British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

No 150, December 2011

Contents

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

BREAK DISCUSSIONS DURING THE VARIABLE STAR SECTION MEETING

TONY MARKHAM

See Report, page 9

FROM THE DIRECTOR

ROGER PICKARD

Variable Star Section Meeting

I am delighted to report the recent Section Meeting held in Eccles with support from the Salford Astronomical Society was a great success and I am very grateful to Melvyn Taylor for the write-up that appears elsewhere in this Circular. I am also very grateful to all the speakers for allowing their presentations to be made available on the web, and for Gary Poyner for adding them - see:
http://www.britastro.org/vss/section_meet_oct_2011.htm

CCD advisor

Following discussions with Richard Miles he has advised that as there has been little call for this service for some years he will step down with immediate effect. My thanks to Richard for fulfilling this role for so long.

Reporting Observations

As Andy Wilson reported at the recent Variable Star Section meeting the database should be online by the end of the year. However, data submission via the web will probably not be in place for about another year or two. To enable observers to become used to the idea that data must be reported in a strict format as from January 1st 2012 we will only accept data into the database that has been submitted as per the guidelines detailed on the website. This will also take a great load off our greatly overburdened Secretary who has done an amazing job in correcting observers' observations over the last 6 years or so.

However, he cannot continue doing this as it is just too time consuming and therefore if your data is not in the correct format(s) it will be returned to you for re-submission in the correct form.

To this end, Clive has endeavoured to make some improvements to the Excel Spreadsheet that is downloadable from the VSS website (which, by the way, also runs under the free Open Office Suite of programmes). In addition, he has also provided new guidelines for those who wish to submit in text format only. These are also available from the web site.

Old (and not so old) paper observations

Mainly through his researches into past Variable Star Section Directors, Jeremy Shears has come across some old observations that need entering into the Section's database and I wondered if anybody might care to volunteer to enter these for us please?

PRO-AM CONFERENCE ON STELLAR ASTROPHYSICS

DOUBLE STARS, PULSATING STARS, EXOPLANETS, SUPERNOVAE...

28 SEPTEMBER - 1ST OCTOBER 2012
ONET LE CHÂTEAU, RODEZ, FRANCE

http://rr-lyr.ast.obs-mip.fr/capas2012/index.php

Official languages will be French and English.

Our member Laurent Corp, from Rodez, has sent us details of this meeting.

CAPAS, [Amateur-Professional Congress - Stellar Astrophysics], aims to present new discoveries and new techniques in various subjects related to stellar astrophysics in which amateur astronomers might be involved. Professional and amateur astronomers, as well as international associations are expected to participate and share their findings. For the first time, double star astronomers and variable star astronomers will be able to share their views during these four days.

There will be two open conferences which will allow attendees to present their work to the public and give the opportunity to the audience to meet astronomers.
A visit to a historical site will be organised.

CAPAS Congress is open to everyone. Daily fees are proposed, in order to allow choice of how much of the conference to attend.

Scientific organization:

Remi Cabanac, IRAP, Tarbes, France
Laurent Corp, Andromède 4A, Rodez, France
Pierre Durand., SAF, Paris, France
Annick Lamouret, Andromède 4A, Rodez, France
Jean-François Le Borgne, IRAP, Toulouse, France
Edgar Soulié, SAF, Paris, France
Tofol Tobal, Garraff Astronomical Observatory, Spain
David Valls-Gabaud, Observatoire de Paris, France

Local organization:

Laurent Corp, Andromède 4A, Rodez
Annick Lamouret, Andromède 4A, Rodez
All members of Andromède 4A, Rodez

Program
Sessions

- Double and multiple stars: photometry
- Double and multiple stars: astrometry

- Pulsating stars ex: RR Lyrae
- Exoplanets and beginning and end of star life [ex: supernovae]

Schedule

Friday
14h00-18h00: welcome
20h30: general public conference

Saturday
9h00-12h00: 1st Session, TBD
14h00-17h00: 2d Session, TBD
20h30: general public conference

Sunday
Morning: Visit to Conques
[Departure by bus + visit + lunch + organ concert + return by bus]
15h00-18h00: 3rd Session, TBD

Monday
9h00-12h00 : 4th Session, TBD

Participants

Remi Cabanac - Tarbes, France
Laurent Corp - Rodez, France
Annick Lamouret - Rodez, France
Jean-Francois Le Borgne - Toulouse, France
Edgar Soulie - Paris, France
David Valls-Gabaude - Paris, France

Travelling to Onet le Château
close to Rodez, located in Midi-Pyrenees, department of Aveyron.

A shuttle service will be available from Rodez airport and train station to Onet le Château for the congress.

Coming by plane
Information on Rodez-Marcillac airport:
Administration: RD 940 - route de Decazeville, 12330 Salles-la-Source.
Telephone: +33 565 76 02 00
Fax: +33 565 42 99 97
e-mail: < *contact@aeroport-rodez.fr* >

Schedules and information: Rodez air port web site: < *http://www.aveyron.cci.fr/la-cci-de-laveyron/les-infrastructures-cogerees/aeroport-rodez-marcillac/* >

From Paris, 0h55mn by Brit Air
From London, 1h30mn by Ryanair
From Lyon, 0h40mn by Hex Air

Coming by train (Rodez station)
From Paris: depending on schedule, 7h10 to 9h30; from Toulouse: 2h

Coming by car
From Paris - 7h; from Toulouse - 2h

Accommodation
List of hotels in Onet-le-Château and Rodez

Onet le Château:

- Le Crystal – route d'Espalion – +33 565 74 91 49
- Hostellerie de Fontanges – Fontanges – +33 565 77 76 00 [web site] room price from 62 •.
- Hôtel Balladins – +33 565 42 96 04 [web site] room price from 39 •
- Hôtel Bastide [Bowling du Rouergue] – 88 route d'Espalion – +33 565 67 08 15 [web site] room price from 70 •.
- Le Laury's – route d'Espalion – +33 565 46 60 60

Rodez: *www.hotel-rodez.com*

- Hôtel Campanile – 1 avenue de l'Entreprise – +33 565 42 97 08 [web site] room price from 32 •.
- Deltour Hôtel – 23 avenue de la Gineste – +33 565 71 22 11 [web site] room price from 48 •.
- Hôtel Concorde – 12 rue Béteille – +33 565 68 31 61 – room price from 56 •.
- Le Charleston – 2 boulevard Denys Puech – +33 565 42 57 28 [web site]
- Hôtel Ibis – 46 rue Saint-Cyrice – +33 565 76 10 30 [web site] room price from 45 •.
- Hôtel le Biney – 7 boulevard Gambetta – +33 565 75 22 98 [web site] room price from 65 •.
- Hôtel Mercure Rodez Cathédrale – +33 565 68 55 19 [web site] room price from 67 •.
- Hôtel Première Classe – Rue Prat Mouly – +33 565 78 20 62 [web site] room price from 29 •.
- Kyriad Hôtel – 38 avenue du maréchal Joffre – +33 565 87 11 00 [web site] room price from 45•.
- La Ferme de Bourran – Bourran – +33 565 73 62 62 [web site]
- Hôtel du Midi – 1 rue Béteille – +33 565 68 02 07 [web site] room price from 45 •.
- Hôtel de la Tour Maje – 1 boulevard Gally – +33 565 68 34 68 [web site] room price from 65 •.
- Hôtel du Clocher – 4 rue Séguy – +33 565 68 10 16 [web site] room price from 42 •.

Room prices are given as an indication.
There will be a shuttle service between Rodez downtown and conference place.

Registration

DEAD LINES:

15 May 2012: Final date for submission of talks.
1st September 2012: End of registrations

Congress location

Congress will take place at Théâtre d'Onet-Le-Château
Route d'Espalion
F-12850 Onet le Chateau

Important dates :

October 2011: opening for registration and talk submissions.
Talk summaries must be send by email to the address: < *capas-2012@orange.fr* > Specify session.
January 2012: Nomination of reviewers.
15 May 2012: Dead line for talk submissions
1st June 2012: Validation/planning of talks by SOC. Confirmation to speakers
1st September 2012: Dead line for registrations

Fees

150• for whole congress, or 60• per day, not including accommodation and transportation.

Fees include :
- power and Wi-Fi in congress room
- breaks
- lunches
- Saturday night dinner for those present
- free access to general public conferences
- shuttle from/to station or airport

A visit of medieval city of Conques will be organized [see web site] but is not included in this price. Fees for this visit will be 50•, including transportation by coach, dinner and a concert.
Cheque payments in Euros may be send to:
Association Andromède 4A - Congres CAPAS
1 rue des Paquerettes
F-12850 Onet-Le-Château
France

No payment by credit card is possible.

Registration

Please send mail to < *capas-2012@orange.fr* >with the following information:
- first and last name
- dates of venue
- address
- email address

And, if needed
- Title for your talk
- Summary of your talk
- session of your talk

DEAD LINES:
15 May 2012: Final date for submission of talks
1st September 2012: End of registrations

Laurent Corp < *laucorp@wanadoo.fr* > has asked, can you please send him an abstract of your presentation, or poster when you can, because he has already received some abstracts, and they will be updating the web site as soon as possible.

