British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

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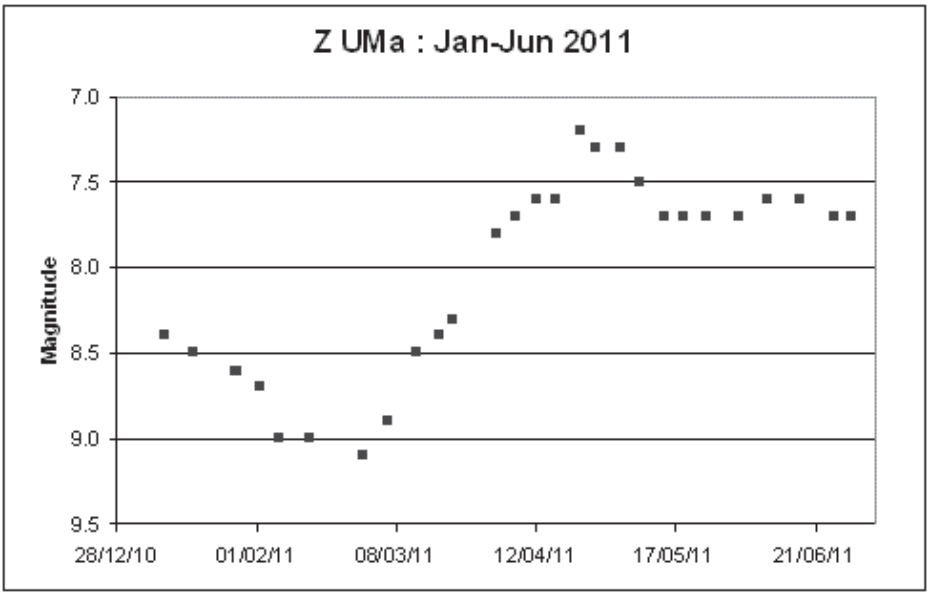
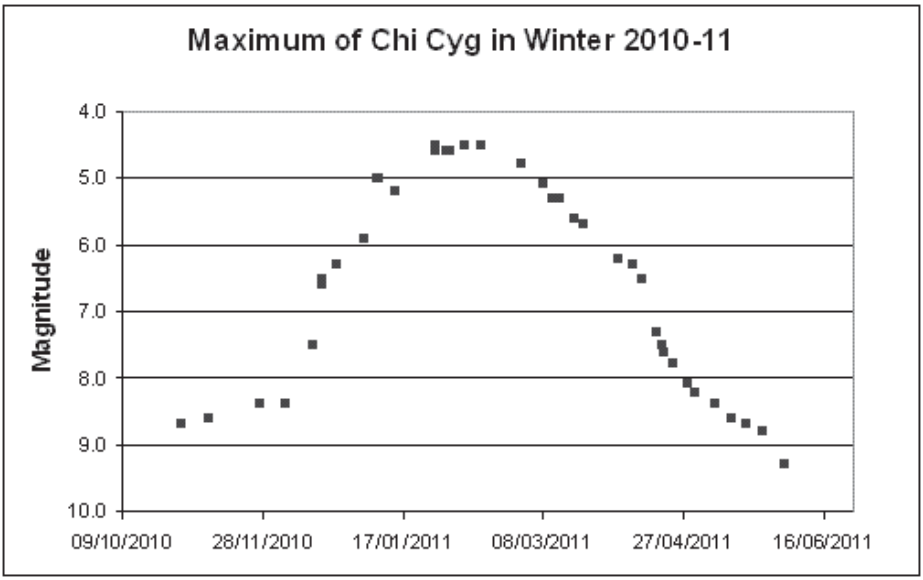




FROM THE DIRECTOR

ROGER PICKARD

BAA VSS Section Meeting Saturday 15th October 2011

A reminder that the next Section Meeting takes place at the:

Monton House Hotel,
116-118 Monton House Road, Eccles,
Manchester, M30 9HG
http://www. montonhousehotel.co.uk/

commencing at approximately 10:30 and finishing around 17:30.

Speakers include Professors Don Kurtz and Tom Marsh and possibly Dr. Boris Gaensicke. Also booked to speak are Des Loughney, Robin Leadbeater and Stan Waterman with short presentations from John Toone, Andy Wilson and Tony Markham.

The cost is likely to be around £10 to include refreshments throughout the day and a light buffet lunch.

Please advise the Director if you wish to attend.

There is ample (free) car parking, and the nearest railway station is Eccles which is about 15 minutes walk from the hotel.

If you wish to stay overnight one either the Friday or Saturday nights (or both) then please contact the hotel directly on 0161 789 7811 quoting "British Astronomical Association" and mention our local contact there who is Paula. Room rates are £35 per night for a single for Bed and Breakfast and £45 for a double. However, you need to book early as they can get booked up quite quickly especially if there is a football match on!

Frequency of Observing

There has been a lot of discussion on the AAVSO e-mailing list this summer about the frequency of observing any particular type of variable. I will not go into any of that now but I thought it might be useful to repeat what is given in our own Visual Observing Guide (which, by the way, is now only £3.50 postage paid from the BAA Office or directly on line at *http://www.britastro.org/sales2006/index.html*).

Observe each star no more frequently than is necessary to show its most rapid variations. The following list gives the recommended minimum interval between observations for the various types of star on the Section's Programmes.

Type	Interval (days)	Type	Interval (days)
Active Galaxies	1	In	1
EBs	(see below)	L	5-10
GCas	5-10	M	5-10

Type	Interval (days)	Type	Interval (days)
N	1	SN	1
RCB	1	SR	5-10
RV	2-5	UG	1 (see below)
SDor	5-10	ZAnd	1

For certain types of Dwarf Novae (UGSU) undergoing bright superoutbursts, observations can be made every few minutes when attempting to detect superhumps visually. Other types of Dwarf Novae show eclipses when in outburst. In these cases estimates should be made every minute or so once it has been established from an ephemeris when an eclipse is imminent. For eclipsing binary stars (type E) the recommended minimum interval can be as little as 30, 20 or even 10 minutes during eclipse, depending upon the rapidity of the fade and rise.

New Beginners Page on the web site

With some recent interest shown by non-Variable Star folk in our favourite subject, Gary Poyner has kindly put together a page on the web site with suggestions of "easy" stars to observe together with other helpful hints.

Please direct anybody that may be interested in starting variable star observing to this page, and remind them we have a number of publications available from the BAA Office at a very reasonable price. These are:

Variable Star Observers Guide	£3.50
Binocular Variable Star Charts Volume 2	£2.50
Variable Star Section CD ROM, contains pdf versions of: Variable Star Observers Guide, Measuring Variable Stars Using a CCD Camera, Binocular Variable Star Charts Volume 2, and much more....	£7.50
Measuring Variable Stars Using a CCD Camera (Printed edition of that which can be found included on the CD ROM)....	£7.50

Sequence Files

It has come to my attention that not all members are aware that the sequence files have been updated (several times) by Ian Miller. These are particularly useful if you are using John Saxton's software to submit your observations to Clive Beech. Therefore, please make sure you are using the most upto date file if you submit observations this way. The file can be downloaded from the front page of the web site under the Data Submission box. My thanks to Tony Markhan for making me aware of this.

NEW BAA VSS ONLINE DATABASE COMING SOON

Andrew Wilson

It is planned that by the end of 2011 there will be a new online database of BAA VSS observations, replacing the Quixote database. This is part of a project lasting several years to modernise the database, which will ultimately see observers able to submit their observations over the web.

Last year saw the completion of the initial database design with observations up to 2007 and the latest sequences loaded. At present new web pages are being built and tested to allow visitors to generate light curves and download data. Before the database is put live the observations up to the end of 2010 will be loaded, and then final testing will be done.

The next phase will be to build the online data submission systems. This may take a couple of years as it is a relatively complex task. To ensure the integrity of online submission a user name and password will be created for observers submitting in this way. This will also make it possible for users to view and validate their own pre-existing data.

One of the crucial elements of this whole project has been to preserve the unique benefits of the BAAVSS database. This is its ability to recalculate historic observations using the latest sequence. A prototype recalculation has been built and tested on a range of estimate formats. However, this is unlikely to be put live this year, to allow further development and thorough testing of this important feature.

It should be noted that thus far all the effort has been put into the visual observations. However, it is expected that the CCD observations will be available via the same web interface either by year end, or early 2012. The PEP observations will also be put online, though I cannot give a timescale for this yet.

I shall be giving a brief update at the forthcoming section meeting, where I hope to demonstration the new web pages.

BOOK REVIEW

Melvyn Taylor

Advancing Variable Star Astronomy: The Centennial History of the American Association of Variable Star Observers.

T.R.Williams and M.Saladyga (Cambridge University Press), 2011. Pp xv + 432.9.
Hardback: ISBN 978-0-521-51912-0. $99.00 / £65

This landmark tome describes many individuals in the amateur and professional scene during this interval mainly from the AAVSO's foundation in 1911.

The index comprises 20 pages, there is a detailed bibliography of 4 pages, and 58 pages

of notes referring to the six main parts comprising 21 chapters. The parts cover, Scientific Pioneers, AAVSO Foundation, Records and Archive, the Bureaus set up by Mayall, Mattei and Henden. There is an epilogue, and seven appendices of notable facts about officers, world groups, historic items, observational totals and awards. In a simple division of its history the first forty years were devoted to the Harvard Cambridge Observatory's connection with the association. The following years show how visual observations maintain a thread of continuity to a world-wide group. The authors offer personal insights about individuals both in the organisational network and those at the eyepiece, but in several cases there is far too much detail. A genuine lack of research is evident in that the joint meeting in Cambridge, U.K. of the AAVSO and the BAA in 2008 Spring is not mentioned when, in contrast, several other international affairs are noted. The solitary efforts of many individuals' using small to large instruments, whether visual or instrumental is acknowledged and appreciated in relation to the inherent value of such 'work'. The prime ethos of how to observe, record, archive and the relationship with the scientific community is not lost on the authors yet these aspects are not described in detail, this is not a text book. I would consider the price may deter many.

ECLIPSING BINARY NEWS

DES LOUGHNEY

Epsilon Aurigae - the end of the eclipse

The eclipse ended in the middle of June. For the whole light curve of the eclipse see: *http://www.hposoft.com/Plots09/VBand.JPG*

Professionals involved in the international observing campaign are requesting that observations (visual) and measurements (CCD/DSLR photometry) continue for the rest of 2011 to complement continuing spectroscopic studies.

The AAVSO has announced that a special edition of their Journal will be devoted to papers on the eclipse. This is scheduled to be published in August 2012.

Zeta Aurigae

Zeta Aurigae is a well known eclipsing binary which has a period of 972 days. The eclipse lasts about 37 days and is somewhat unusual because a small very hot blue star passes behind a supergiant red star. Ingress and egress last about 1.5 days. There are no sharp boundaries to the eclipse as the smaller star continues to shine, during ingress and egress, through the tenuous outer atmosphere of the larger star.

The midpoint of the next eclipse is scheduled for 19th November 2011 which means that ingress is around 2nd November and egress around 7th December. Measurements are called for from the beginning of October until the end of December.

There are differing views of the depth of the eclipse. GCVS states it to be 0.27V, Krakow 0.6V whereas, during the last eclipse in 2009, the depth was found to be about 0.14V.

