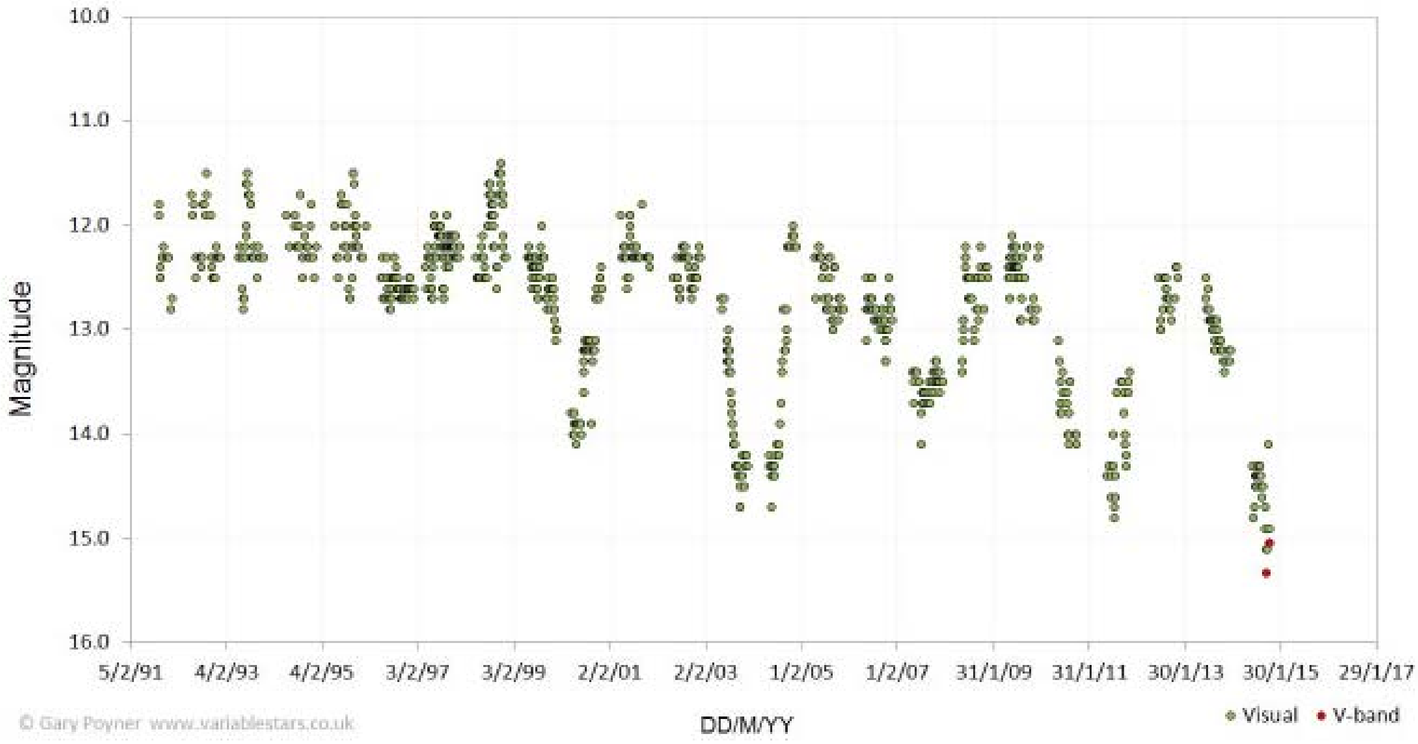
RZ Vul was first noted in Astronomische Nachrichten 4079 (1906), in a short paper entitled “Veränderliche Stern in der Umgebung von gamma Sagittae” (Variable Star in the environment of gamma Sagittae) by M.Von and G.Wolf. The object then appears to have been largely ignored for many years, as the GCVS describes a reference to a study of the star 75 years later in 1981 (a Tartu publication to which I do not have access). The GCVS gives an amplitude of 12.5 - 16.0p (taken from the Tartu publication), and also notes that it is an IRAS source 19450+1921.

RZ Vul is an interesting, and at times challenging to observe, RVB type star. RVB stars are pulsating, highly evolved, giant stars which differ from the RVA subclass (R Sct for example) by the presence of a supercycle. During the supercycle, which can be several years in length, the mean brightness can fall by over one magnitude. RV Tauri stars have a pulsation period of months, while the RVB subgroup reveals supercycles in years, superimposed over the ordinary period. The light curves reveal themselves to be highly complex and at times difficult to interpret. RV stars also have a special place on the HR diagram as possible transition stars from the Asymptotic Giant Branch.

I began observing RZ Vul in 1991 (Figure 1), and for the next eight years the variations appeared to be what one might expect from a star of this nature, varying between magnitude 11.0 and 13.0. Then in December 1999, RZ Vul underwent a deep minimum to magnitude 14.1. This was the start of a series of fading events which were completely unexpected. An examination of the long term AAVSO light curve (which goes back to the

Text continues page 18.

Figure 1. Visual and V-band light curve of RZ Vul 1992-2014 from observations by Gary Poyner



mid-1960 s) shows that this type of behaviour had not been seen before in this star.

Taking the mean magnitude of RZ Vul as 12.5, this first fade of 1999 took about one year to complete its decline and recovery, showing a symmetrical profile in the light curve. In June 2003 a similar fading took place, this time to a level of 14.7 and a decline time of 6 months. On this occasion RZ Vul recovered by 0.5 magnitudes one month later when the star became difficult to observe in the late winter sky. Observations in the early spring of 2004 revealed RZ Vul to be still at 14.2 before fading once again to 14.7 six weeks later. The recovery began almost immediately, taking 6 months to get back to its mean brightness. Two years later in November of 2006 a very different fade occurred, taking a much longer; 8 months to a minimum of 14.0, and 9 months recovery. A further fade, which occurred in September 2009 was slower to decline (23 months) and fainter at minimum light (14.8). The recovery, in contrast, took just half the time (11.5 months) to return to its mean brightness.

The fades described above were now almost expected by the small number of observers following RZ Vul around the world, and in 2013 the star did not disappoint by once again fading. On this occasion the fade reached yet another historical low state of 15.3 V in October 2014, giving this decline a length of 15 months. In October 2014 there also occurred a rise to magnitude 14.1 in just 10 days, before a fade back to 14.9 seven days later. As I write these words (Nov 7, 2014), RZ Vul remains around magnitude 15.0V.