JOHN GLASBY – A BRIEF OBITUARY

ROGER PICKARD

Photo was scanned from John Glasby's The Variable Star Handbook*

John Glasby, a former Director of the Variable Star Section, died, aged 82, on the 5th June 2011.

He joined the British Astronomical Association in 1958, and was appointed Director of the Variable Star Section in 1965, upon the resignation of his predecessor, Reginald Andrews. He remained in office until 1971. He wrote a number of books on variable stars.

Glasby was a professional research chemist, and a prolific writer of pulp fiction, including Science-fiction and Westerns amongst many others. He used a range of pseudonyms. He was born at East Retford in Nottinghamshire on the 23rd September, 1928 and was educated at the King Edward VI Grammar School there, and developed an interest in science and astronomy. After graduating in Chemistry at Nottingham University he joined ICI's Nobel division, where he carried out research on detonators and rocket propellants becoming head of the Physical Chemistry department. After 25 years he moved to ICI's Organic department, where he served as division editor and assistant public relations manager. He retired in 1988.

I met him on a couple of occasions, once at his home in Ayrshire where he showed me the 13″ telescope [from memory, this was on loan from the BAA], and once at a BAA Meeting in London where he gave me some charts specifically relating to flare stars. It was using one of these that I was able to locate AD Leonis in 1970, and detected a large flare of almost a full magnitude which I was able to follow for some 45 minutes. I found him a very charming and easy-going man.

He married Janet Beattie Hannah on the 10th July 1954 and had three sons, John Stuart, Raymond Vincent and Edmund Patrick, and two daughters, Ann Marie and Jennifer Frances, who all survive him. We extend our condolences to his family.

Reference

* The Variable Star Handbook. Published by Sidgwick and Jackson, 1971

http://www.encyclopedia.com/article-1G2-3413800091/glasby-john-s-1928.html

I am grateful to the obituary that appeared in 'The Telegraph' on the 15th September 2011 for much of this information, and to Gary Poyner for pointing it out to me:
http://www.telegraph.co.uk/news/obituaries/8766379/John-Glasby.html

ECLIPSING BINARY NEWS - JANUARY 2012

DES LOUGHNEY

Zeta Aurigae

The eclipse was scheduled to start on 2nd November 2011. It seems that it did start on 31st October. At the time of writing [7/11/11] we are in the 'totality' phase with the same depth of eclipse as in 2009 - about 0.14V. The depths of eclipse as described by GCVS at 0.27V and by Krakow at 0.6V are incorrect.

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

This new B. A. A. Variable Star Section Handbook has been completed and is available on our website for downloading.

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

Eta Geminorum

This red giant star is the BAA's Variable Star of the Year for 2012. It is a semi-regular variable which varies between 3.1 magnitude and 3.5 magnitude. About every 8 years it undergoes an eclipse with a minimum of about 3.9. The eclipse is scheduled to start in late August and finish by mid-November 2012.

In order to distinguish clearly between the semi-regular variability and the eclipse we have started intensive observation of the system from October 2011. The campaign will include DSLR photometry. All observations and measurements are welcome.

RZ Cassiopeia Predictions for 2012

I made an error in preparing the RZ Cassiopeia predictions for 2012 which have been published in the BAA 2012 Handbook. The effect of the error is that all of the predictions are 12 hours early throughout the whole of 2012. The actual eclipses are 12 hours later than listed in the Handbook. Thus the first eclipse is not around midday on January 1st but just after midnight on January 2nd.

There has been no error in the RZ Cassiopeia predictions contained within these Circulars. The correct predictions, in the same format as the Handbook, can be downloaded from our website or alternatively a hardcopy can be obtained from myself.

I apologise for any inconvenience caused by this error.

EG Cephei

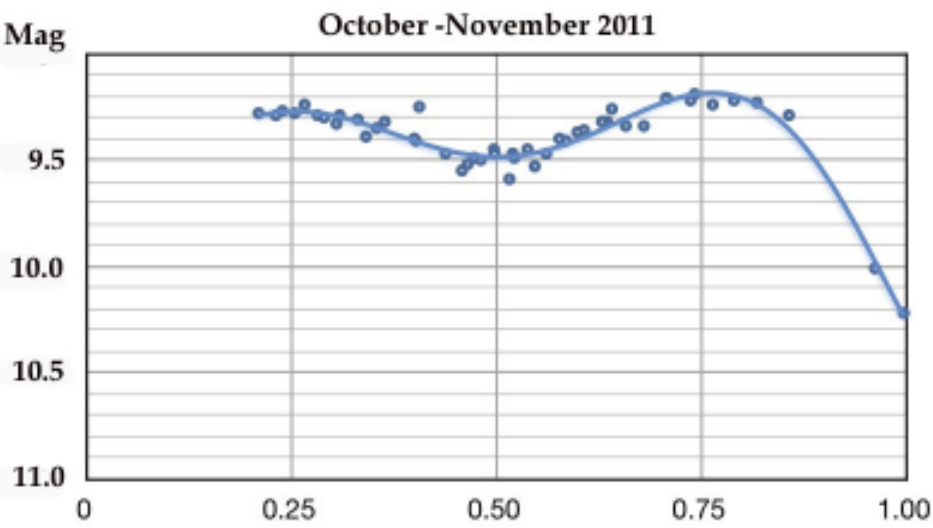
I was recently asked to have a look at the eclipsing binary EG Cephei which is quite near Polaris. This is a semi-detached system of EB class about 400 light years from us. Its period is 0.545 days with a primary minimum of 0.9 magnitude in depth and a secondary magnitude of 0.3 magnitude in depth.

The magnitude varies in V from 9.6 to 10.6. This system seemed to be a challenge for precision DSLR photometry as it is relatively faint for the 200 mm lens that I use. However, I realised that because the system is near the pole it is possible to use longer exposures than usual without unacceptable blurring of the stars [with an undriven camera]. The settings with a Canon 200 mm lens and Canon 450D DSLR were as follows:

exposure 5 seconds, ISO 800 and f2.8. This obtained a satisfactory signal to noise ratio.

Being so near the pole the system was high up and easy to find. Nearby Kappa Cephei [4.38V] can be seen through the viewfinder of the camera. The stars moved relatively little during the 15 minute intervals between exposures so it was easy to adjust the camera for tracking.

Measurements were started in October 2011. Due to weather it has been impossible to do measurements on an evening with a primary eclipse. It has been possible to do a couple of profiles of the secondary eclipse. The unfiltered measurements are plotted on the phase diagram below.



EG Cephei

The depth of the secondary eclipse is as predicted at around 0.3 magnitude. The curve is constructed using the polynomial function contained within the chart menu of a spreadsheet. When the diagram is printed out and the curve analysed using the bisected chord method it is found that the secondary eclipse seems to be occurring as predicted. The secondary minimum is centred on 0.5 phase. The phase diagram was constructed using the latest Krakow period of 0.54462207 days and by converting all the times of measurement into Heliocentric Julian dates/times.

Note the emerging shape of the light curve which illustrates continuous variability owing to the ellipsoidal distortion of two stars of very different luminosity in close proximity.

Hopefully the weather will allow the determination of a full light curve and phase diagram. In the meantime the data on the secondary minimum has been useful in indicating there has been little recent period change.

desloughney@blueyonder.co.uk

B.A.A. VARIABLE STAR SECTION MEETING MONTON HOUSE HOTEL, ECCLES, MANCHESTER

SATURDAY, 15TH OCTOBER 2011

MELVYN TAYLOR

Photographs also by Melvyn Taylor.

Des Loughney and Robin Leadbeater

Des Loughney the BAA VSS Eclipsing Binary secretary presented photometric results to date of the **International Epsilon Aurigae campaign** including his own V measurements using a DSLR. The light curve of V magnitudes up to April 2010 shows its initial fading with a series of steps (stand-stills) that are also represented in the spectroscopic data. It was difficult to interpret a central brightening in June and July of 2010 but there were a few anomalies that were not due to the 50d to 60d pulsations (seen out of eclipse) of the F0 primary. A feature of the egress which started at the beginning of March 2011 was a 'knee' in the plot possibly indicating a difference of composition in the disc, this was not recorded in the 1982 eclipse. The AAVSO is organising a special JAAVSO, which will be published in August 2012, illustrating what has been learnt from this epsilon Aurigae eclipse. More international campaigns are to be made in the future of zeta Aurigae, P Cygni and rho Cassiopeiae where photometry using DSLRs will feature. These campaigns, similar to the epsilon Aurigae campaign, are pro-am campaigns which utilise complementary V photometry and spectroscopy work.

Robin Leadbeater spoke about the **spectroscopic aspect of the recent epsilon Aurigae eclipse**. The joint international collaboration has given a revised low mass model of the stellar system involving a primary object of 2.7 solar masses (F0II-III) and the obscuring body, temperature 500K, 7.6 AU in diameter containing a 5.9 solar mass (B5V) star. Checking the neutral potassium (7699A) line with a high resolution (0.3 angstrom) spectrograph and a C11 SC telescope, the speaker was able to follow the changes in absorption of the light from the F0 star due to the eclipsing object, and interpret the disc rotation from the

Doppler effect. The strength of the line plotted with time shows step-like features with some degree of correlation between ingress and egress, which suggest the disc may contain ring like features possibly akin to solar system orbits. A possible correlation of these with variations in the light curve mentioned by the previous speaker remains to be investigated. The campaign has been rich in data from many investigators amateur and professional, with about 800 amateur spectra recorded throughout the eclipse.