Eclipsing Binary Handbook - A Beginner's Guide to making observations of Eclipsing Binary Star Systems

This new BAA VSS Handbook has nearly been completed and should be available by the time this article is published in October. A copy (it is planned), can be downloaded from the BAA VSS website. This copy is seen as a 'living document' and will be updated as necessary. We will welcome comments on the Handbook, including suggestions for additions and amendments.

A stapled, colour photocopied, hard copy can be obtained by contacting me.

The strange case of SS Lacertae

The GCVS database classifies SS Lacertae as an EA/D eclipsing binary system with a period of 14.4178 days. The depths of the primary and secondary minima were 0.5 magnitude.

However, there have been no eclipses since around 1944. There have been a number of attempts to explain the mysterious cessation. The mystery seems to have been resolved in 2000.[1]

It was established that the system is still a spectroscopic binary. A study of photographic plates from 1911 showed that the amplitude of the eclipse actually, steadily, decreased during this period. All the evidence allowed a model of the system to be created that demanded a third body that through gravity altered the orientation of the system with respect to Earth. The primary eclipse ceased in 1937, and the secondary eclipse around 1950.

The model predicts that eclipses will be resumed in about 2300 which is something for a future generation of amateur astronomers to look forward to.

References

1. The Cessation of Eclipses in SS Lacertae: The Mystery Solved. Guillermo Torres and Robert P. Stefanik 2000 The Astronomical Journal Vol.119, issue 4, pp. 1914 - 1929.

I found after writing this that ten years ago in VSSC No 109, September 2001,p.16, Tristram Brelstaff wrote about this paper soon after it came out, refering to one other paper[2], which covered remeasuring and reanalysing all available data and showed that the eclipses of SS Lac probably started in 1885.

2. Analyses of the Currently Non-eclipsing Binary SS Lacertae or SS Lacertae's Eclipses. E. F. Milone et al, Astron. J., 119, 1405-1423 (2000)

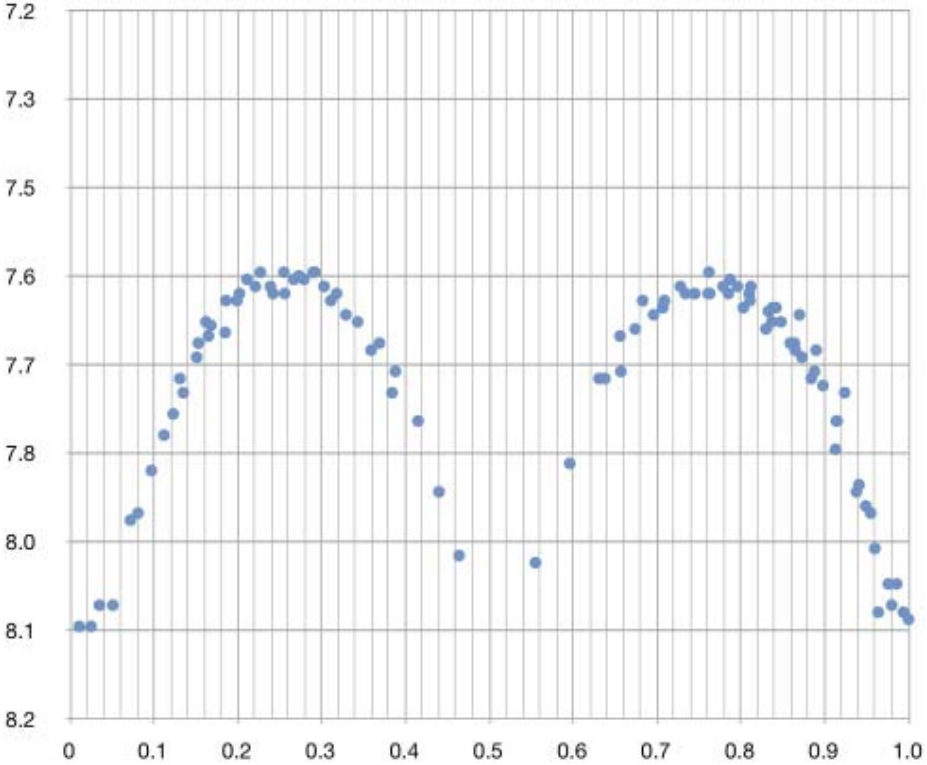
Preliminary Results: The period of V566 Ophiuchi

On a recent visit to La Palma in the Canaries I was able to make 110 DSLR photometry unfiltered measurements of the magnitude of theV566 Ophiuchi V566 Ophiuchi system. On the phase diagram below magnitude is the vertical axis. Each dot represents the analysis of ten images. The settings for Canon 450D camera with a 100 mm lens were ISO 800, F2.8 and an exposure of 5 seconds.

As you will see the project to determine new elements was not fully completed. More measurements will have to be made around the secondary minimum.

The measurements around the primary minimum suggest that the eclipse is occurring slightly later than predicted. The latest elements, quoted on the Krakow website, state that the period is 0.4096567 days. The measurements below suggest a period of 0.4096572 days. The O/C diagram on the Krakow website, which was constructed to much earlier measurements, indicates that by 2011 the period will have increased by 0.1978 days, which is supported by this latest period.

Figure 1: Phase diagram of V566 Ophiuchi



Two Eclipsing Binaries for the Winter

SW Lacertae

This is on our Eclipsing Binary Programme. It is an EW class overcontact system with a period of just 0.32072 days and is in eclipse all the time. Such a short period means that it goes from maximum to minimum in just 1.92 hours. The depth of the primary eclipse is 0.9 magnitude and the secondary 0.8 varying from 8.5 to 9.4 magnitude. The system is composed of similar sun like stars.

The system is on our list because of variations in the shape of the light curve and in the

depths of minima and heights of maxima. The most probable cause of such variations are giant star spots which in turn are due to the complex magnetic fields of stars in close proximity.

ER Orionis

This is also on our programme and is particularly easy to find as it is very near Rigel. It is an EW system with a period of 0.4234135 days, varying from 9.3 to 10.1 magnitude. It is thus in continuous eclipse. The depths of the primary and secondary eclipses are equal at 0.7 magnitude.

This system has made it on to our list as there are variations in the light curve.

Charts for systems can be obtained by contactingmyself:
desloughney@blueyonder.co.uk

"PERIODICITY" IN RECURRENT NOVAE ?

TONY MARKHAM

BAA Journal Volume 73, Number 7, included a summary of a talk given by VSS Director R. G. Andrews at the BAA meeting of 1963 March 27th. This covered a suggestion put forward the previous year by M. Friedjung regarding a pattern in the intervals between Recurrent Nova outbursts:

In the Journal, Vol 72, No 6, Mr Friedjung had noted a basic period of 2230 days for recurrent novae. For instance, T Coronae Borealis had showed maxima at a period of 13 x 2230 days ; RS Ophiuchi 4 x 2230 days ; T Pyxidis 2,3,5 x 2230 days and U Scorpio 7 and 5 x 2230 days. It seemed, therefore, that every 2230 days a "crisis" set in with these stars; if the ciritical stage was passed, an outburst resulted. Mr Friedjung's paper has been criticised by Dr Churchhouse in Vol 73, No 2 of the Journal and had given his view that not enough maxima had been seen to enabled any conclusions to be reached. Mr Friedjung had replied, in effect, 'Wait and see!' and now, obligingly, on plates taken in August, VY Aquarii had shown another maximum, fitting in well with the 2230-day period; it was in fact 9 times this basic period. Mr Andrews said that he felt that recurrent novae should now be watched very closely indeed, since the idea of a basic period was starting to look very credible …

Of course, with many more recurrent nova outbursts having been detected, we now know that the apparent 2230 day period (approx 6 years 40 days) was spurious – the recent T Pyx outburst occurred approx 44.4 years after the previous outburst, nowhere close to a multiple of 2230 days.

A big problem is knowing whether the above pattern could occur by chance. Friedjung quoted a probability of 0.0008. Churchhouse suggested that this was just the probability of the "period" being 2230 days, but the true probability remained unclear. Can any readers suggest the correct probability for 7 out of 10 intervals being close to a multiple of any number of days?

MEMORIES OF TOM CRAGG

John Toone

Tom Cragg

Photograph supplied by Elizabeth Waagen of the AAVSO.

I was very much saddened to hear that Tom Cragg passed away on the 6th May 2011. I have met Tom on four occasions and each time resulted in enthralling conversation about astronomy in general, and variable stars in particular. Tom was the first AAVSO observer I met, and I consider myself fortunate that he happened to be one of the very best visual observers of the twentieth Century. Of the USA born variable star observers only Wayne Lowder, John Bortle, and Edward Oravec have exceeded Tom's total of 166,059 observations, which commenced in 1945. Tom joined the AAVSO at aged 17 in the same year and fortuitously forged a career of being night assistant at two of the World's major observatories. He was employed at Mount Wilson between 1952 and 1976, and then at Siding Spring from 1976 to 1993. It was at Siding Spring Observatory that I first met Tom (VSS Circular 146, December 2010, page 21 refers) in 1986. Whilst at Mount Wilson Tom had the opportunity to use the 100″ Hooker telescope visually, and it was with this instrument that he reported a shadow transit of a Uranian satellite by visual means. Between 1965 and 1976 Tom also used the Ford Observatory in California which was at an altitude of 7,474 feet and was equipped with an 18″ reflector. With this instrument Tom was regularly making 100+ observations per night and visual estimates

fainter than magnitude 17.0. Tom had a particular interest in U Geminorum and would on occasion make up to 30 estimates per night in an attempt to record eclipses at minimum light. Whilst doing this work he saw flickering on at least one occasion which made his attempt to secure reliable magnitude estimates impossible. Summaries of Tom's work at the Ford Observatory are recorded in the observatory logbook which can be accessed at:

http://www.aavso.org/ford-observatory-log-book-pages

Following his retirement I also met Tom in Coonabarabran, Australia in 1999 (VSS Circular 101, September 1999, page 12 refers) and at AAVSO meetings in Huntsville in 2000 and Boston in 2001. Each time we met we had lengthy discussions on charts and sequences, and how sequences in particular could be improved. I regard Tom as being the main advocator for wholesale sequence improvement within the AAVSO prior to Mike Simonsen's appearance in 2001. Tom was a very exacting visual observer and his precision skills demanded accurate sequences, which were unfortunately not always available to him especially for southern hemisphere variable stars. The fact that Tom was observing to a fainter level than most other visual observers made the problem more acute. When we observed X Leonis together at Siding Spring in 1986 our estimates were logged separately as 0.4 magnitude different (15.9 and 16.3) but in reality we were only 0.1 magnitude apart and the exaggerated discrepancy was purely down to the differing AAVSO and BAA VSS sequences employed. Tom and I were resolved that something had to be done to improve sequences as soon as adequate photometry became available, but unfortunately that was not to happen until the 21st Century. Not surprisingly at the 2000 AAVSO meeting where there was a high international representation, Tom was a positive driving force for the formation of the International Chart Working Group which by 2002 had established clear guidelines for standardising sequences using modern accurate photometry.