The telescopic field of RZ Vul is a challenging one visually, due to the presence of a 15.3 magnitude field star just 20 arc seconds SW of the variable. Consequently, when RZ Vul is at magnitude 15.3 or fainter, identification is tricky in all but the clearest of conditions. To be sure that the observations at this low level were accurate, I obtained several V-band images of the field using the Bradford Robotic Telescope (BRT) during 2014. Roger Pickard has also reported V-band data at this current minimum which agrees well with both my own visual observations and V-band observations from BRT. The B-V index of RZ Vul is +1.4, so unfiltered CCD images will give brighter values than V-band measures.

The BAAVSS database shows that seven observers contributed to the complete light curve dating back to 1991. Of these observers, three (John Day, Graham Salmon and Eddy Muyllaert) are historical data and are all pre- year 2000, with just myself, Tim Withers, V Hull and Roger Pickard continuing monitoring this fascinating star during these intriguing fading episodes.

If you fancy adding RZ Vul to your observing programme, the AAVSO do have a chart and sequence available to download using their Variable Star Plotter:

www.aavso.org/vsp

garypoyner@blueyonder.co.uk

* * *

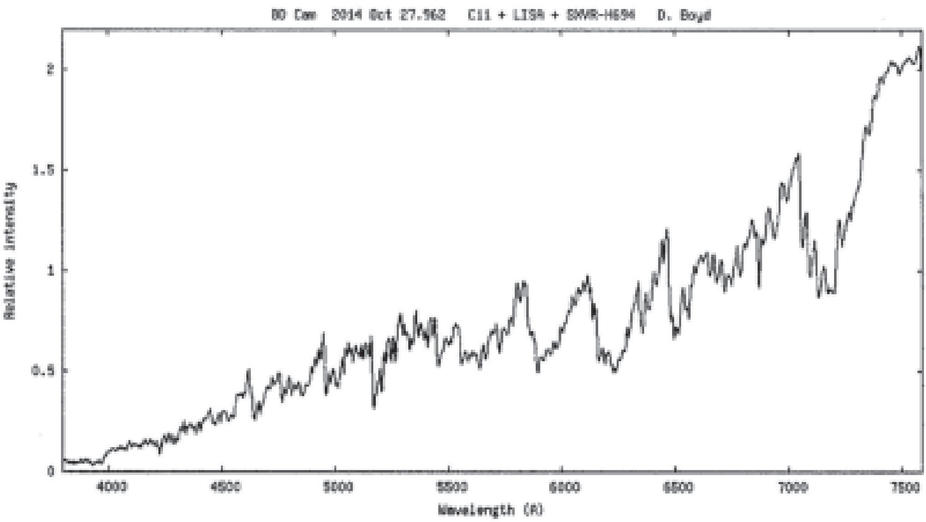
SPECTRA OF SYMBIOTIC STARS

David Boyd

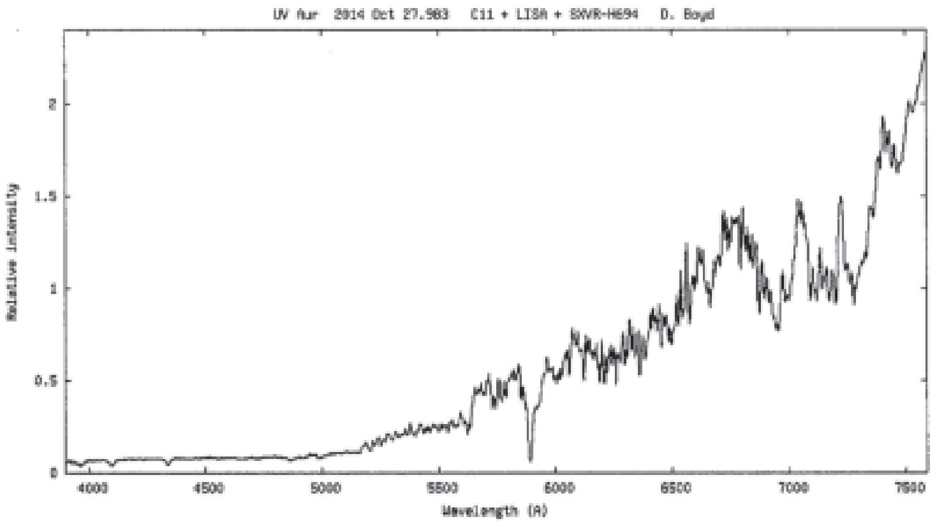
Here are spectra of five symbiotic stars taken during the past 3 months. Symbiotic stars are binary systems usually consisting of a cool red giant star, which may pulsate, and a white dwarf with an accretion disc. As a class they are referred to as Z And stars although in practice this is a very diverse group with a wide range of spectral types. The red giant may emit a wind, and the accretion process may cause flickering, so these stars often have complex light curves and spectra which vary in time. Some spectra have strong hydrogen emission lines from the white dwarf accretion process.
The V magnitudes and spectral types are listed in Simbad:
<http://simbad.u-strasbg.fr/simbad/>
and the data for the five stars in question are shown below:

Star	V magnitude	Spectral type
BD Cam	5.1	S3.5 / 2 B
UV Aur	10.4	C8,1Je + B9V
V627 Cas	10.6	M2eII-III C
EG And	7.2	M2III:e C
AX Per	9.4	M3IIIep + A0 C

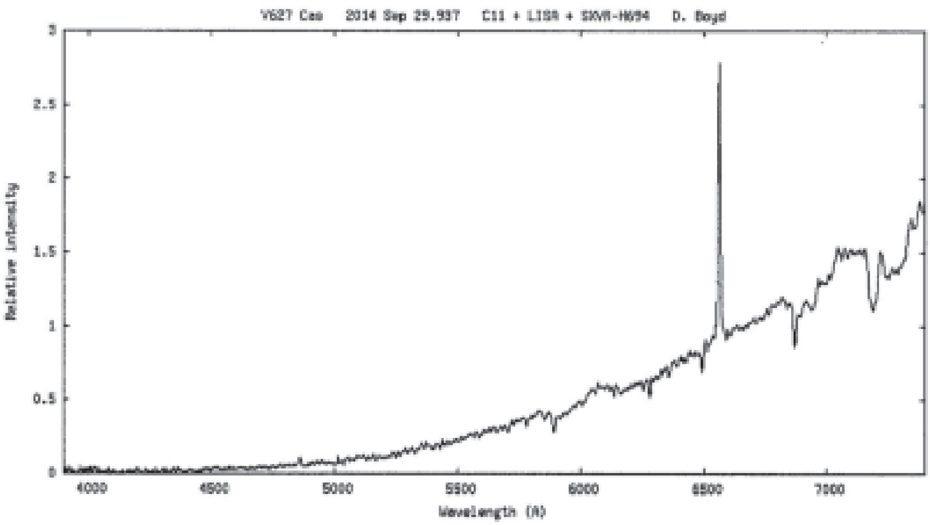
Spectrum of BD Cam 2014 Oct 27.962 D. Boyd