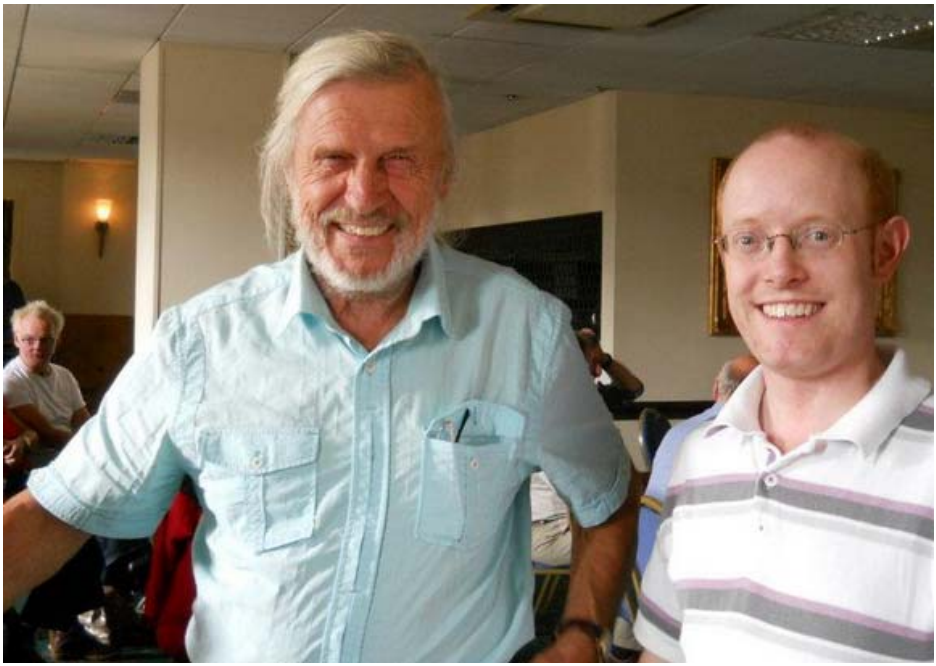
Professor Tom Marsh, University of Warwick, presented a talk about **'Planets around evolved stellar systems'**.

In studies of planetary transits of both single and twin (binary) stars one of the first investigated was Kepler 16b found earlier this year. The number of white dwarf binaries is increasing through sky surveys, and using high-speed time resolution of eclipses in these systems it is possible by checking time anomalies to reveal transiting planets. There may be 10^9 0.6 solar mass wd objects in our Milky Way. The relation of evolved stars with type Ia supernovae, and the cataclysmic mechanism that turns a white dwarf into a supernova in less than two seconds was described. A recent event in Messier 101, Tycho's 1572 sighting and Kepler's 1604 are all type Ia SN. The University of Warwick has developed since commissioning in 2002 a high speed ccd camera - UltraCam that has been used on various telescopes, for example, the Liverpool Robot, WHT (4.2m) and the VLT (8.2m) for analysing orbital, rotational speeds and micro variations in white dwarf systems. Tested data from the LT, and a Gemini survey, has discovered four double white dwarf eclipsers that are being followed to check timing anomalies and up-dating the ephemerides. The speaker sought to obtain and extend data from willing observers in order to cover gaps in long-term data on objects: for example, V471 Tauri (magnitude 9.8V), QS Virginis, DE Canum Venaticorum, RXSJ2130.6+4710 and the southern hemisphere RR Caeli. In these cases precise eclipse times would be valuable.

Tony Markham spoke about the **VSS Facebook** pages and began with a bit of audience participation as the meeting was asked to reveal their (not exact) ages in steps of 10 years and the same when they joined the BAA. One person of the 36 attending was under 40 years of age thus leaving a suggestion that, if this is representative of the VSS membership, the long term looks bleak. The idea of creating Facebook pages was to make the group more visible to younger people and give them a reason for joining, for example, if a bright nova erupts make that information available in an

easy and fast way. Tony concluded by highlighting that we need the current VSS members to look for opportunities to publicise the VSS and its good work via Facebook and other Social Media.

In describing the current building of the **BAA VSS database**, **Andy Wilson** highlighted several web pages of light-curves and observations that were being tested. An example of the symbiotic variable AG Draconis was shown that could be viewed long-term, or magnified to show very short changes. Data currently for 2008 and 2009 is being added with the 2010 observations likely to be finalised by year end and the CCD set is to follow. Chart sequence data is also held within the database and limited 'on-line' accessibility will be added in due course. An important link of the sequence data with the observations will allow amended reduced magnitudes to be handled automatically in a future release.



Stan Waterman and Andy Wilson

Stan Waterman followed on from his searches of Cygnus (where so far he has found 1022 variable stars) presented at previous meetings, with results of a 2.8° square just north of Capella at right ascension 05h18m, declination N41°50'. These results were made from 2003 October to 2008 March on 76 nights, resulting in 21,000 images tested as usable from a total of 25,000. Measuring over 28,000 stars in the fields and finding variables of interest with his customised software was/is a real challenge. Preliminary light curves of those stars have been produced and monitored for variability. Detailed notes were given in his presentation, about the process of imaging, collecting and processing data, and detecting variable objects, together with many light-curves. **178 new variables** had been found, comprising 63 eclipsers, 64 slow variables, 37 fast variables (periods less than 1 day), one new Cepheid, and 13 miscellaneous variables, with 6

already catalogued in the General Catalogue of Variable Stars. Particular interest was given to the possible orbit(s) of a magnitude 8.7 visual binary in the Auriga field that had a long slow dip in the light-curve and a period in the order of 1.514days. A literature review from an interval of 95 years leads to a curious stellar system that would appear to require further investigation.

John Toone had just returned from the **Centennial Meeting of the AAVSO** in Boston, USA. At the AAVSO celebrations, were representatives of the BAV (Germany), Belgium, New Zealand and European (French based GEOS) observing groups. In an address at the meeting he emphasised that the BAA VSS is the prototype body devoted to the subject of Variable Stars, with a homogenous database aligned with the current sequences going back to 1888. Future work will be to continue obtaining high quality data on variable stars by all available means. Several photographs of the meeting were displayed, including those of prominent AAVSO officers and members. At the Centennial Banquet, Albert Jones was made an Honorary Member of the AAVSO, and John presented a framed certificate to mark the occasion to Arne Henden. He also presented the third Charles Butterworth award to Mike Simonsen, for his outstanding work on charts and sequences.

Professor Don Kurtz of the University of Central Lancashire on the subject of **'The New Keplerian Revolution'**

In a 105 square degree stellar field between Deneb, alpha Cygni, and Vega precise photometry is being made by the Kepler spacecraft that was launched 2009 March. One of its missions is to find and determine the frequency of planets within the 'habitable zone' of the parent star. Other areas of investigation are to examine binary objects, check which systems have accretion discs, asteroseismic studies, magnitude ranges, stellar cycles and detection of active galactic nuclei. Most of the stars are in the magnitude range 9 to 16 (V to R bands). The planetary candidates are mainly investigated by radial velocity measures and others by transit observations. By 2011 February 1235

planets had been announced by the Kepler team. One star known as Kepler 11a, about 2,000 light years away, has 6 planetary objects labelled Kb to Kg. Another find, Kepler 18b has one 'large Earth' and two low density Neptune type planets. Stellar pulsations, the interior convections, photospheric oscillations, magnetic fields and flares, and coronal changes are all part of the data acquisition Kepler will be undertaking for the next 3 to 4 years. The mass, age, and radius, of Kepler stars can be determined by studying its global oscillations through precise Doppler shift, and/or milli-magnitude changes.

Gary Poyner, BAA VSS Recurrent Objects Co-ordinator, described the variability of

V1413 Aquilae a E+ZAND type star varying in extreme from magnitude10.6 to 15.1. Discovered in 1950 and with an outburst seen in 1983, one eclipse of 2 magnitudes and duration over 50 days was identified in 1988. Gary started visual observations in1995, and since then has made over 1000 light estimates that provide predictions for the next set of eclipses. The speaker also highlighted the **Long Term Polar Monitoring Programme** in the section, and mentioned that more observers are needed tocontinuecovering these objects. At present there are five active participants.

David Boyd, BAA President, spoke briefly about his observations of **HS1857+7127**, a dwarf nova varying between magnitudes 14.0 and 17.5 which is under investigation by the AAVSO's Z Camelopardalis campaign. He had recorded six eclipses of depth 0.15 magnitude during recent outbursts from which times of eclipse minimum had been obtained, and a new ephemeris calculated. This enab-led knowledge of the orbital period to be improved from 272.317(1)m to 272.31866(6)

John Toone and David Boyd

David Boyd's more detailed article on HS1857+7127 follows on page 22 .

THREE VARIABLES FOR THE PRICE OF ONE!