Tom also had interests in many non astronomical subjects and I recollect the following memorable events:

1. Tom was an accomplished musician and a stylish flute player in particular. He certainly put on quite a show with the support of Rhona Fraser to entertain myself and Robert McNaught during a break from observing at Siding Spring in1986.
2. At the AAVSO meeting in 2001 Tom told me about his trip to Europe where he visited the area of the battle of Jutland in the North Sea because he had a keen interest in naval history. Tom explained to me his knowledge of what was the largest ever battleship engagement which took place in 1916. Arne Henden who was within earshot chipped in with Vice-Admiral Beatty's words "there seems to be something wrong with our bloody ships today" when a third Royal Navy battle-cruiser blew up. Tom instantly recognised the phrase which resulted in the expansion and intensification of the conversation.

The remote Australian outback town of Coonabarabran which is well known for serving the Siding Spring Observatory has just acquired a permanent star in the form of Tom's grave whose legacy will be retained within the AAVSO and beyond for years to come.

The photo on page 10 was taken by Ron Royer at the 2001 AAVSO meeting..

Tom, Janet Mattei and myself at the 2001 AAVSO meeting.

SN 2011BY - A TYPE 1A SUPERNOVA IN NGC 3972 DISCOVERED BEFORE MAXIMUM

DAVID BOYD

This supernova in the galaxy NGC 3972 in Ursa Major was first reported by the Central Bureau in CBET 2708. It was discovered on 2011 April 26.8 UT by Zhangwei Jin, and Xing Gao in China, using a C14 and unfiltered CCD camera. Its discovery magnitude was given as 14.2 and its position as RA 11:55:45.56 Dec +55:19:33.8 (J2000.0), 5.3" east

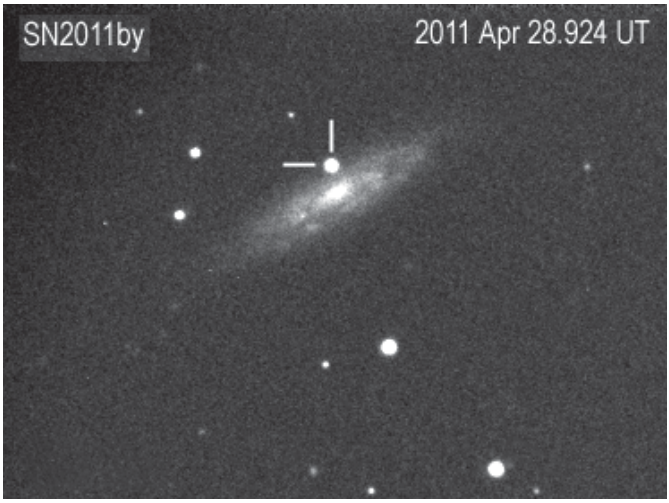


Figure 1: SN 2011by 2 days after discovery at V=14.18, stack of 11 x 60sec images.

and 19.1" north of the centre of the galaxy. Spectra obtained on 2011 April 27.5 UT with a 2.16-m telescope by T. Zhang, Z. Zhou and X. Wang showed it to be a type 1a supernova about 10 days before maximum. It was then given the designation SN 2011by. Given the cosmological importance of type 1a supernovae as potential standard candles, it is important to obtain as complete light curves as possible, particularly if they are discovered well ahead of maximum.

I received AAVSO Alert Notice 438 about the discovery in the early evening of April 28. Through a gap in the passing clouds, I was able to image the SN that night using a 0.35-m SCT and SXVR-H9 CCD with V and R filters, and reported the magnitudes as V=14.18, R=14.04 (Figure 1). Magnitudes were calculated using comparison stars published by the AAVSO. I followed it as it quickly brightened to a maximum of V=12.92 on May 9, and then slowly faded. I eventually lost it behind trees low in the north-west in the middle of August.

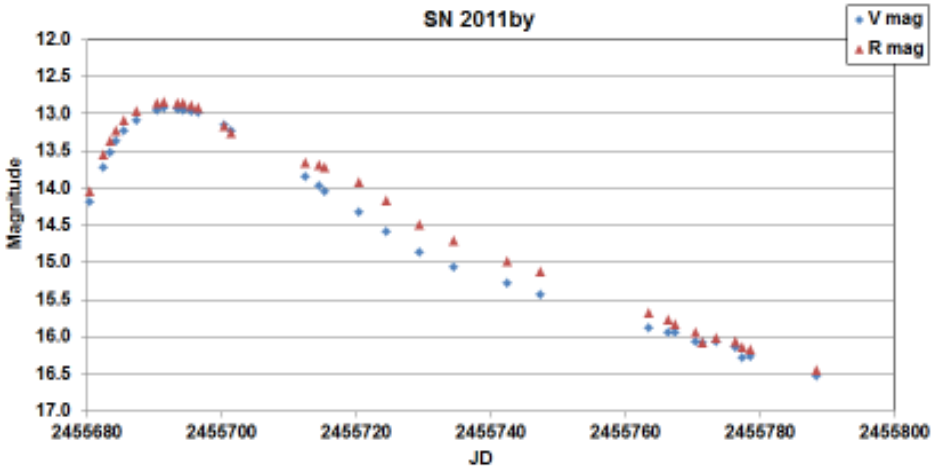


Figure 2: V and R light curves of SN 2011by.

Figure 2 gives V and R light curves which clearly show a red excess as the SN faded and Figure 3 shows the V-R colour index with more positive values of V-R indicating increasing redness. The reddening reaches a maximum about 30 days after the light curve maximum. The larger scatter towards the end of the V-R light curve is because of the increasing measurement errors on the V and R magnitudes as the SN fades.

According to (1), type 1a SN often show a secondary maximum in infrared light probably due to the release of residual energy trapped within the photosphere as the opacity of the ejecta declines. This appears to be a text-book case with the maximum of the reddening phase coming at about the expected time after maximum.

Reference

(1) Pinto P.A. & Eastman R.G., Astrophysical Journal, 530, 757 (2000)

Figure 3 is on page 12

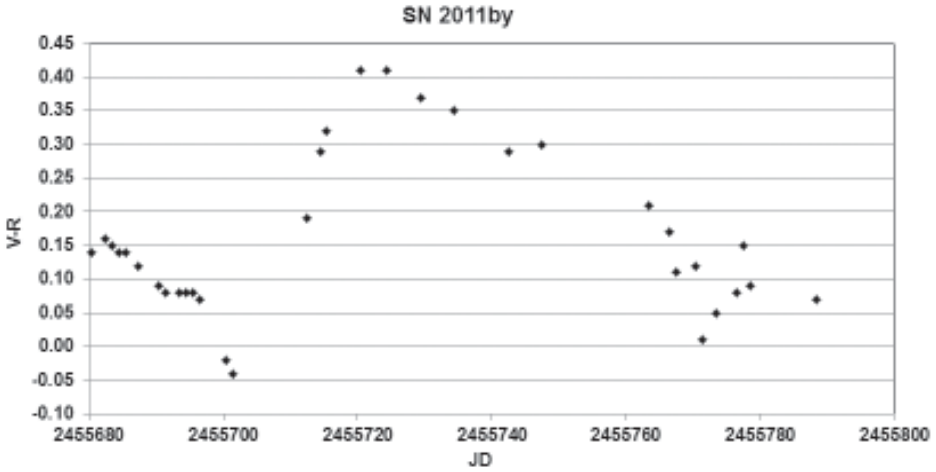


Figure 3: V-R colour index of SN 2011by.

RY URSAE MAJORIS

MELVYN TAYLOR

RA 12h 21m, Dec. +61° 19' (2000), SRB, magnitude 6.7 to 8.3, period 310d? [GCVS] M3III. One the best semi-regulars on the binocular programme, this well covered circumpolar variable is highlighted via the light curves from 1979 to 2003. Typical SR variations are evident, and a cursory examination of a mean (primary) period, where several are evident, is about 294d. A mean visual range is 6.9 to 8.2, with maxima ranging by 0.6 magnitude (6.9-7.5), and minima 0.7 magnitude (7.5-8.2).

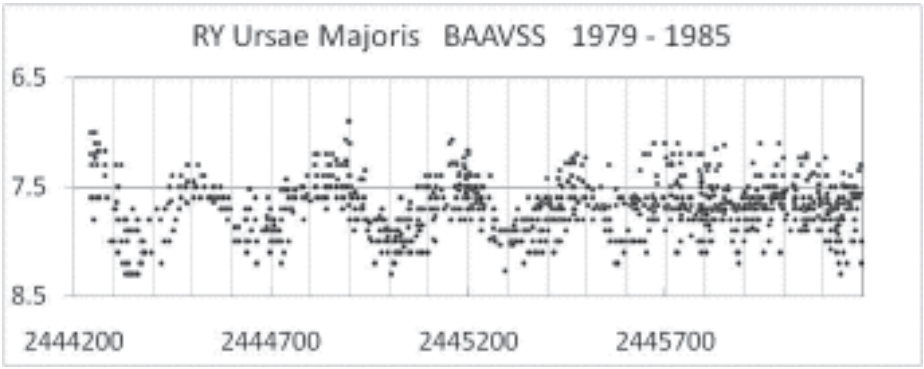
The irregular and smaller changes are up to about 0.5mv. Observers have suggested that these temporary intervals of stability or small change may dampen their enthusiasm in following the 'red variables', yet with time and a stoic-like attitude it is possible to produce a preliminary summary as here. Light curves show visual magnitude against Julian Date. [JD 2444200 = 1979 May 06, JD 2446400 = 1985 Dec 01, JD 2448600 = 1991 Dec 09, JD 2450800 = 1997 Dec 17]

The binocular chart with sequence no. 217.02 also identifies the SRA type Z Ursae Majoris (6.2 to 9.6, period 196d, SRB and T Ursae Majoris(6.6 to 14.0, period 257d, M) both on VSS programmes. S Ursae Majoris another long period variable is also shown.

It is only fitting to list and thank the observers whose observations have been plotted – every estimate in this interval of time. Instruments used were mainly of 50mm to 80mm aperture.