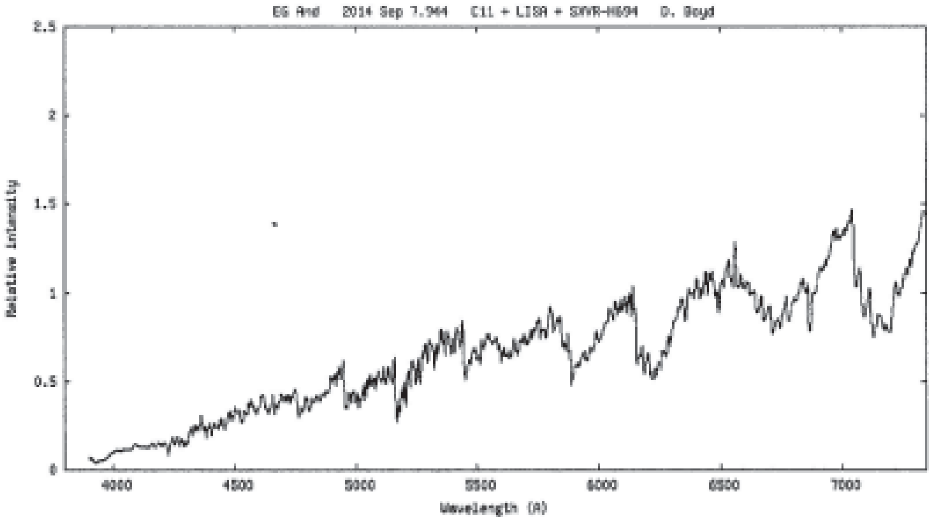
Spectrum of UV Aur 2014 Oct 27.983 D. Boyd



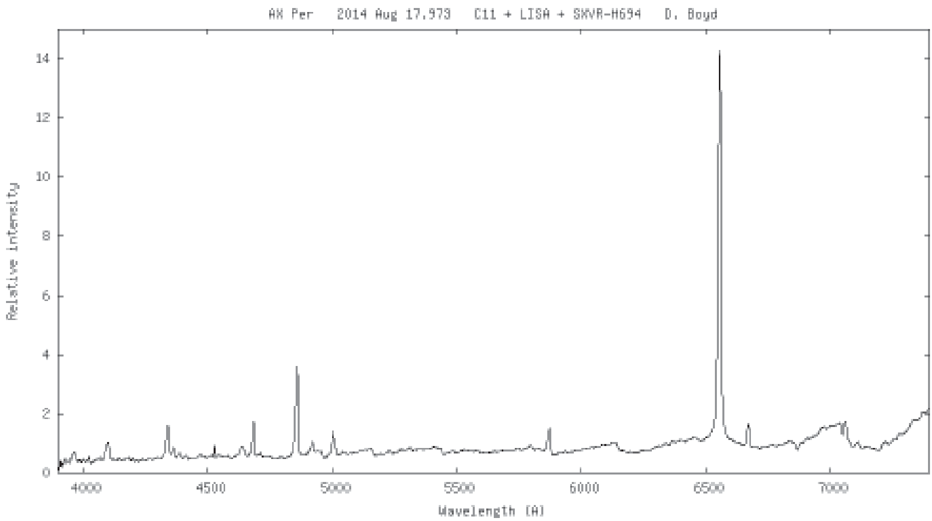
Spectrum of V627 Cas 2014 Sep 29.937 D. Boyd



Spectrum of UV Aur 2014 Oct 27.983 D. Boyd



Spectrum of AX Per 2014 Aug 17.973 D. Boyd



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T LEONIS AND THE FIRST RECORDED UGSU SUPEROUTBURSTS

JOHN TOONE

T Leo is one of only two UGSU stars to regularly exceed magnitude 10 during outburst, and it has played a pivotal role in determining the cause of the superoutburst phenomenon.

The discovery of T Leo less than 7 years after U Gem, and 34 years before SS Cyg, was a remarkable feat of visual observing. In late April 1862, C. H. F. Peters at Hamilton College Observatory was monitoring the asteroid (73) Clytia in eastern Leo, and noticed an uncharted star between magnitudes 10 and 11. The star started to fade so Peters carefully measured its position and commenced making light estimates. Soon the star became too faint to see with certainty, but Peters regularly checked the field hoping the star would brighten again which it did very suddenly almost exactly 3 years later. Peters then announced his discovery in the Astronomische Nachrichten giving details of the variable's position together with his light estimates and the comparison stars used. (See "The Discovery Annoucement of T Leo" below). A re-examination of Peters' light estimates given in the discovery announcement reveals that T Leo had undergone a typical UGSU superoutburst accompanied by a brief re-brightening event in 1862.

The 5 comparison stars Peters used for estimating T Leo in 1862 are listed below together with modern identifications and V magnitudes:

α	=	GSC 274 717	=	10.0 (APASS)
β	=	GSC 274 473	=	11.4 (CMC14)
γ	=	GSC 274 431	=	12.2 (APASS)
δ	=	GSC 274 1025	=	12.8 (USNO 1M)
ε	=	GSC 274 828	=	13.5 (USNO 1M)

Peters probably first saw T Leo on the evening of 25th April 1862 which was the first night he measured the position of (73) Clytia and estimated the asteroid to be magnitude 12.7. Peters initially thought that T Leo was simply an omission from Chacornac's charts, and so only did a rough estimate of magnitude 10.5. Peters measured the position of (73) Clytia on the 26th, 27th, 29th and 30th April, and 2nd May, but on 3rd May he noted that the nearby suspected 'star omission' was clearly fading. Peters then made light estimates of the new variable star on eight nights between the 3rd and 14th May before the variable was completely lost.

Assuming a magnitude of 10.5 for the nights that (73) Clytia was observed prior to 3rd May, and combining them with the light estimates made subsequently once Peters recognized its variability, the light curve shown in Figure 1 can be constructed.

With our current knowledge of the form of UGSU superoutbursts the most likely interpretation of Peters' data from 1862 is that a superoutburst with a width of at least 14 days occurred, and was closely followed by a re-brightening event lasting not much more than 4 days (Figure 2).

Text continues page 18.