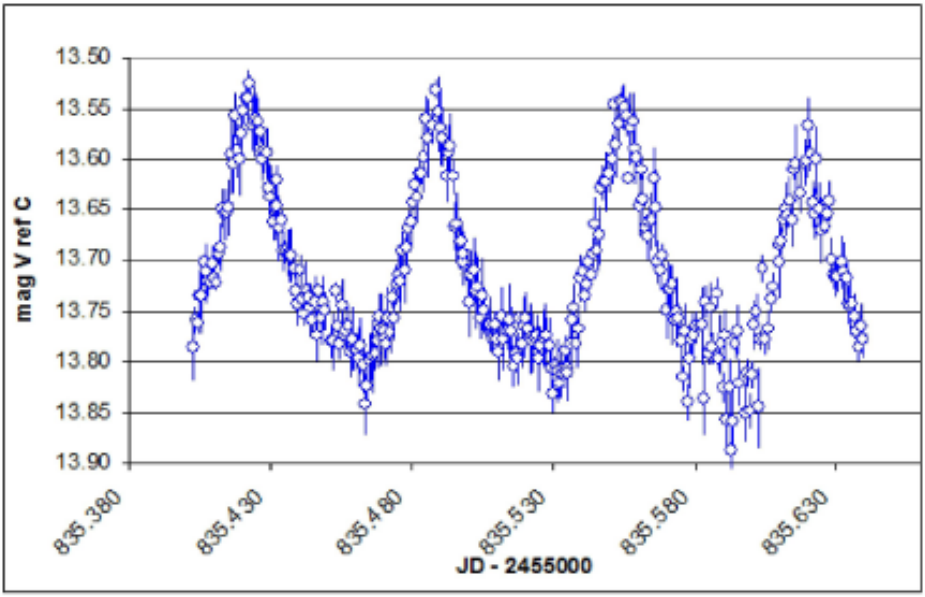
ROGER PICKARD

Recent CCD V Observations by Roger Pickard with an LX200 14″ with SXV H9 CCD.

On the night of 2011 September 30th after observing V1692 Aquilae as part of the Variable Stars South programme, Equatorial Eclipsing Binaries Project[1], I decided to move on to 1RXS J231935.0+364705. It was announced on baavss-alert[2] by Eddy Muyllaert earlier that evening, as being in outburst.

This SU Ursae Majoris type star proved to be showing superhumps with a period of 0.065761(9) days. See Figure 1. However, this was to turn out to be only the first of three variable stars observed in the same field of view on this and the following night.

Figure 1: 1RXS J231935.0+364705 on 2011 Sep 30 showing superhumps.



Star number 2

When I came to analyse the results I found that one of the comparison stars I had used was variable! This turned out to be the eclipsing binary GSC 02764 01639 which I had observed at secondary minimum (see Figure 3). I then had to omit this star from my list of comparisons!

Figure 2: 1RXS J231935.0+364705 on 2011 Oct 01, again showing superhumps.

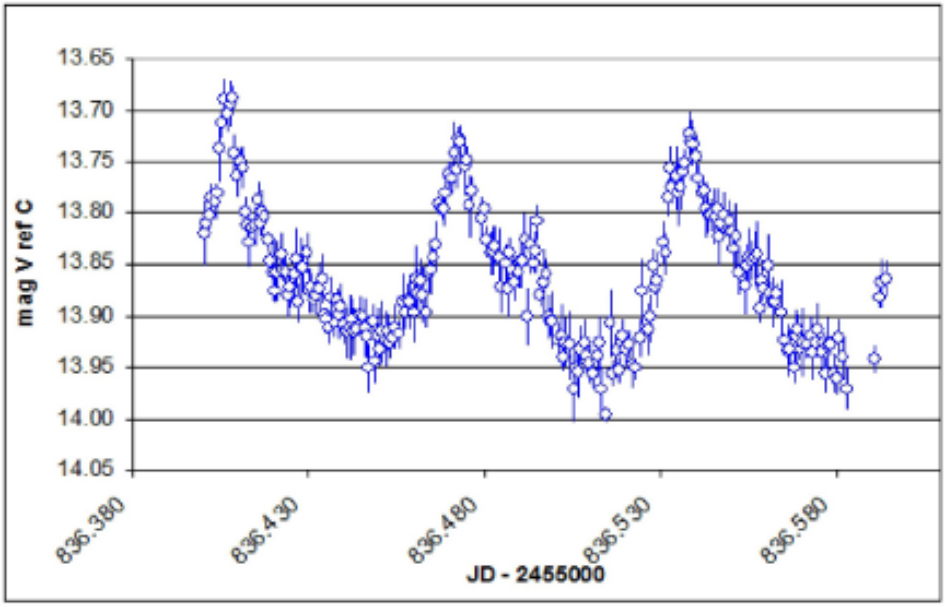
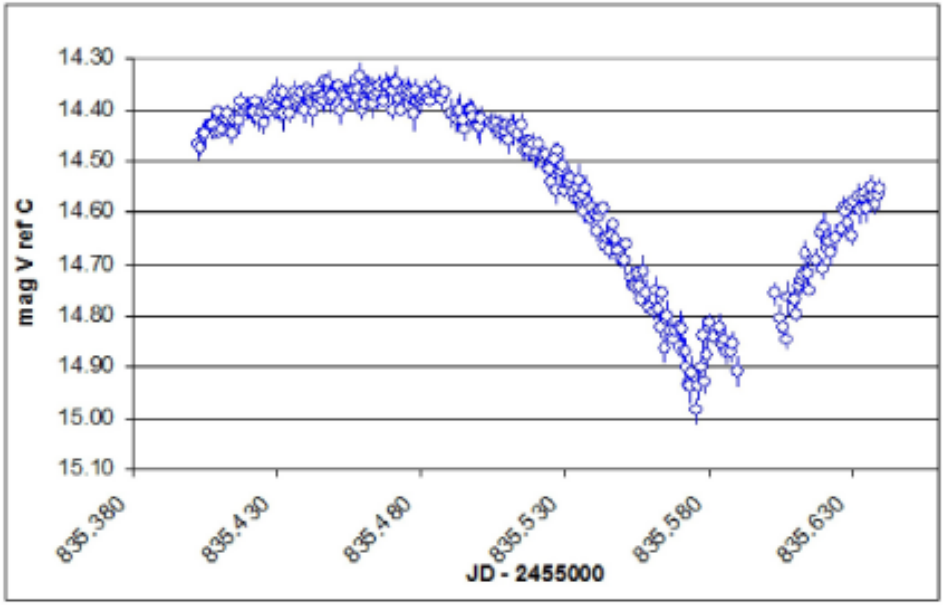
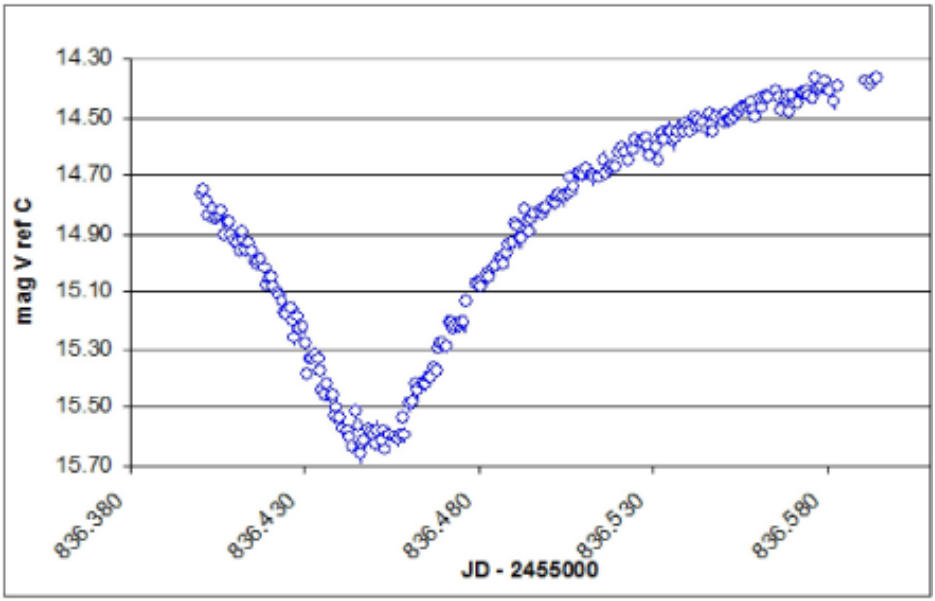


Figure 3: GSC 02764 01639 on 2011 Sep 30 showing a secondary minimum.



I was able to repeat the observations the following night (see Figures 2 and 4), but this time I caught the eclipsing binary at primary minimum. It turned out this star was of the beta Lyrae type with a period of 0.5774 days.

Figure 4: GSC 02764 01639 on 2011 Oct 01 showing a primary minimum.



Using the Epoch of HJD 2451453.9460 (02 Oct 1999) and a period of 0.5774 days from the original observation by A. V. Khruslov[3] I constructed a phase plot (see Figure 5). With primary minimum occurring at a phase of approximately 0.74 this ephemeris is obviously in need of updating, as it should occur at phase 1.0! But is it late or early?

More observations are required.

Star number 3

Interestingly, a few days later I was notified by Denis Denisenko of the Russian Space Research Institute, to advise me that a fellow variable star observer, Etienne Morelle, had discovered another variable in the same field of view. Sadly, it was on the limit of my field of view and so my observations were not that good - see Figure 6.