Observers of RY Ursae Majoris 1979 - 1997

Albrighton Baransky Brelstaff Britton Brown Chaplin Chapman Charleton Clayton Conner Currie Day	Ells Espey Evans Farrer Fleet Forno Fraser Freeman Geddes Gough Granslo Hapgood	Harper Hather Henshaw Higgs Hoare Hornby Howarth Hufton Hurst Isles Jackson Jobson Johnston	Kennedy Kiernan Kucinskas Livesey Livingstone Lubek Markham Marriott Mason McInnery Middlemist Morell Mormyl Nartowicz Nicholls	O'Neill Parkinson Pickard Pickup Pointer Poxon Quadt Ramsey Robinson Saville Scowen Shanklin Simmons Smith Spooner	Steele Stephanopoulos Stott Swain Tanti Taylor Toone Wildey Wilson Wise Worraker Young Yusuf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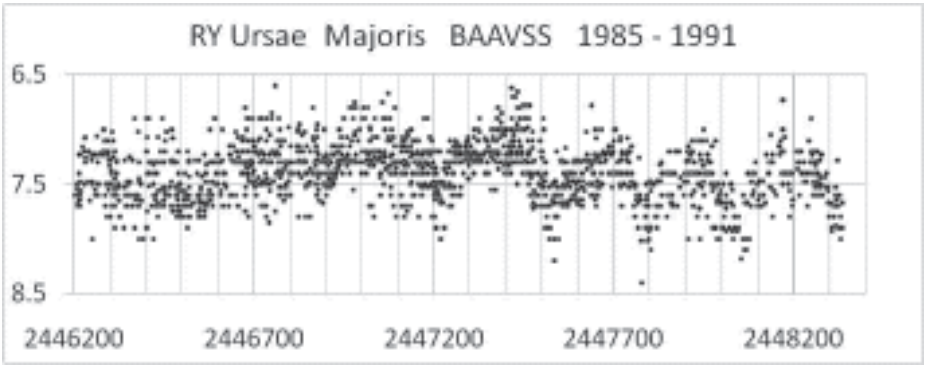
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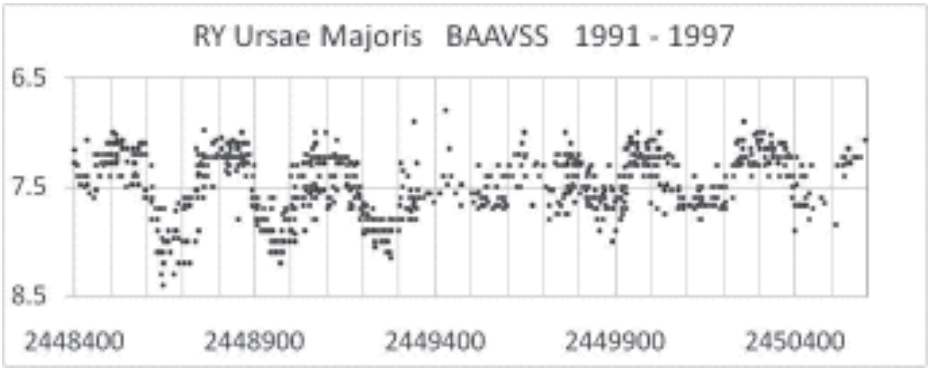
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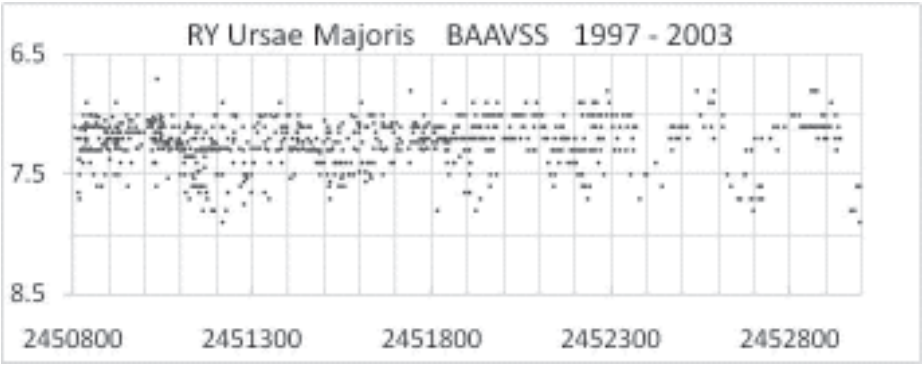


SUPERNOVA 2011FE in M101

Denis Buczynski and Janet Simpson

Peter Nugent et al reported in Astronomer's Telegram No. 3581 on 24th August 2011 at 23:47 UT[1]:

"*The Type Ia supernova science working group of the Palomar Transient Factory (ATEL #1964) reports the discovery of the Type Ia supernova PTF11kly at RA=14:03:05.81, Dec=+54:16:25.4 (J2000) in the host galaxy M101. The supernova was discovered on Aug. 24 UT when it was at magnitude 17.2 in g-band (calibrated with respect to the USNO catalog). There was nothing at this location on Aug 23 UT to a limiting magnitude of 20.6. A preliminary spectrum obtained Aug 24 UT with*" the Fibre-fed RObotic Dual-beam Optical Spectrograph, "*FRODOSPEC on the Liverpool Telescope indicates that PTF11kly is probably a very young Type Ia supernova: Broad absorption lines (particularly Ca II IR triplet) are visible. The presence of an H-alpha feature is confidently rejected. STIS/UV spectroscopic observations on the Hubble Space Telescope are being triggered by the ToO program "Towards a Physical Understanding of the Diversity of Type Ia Supernovae" (PI: R. Ellis). Given that the supernova should brighten by 6 magnitudes, the strong age constraint, and the fact that the supernova will soon be behind the sun, we strongly encourage additional follow-up of this source at all wavelengths.*"

A chart can be plotted on the AAVSO website to the designation SN 2011fe, or the objects coordinates.[2]

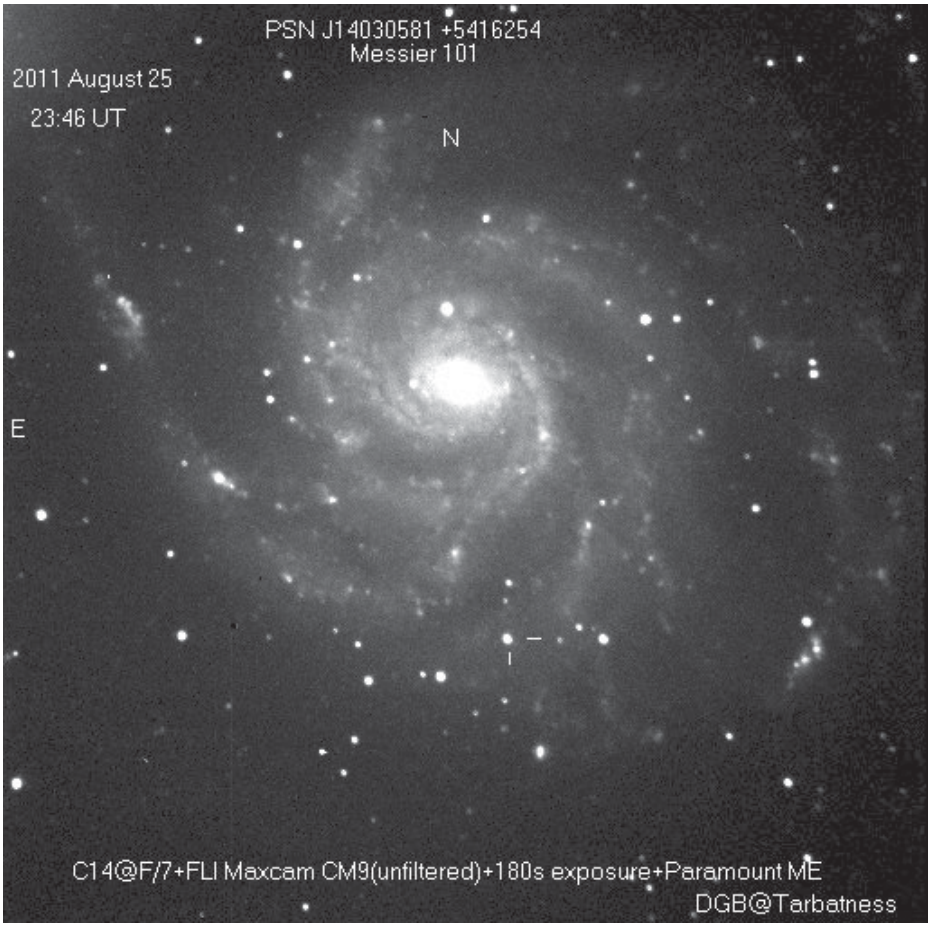
On the 29th August Robin Leadbeater reported "*this supernova is now at magnitude 11.5 and still rising. An amateur spectrum by Jim Edlin shows a clear Type Ia signature with a strong broad Si absorption line.*"[3] "*The spectrum was taken with C14, Atik 314L, and LISA spectrograph on 2011-08-29.19.*"[4] It can be seen at:

http://groups.yahoo.com/group/spectro-l/attachments/folder/183247248/item/1863856757/view

James Edlin said the supernova was "*quite bright for the LISA. I would estimate it to be about magnitude 12.*"[4]

Currently SN 2011fe has been reported as 10.5 vis Sep 2.283; and 10.530 I Sep 2.2074[5]

Photograph of SN 2011fe in M101taken by Denis Buczynski.



After measuring the image, Denis derived the following data:
Field of image is 16.4 x 16.4 arc minutes.
Scale of image is 1.9 arc seconds per pixel.
Position of SN 2011fe, RA 14h 03m 05.76s, Dec +54° 16' 25.6"
On August 25th 23.46 UT, Magnitude R = 13.6

References

1: *http://www.astronomerstelegram.org/?read=3581*
2: *http://www.aavso.org/vsp*
3: *http://tech.groups.yahoo.com/group/staranalyser/message/2222*
4: *http://tech.groups.yahoo.com/group/spectro-l/message/11046*
5: AAVSO Quick Look: *http://www.aavso.org/ql*

THE VISUAL OBSERVING EXPERIMENT NO 2

JOHN TOONE

The 'visual observing experiment' undertaken at the VSS Variable Star Workshop at Edinburgh on the 18th October 2008 (refer to VSS Circular No 139, March 2009, pages 38 to 42) was repeated at the VSS Variable Star Workshop at Hampshire on 13th March 2010.

As with the original experiment (referenced hereafter as Experiment No 1) the objectives were:

1. To establish an indication of the normal range (scatter) of visual data for red variable stars using the latest sequences comprising non red comparison stars from the Hipparcos and Tycho catalogues.

2. To calculate a personal equation figure for the individuals participating in the experiment and establish how much the personal equation contributes to the scatter in the data.

Five red variable stars were selected for the experiment. Colour images of the binocular field of each variable star were projected, and volunteer participants were invited to make visual magnitude estimates by comparison with the latest VSS charts/sequences which were also projected. Each participant then filled in the standard VSS observation report form with their 'visual estimates' of the five variable stars which were: V Canum Venaticorum, AG Pegasi, R Serpentis, Z Ursae Majoris and RY Ursae Majoris.

The thirteen male, and three female participants, consisted of a range of seasoned veteran observers (200,000+ visual observations) to complete novices. The age range was also extensive in the region of thirty to seventy years. Some of the participants were CCD observers more used to measuring black images on a white background. The participants were predominantly English, whereas the participants in Experiment No 1 had been predominantly Scottish. (I was not expecting this to have a bearing on the results but it was noted anyway).

The red variable stars had an average B-V of +1.4, over a range of +1.2 to +1.8 according to the Hipparcos and Tycho catalogues. The comparison stars used were generally non red with an average B-V value of +0.8, and a range of +0.2 to +1.2. The average B-V difference between the comparison stars and the variable stars was therefore 0.6 magnitude which would in theory [using the Howarth and Bailey formula $mv = V + 0.159(B-V)$] result in an average visual estimate (mv) being 0.1 magnitude fainter than an equivalent CCDV measurement.

The individual estimates from the experiment are listed in following 'Estimate Table' for each star, and the resultant magnitudes are averaged out.