Figure 1:
Light Curve of
T Leo   1862

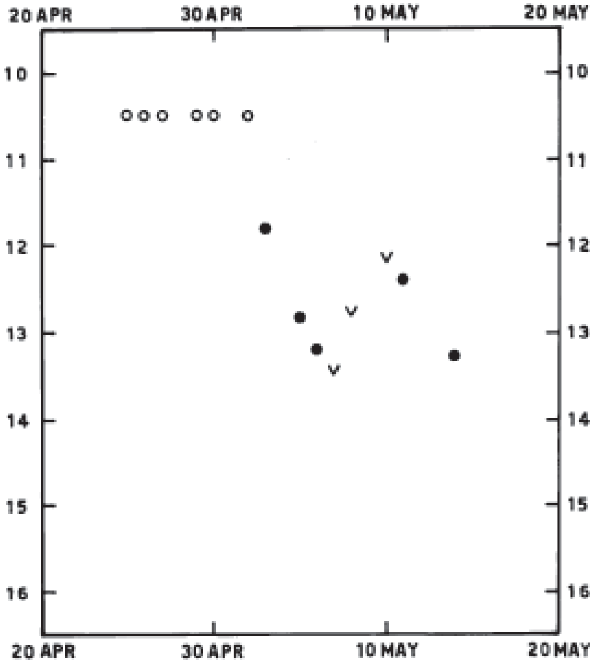
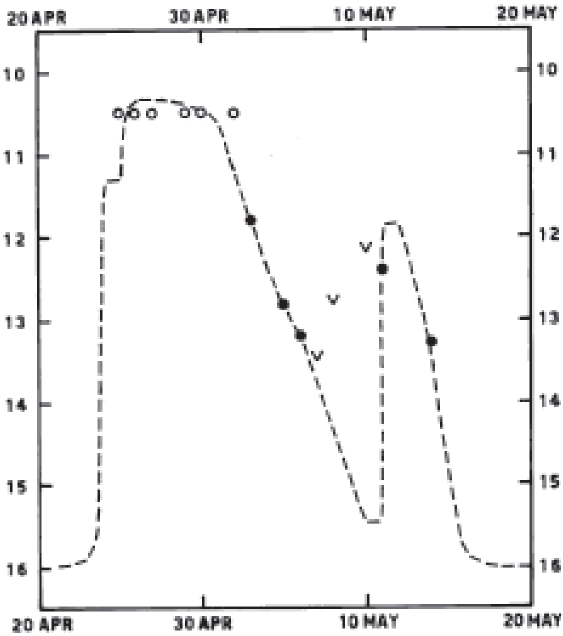


Figure 2:
Light Curve of
T Leo 1862
Superoutburst



The normal outbursts of T Leo tend to be rather short lasting only between 1 and 6 days, whereas the superoutburst durations last between 11 and 21 days. The second outburst Peters saw in 1865 lasted between 24th April and 3rd May, so it is safe to assume that this too was a superoutburst.

The two superoutbursts seen by Peters in 1862 and 1865 are significant in that they represent the first observational data of UGSU superoutbursts (and re-brightening events) occurring. The next UGSU superoutburst to be recorded was obtained by photographic means in 1896 (UV Per). The prototype star SU UMa would not be discovered until 1908, and the classification UGSU would not be introduced until 1952 some 90 years after Peters initial discovery and work on T Leo.

Peters' discovery of T Leo, together with his meticulous observational records of the outbursts recorded in 1862 and 1865 is an important landmark in the early history of cataclysmic variable star research and deserves belated recognition as such.

The Discovery Announcement of T Leo

T Leo was the second dwarf nova to be discovered, and like its predecessor U Gem it was found accidentally by visual means, in a zodiac constellation, by an observer more concerned with asteroid research. C H F Peters at Hamilton College Observatory, Clinton, New York, made the discovery in 1862, and T Leo was the first variable star to be discovered from America. Due to the ongoing civil war the publication of the Astronomical Journal (the principal American astronomical publication) had been suspended, so instead Peters made the announcement in the German publication Astronomische Nachrichten, in 1865. This discovery paper has now been kindly translated from German into English by Storm Dunlop and is reproduced below. The paper is entitled "Concerning Two New Variables" because it announced Peters' discovery of both T Leo and S Ari but the translation below is restricted solely to the T Leo element.

Concerning two new Variables. From Professor, Dr C.H.F. Peters
(Astronomische Nachrichten, No. 1540, pp 55 - 58, 1865)

1865.0 : RA = $11^h\,31^m\,31^s33$, Dec. = $+4°\,7'\,8''.4$

In the last days of April and the beginning of May 1862, I noticed, about one degree north of the position where Clytia was then located, a star of about magnitude 10 to 11 that was not depicted on Chacornac's charts. Its non-planetary nature was soon obvious through its lack of motion. On 3rd May, its position was determined by comparisons, using the ring micrometer, with W. 11^h, No. 442, and the brightness estimated between β and γ (see below). On 5th May, on scrutinizing the area again, all that could be found there was a star of 13^{th} magnitude, approximately = δ.

May 6: The star has become even fainter, between δ and ε; in moonlight, but otherwise very fine sky and only just visible.
May 7: Misty and the Moon brighter; Var. now not visible, certainly now fainter than ε, which star may still be just made out.
May 8: Now somewhat less of the Var. visible. The Moon is now closer, and Star δ, preceding on the parallel is now the last that is visible.
May 10: β and γ are the last visible stars, close to the Moon.

May 11: Var. has again brightened, and this evening appears almost as bright as γ, so a repetition of the determination of position with the filar micrometer was started, when the sky clouded over.
May 14: Var. very faint, although the sky was clear and the Moon had even set previously; somewhat brighter than ε.
May 15: About 10h Var. not visible; however the Moon was causing the atmosphere to be bright.
May 16: Somewhat misty; the existence of the Var. was recognized only fleetingly.
May 17: Air good, Var. invisible.
May 22: Very beautiful clear air; just a glimmer of the Var. seen.
May 29: Sky very bright; glimpses of Var. clearly seen.
May 31: Moderately good air: Var. barely detectable at intervals (by fits).
June 20, 9h30m; Var. identified at intervals, very faint, but it was very low, and the horizon was not free from mist.

1863 Jan. 23: Var. not yet reappeared.
March 16: Var. not visible.
June 13: No trace of the Var.

1865 Feb. 2: It seems to me that I can see a faint glimmer at the position of the Var.
February 21: I am convinced a faint glimmer.
Feb. 24: Very clear air, the Var. clearly detected, estimated at fainter than 14th magnitude.

During March and at the beginning of April, the Var. was often looked for, it appeared to be increasing, but still remained very faint.

April 24: Var. was immediately apparent, shining as a 10th-magnitude star, i.e., = α. The position given above was determined from measurements made with the filar micrometer during this evening. The comparison star was Rümker 3630 (= W. 11h.442), for 1865, after the application of the “systematic” correction to:

$11^h26^m23^s37$; + 4°6’ 29”.1

The comparisions May 3 1862, gave results for the Var., reduced to the same Epoch:

31^s71 and 7”.3.