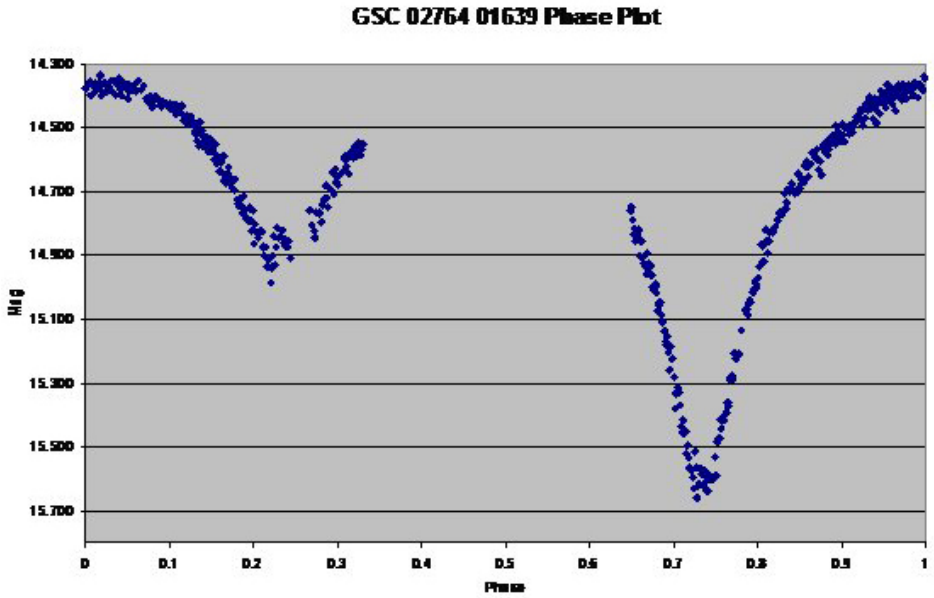


Figure 5: Phase Plot of GSC 02764 01639.

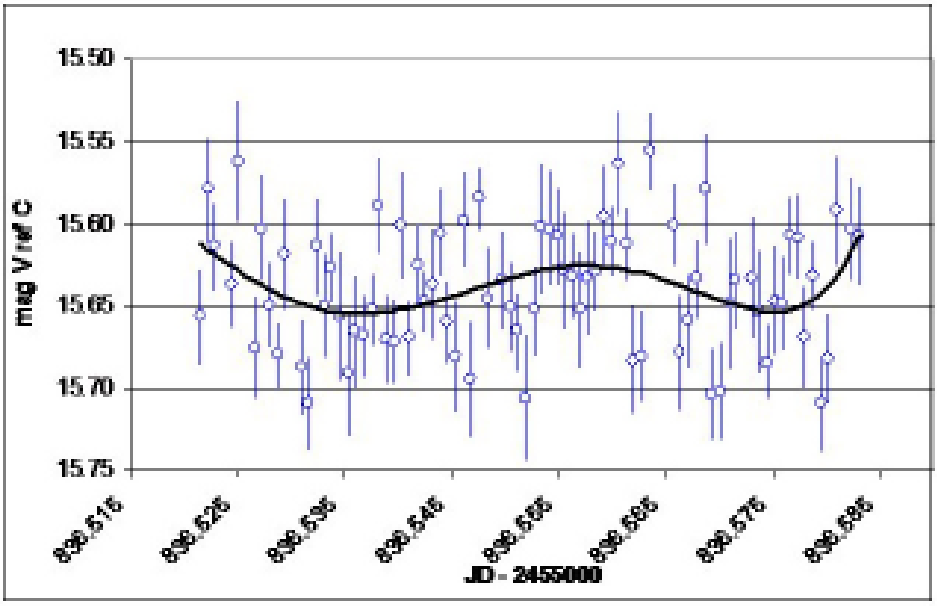


Figure 6: Denisenko Variable USNO-B1.0 1267-0564371 on 2011 Oct 01.

An image of all three variables is shown in Figure 7 which has north up, and east to the left.

Sadly, I have not had clear skies since then to attempt any further follow-up observations.

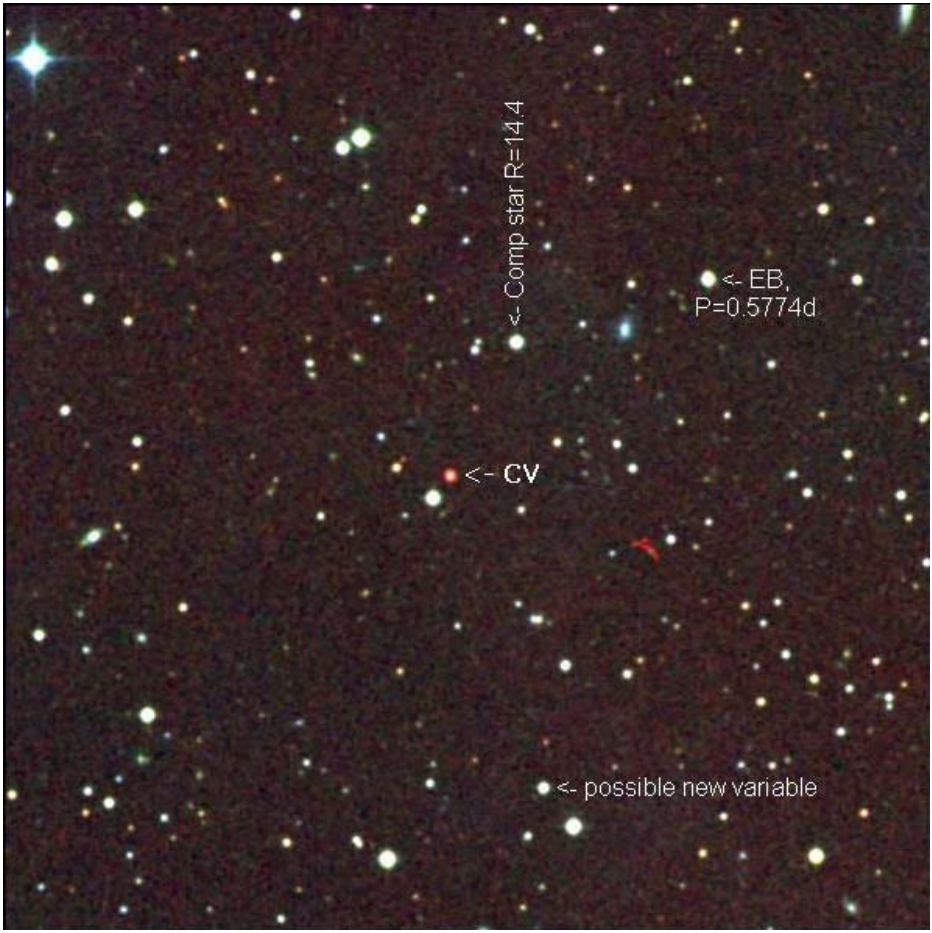
roger.pickard@sky.com

References

1. *http://www.variablestarssouth.org/index.php/research-projects/equatorial-eclipsing-binaries*
2. *baavss-alert@yahoogroups.com*
3. A.V. Khruslov, 2008, PZP 8, 52.

Figure 7: Image of all three variables.

Courtesy of Denis Denisenko



AN ENCOUNTER WITH RR LYRAE STARS

(The first of three articles)

GRAHAM SALMON

A. A little personal history

My interest in variable stars began in 1994 just before we moved from Sussex to Cornwall. My wife, Brenda, and I had been running a residential adult college providing a wide variety of courses from the ever popular painting and writing, to the minor interests of bricklaying and beekeeping. Some of these we would participate in ourselves. Patrick Moore had taken a brilliant astronomy course for us in 1983 but he had been unable to come subsequently, so in 1993, at the suggestion of Sussex University, I got in touch with Norman Walker who came and took a course for us then. He returned in 1994 when, at my suggestion, he talked about what amateurs could usefully do, concentrating in particular on the observation of variable stars.

I had always enjoyed the night sky and started making my own 6 " Newtonian just before I left school. The Mount Palomar 200" telescope had just started operations and my telescope would be the Next Big Thing. I was therefore somewhat piqued when a boy called Roger Griffin, two years younger than me, entered his 5" Newtonian in the end of term Hobbies Exhibition. It was home-made and very nattily finished. However, I was very fortunate to discover that behind our shops in Coulsdon, F.J. Hargreaves and his colleague, John Thompson, had their workshop where they were working on a 48" mirror for Canberra University. John had recently returned from working on the Palomar

Figure 1. View of observatory with roof rolled back.

telescope. They provided some key help when it came to parabolising my mirror. I used the telescope while I was at college, and for some years afterwards, but what with work and family, it stood in the corner unused for thirty years.

So, before leaving Sussex, I bought a Meade LX 200 Schmidt Cassegrain telescope, and was able to install it on the roof of the late Regency vicarage we bought in Cornwall[Fig.1] It was situated where in past years the tank for collecting rain water for use in the house had been.