Name	V CVn	AG Peg	R Ser	ZUMa	RYUMa
Nick Aitkinson	H(1)V(1)K=8.1	J(1)V(1)K=8.5	E(3)V(1)G=7.1	=E = 8.4	
David Boyd	G(1)V(3)H=7.2	=J = 8.2	E(3)V(1)G=7.1	=D = 7.9	1(1)V(1)2=7.1
David Briggs	=G = 7.0	J(1)V(4)K=8.3	E(2)V(1)G=7.0	=D = 7.9	1(1)V(2)2=6.9
Ann Davies	G(3)V(2)H=7.4	G(2)V(1)J=8.0	E(3)V(1)G=7.1	=E = 8.4	1(2)V(1)2=7.2
Gill England	G(2)V(1)H=7.5	G(2)V(2)K=8.2	E(2)V(3)G=6.7	C(2)V(1)D=7.8	=2 = 7.4
Guy Hurst	G(1)V(2)H=7.2	J(1)V(1)K=8.5	E(4)V(1)G=7.1	C(3)V(1)D=7.8	=2 = 7.4
Des Loughney	G(3)V(1)H=7.5	J(1)V(2)K=8.4	E(4)V(1)G=7.1	D(1)V(4)E=8.0	1(3)V(1)2=7.2
John Mallett	=G = 7.0	=J = 8.2	E(4)V(1)G=7.1	C(2)V(1)D=7.8	=2 = 7.4
Tony Markham	G(1)V(4)H=7.1	J(1)V(4)K=8.3	E(2)V(1)G=7.0	C(4)V(1)D=7.8	1(1)V(2)2=6.9
Michael McCabe	=G = 7.0	=J = 8.2	=G = 7.3	=D = 7.9	=2 = 7.4
Hazel McGee		J(1)V(3)K=8.3	E(3)V(2)G=6.9	D(1)V(2)H=8.2	1(2)V(1)4=7.4
Brian McInnerny	G(1)V(2)H=7.2	G(1)V(1)J=7.9	=G = 7.3	C(2)V(1)D=7.8	1(2)V(1)2=7.2
Roger Pickard	=G = 7.0	=J = 8.2	E(4)V(1)G=7.1	C(4)V(1)D=7.8	=2 = 7.4
Gary Poyner	B(4)V(1)G=6.8	J(2)V(2)K=8.5	E(4)V(1)G=7.1	C(3)V(1)D=7.8	2(1)V(2)4=7.5
Tom Saville	B(3)V(1)G=6.7	J(1)V(4)K=8.3	=F, G+2 = 7.0	D(1)V(1)E=8.2	2(1)V(2)4=7.5
Geoff Thurston	=G = 7.0	J(5)V(1)K=8.6	E(4)V(1)G=7.1	C(3)V(2)D=7.8	1(4)V(1)2=7.3
Range	6.7 to 8.1	7.9 to 8.6	6.7 to 7.3	7.8 to 8.4	6.9 to 7.5
Average	7.18	8.29	7.07	7.96	7.28

Estimate Table

With the exception of V Canum Venaticorum the full range of estimates for each variable was between 0.6 and 0.7 magnitude. This was almost identical to Experiment No 1 which recorded a range of 0.5 to 0.7. This confirms that the benchmark for scatter for moderately

red variable stars is 0.7 magnitude. Like with Experiment No 1 the participants had difficulty with V Canum Venaticorum where the range was double at 1.4 magnitude. This was considered to be a result of the photographic image used in the experiment. The average magnitudes from the two experiments were compared as follows:

Star	V CVn	AG Peg	R Ser	ZUMa	RYUMa
Experiment No 1	6.93	8.21	6.89	7.89	7.19
Experiment No 2	7.18	8.29	7.07	7.96	7.28
Difference	-0.25	-0.08	-0.18	-0.07	-0.09

So the participants in Experiment No 2 were on average consistently recording estimates 0.1 magnitude fainter than the participants in Experiment No 1. This could mean that Scottish observers are perhaps less red sensitive which is logical considering the predominant blue colour of the cross of St Andrews flag. On the other hand (more realistically) it might be due to the respective room illumination levels where sunlight was penetrating the room in Experiment No 2.

The individual observer deviations from the mean magnitude for each star (apart from V CVn where the image was deemed flawed and the estimates unreliable) were then calculated and are tabulated below. The average individual deviation was then calculated to give a guide to each observer's position relative to the overall mean value (in other words their personal equation for red variable stars using non red comparison stars). A positive deviation means brighter than average and a negative deviation means fainter than average. The full range for all participants was between Tony Markham at +0.18 (bright) and Nick Aitkinson at -0.20 (faint). So the total average deviation range was 0.38 magnitude and the extreme deviation range for any single observer was 0.7 magnitude. Both Ann Davies and Des Loughney had calculated mean deviations of zero on the mv scale.

See following Personal Equation Table

The estimates and personal equation figures were examined to see if there were any major trends with respect to the participant's age or gender. The only item of note was that the female participants recorded mean personal equation figures across the full range (0.56 mag) whereas the male participants were concentrated very much in the mid range (just 0.23 mag). To establish whether this is a real gender effect would require further and more extensive sampling.

Continued on page 21

Name	AG Peg	R Ser	ZUMa	RYUMa	Range mv	Average mv
Nick Aitkinson	-0.2	0	-0.4		0.0 to -0.4	-0.20
David Boyd	+0.1	0	+0.1	+0.2	+0.2 to 0.0	+0.10
David Briggs	0	+0.1	+0.1	+0.4	+0.4 to 0.0	+0.15
Ann Davies	+0.3	0	-0.4	+0.1	+0.3 to -0.4	0.00
Gill England	+0.1	+0.4	+0.2	-0.1	+0.4 to -0.1	+0.15
Guy Hurst	-0.2	0	+0.2	-0.1	+0.2 to -0.2	-0.03
Des Loughney	-0.1	0	0	+0.1	+0.1 to -0.1	0.00
John Mallett	+0.1	0	+0.2	-0.1	+0.2 to -0.1	+0.05
Tony Markham	0	+0.1	+0.2	+0.4	+0.4 to 0.0	+0.18
Michael McCabe	+0.1	-0.2	+0.1	-0.1	+0.1 to -0.2	-0.03
Hazel McGee	0	+0.2	-0.2	-0.1	+0.2 to -0.2	-0.03
Brian McInnerny	+0.4	-0.2	+0.2	+0.1	+0.4 to -0.2	+0.13
Roger Pickard	+0.1	0	+0.2	-0.1	+0.2 to -0.1	+0.05
Gary Poyner	-0.2	0	+0.2	-0.2	+0.2 to -0.2	-0.05
Tom Saville	0	+0.1	-0.2	-0.2	+0.1 to -0.2	-0.08
Geoff Thurston	-0.3	0	+0.2	0	+0.2 to -0.3	-0.03
Range mv	0.4 to -0.3	0.4 to -0.2	0.2 to -0.4	0.4 to -0.2		

Personal Equation Table

Continued from page 19

In summary the principle findings of Experiment No 2 are as follows:

1. For moderately red (B-V +1.4) variable stars using non red (B-V +0.8) comparison stars under identical conditions and instrumentation, the scatter in visual data is no more than 0.7 magnitude (identical result to Experiment No 1).

2. Half of the scatter (0.38 magnitude) can be accounted for by the personal equation range which is +0.18 to -0.20 magnitude in mv (reduced figure than for Experiment No 1). The remaining scatter (0.32 mag) is the errors normally to be expected in visual observations.

This limited experiment has further helped to quantify the effects on visual data that red variable stars impose and I am grateful to all of the volunteer participants at the Variable Star Workshop in Hampshire for their most invaluable input. In the future it is intended to do a similar exercise for blue/white variables (B-V -0.2 to +0.4) to quantify how much the personal equation changes across the full colour range. So please can members be prepared to participate in Visual Observing Experiment No 3 at a future VSS meeting.

IBVS 5956 - 5995

JANET SIMPSON

5957 Time-Resolved Spectroscopy of the Polar RBS 0324 =1RXS J023052.9-684203. (Cieslinski et al, 2010)
5958 CCD Times of Minima of Eclipsing Binaries and Maxima of Pulsating Stars. (Liakos and Niarchos, 2010)
5959 BAV-Results of Observations - Photoelectric Minima of Selected Eclipsing Binaries and Maxima of Pulsating Stars. (HUBSCHER and Monninger, 2011)
5960 Timings of Minima of Eclipsing Binaries. (Diethelm, 2011)
5961 USNO-A2.0 1425-04279615 and USNO-A2.0 1425-04280420: Two New Short-Period Eclipsing RS CVn Variables. Solovyov et al, 2011
5962 Study of the Eccentric-Orbit Binary GSC 03152-01202. (Bloomer et al, 2011)
5963 Photometric Analysis and Evidence for a Third, Dwarf Component in the FY Boo System. (SAMEC et al, 2011)
5964 Photometric Variability of the Chemically Peculiar Hot Subdwarf LS IV -14 116. (Jeffery, 20 January 2011)
5965 Minima Times of Some Eclipsing Binary Stars. (DEMIRCAN et al, 2011)
5966 CCD Minima for Selected Eclipsing Binaries in 2010. (Nelson, 2011)
5967 New Multicolour CCD Photometric Analysis of BI CMi. (LIAKOS and NIARCHOS, 2011)
5978 Periodicities of a Nova-Like Cataclysmic Variable Star RX J1951.7+3716. (Zubareva and Antipin, 2011)

5969 The 80th Name-List of Variable Stars. Part I - RA 0h to 6h. (Kazarovets et al, 2011)
5970 The Absolute Dimensions of CU Sge. (Nelson et al, 2011)
5971 Differential Photometry of 2MASS J09440940-5617117. (Silva et al, 2011)
5972 New Times of Minima of Some Eclipsing Variables. (Lacy, 2011)
5973 New Radial Velocities of Some Semi-Regular Variable Stars. (Aslan, 2011)
5974 Times of Minima for Eclipsing Binaries 2010. (Dvorak, 2011)
5975 A 116 Year Record of Mass Transfer in R Arae. (Reed, 2011)
5976 V974 Cyg - A Triple System with Apsidal Motion. (Volkova and Volkov, 2011)
5977 Maxima of High-Amplitude Delta Scuti Stars. (Wils et al, 2011)
5978 Photoelectric Minima of Some Eccentric Eclipsing Binary Systems. (Bozkurt, 2011)
5979 New and Unpublished Times of Minima of Eclipsing Binary Systems. (Borkovits et al, 2011)
5980 Minima Times of Selected Eclipsing Binaries. (Parimucha et al, 2011)
5981 A Search for Period Changes in Long Period Variables. (LEBZELTER and ANDRONACHE, 2011)
5982 The Eclipsing Cataclysmic Variables PHL 1445 and GALEX J003535.7+462353. (Wils et al, 2011)
5983 On the Optical Variations of AH Herculis. (Spogli et al, 2011)
5984 BAV-Results of Observations - Photoelectric Minima of Selected Eclipsing Binaries and Maxima of Pulsating Stars. (HUBSCHER, 2011)
5985 PQ Ser Unveiled - Not a Cataclysmic Variable. (Kafka and Honeycutt, 2011)
5986 The GEOS RR Lyr Survey. (Le Borgne et al, 2011)
5987 MOST Satellite Photometry of Regulus. (Rucinski et al, 2011)
5988 CCD Times of Minima of Some Eclipsing Variables. (Dogru et al, 2011)
5989 Rotational Variability in Pre-Main-Sequence Stars: TWA 6 in 2008. (LAWSON and CRAUSE, 2011)
5990 CCD Times of Minima of Eclipsing Binaries and Maxima of Pulsating Stars. (Liakos and Niarchos, 2011)
5991 V407 Peg and LU Vir: Two Contact Binaries with Displaced Secondary Minima. (ZASCHE, 2011)
5992 Timings of Minima of Eclipsing Binaries. (Diethelm, 2011)
5993 Hen2-446 - a B[e] star with a variable V/R ratio. (Kondratyeva, 2011)
5994 V456 Cyg - A Detached Eclipsing Binary. (Nelson, 2011)
5995 UBVRI observations of the flickering of the symbiotic star MWC 560. (Zamanov et al, 2011)