May 3: Var. has again declined; in the light of the eight-day-old Moon it is just visible, approximately like the stars in the preceding, small right-angled triangle; the evening was clear and fine.
May 16: Var. invisible.

As a result of the preceding observations, the following approximate conclusions may be drawn. The duration of visibility at maximum is short relative to the period; the light-curve is not completely uniform; the period will be close to = 3,365/n days, when n is an integer and not very large; the value n = 3 may be excluded on the basis of the observations made in the spring of 1863; perhaps n = 1, or the period 3 years, which may only be determined by later observations.

Here are the co-ordinates of the comparison stars mentioned above, reduced to the reference grid of Chacornac's charts:

α	=	$11^h30^m36^s$	+4°23'0
β	=	31 4	2.7
γ	=	30 51	13.0
δ	=	30 36	10.0
ε	=	30 47	13.8
Var.	=	31 4	10.0

Clinton, May 1865. C H F Peters

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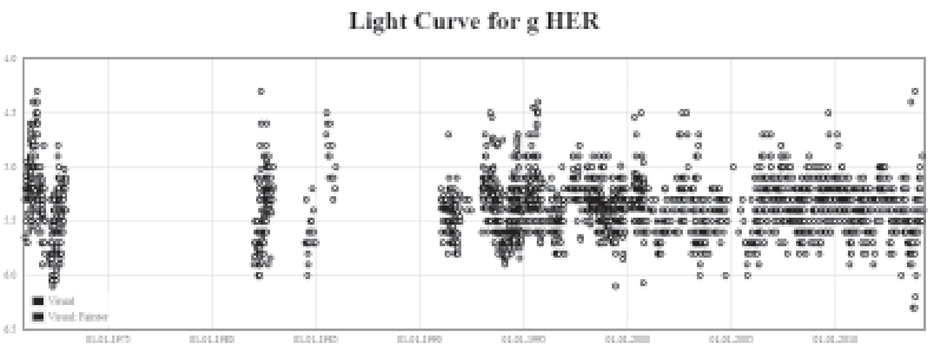
FILLING IN THE GAPS: A BACKGROUND TASK FOR CLOUDY NIGHTS AND WINTER DAYS.

TONY MARKAM

The release of the interface that allows light curves to be generated from the observations in the BAA VSS database has been a great step forward. However, as reported in VSSC 161 (2014 Sep) the ability to generate such light curves did also reveal a number of significant gaps in the database records.

For example, the light curve for the semi-regular variable g Herculis was missing most of its data for the years 1973 to 1990 – although the gap was briefly interrupted by the well covered year of 1982 (some 1984-85 data were resubmitted by me in spring 2014).



I knew that I had submitted data for g Her and for other affected stars for many of these years. I well recall the six-monthly task of entering my observations on paper report forms, putting them in a large envelope, taking that along to the post office and waiting several days to receive acknowledgement from the BAA VSS that the observations had arrived safely. However, with it being very unlikely that the missing report forms would re-surface, the only solution would be to resubmit the missing data.

The gaps pre-dated the era of electronic submission of observations. Therefore I would need to key in the data from my old logs. Fortunately, from 1984 onwards I had maintained a card index system (one card per variable) with observations being added soon after they were made. This had saved me from having to work through my log books every 6 months – I would simply copy the entries from the cards to the paper report forms. It also meant that I retained an organised copy of the observations which I could now re-use.

There were still some challenges. The cards did not always record the names of the sequences used - it had always been the "current" one for that variable at the time. Hence some detective work was required to match the comparison stars, labels and magnitudes with sequences that are known to the BAA VSS database.

For observations made prior to 1984, there were no such cards containing my observations. For these, I now carried out a two step process. First, I worked through my old log books to generate the cards for each star. Then I keyed in the data from the cards and uploaded it to the database.

I also have many observations from late 1978 to late 1981 from before I became a BAA VSS member. These posed an interesting challenge. I had obtained sequences from a variety of sources – books, magazines, NWAVSO. Some of these could have unknowingly have been BAA VSS sequences. Others might have been JAS VSS, NWAVSO or AAVSO sequences. In nearly all cases, I would only have recorded the comparison star magnitudes but it was usually straightforward to deduce the identity of these comparison stars and then re-reduce the light estimates using the comparison star magnitudes in use by the BAA VSS charts of that era.

Over the years I had also observed many variables that were not on the BAA VSS programme at the time and, hence, had never submitted report forms for them. They included many suspected variables and many Mira type variables. Some of the suspected variables were labelled on existing BAA VSS charts for other variables (e.g. +49 2165 CVn is labelled on old charts for Y CVn), so I merely needed to ask Ian Miller to allocate a sequence name and arrange for the suspected variable and sequence name to be added to the database. For stars without "official" charts, I also needed to let Ian know the identities of the individual comparison stars used.

In my case, the number of observations to be (re)submitted is rather large – over 10000. This is clearly not something to be achieved quickly. It is however a good background task for cloudy nights and for days when the weather outside is foul!

Thus, an added benefit from all of this is that the database is gaining many observations that were never previously submitted. Maybe other observers will also have observations that were only submitted to other organizations (e.g. TA, NWAVSO), that they can now submit to the BAA VSS database?

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THE AAVSO DSLR OBSERVING MANUAL – A REVIEW

Richard Miles

The cooled astronomical CCD camera has been the main workhorse of the amateur astronomer keen to achieve the best results possible, whether by way of imaging the deep-sky, detecting the faintest objects, performing astrometry, or making accurate measurements of the brightness of stars, etc. However, things are changing, especially when it comes to the relative cost-effectiveness of large area astronomical cameras compared to mass-produced cameras for the digital market. We are now seeing the Digital Single-Lens Reflex (DSLR) camera begin to catch up with the traditional cooled CCD camera in a race that has endured these past 20 years or so.

The DSLR camera has a number of potential advantages, especially:

- sensors used are usually physically larger and can be manufactured at a small fraction of the cost.

- the interchangeable mounting system permits a very wide range of lenses, telescope or other optical equipment to be attached to the camera giving it great flexibility in terms of sky coverage

- the DSLR can be used for ordinary day-to-day photography making the financial investment doubly effective

Since a DSLR is not normally cooled, noise in the sensor and electronics has been a serious limitation, but recent models of camera exhibit much less noise at ambient temperature enabling longer exposures thereby reaching higher signal to noise ratio than before. One other limitation is that the DSLR is typically a colour camera with built-in filtering of the light generating three frames per image, namely a Red, Green and Blue frame. So interposing external filters in the light path, as for example when filter wheels are used with astronomical CCD cameras, is not an effective option. However, it turns out that the Green filter (of the RGB set) employed in a DSLR has a broadly similar transmission to that of a Johnson V filter as used in astronomy. This fact has opened up the possibility of exploiting DSLRs in V photometry of variable stars, which goal has been pursued to good effect by some advanced amateurs, including our own Des Loughney as his work on binary stars such as β Lyrae, ε Aurigae, etc. has demonstrated.