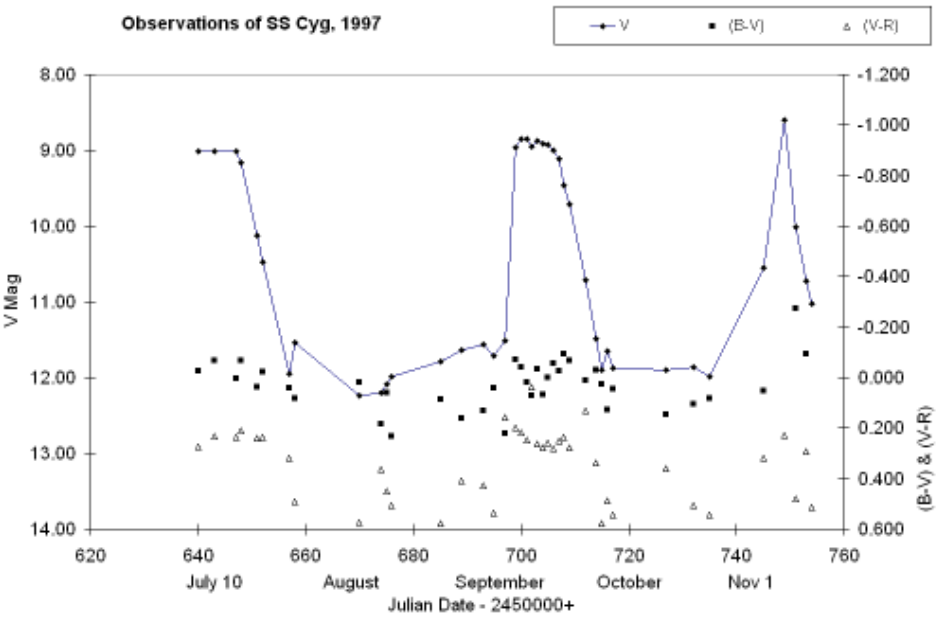
Figure 2. View of chimneys from observatory.

To satisfy the planners it had a rollback roof, with a dormer window to make it look like a maid's bedroom. The window had to be opened before winding the roof back so as to clear the telescope. I was concerned that all the tall chimneys might interfere, but they rarely did.

It was a bit tricky building it on the roof, but worth it as the house is surrounded by tall trees and Brenda was keen to develop the whole five acre garden without an observatory cluttering it up in the middle! She did a brilliant job on the garden and it became quite famous.

I joined the BAA and under Gary Poyner's direction started the visual observation of a batch of stars in the telescope program. I had bought a Starlight Express SXL-8 CCD and one of Norman's filter boxes, and with the fine summer of 1997, I was able to follow SS Cygni in B, V and R from July to November that year. I was unable to get reliable values for the B and R values of the comparison stars. I was pleased with the plot in V showing two long and one short outbursts.

Figure 3. Light curve for SS Cygni from July to September 1997.



In 2000, following a talk at a VSS meeting by Patrick Miles, I built a clear sky detector to his design[1] and situated its control box next to the television set so that while watching television it would alert me if the sky cleared. This project was a useful reintroduction to electronics (having worked for Ferranti computers in the 1950s) and I followed that project up with another, providing a motor drive for the filter box. This enabled me to follow the outburst of WZ Sagittae in B, V and R during August 2001. WZ Sagittae usually goes into outburst every 33 years, so I was greatly impressed that this outburst had been detected by patient regular observation after only 22 years, 11 years before it was expected.

I quickly found that measuring each frame of a time series one by one was exhausting, but discovered some software called MiPS which had the basic photometry and astrometry facilities together with a way of programming them using BASIC which did the job automatically very well until AIP4WIN arrived.

Up to this time there had been considerable debate about the linearity of CCDs and consequently the reliability of the results. Richard Miles devised an experiment to check on this and demonstrated that all was well provided the charge in each pixel was kept below 50% of its full well value. The situation was greatly improved with the arrival of the second generation CCDs, at which point I upgraded to a Starlight Express SXV-H9.

However in 2003 I found that my neck was not supple enough to continue with visual observing, particularly on cold winter nights, so I put the telescope under remote control and was able to continue observations while sitting by the fire with one eye on the television. I was using PCAnywhere with my own custom list of target stars so going from one to the next was normally quite quick, but the backlash on the Meade sometimes

made the pointing inaccurate and then trying to correct it could waste a lot of time. However, I was able to reach stars of magnitude 16 or 17, instead of my visual limit of 13.3.

I was not using my filter box and obtaining time series observations as much as I wanted to. Every now and then a cataclysmic would go into outburst, an alert and call for time series observations would go out and, as likely as not, I would miss it as either I had not looked at my emails or the sky would be cloudy. Consequently I thought I would try RR Lyrae stars knowing they might be boring but at least they are varying all the time. Norman, in his book "Getting the Measure of the Stars", includes a section on projects including one with 11 RR Lyrae stars.[2]

RR Lyrae stars are one of the groups of pulsating stars along with Mirae, classical Cepheids and Delta Scuti. They have periods of 5 to 19 hours and amplitude of 0.5 to 1.3 magnitude so that during a long winter's night a whole cycle may be observed. With an automatic telescope to take an observation every minute or so, the astronomer can go to bed and look at the results in the morning. They are well through their life cycle so one could say that they are elderly stars which can be recommended for elderly astronomers, although younger persons are not debarred. I did add a modification to my clear sky detector so that if the sky clouded up, it buzzed me in bed, but hopefully without waking Brenda!

References

1. Clear Sky Detection with a Compensation Pyregeometer by Patrick Miles, Journal British Astronomical Association 110.3.2000.2.
2. "Getting the Measure of the Stars" by W. A. Cooper and E. N. Walker, published 1989, by Adam Hilger, and by Taylor and Francis.

IMPROVING THE ORBITAL PERIOD OF HS1857+7127

David Boyd

HS1857+7127 is a dwarf nova identified spectroscopically during the Hamburg Quasar Survey[1] by its strong Balmer emission lines on a blue continuum plus weaker He I lines. Its discovery was first published in 2006 in a paper by Aungwerojwit et al[2] based on observations made between April 2002 and May 2004. The paper includes several light curves showing shallow eclipses and times of minimum for 9 eclipses, from which they derive the following ephemeris for the eclipse time of minimum:

$$HJD\,(min) = 2452368.53243(98) + 0.189109(1) \times E$$

This corresponds to an orbital period of 272.317(1) min. Based on its frequent relatively large amplitude outbursts, its long orbital period and the similarity of its UV spectrum in outburst to that of Z Camelopardalis, the authors suggested it might be a UGZ-type dwarf nova. It was therefore included in the AAVSO CV Section's Z CamPaign organised by Mike Simonsen[3].

Its light curve over the past year (Fig. 1) shows frequent short outbursts to around 14th magnitude separated by low periods at 17th magnitude – but as yet no standstills. Its true

nature is therefore still unclear, although it is increasingly looking like a UGSS-type dwarf nova.

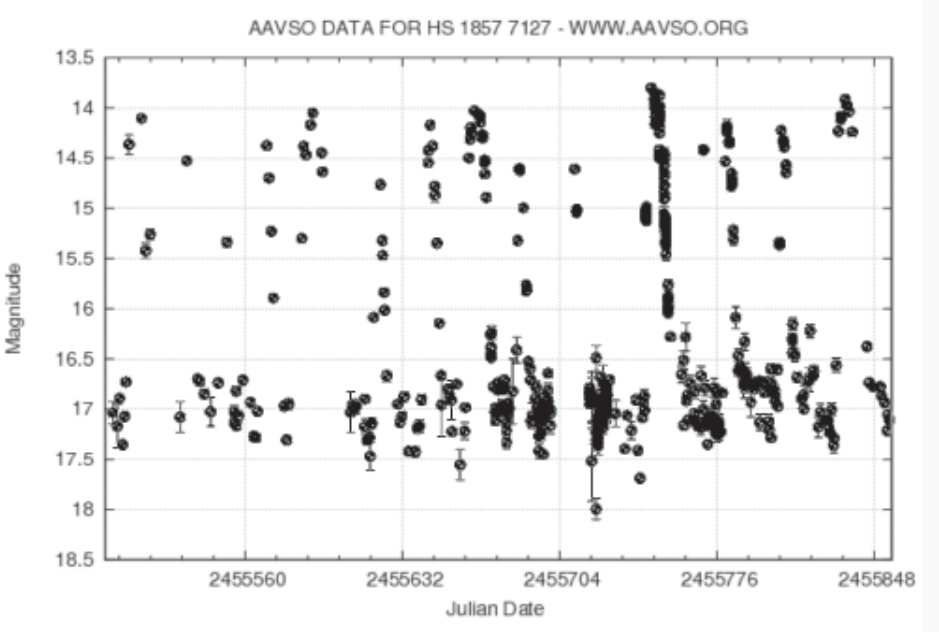


Figure 1. AAVSO light curve for HS1857+7127 from 2010 Nov. to 2011 Oct.

The eclipses are only 0.15 magnitude deep (Fig. 2) so can only be well resolved with amateur equipment when the star is in outburst. By observing it during several outbursts in recent months, I have recorded 6 further eclipses and measured their times of minimum. These are listed in Table 1 with orbit numbers based on assigning orbit 0 to the first eclipse listed in reference[2]. Equipment used was a 0.35-m SCT, SXVR-H9 CCD camera and Johnson V filter.