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/issues.html*

BINOCULAR PRIORITY LIST

MELVYN TAYLOR

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

Variable		RA (2000) Dec	Range	Type	Period	Chart	Prog
AQ	***And***	00 28 +35 35	8.0-8.9	SR	346d	303.01	
EG	***And***	00 45 +40 41	7.1-7.8	ZAnd		072.02	
V	***Aql***	19 04 -05 41	6.6-8.4	SRb	353d	026.04	
UU	***Aur***	06 37 +38 27	5.1-6.8	SRb	234d	230.02	
AB	***Aur***	04 56 +30 33	6.7-8.4	Ina		301.01	
V	***Boo***	14 30 +38 52	7-12	Sra	258d	037.01	
RW	***Boo***	14 41 +31 34	7.4-8.9	SRb	209d	104.01	
RX	***Boo***	14 24 +25 42	6.9-9.1	SRb	160d	219.01	
ST	***Cam***	04 51 +68 10	6.0-8.0	SRb	300d?	111.02	
XX	***Cam***	04 09 +53 22	7.3-9.7	RCB		068.01	T/B
X	***Cnc***	08 55 +17 04	5.6-7.5	SRb	195d	231.01	
RS	***Cnc***	09 11 +30 58	5.1-7.0	SRc	120d?	269.01	
V	***CVn***	13 20 +45 32	6.5-8.6	SRa	192d	214.02	
WZ	***Cas***	00 01 +60 21	6.9-8.5	SRb	186d	1982Aug16	
V465	***Cas***	01 18 +57 48	6.2-7.8	SRb	60d	233.01	
γ	***Cas***	00 57 +60 43	1.6-3.0	GCAS		064.01	
Rho	***Cas***	23 54 +57 29	4.1-6.2	SRd	320d	064.01	
W	***Cep***	22 37 +58 26	7.0-9.2	SRc		312.01	
AR	***Cep***	22 52 +85 03	7.0-7.9	SRb		1985May06	
Mu	***Cep***	21 44 +58 47	3.4-5.1	SRc	730d	112.01	
O	***Cet***	02 19 -02 59	2.0-10.1	M	332d	039.02	T/B
R	***CrB***	15 48 +28 09	5.7-14.8	RCB		041.04	T/B
W	***Cyg***	21 36 +45 22	5.0-7.6	SRb	131d	062.03	
AF	***Cyg***	19 30 +46 09	6.4-8.4	SRb	92d	232.01	
CH	***Cyg***	19 25 +50 15	5.6-10.5	ZAnd+SR	97	089.03	
U	***Del***	20 46 +18 06	5.6-7.9	SRb	110d?	228.01	
EU	***Del***	20 38 +18 16	5.8-6.9	SRb	60d	228.01	
TX	***Dra***	16 35 +60 28	6.6-8.4	SRb	78d?	106.02	
AH	***Dra***	16 48 +57 49	7.0-8.7	SRb	158d	106.02	
NQ	***Gem***	07 32 +24 30	7.4-8.0	SR+ZAnd	70d?	077.01	
X	***Her***	16 03 +47 14	6.1-7.5	SRb	95d	223.01	
SX	***Her***	16 08 +24 55	8.0-9.2	SRd	103d	113.01	
UW	***Her***	17 14 +36 22	7.0-8.8	SRb	104d	107.01	
AC	***Her***	18 30 +21 52	6.8-9.0	RVA	75d	048.03	
IQ	***Her***	18 18 +17 59	7.0-7.5	SRb	75d	048.03	
OP	***Her***	17 57 +45 21	5.9-7.2	SRb	120d	1984Apr12	
R	***Hya***	13 30 -23 17	3.5-10.9	M	389d	049.02	T/B
RX	***Lep***	05 11 -11 51	5.0-7.4	SRb	60d?	110.01	
Y	***Lyn***	07 28 +45 59	6.5-8.4	SRc	110d	229.01	
SV	***Lyn***	08 84 +36 21	6.6-7.9	SRb	70d?	108.03	
U	***Mon***	07 31 -09 47	5.9-7.9	RVB	91d	029.03	
X	***Oph***	18 38 +08 50	5.9-9.2	M	328d	099.01	
BQ	***Ori***	05 57 +22 50	6.9-8.9	SR	110d	295.01	

Variable		RA (2000) Dec	Range	Type	Period	Chart	Prog
AG	***Peg***	21 51 +12 38	6.0-9.4	Nc		094.02	
X	***Per***	03 55 +31 03	6.0-7.0	GCas+Xp		277.01	
R	***Sct***	18 48 -05 42	4.2-8.6	RVA	146d	026.04	
Y	***Tau***	05 46 +20 42	6.5-9.2	SRb	242d	295.01	
W	***Tri***	02 42 +34 31	7.5-8.8	SRc	108d	114.01	
Z	***UMa***	11 57 +57 52	6.2-9.4	SRb	196d	217.02	
ST	***UMa***	11 28 +45 11	6.0-7.6	SRb	110d?	102.02	
VY	***UMa***	10 45 +67 25	5.9-7.0	Lb		226.01	
V	***UMi***	13 39 +74 19	7.2-9.1	SRb	72d	101.02	
SS	***Vir***	12 25 +00 48	6.9-9.6	SRa	364d	097.01	
SW	***Vir***	13 14 -02 48	6.4-8.5	SRb	150d?	098.01	

Updated 7th February 2010, M.T.

* *

ECLIPSING BINARY PREDICTIONS

DES LOUGHNEY

The following predictions, based on the latest Krakow elements, should be usable for observers throughout the British Isles. The times of mid-eclipse appear in parentheses, with the start and end times of visibility on either side. The times are hours UT, with a value greater than '24' indicating a time after midnight. 'D' indicates that the eclipse starts/ends in daylight; 'L' indicates low altitude at the start/end of the visibility, and '<<' indicates that mid eclipse occurred on an earlier date/time.

Please contact the EB secretary if you require any further explanation of the format.

The variables covered by these predictions are :

RS CVn	7.9 - 9.1V	AI Dra	7.2 - 8.2	U Sge	6.45 - 9.28V
TV Cas	7.2 - 8.2V	Z Vul	7.25 - 8.90V	RW Tau	7.98 - 11.59V
U Cep	6.8 - 9.4	Z Dra	10.8 - 14.1p	HU Tau	5.92 - 6.70V
U CrB	7.7 - 8.8V	TW Dra	8.0 - 10.5v	X Tri	8.88 - 11.27V
SW Cyg	9.24 - 11.83V	S Equ	8.0 - 10.08V	TX Uma	7.06 - 8.80V
V367 Cyg	6.7 - 7.6V	Z Per	9.7 - 12.4p	Del Lib	4.9 - 5.9
Y Psc	10.1 - 13.1	SS Cet	9.4 - 13.0	RZ Cas	6.3 - 7.9

Note that predictions for Beta Per and Lambda Tau can be found in the BAA Handbook.

For information on other eclipsing binaries see the website:
http://www.as.ap.krakow.pl/o-c/index.php3

Again please contact the EB secretary if you have any queries about the information on this site and how it should be interpreted.

October

2011 Oct 1 Sat
TX UMa....D19(14)19
S Equ.....D19(15)20
Z Per.....20(25)29D
RZ Cas.....22(24)27

2011 Oct 2 Sun
Y Psc.....00(05)04L
AI Dra.....D18(18)19
U CrB.....D18(20)22L
RW Tau.....L20(18)23
Z Dra.....20(23)25
SS Cet.....L21(17)21

2011 Oct 3 Mon
V367 Cyg...01(45)05L
RZ Cas.....03(05)05D
U Cep.....03(08)05D
TW Dra.....D18(14)19
Z Vul.....D18(20)25
SW Cyg.....D18(23)29
U Sge.....D18(24)25L
V367Cyg.D18(45)29L
AI Dra.....22(23)24

2011 Oct 4 Tue
TV Cas.....01(05)05D
Z Dra.....05(07)05D
TX UMa.D18(16)20L
V367Cyg.D18(21)29L
S Equ.....20(26)25L
Z Per.....21(26)29D

2011 Oct 5 Wed
AI Dra.....02(04)05
RS CVn....L04(05)05D
V367Cyg.D18(<<)29L
U Cep.....D18(19)24
Y Psc.....19(23)28
TV Cas.....21(25)29

2011 Oct 6 Thu
Z Vul.....01(07)02L
TW Dra.....04(09)05D
RZ Cas.....D18(19)22
Z Dra.....22(24)27

2011 Oct 7 Fri
TX UMa.D18(17)20L
TV Cas.....D18(20)25
RZ Cas.....21(24)26
Z Per.....23(28)29D

2011 Oct 8 Sat
RW Tau.....02(07)05D
U Cep.....02(07)05D
X Tri.....05(07)05D
SW Cyg.....D18(12)18
Z Vul.....D18(18)23
AI Dra.....D18(18)19
TW Dra.....24(29)29D

2011 Oct 9 Sun
RZ Cas.....02(05)05D
X Tri.....04(07)05D
TV Cas.....D18(16)20
Z Dra.....D18(17)20
Y Psc.....D18(18)22
U CrB.....D18(18)22L
RS CVn...D18(24)20L
HU Tau.....L21(17)21
AI Dra.....21(23)24

2011 Oct 10 Mon
RS CVn...L03(00)05D
X Tri.....04(06)05D
U Sge.....D18(18)24
TX UMa.D18(19)20L
U Cep.....D18(19)24
RW Tau.....21(25)29D
TX UMa...L23(19)24
Z Vul.....23(29)25L
Z Dra.....24(26)28

2011 Oct 11 Tue
Z Per.....00(05)05D
AI Dra.....02(03)05
X Tri.....03(05)05D
S Equ.....D18(23)25L
TW Dra.....19(24)29
HU Tau.....L20(19)22

2011 Oct 12 Wed
X Tri.....02(05)05D
RZ Cas.....D18(19)21
SW Cyg.....20(26)29D

2011 Oct 13 Thu
X Tri.....01(04)05D
U Cep.....02(07)05D
TV Cas.....03(07)05D
Z Vul.....D18(15)21
Z Dra.....D18(19)22
TX UMa.D18(20)20L
RW Tau.....L19(20)25
HU Tau.....L20(20)24
RZ Cas.....21(23)26
U Sge.....21(27)24L
TX UMa....L22(20)25

2011 Oct 14 Fri
X Tri.....01(03)05D
Z Per.....02(06)05D
AI Dra.....D18(18)19
TW Dra.....D18(19)24
RS CVn...D18(19)20L
TV Cas.....22(26)29D