In particular, DSLRs have been used very successfully to do real science by way of stellar photometry as part of the AAVSO's Citizen Sky program. Following on this initiative, the AAVSO has now compiled an observing manual with the help of more than 20 contributors including such people as Arne Henden, Mike Simonsen, Brian Kloppenborg, Matthew Templeton, Bob Buchheim, Tim Hager and Des Loughney to name but a few. In this article, I review Version 1.3 of "The AAVSO DSLR Observing Manual" which first appeared in 2014 June and which is available for free download at:

http://www.aavso.org/sites/default/files/AAVSO_DSLR_Observing_Manual_v1-3.pdf

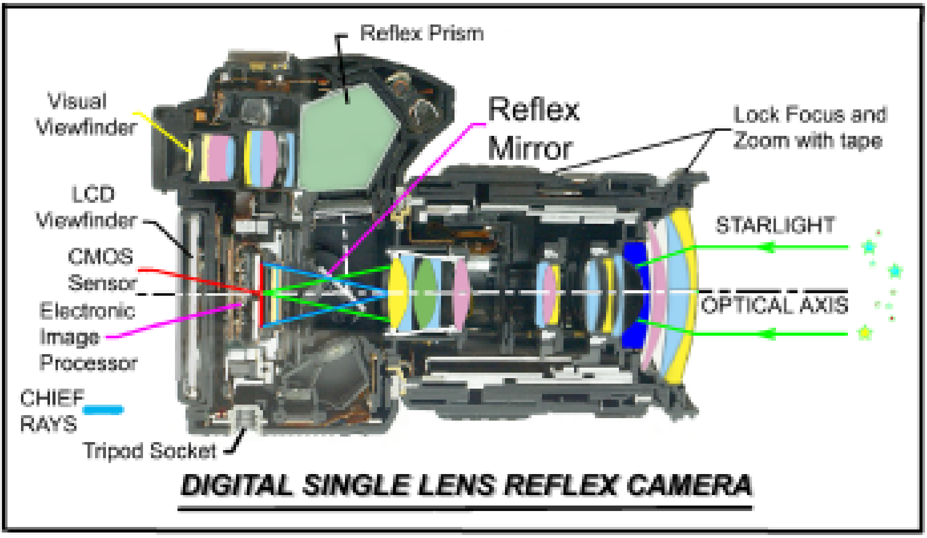

Fig.1 A cutaway of a DSLR camera showing the various components (reproduction of Fig.2.1 of AAVSO DSLR Observing Manual)

The manual (A4 format, 92 pages) has been produced as a basic introduction and guide to using a DSLR camera to make variable star observations. The target audience is broad, ranging from the first-time beginner to intermediate-level observers, although many advanced users of DSLRs for astronomy should find topics of interest amongst its pages. The style is very readable, engaging and well written in good English. Its prime objective is to demystify the process of obtaining scientific-quality photometry using DSLR cameras and hopefully, in so doing, it will encourage many more such camera owners to try their hand at measuring V magnitudes, and to have fun in the process. It wisely avoids going into too much detail as to how DSLR cameras work, or in providing instructions as to how a particular model of camera is operated, which would have added unnecessarily to the length of the document.

The layout of the manual includes an introduction, and sections on equipment overview, software overview, image acquisition, image processing, photometric calibration as well as advice on developing a DSLR observing program. Four appendices reserve more in-depth treatment to topics on; (A) identifying optimal exposure times and saturation issues; (B) linearity checking; (C) testing dark frames for defective pixels; and (D) testing flat frames for uniform illumination, the latter being a particular issue when the angular field of view is large.

Even if you do not intend to pursue DSLR work, I suggest reading the five-page introduction as the comments made there are not only relevant to DSLRs but also apply to variable star work in general. If you are tempted to use your ordinary camera in your astronomical pursuits, then do read on, as the manual contains virtually all you need to know to make successful V magnitude observations of variable stars and the like. Although it specifically addresses the use of DSLRs for this purpose, most of the contents are also relevant if you are contemplating using other types of modern digital camera, given that they can 1) be operated in manual mode 2) allow raw images to be saved and 3) have a live view exposure simulation to aid in setting the focus: star images usually require defocussing slightly for best results!

Section 2.5 comprises an informative assessment of filters and the spectral response of the camera. The conclusion is that although the camera generates RGB frames, it is not possible to use the Red or Blue frames to derive Cousins-R or Johnson B magnitudes. Only the Johnson V magnitude is readily obtainable by using either the G (Green) image directly, or by synthesizing a 'V synthetic filter' by the VSF technique proposed by Roger Pieri, in which all three colour channels are utilised (see p.21). The way in which the non-ideal spectral response of the camera is compensated for is dealt with in detail in Chapter 6 on photometric calibration. This is a key aspect and the manual rightly addresses the subject in some depth, in that the primary objective is to characterise the so-called transformation coefficient, T, for your particular camera and lens setting. Figure 2 illustrates an example for which the coefficient for converting G to Johnson V magnitude, T_V, is dependent on the difference in (B-V) colour of stars and equals -0.116. The larger the absolute value of T, the more the spectral response of your system departs from that of the standard V magnitude system. The smaller the value of T, the more accurately you will be able to transform your measurements into the standard system.

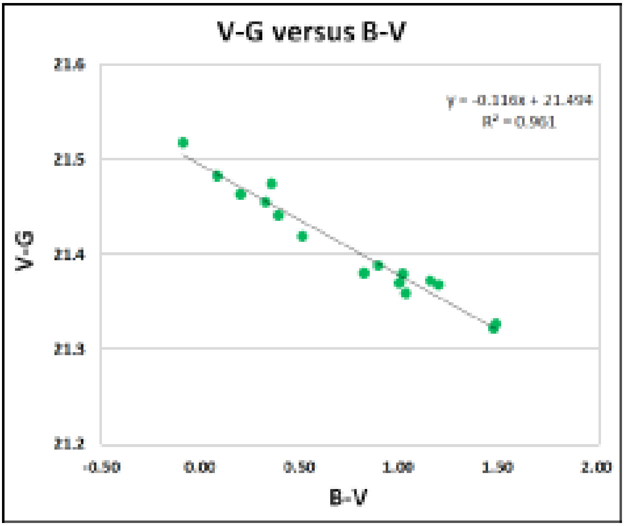

Fig.2 Example of a transformation plot showing the difference between the standard V magnitude and the DSLR instrumental G magnitude versus star colour (reproduction of Fig.6.1 of AAVSO DSLR Observing Manual, courtesy Mark Blackford)

Chapter 3, on software, provides a concise treatment of the subject by way of an overview without getting into too much detail, which might otherwise lose the reader. Software systems referred to are IRIS, Muniwin, AIP4WIN and MaxIm DL Pro. Several other software solutions for photometry exist, and several of these might be worth including in any future revision of the manual.