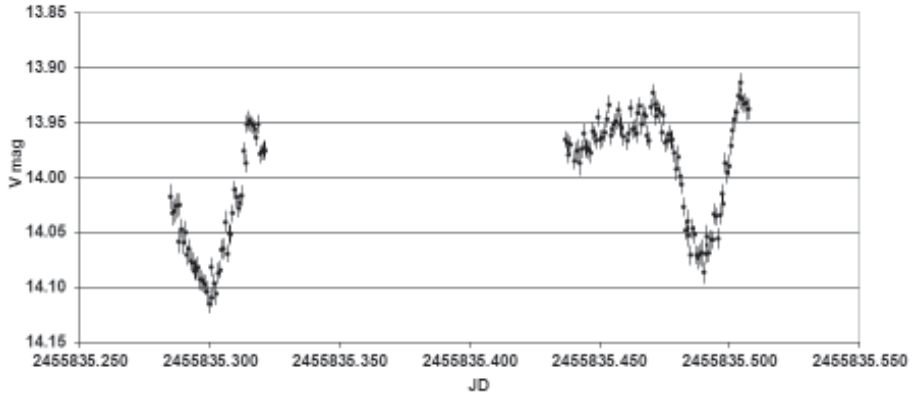


Figure 2. Eclipses recorded on 2011 September 30.

Orbit no	Time of minimum (HJD)	Uncertainty
17550	2455687.41481	0.00315
18053	2455782.53647	0.00193
18179	2455806.36301	0.00098
18332	2455835.29876	0.00119
18333	2455835.48994	0.00066
18338	2455836.43161	0.00096

Table 1. Eclipse orbit numbers and times of minimum.

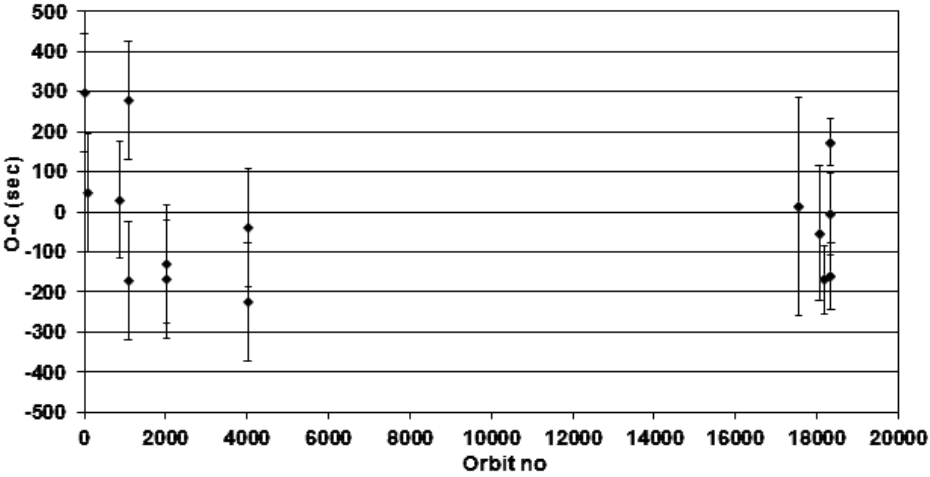
As noted in reference [2], the eclipse profiles vary considerably and some are quite noisy, possibly because of flickering or some other cause of small-scale variability in the light curve. This increases the estimated uncertainty and the scatter in the measured eclipse times.

When these new eclipses are included in an O-C analysis with the earlier published eclipses (Fig 3), they enable an improved determination of the eclipse ephemeris and orbital period:

HJD (min) = 2452368.53102(62) + 0.18911018(4) * E

This corresponds to an orbital period of 272.31866(6) min, a substantial improvement on the precision of the previously published value. Besides improving eclipse predictions, this will make the detection of any future change in the orbital period more secure.

Figure 3. O-C analysis including eclipse times from reference [2] (orbits 0 – 4026) and Table 1 (orbits 17550 – 18338).

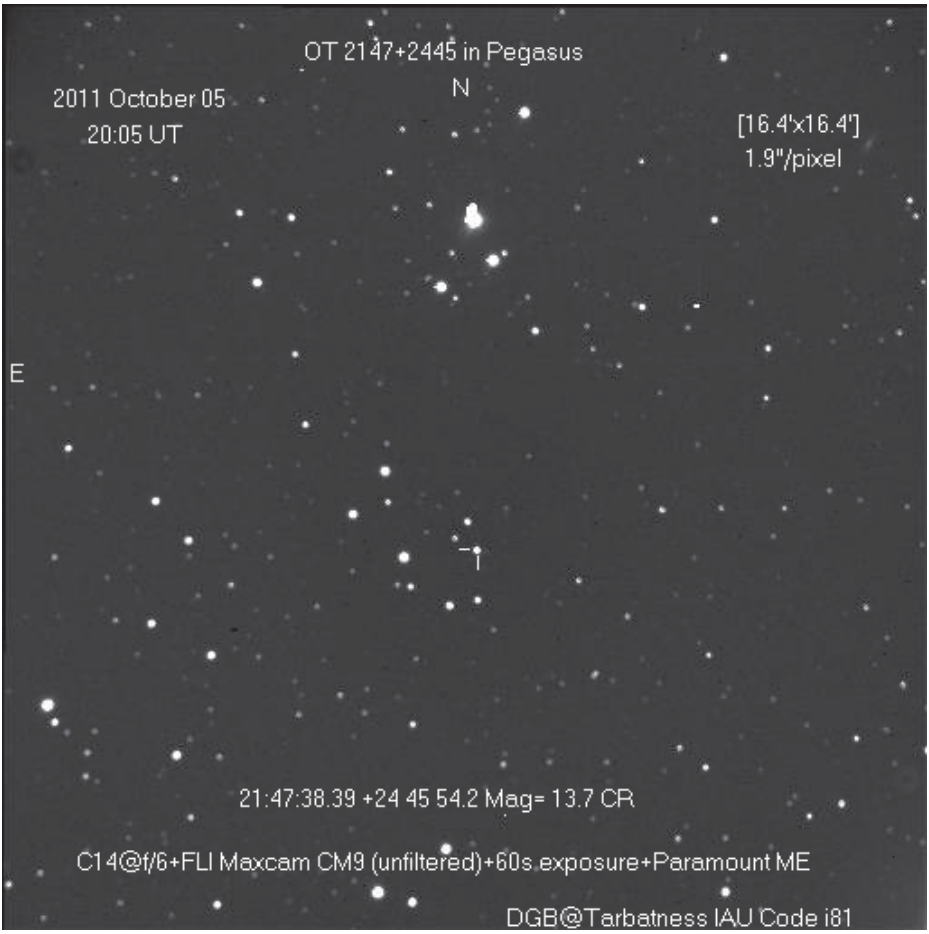


References

[1] *http://deneb.astro.warwick.ac.uk/phsdaj/HQS_Public/HQS_Public.html*
[2] Aungwerojwit A. et al., Astronomy & Astrophysics, 455, 659–672 (2006)
[3] *https://sites.google.com/site/aavsocvsection/z-campaign*

OT 2147+2445 IN PEGASUS

DENIS BUCZYNSKI



The Catalina Real Time Transient Survey detected a bright CV in outburst.

Gianluca Masi tracked the transient, remotely using the 14" photo-metric unit part of the Virtual Telescope, on 5th October 2011 he sent out a message on VSNET saying he had taken more than 5 hours of time resolved photometry which made a nice light curve with beautiful superhumps, showing that the Catalina Transient is a new SU Ursae Majoris type Star.

Reference

http://ooruri.kusastro.kyoto-u.ac.jp/mailarchive/vsnet-alert/13721
Gianluca Masi's light curve:
http://
virtualtelescope.bellatrixobservatory.orgOT_J214738_4_244553_4oct2011.jpg

CAUGHT IN THE ACT.
FLICKERING IN RX ANDROMEDAE.

GARY POYNER

If you like observing Cataclysmic Variable Stars, especially Dwarf Novae, there will come a time when you catch one on the rise to maximum, and find that your estimate is extremely difficult to make because the magnitude of your target is changing from one moment to the next by a few tenths of a magnitude. It does not happen to all Dwarf Novae of course, nor does it happen all the time to objects in which you have observed it to occur before. This is the mysterious 'flickering', a phenomenon which has perplexed professional astronomers for many years, and kept the amateur observer intrigued as to what he/she is seeing. Occasionally seen in Symbiotic stars as well as other type of CVs (UX Usae Majoris was the first CV where flickering was recorded), the cause of this very real effect remains very much a topic of conversation. Of one thing we are (almost) sure, that the phenomenon is a disc event, probably associated at times with the bright spot (or hot spot), where the gas stream impacts on the disc.

John Toone has written about flickering in several dwarf novae (most notably U Geminorum) in these pages before, so it came as no surprise when on the evening of Tuesday October 18th at 20h 51m UT, I picked up a message, sent to BAAVSS Alert on my BlackBerry, that he had detected RX Andromedae "...rising rapidly and appears to be small scale (visual that is) flickering". I was observing variables in Pegasus at the time, so moved the telescope directly to RX Andromedae to see what was going on. RX And was certainly in outburst at 11.6, but what was most evident was that it was tricky getting an accurate estimate as the magnitude was fluctuating by up to 0.4 magnitudes in timescales of seconds! I had seen flickering in Dwarf Novae before, and on one occasion made attempts at observing and recording the phenomenon[1]. Here was a perfect opportunity to try again, so after watching RX And flicker away for a couple of minutes I began my observing run at 21h 18m. I made estimates every 10 seconds against just one comparison star (the 118 star on the AAVSO chart), as I find this is the best and the easiest way to do it on such short time scales. I did not move my eye from the eyepiece, just closed it and counted to 10 before opening it again and making an estimate. It is quite easy to count out 10 seconds accurately with practice. The times and estimates were recorded on my phone. Twelve minutes fifty seconds and 78 observations later, cloud came over quickly from the west, and ended my observing run (although I could still see RX Andromedae).