2011 Oct 15 Sat
X Tri.....00(03)05
Z Dra.....01(04)05D
RZ Cas.....02(04)05D
U Cep.....D18(19)24
HU Tau.....L20(21)25
Z Vul.....21(26)25L
AI Dra.....21(23)24
X Tri.....23(26)28

2011 Oct 16 Sun
U CrB.....D18(16)21L
TV Cas.....D18(22)26
TX UMa.D18(22)20L
RW Tau.....L19(14)19
TX UMa....L22(22)27
X Tri.....23(25)28

2011 Oct 17 Mon
Y Psc.....02(06)03L
AI Dra.....02(03)05
Z Per.....03(08)05D
U Sge.....D18(12)18
TW Dra.....D18(15)20
SW Cyg.....D18(16)22
Z Dra.....19(21)23
HU Tau.....L20(23)27
X Tri.....22(25)27

2011 Oct 18 Tue
U Cep.....02(07)05D
Z Vul.....D18(13)19
TV Cas.....D18(17)22
RZ Cas.....D18(18)20
S Equ.....D18(19)24L
X Tri.....21(24)26

2011 Oct 19 Wed
Z Dra.....03(06)05D
RW Tau.....04(09)05D
RS CVn...D18(15)20L
TX UMa....19(24)19L
HU Tau.....20(24)28
RZ Cas.....20(23)25
X Tri.....21(23)26
U CrB.....21(27)21L
TX UMa....L22(24)28

2011 Oct 20 Thu
Z Per.....04(09)05D
TW Dra.....05(10)05D
U CrB.....L05(03)05D
AI Dra.....D18(18)19
U Cep.....D18(18)23
U Sge.....D18(21)24L
Z Vul.....19(24)25L
X Tri.....20(22)25
Y Psc.....20(25)27L

2011 Oct 21 Fri
RZ Cas.....01(03)05D
V367Cyg.D18(60)28L
X Tri.....19(22)24
Z Dra.....20(23)25
AI Dra.....21(22)24
HU Tau.....22(25)29
RW Tau.....23(27)30D
SW Cyg.....24(30)29L

2011 Oct 22 Sat
TV Cas.....04(08)06D
V367Cyg.D18(36)28L
X Tri.....19(21)24
TX UMa.L22(25)30D

2011 Oct 23 Sun
TW Dra.....00(05)06D
U Cep.....01(06)06D
AI Dra.....02(03)04
Z Dra.....05(07)06D
V367Cyg.D18(12)28L
U CrB.....D18(13)19
X Tri.....18(20)23
HU Tau.....23(27)30D
TV Cas.....24(28)30D

2011 Oct 24 Mon
RS CVn.....03(10)06D
V367Cyg.D18(<<)28L
Z Dra.....D18(16)18
RZ Cas.....D18(17)20
Y Psc.....D18(19)24
X Tri.....D18(20)22
RW Tau.....L18(22)26

2011 Oct 25 Tue
S Equ.....D18(16)22
U Cep.....D18(18)23
X Tri.....D18(19)22
Z Vul.....D18(22)24L
TV Cas.....19(23)28
RZ Cas.....20(22)25
TW Dra.....20(25)30D
TX UMa...22(27)30D
Z Dra.....22(24)27

2011 Oct 26 Wed
HU Tau....00(04)06D
AI Dra.....D18(17)19
X Tri.....D18(18)21
SW Cyg....D18(19)25
U CrB.....19(24)21L
2011 Oct 27 Thu
RZ Cas.....00(03)05
U CrB....L05(00)06D
U Sge.....D18(16)21
X Tri.....D18(18)20
TV Cas.....D18(19)23
RW Tau.....L18(16)21
AI Dra.....21(22)24
2011 Oct 28 Fri
U Cep.....01(06)06D
HU Tau....02(05)06D
RZ Cas.....05(07)06D
Y Psc.....D18(14)18
X Tri.....D18(17)20
Z Dra.....D18(18)20
TW Dra....D18(20)25
S Equ.....22(27)24L
TX UMa..23(28)30D
2011 Oct 29 Sat
AI Dra.....02(03)04
RS CVn..L02(05)06D
Z Per.....D18(13)18
TV Cas.....D18(14)19
X Tri.....D18(16)19
Z Dra.....24(26)29
2011 Oct 30 Sun
HU Tau....03(07)06D
U CrB.....05(11)06D
X Tri.....D17(16)18
RZ Cas.....D17(17)19
U Cep.....D17(18)23
Z Vul.....D17(20)24L
U Sge.....19(25)23L
2011 Oct 31 Mon
SW Cyg....03(09)04L
X Tri.....D17(15)17
TW Dra....D17(16)21
RZ Cas.....19(22)24

November

2011 Nov 1 Tue
TX UMa..01(06)06D
HU Tau....04(08)06D
S Equ.....D17(13)19
Z Per.....D17(14)19
AI Dra.....D17(17)19
Z Dra.....D17(19)22
RZ Cas.....24(26)29
2011 Nov 2 Wed
RW Tau....00(05)06D
U Cep.....01(06)06D
TV Cas.....01(05)06D
U CrB....D17(22)20L
RS CVn.....18(24)19L
AI Dra.....21(22)23
2011 Nov 3 Thu
Z Dra.....01(04)06D
RS CVn..L02(00)06D
RZ Cas.....05(07)06D
HU Tau....06(10)06D
TV Cas.....21(25)29
2011 Nov 4 Fri
AI Dra.....02(03)04
TX UMa..02(07)06D
Z Per.....D17(16)21
U Cep.....D17(17)22
Z Vul.....D17(18)23
SW Cyg.D17(23)28L
S Equ.....18(24)23L
RW Tau.....19(23)28
Y Psc.....22(26)26L
2011 Nov 5 Sat
RZ Cas.....D17(16)19
TV Cas.....D17(20)25
Z Dra.....19(21)23
2011 Nov 6 Sun
TW Dra....01(06)06D
U CrB....L04(09)06D
U Sge.....D17(19)23L
RZ Cas.....19(21)23
Z Vul.....23(29)23L
2011 Nov 7 Mon
U Cep.....00(05)06D
Z Dra.....03(06)06D
TX UMa..04(09)06D
SS Cet.....05(09)05L
TV Cas.....D17(16)20
Z Per.....D17(17)22
AI Dra.....D17(17)18
RS CVn..D17(19)18L
RW Tau.....L17(18)23
RZ Cas.....23(26)28

2011 Nov 8 Tue
RS CVn.....L01(<<)02
Y Psc.....D17(21)25
TW Dra.....21(26)30D
AI Dra.....21(22)23
2011 Nov 9 Wed
RZ Cas.....04(06)06D
SW Cyg.....D17(13)19
Z Vul.....D17(16)21
U Cep.....D17(17)22
U CrB.....D17(20)20L
V367 Cyg..D17(50)26L
Z Dra.....20(23)25
U Sge.....23(28)23L
2011 Nov 10 Thu
AI Dra.....01(03)04
SS Cet.....04(09)04L
TX UMa.....05(10)06D
X Tri.....06(08)06D
Z Per.....D17(18)23
V367 Cyg..D17(26)26L
2011 Nov 11 Fri
TV Cas.....03(07)06D
Z Dra.....05(07)06D
X Tri.....05(07)06L
V367 Cyg..D17(02)26L
RZ Cas.....D17(16)18
S Equ.....D17(21)23L
TW Dra.....D17(21)26
HU Tau.....L18(15)19
Z Vul.....21(26)23L
2011 Nov 12 Sat
U Cep.....00(05)06D
X Tri.....04(07)06L
V367 Cyg....D17(<<)22
RS CVn.....D17(14)18L
Y Psc.....D17(15)20
Z Dra.....D17(16)18
RZ Cas.....18(20)23
TV Cas.....22(26)30D
2011 Nov 13 Sun
RW Tau.....02(07)06D
SS Cet.....03(08)04L
X Tri.....04(06)06L
U CrB.....L04(07)06D
U Sge.....D17(13)19
AI Dra.....D17(17)18
Z Per.....D17(20)25
HU Tau.....L18(16)20
SW Cyg.....20(26)28L
Z Dra.....22(25)27
RZ Cas.....23(25)27

2011 Nov 14 Mon
X Tri.....03(05)06L
SW Cyg....L05(02)06D
Z Vul.....D17(13)19
TW Dra.....D17(16)21
U Cep.....D17(17)22
TV Cas.....18(22)26
AI Dra.....21(22)23
2011 Nov 15 Tue
X Tri.....02(05)06L
RZ Cas.....03(06)06D
HU Tau.....L18(18)21
RW Tau.....21(25)30
2011 Nov 16 Wed
AI Dra.....01(03)04
X Tri.....02(04)06L
SS Cet.....03(07)04L
TX UMa..D17(13)18L
U CrB.....D17(17)19L
TV Cas.....D17(17)22
Z Dra.....D17(18)20
Z Per.....D17(21)26
U Sge.....D17(23)22L
Z Vul.....19(24)23L
U Cep.....24(29)30D
2011 Nov 17 Thu
X Tri.....01(03)06L
RS CVn.....03(10)06D
AI Dra.....06(07)06D
RZ Cas.....D17(15)18
HU Tau.....L18(19)23
Z Dra.....24(26)29
2011 Nov 18 Fri
X Tri.....00(03)05
TV Cas.....D17(13)17
SW Cyg.....D17(16)22
S Equ.....D17(18)22L
RW Tau.....D17(20)24
RZ Cas.....17(20)22
X Tri.....23(26)28
2011 Nov 19 Sat
SS Cet.....02(07)04L
TX UMa..D17(15)17L
U Cep.....D17(16)21
AI Dra.....D17(17)18
Z Per.....18(23)27
HU Tau.....L18(20)24
RZ Cas.....22(25)27
X Tri.....23(25)28
Y Psc.....23(28)25L

2011 Nov 20 Sun
TW Dra.....02(07)06D
U CrB.....L03(04)06D
TV Cas.....04(08)06D
Z Dra.....17(19)22
AI Dra.....20(22)23
X Tri.....22(25)27

2011 Nov 21 Mon
RZ Cas.....03(05)06D
RW Tau.....D17(14)19
Z Vul.....D17(22)22L
HU Tau.....18(22)26
X Tri.....21(24)26
U Cep.....23(28)30D
TV Cas.....24(28)30D

2011 Nov 22 Tue
RS CVn...L01(05)06D
AI Dra.....01(02)04
SS Cet.....01(06)04L
Z Dra.....02(04)06D
TX UMa..D17(16)17L
Z Per.....19(24)29
TX UMa.....L20(16)21
X Tri.....21(23)26
TW Dra.....21(26)30D
SW Cyg.....24(30)27L

2011 Nov 23 Wed
SW Cyg...L05(06)06D
AI Dra.....06(07)06D
RZ Cas.....D17(15)17
U CrB.....D17(15)19L
U Sge.....D17(17)22L
Y Psc.....18(22)25L
HU Tau.....19(23)27
TV Cas.....19(23)28
X Tri.....20(23)25