Chapter 4 deals with the task of acquiring suitable images for photometry and is a goldmine of information and advice, including some 'tricks of the trade'. Chapter 5 considers the steps necessary in processing the images and arriving at a measurement of the magnitude. Both chapters are written in a clear and authoritative style and should prove very helpful in guiding people through the steps required to do science with their DSLR.

After explaining the 'what, why and how' of DSLR photometry, the manual might have left it at that, or possibly might have included an appendix on what to observe. Instead, the AAVSO has taken the trouble of devoting Chapter 7 to the subject of developing a DSLR observing program, in which would-be DSLR observers are enthused to try their hand by way of some recommended bright variable star targets, available to folk in either northern or southern hemispheres. Details are also given on how to use the AAVSO Variable Star Plotter (VSP) facility for producing charts tailored to one's requirements. One last suggestion for the would-be observer is to do a little 'constant star' training as a learning exercise before embarking on variable star photometry in earnest. However it would be good if the manual also advised on how one might identify such stars in the first place, given that many are intrinsically variable on some scale or other.

I would have liked to have seen included more discussion on the choice of f-stop in Section 2.4 dealing with lens settings. One reason is that very fast f-stops result in a very noticeable fall-off in the illumination of the focal plane and response of the sensor towards the edges: a form of vignetting. This arises from the increasingly oblique angle of incidence of the light striking the sensor towards its corners, although the effect is largely calibrated out by way of the flat frame (Section 4.4.3). Other more important reasons are that fast f-ratios suffer from increasing optical aberrations towards the edges of the field, and if the lens is defocussed, the distribution of a point-source image varies more across the frame at small f-stops. It is therefore often a good approach to close the lens aperture down by one, two or more click stops depending on the optical quality of the lens, so as to minimise these effects. You might wish to avoid using the f/1.4 lens (shown in Fig. 2.5) at full aperture, for instance, except where you are after a pretty picture.

The term 'ADU', which I have always understood to mean 'analog-to-digital unit' has been renamed 'arbitrary digital unit' in the manual (p.8), which is a bit disconcerting. There are a few americanisms as far as expressions go. For instance, I prefer 'at first glance' to 'at first blush', and I am not sure if I would 'fall in love with a particular star' or not (p.11).

The approach of the manual is to avoid the use of Greek symbols in the Bayer names of stars, preferring instead to spell the symbol such as "beta Lyrae" or "bet Lyr" for short. However, I was surprised to see μ Cephei written as "miu Cephei" or "miu Cep" for short, since in all other references "mu" is the norm.

There is no index (as yet) and furthermore on a hand-held device such as a tablet it is not possible to navigate through the PDF document via a table of contents. Typos noted and other minor amendments and suggestions have been passed on to the AAVSO by this reviewer. I should add that I began reviewing version 1.2 of the manual before version 1.3 appeared, and as a result many of the amendments first identified were in fact put right in this latest version. Well done the AAVSO and all of the contributors. Let us hope that the manual will encourage many more observers to use a DSLR camera in their variable star studies in future.

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NOVA DEL 2013 (V339 DEL) - A SPECTROSCOPIC BONANZA

ROBIN LEADBEATER

(Presented by the author at the BAA VSS meeting York May 2014)

In July 2013 Professor Steve Shaw of the University of Pisa met with colleagues to discuss how to resolve some still unanswered questions concerning the evolution of classical Novae and to plan a multi-wavelength campaign covering the next bright Nova. As part of this, members of the ARAS group (The Astronomical Ring for Access to Spectroscopy, a loose international association of amateur spectroscopists dedicated to developing expertise and fostering Pro-Am cooperation in this area) were invited to take part, with the objective of maximising spectroscopic coverage in the visible range throughout its evolution.

As it turned out, they did not have long to wait. Early on the morning of 14th August a faint (magnitude 17) star in Delphinus started to brighten rapidly. It was first spotted at magnitude 6.8 by Koichi Itagaki in Japan at 14:00UT, and ARAS group members were alerted to its presence as a possible Nova by a messsage on their forum from Paolo Berardi. Ideally placed for observers in Europe, French amateur Oliver Garde started taking spectra as night fell using his high resolution echelle spectrograph and at 20:20UT posted a spectrum (the earliest recorded of this object) clearly showing the characteristics of a classical nova.

Measurements continued throughout the night, and as dawn approached in Europe the baton was passed to Jim Edlin and Keith Graham in the US, and from there to Terry Bohlsen in Australia who was just able to observe the nova low in the west. By nightfall in Europe once more there were already 50 ARAS group spectra from 10 different observers giving unrivalled coverage of this crucial early evolution.

As word spread, more amateur observers joined the campaign, including a Pro-Am team on Tenerife (the Convento group) who were studying Wolf Rayet stars using the IAC80 telescope and who generously dedicated some spare telescope time to cover gaps due to poor weather. By the end of the first week the number of observers had grown to 35, contributing 260 spectra at a range of resolutions.

A webpage on the ARAS website to archive the spectra, and newsletters to disseminate information, were quickly set up by Francois Teyssier, an amateur specialising in the spectroscopy of cataclysmic variables. To the webpage Steve Shore added a running commentary throughout the campaign, describing in detail the astrophysical processes behind the changes seen in the spectrum and steering our efforts to look for particular phenomena.

The campaign continued to the end of 2013 with the ARAS group following the evolution of the visible spectrum in unprecedented detail, from the initial fireball, through the various stages to the nebular phase, a total of 1100 spectra from 38 amateur observers worldwide. This unique data resource has already revealed new phenomena, such as the first evidence of Raman scattering in a classical nova of the O VI 1032 line at 6582 Angstrom, and at time of writing spectra from the campaign archive have been published in 2 peer reviewed papers. At time of writing the nova (now magnitude 12.6) is still being followed by some ARAS members.

Additionally, during the campaign ARAS group members were able to develop techniques which enable amateurs to flux calibrate spectra in absolute terms, allowing the evolution of emission line strength to be quantified, and giving opportunities to improve the accuracy of photometry on emission line targets which prove difficult for conventional filter photometry.