2011 Nov 24 Thu
RW Tau.....04(09)06D
U Cep.....D17(16)21
RZ Cas.....D17(19)22
Z Dra.....19(21)24
X Tri.....19(22)24

2011 Nov 25 Fri
SS Cet.....01(05)04L
S Equ.....D17(15)20
AI Dra.....D17(17)18
TX UMa..D17(18)17L
TV Cas.....D17(19)23
TW Dra.....D17(22)27
X Tri.....19(21)24
TX UMa.....L20(18)22
Z Per.....20(25)30
HU Tau.....21(24)28
RZ Cas.....22(24)26

2011 Nov 26 Sat
Z Dra.....03(06)06D
Z Vul.....D17(20)22L
X Tri.....18(21)23
U Sge.....20(26)21L
AI Dra.....20(22)23
RW Tau.....22(27)30D
U Cep.....23(28)30D

2011 Nov 27 Sun
RS CVn.....L00(00)06
RZ Cas.....02(05)06D
U CrB.....L03(02)06D
TV Cas.....D17(14)19
Y Psc.....D17(17)21
SW Cyg.....D17(20)26
X Tri.....17(20)22
V367 Cyg....20(64)25L
HU Tau.....22(26)30

2011 Nov 28 Mon
SS Cet.....00(05)03L
AI Dra.....01(02)04
TW Dra.....D17(17)22
X Tri.....D17(19)22
V367Cyg..D17(40)25L
TX UMa.....L19(19)24
S Equ.....20(25)22L
Z Dra.....20(23)25
Z Per.....22(27)31D

2011 Nov 29 Tue
AI Dra.....06(07)07D
TV Cas.....06(10)07D
U Cep.....D17(16)21
V367Cyg..D17(16)25L
X Tri.....D17(18)21
RW Tau.....D17(22)26
HU Tau.....23(27)31D

2011 Nov 30 Wed
Z Dra.....05(07)07D
del Lib.....L06(06)07D
V367Cyg..D17(<<)25L
U CrB.....D17(13)19L
X Tri.....D17(18)20
RZ Cas.....D17(19)21
SS Cet.....24(28)27L

DECEMBER

2011 Dec 1 Thu
TV Cas.....01(05)07D
TW Dra.....D17(13)18
Z Dra.....D17(16)18
AI Dra.....D17(17)18
X Tri.....D17(17)20
Z Vul.....D17(18)22L
RS CVn....D17(19)17L
TX UMa.....L19(21)25
RZ Cas.....21(23)26
U Cep.....23(28)31D
Z Per.....23(28)31D
RS CVn.....L24(19)25

2011 Dec 2 Fri
HU Tau.....01(04)07L
SW Cyg....L04(09)07D
S Equ.....D17(12)17
RW Tau.....D17(16)21
X Tri.....D17(16)19
AI Dra.....20(21)23
TV Cas.....21(25)29
Z Dra.....22(25)27

2011 Dec 3 Sat
RZ Cas.....02(04)06
X Tri.....D17(16)18
U Sge.....D17(20)21L
U CrB.....18(24)18L
SS Cet.....23(28)27L

2011 Dec 4 Sun
AI Dra.....01(02)03
HU Tau.....02(06)06L
U CrB.....L02(00)05
TW Dra.....03(08)07D
RZ Cas.....06(09)07D
X Tri.....D17(15)18
U Cep.....D17(15)20
TV Cas.....D17(20)25
TX UMa.....L19(22)27

2011 Dec 5 Mon
Z Per.....00(05)07D
AI Dra....06(07)07D
RW Tau...06(10)07L
X Tri.....D17(14)17
Z Dra.....D17(18)20
S Equ...D17(22)21L

2011 Dec 6 Tue
HU Tau...03(07)06L
Z Vul.....D17(16)21
TV Cas...D17(16)20
RZ Cas...D17(18)21
SW Cyg..17(23)26L
TW Dra..22(27)31D
SS Cet.....22(27)27L
U Cep.....22(27)31D
Z Dra.....24(26)29

2011 Dec 7 Wed
SW Cyg..L04(<<)05
U CrB.....05(11)07D
del Lib..L06(05)07D
AI Dra....D17(16)18
TX UMa...19(24)29
RZ Cas.....20(23)25

2011 Dec 8 Thu
RW Tau...00(05)06L
Z Per.....02(07)07D
HU Tau...05(08)06L
Y Psc.....19(24)24L
AI Dra.....20(21)23
Z Vul.....21(27)21L

2011 Dec 9 Fri
RZ Cas.....01(03)06
U Cep.....D17(15)20
Z Dra.....17(19)22
TW Dra.....18(23)28
SS Cet.....22(26)27L

2011 Dec 10 Sat
AI Dra.....01(02)03
TV Cas...03(07)07D
RZ Cas...06(08)07D
HU Tau...06(10)06L
U Sge.....D17(14)20
U CrB..D17(21)18L
RW Tau.....19(23)28
TX UMa...21(25)30

2011 Dec 11 Sun
Z Dra.....02(04)06
U CrB.....L02(<<)03
RS CVn.....03(09)07D
Z Per.....03(08)07D
AI Dra.....05(07)07D
SW Cyg.....D17(13)19
Z Vul.....D17(13)19
U Cep.....22(27)31D
TV Cas.....22(26)31

2011 Dec 12 Mon
RZ Cas.....D17(18)20
TW Dra.....D17(18)23
Y Psc.....D17(18)23
S Equ.....D17(19)21L
SS Cet.....21(26)26L

2011 Dec 13 Tue
AI Dra.....D17(16)18
RW Tau.....D17(18)22
TV Cas.....18(22)26
U Sge.....18(24)20L
Z Dra.....19(21)24
Z Vul.....19(24)21L
RZ Cas.....20(22)25
TX UMa...22(27)31D

2011 Dec 14 Wed
U CrB.....02(08)07D
Z Per.....05(09)07L
del Lib.....L05(05)07D
U Cep.....D17(15)20
AI Dra.....20(21)22

2011 Dec 15 Thu
RZ Cas.....01(03)05
Z Dra.....03(06)07D
TW Dra.....D17(13)18
TV Cas.....D17(17)22
SS Cet.....20(25)26L
SW Cyg.....21(27)25L
RS CVn...L23(28)31D

2011 Dec 16 Fri
AI Dra.....01(02)03
SW Cyg...L03(03)07D
RZ Cas.....05(08)07D
Z Vul.....L06(11)07D
del Lib.....07(13)07D
RW Tau.....D17(12)17
Y Psc.....D17(12)17
HU Tau.....D17(14)18
V367Cyg.D17(55)24L
U Cep.....22(27)31D
TX UMa...24(28)31D

2011 Dec 17 Sat
AI Dra.....05(07)07D
Z Per.....06(11)06L
V367Cyg..L06(31)07D
TV Cas.....D17(13)17
U CrB.....D17(19)17L
V367Cyg..D17(31)24L
Z Dra.....21(23)25

2011 Dec 18 Sun
X Tri.....03(05)04L
TW Dra.....04(09)07D
V367Cyg..L06(07)07D
V367Cyg..D17(07)24L
HU Tau.....D17(15)19
RZ Cas.....D17(17)19
Z Vul.....17(22)21L
SS Cet.....20(24)26L

2011 Dec 19 Mon
RW Tau.....02(07)06L
X Tri.....02(05)04L
TV Cas.....04(08)07D
Z Dra.....05(08)07D
V367Cyg.L06(<<)07D
V367Cyg.D17(<<)24L
U Cep.....D17(14)19
S Equ.....D17(16)20L
AI Dra.....D17(16)17
RZ Cas.....19(22)24

2011 Dec 20 Tue
TX UMa....01(06)07D
X Tri.....02(04)03L
Z Dra.....D17(16)19
SW Cyg.....D17(16)22
HU Tau.....D17(17)20
U Sge.....D17(18)20L
AI Dra.....20(21)22
RS CVn.....L23(24)30
TW Dra.....23(28)31D
TV Cas.....24(28)31D
RZ Cas.....24(26)29

2011 Dec 21 Wed
X Tri.....01(03)03L
U CrB.....L01(06)07D
del Lib.....L05(05)07D
Z Vul.....L06(09)07D
SS Cet.....19(24)26L
RW Tau.....20(25)29L
U Cep.....21(26)31D
Z Dra.....22(25)27

2011 Dec 22 Thu
X Tri.....00(03)03L
AI Dra.....00(02)03
RZ Cas.....05(07)07D
HU Tau.....D17(18)22
TV Cas.....19(23)28
X Tri.....24(26)27L

2011 Dec 23 Fri
TX UMa..03(07)07D
AI Dra.....05(07)07D
del Lib.....06(12)07D
Z Dra.....07(09)07D
Z Per.....D17(13)18
Z Vul.....D17(20)20L
TW Dra.....18(23)29
Y Psc.....21(25)23L
X Tri.....23(25)27L

2011 Dec 24 Sat
U Sge.....L06(03)07D
U Cep.....D17(14)19
RZ Cas.....D17(16)19
U CrB.....D17(17)17L
Z Dra.....D17(18)20
TV Cas.....D17(19)23
HU Tau.....D17(19)23
RW Tau....D17(20)24
SS Cet.....19(23)26L
X Tri.....22(25)27L

2011 Dec 25 Sun
SW Cyg.....00(06)01L
SW Cyg..L03(06)07D
AI Dra.....D17(16)17
RZ Cas.....19(21)23
X Tri.....22(24)27
RS CVn.....L22(19)25

2011 Dec 26 Mon
Z Dra.....00(02)05
TX UMa..04(09)07D
Z Vul.....L06(07)07D
S Equ.....D17(13)18
TV Cas.....D17(14)19
Z Per.....D17(15)20
TW Dra....D17(19)24
HU Tau....D17(21)24
AI Dra.....20(21)22
X Tri.....21(23)26
U Cep.....21(26)31
RZ Cas.....23(26)28

2011 Dec 27 Tue
U Sge.....06(12)07D
U Sge.....D17(12)18
RW Tau....D17(14)19
Y Psc.....D17(20)23L
SS Cet.....18(23)25L
X Tri.....20(23)25

2011 Dec 28 Wed
AI Dra.....00(02)03
U CrB....L01(04)07D
RZ Cas.....04(06)07D
del Lib....L04(04)07D
TV Cas.....06(10)07D
Z Vul.....D17(18)20L
Z Dra.....17(20)22
HU Tau.....18(22)26
X Tri.....19(22)24

2011 Dec 29 Thu
AI Dra.....05(06)07D
TX UMa..06(10)07D
U Cep.....D17(14)19
TW Dra....D17(14)19
Z Per.....D17(16)21
SW Cyg..D17(20)25L
S Equ.....18(23)20L
X Tri.....19(21)24

2011 Dec 30 Fri
TV Cas.....01(06)07D
Z Dra.....02(04)07
RW Tau.....04(08)05L
del Lib.....06(12)07D
RZ Cas.....D17(16)18
U Sge.....D17(21)19L
SS Cet.....17(22)25L
X Tri.....18(21)23
HU Tau.....20(23)27

2011 Dec 31 Sat
Z Vul.....L05(05)07D
Y Psc.....D17(14)18
AI Dra.....D17(16)17
X Tri.....17(20)22
RZ Cas.....18(21)23
U Cep.....21(26)30
TV Cas.....21(25)29

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The **deadline for contributions** to the next issue of VSSC (number 150) will be 7th November, 2011. All articles should be sent to the editor (details are given on the back of this issue).

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