Publications using ARAS Nova Del campaign spectra (as of 2014 November 06)

Continuing spectroscopic observations (3500–8800A) of Nova Del 2013 with the Ondrejov Observatory and the ARAS group.
Shore, S. N. et al., The Astronomer's Telegram, reference numbers 5312, 5378, 5546
http://www.astronomerstelegram.org/?read=5312
http://www.astronomerstelegram.org/?read=5378
http://www.astronomerstelegram.org/?read=5546

The first detection of the Raman scattered O VI 1032 A line in classical novae - the case of Nova Del 2013 and Nova Cyg 2014.
A. Skopal et al, The Astronomer's Telegram, reference number 6132.
http://www.astronomerstelegram.org/?read=6132

The early evolution of the extraordinary Nova Del 2013 (V339 Del).
A. Skopal et al, Astronomy and Astrophysics, Volume 569, A112, (2014), also available at:
http://arxiv.org/abs/1407.8212

The expanding fireball of Nova Delphini 2013.
G H Schaefer et al, Nature Letters (2014), Published online 26 October 2014:
http://www.nature.com/nature/journal/vaop/ncurrent/full/nature13834.html

Further Reading

Francois Teyssier's ARAS webpage for the campaign with commentary by Steve Shore:
http://www.astrosurf.com/aras/novae/Nova2013Del.html

The story as it unfolded on the ARAS forum:
http://www.spectro-aras.com/forum/viewtopic.php?f=5&t=682

The ARAS database of spectra:
http://www.astrosurf.com/aras/Aras_DataBase/Novae/Nova-Del-2013.htm

Spectroscopic coverage of other novae by the ARAS group:
http://www.astrosurf.com/aras/novae/Novae_Aras.html

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THE VARIABLE STAR SECTION MEETING 21ST JUNE, 2014

Tony Markham

(continued from VSSC 161)

The asynchronous Polar V1432 Aquilae and its path back to synchronism

David Boyd explained that white dwarfs with magnetic fields weaker than 10 megaGauss are classed “intermediate polars”, and those with stronger magnetic fields are classed as “polars”. In these latter (polar) systems, the spin period and orbital period are normally identical. There are however four (out of 135) in which this is not the case, and these are termed “asynchronous polars”. It is thought likely that the discrepancies occur because the white dwarf’s spin period has been knocked out of sync during a nova explosion, and afterwards it will take 100 -1000 years for it to get back into sync. In the case of V1432 Aql, the white dwarf’s spin period is 1% shorter than the orbital period (in the other three, the spin period is longer), and eclipses can also be seen. A consequence of the period difference is that the accretion stream will encounter a constantly changing magnetic field and this offers a useful test-bed for our understanding of the underlying accretion process.

An analysis of over 75000 photometric measures over 15 years (by 23 observers, in 10 countries) has been carried out. Magnitudes were unfiltered but have been manually aligned, and will usually be accurate to much better than 0.1 mag. In the rest-frame of the binary system, the white dwarf is slowly rotating - currently with a 62 day period. The white dwarf’s rotation axis is perpendicular to the orbital plane, but the magnetic field is inclined to the rotation axis, and is slowly precessing. From our line of sight, the orbital plane is inclined at approx 77 degrees. The accretion stream periodically occults the white dwarf and the O-C (observed - calculated) evolution for this can be monitored. Since 1990, the rotation period described above has increased from 50 days to 62 days. This suggests that the orbital and spin periods will return to synchronism within a few years of the year 2100.

Highlights of the Cygnus project

Stan Waterman described several highlights of his monitoring of stars in the Cygnus region during the years 2002-2010. One of his early surprises was the revelation that stars vary in brightness – he had been looking for exoplanet transits and had not considered the possibility that the brightness might vary for other reasons. Via the use of periodograms he has been able to identify periods of variation. “Dip Hunting” has identified around 350 new variables, with periods ranging from 0.1 days to 10 days. Two flare stars have been identified – one brightened by 2.6 magnitudes in 90 seconds and faded back over 12 minutes. Stan also showed a selection of his favourite light curves in categories that included “fastest”, “slowest” and “prettiest”. A particular highlight was the discovery of a triple eclipsing system.

Possible ER UMa - type Dwarf Nova in the Catalina Sky Survey

Jeremy Shears described a campaign to study the star CSS 121005:212625+201948.

John Greaves had drawn attention to this star in Oct 2012, describing it as being "in outburst as much as not". In outburst it reaches magnitude 15.5, and it drops below magnitude 20.5 at minimum. ER UMa type dwarf novae show short supercycles – the time between their superoutbursts is 20-50 days, compared with several hundred days for most other dwarf novae, and around 10000 days for WZ Sge. One example of an ER UMa type object is RZ LMi which typically produces two normal outbursts, at intervals of 9-11 days, between superoutbursts. The primary aim of the campaign is to determine whether this CSS star is of the ER UMa type. Additional aims are to determine the outburst frequency, the typical outburst duration and the length of the supercycle.

Recent activity of R Scuti

John Toone gave an overview of the activity of R Scuti during 2013. This had been an exceptional year for the star. Following two very uneventful years, R Scuti had dropped to the unusually faint level of mag 8.4 in June 2013, and spent a record 42 days below mag 8.0, and a record 62 days below mag 7.0 (the previous records having been 16 days and 53 days respectively in 1983). Another prolonged and unusually deep minimum occurred during the early autumn. John also noted that unusually deep minima seem to cluster together in the long term light curve, and there is a strong hint of a regular pattern. The most recent clusters occurred in 1927, 1956, 1983 and 2013, the intervening gaps being 29, 27 and 30 years. John mentioned a published spectrum from 1983 that was claimed to have been taken with R Scuti at its faintest. However, the date of the spectrum seems to have coincided with R Scuti being at mag 7.9, and so brightening from minimum.

David Boyd reported that he had obtained seven spectra of R Scuti during Oct-Nov 2013 as the star was brightening from minimum and arriving back at maximum. The first, from Oct 17, coincided with the star being at mag 8.2. The spectrum showed bands of TiO and only a trace of H-alpha (a typical late M spectrum). By Oct 29, with R Scuti brightening, the bands are disappearing, and H-alpha is stronger (mid M spectrum). By Nov 03, there are strong Balmer emission lines and the peak of the background continuous spectrum is moving towards shorter wavelengths (mid K/early M spectrum). By Nov 14, with R Scuti back at maximum, a late G/early K spectrum is seen.

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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 < roger.pickard@sky.com >, 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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* * *

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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CCD Guide	BAA Office	£7.50
Binocular Booklet	Director or BAA Office	£2.50
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Charts are downloadable from the VSS web pages at
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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/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 163) will be 7th February 2015. All articles should be sent to the editor (details are given on the back of this issue).

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Glyn Marsh 01624 880933, or
Martin Mobberley 01284 828431.

Variable Star Alerts
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