The light curve shown opposite in figure 1 is the result of that short observing run. Two things are very obvious. The first is that it is almost periodic in nature, and the second shows the amplitude of the variation almost certainly decreasing towards the end of the run. We will never know if the latter did happen, as John's plea for CCD observations in his alert message did not result in any response from CCD observers, (particularly disappointing to both myself and John I have to say). However at least we can have some fun with the periodicity. Seventy eight observations is not a lot of data to undertake any meaningful analysis, so I ran the observations through Peranso[2] just for the sake of it, and share the results here just as a talking point. Two obvious periods were shown in PDM, Anova and Lomb-Scargle methods. These were 0.0016d (2.3m) and 0.0022d (3.17m), the latter number resulting from prewhitening the first run. The phase plot folded on 0.0016d is shown in figure 2.

What all this means I do not know. Perhaps if we had CCD data to implement the few visual observations we might have been able to get something useful from the data, but

Figure 1: Light curve of RX Andromedae 18th October 2011, 21h 18m – 21h 30m 50s

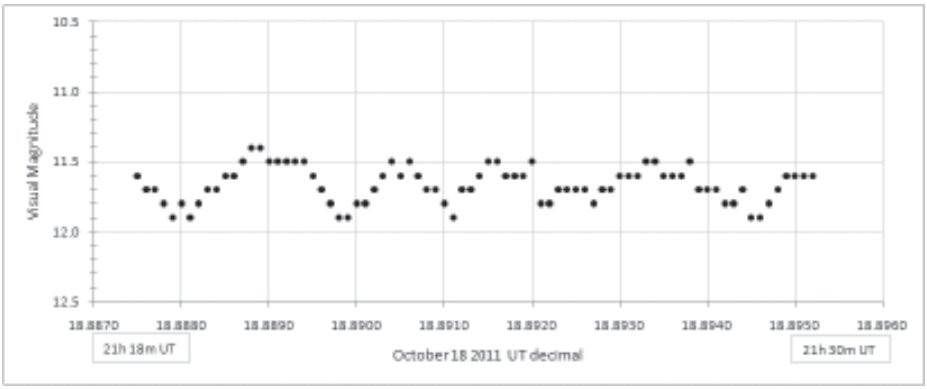
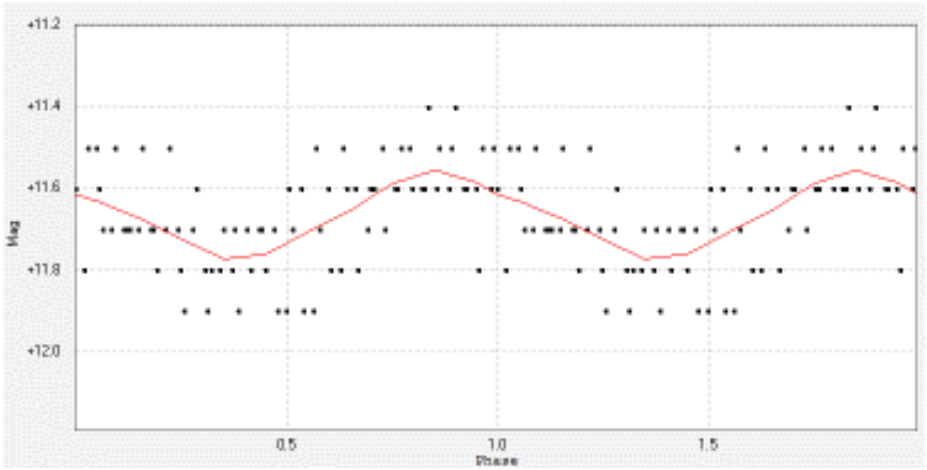


Figure 2:Phase plot of RX Andromedae, folded on the shorter period of 0.0016d



we did not. Is there any reason why flickering should (or should not) be periodic? I can not answer that either. One thing is for sure though, flickering is a very real event, and is easily detectable to the visual observer. It does appear to be more common as the Dwarf Novae is rising to maximum, as John Toone has written in the past. This is to be expected I suppose as the disc at this time is in a very energetic state.

Lots of VSS observers monitor Dwarf Novae. If you happen to observe one of them on the rise, take a little more care with your observation to see if there is any flickering present. If you think there is, do everyone a favour and report it to the alert group straight away. And if you are a CCD observer and see this alert, please have a go if you can do very short integration times.

References

1: Observations of the recently discovered dwarf nova 1RXSJ053234.9+624755 during the 2005 March superoutburst. Poyner and Shears, JBAA Vol 116, 1, 2006.
2: Vanmunster T., Peranso, *http://www.peranso.com*

NIGHT TIME CLOUD COVER IN MANCHESTER AND SHREWSBURY

JOHN TOONE

I started to record notes on night time cloud cover at the same time that I commenced making variable star observations in January 1975. At the end of 2010 I had acquired equal lengths of data [18 years, approximating to 6,000 nights] on night time cloud cover for my two observing sites at Manchester and Shrewsbury, so I felt that this was a good time to undertake a seasonal analysis and statistical comparison between the two sites in terms of night time cloud.

I was resident in Boothstown, seven miles west of the center of Manchester, between January 1975 and December 1992. From January 1993 until December 2010 I was resident in Cressage, eight miles south-east of Shrewsbury. The physical parameters of the two sites are as follows:

Manchester
Latitude: 53°, 30' 05" N
Longitude: 02°, 24' 49" W
Altitude: 44m

Shrewsbury
Latitude: 52°, 37' 47" N
Longitude: 02°, 36' 00" W
Altitude: 72m

The two sites are only separated by 70 miles but the near 1 degree difference in latitude is noticeable in the month of June where the night time sky is slightly less twilit from Shrewsbury. Manchester has a reputation for incurring inclement weather, and Shrewsbury lies in the rain shadow of the Cambrian Mountains, so I was expecting that overall Shrewsbury would record less cloud than Manchester in this analysis.

Whilst I was physically resident at the two sites I classified each night into one of three categories:

1. Cloudy Night: A night on which the sky was too cloudy to permit any form of astronomical observation.
2. Partly Clear Night: A night where the sky was partly clear and it was possible to undertake astronomical observations for limited spells.
3. Clear Night: A night where the sky was predominantly clear and permitting prolonged astronomical observations.

Manchester Site Results

For Manchester during the years 1975 to 1992 the following data was recorded:

Year	Nights	Cloudy	Cloudy/Clear	Clear	% Cloudy	% Cloudy/Clear	% Clear
1975	349	175	109	65	50	31	19
1976	345	203	101	41	59	29	12
1977	365	180	135	50	49	37	14
1978	352	192	116	44	55	33	12
1979	358	178	144	36	50	40	10
1980	321	170	119	32	53	37	10
1981	341	182	125	34	53	37	10
1982	339	175	119	45	52	35	13
1983	341	190	116	35	56	34	10
1984	333	178	101	54	54	30	16
1985	326	194	90	42	59	28	13
1986	326	177	111	38	54	34	12
1987	344	208	93	43	60	27	13
1988	339	213	85	41	63	25	12
1989	338	205	84	49	61	25	14
1990	338	203	97	38	60	29	11
1991	338	203	94	41	60	28	12
1992	236	147	62	27	62	26	12
Total/Average	6029	3373	1901	755	56	32	12

1988 was the cloudiest year, 1977 was the least cloudy year, but the greatest number of clear nights occurred in 1975. A possible trend in the above figures is that there was a higher percentage of cloudy nights in the second half of the period covered.

Shrewsbury Site Results

For Shrewsbury during the years 1993 to 2010 the following data was recorded:

Year	Nights	Cloudy	Cloudy/Clear	Clear	% Cloudy	% Cloudy/Clear	% Clear
1993	281	160	78	43	57	28	15
1994	271	147	80	44	54	30	16
1995	327	165	92	70	51	28	21
1996	362	227	91	44	63	25	12
1997	346	194	97	55	56	28	16
1998	320	190	104	26	59	33	8
1999	320	162	112	46	51	35	14
2000	324	176	112	36	54	35	11
2001	352	198	106	48	56	30	14
2002	330	196	97	37	11	59	11
2003	324	180	93	51	55	29	16
2004	308	199	80	29	65	26	9
2005	302	154	107	41	51	35	14
2006	339	197	106	36	58	31	11
2007	348	162	135	51	46	39	15
2008	338	169	119	50	50	35	15
2009	340	172	118	50	50	35	15
2010	322	178	91	53	55	28	16
Total/Average	5854	3226	1818	810	55	31	14

2004 was the cloudiest year, 2007 was the least cloudy year, but the greatest number of clear nights occurred in 1995.

To establish if there are any seasonal trends the data was re-reduced into combined monthly totals and also expressed as percentages:

Manchester 1975 – 1992

Month	Nights	Cloudy	Cloudy/Clear	Clear	% Cloudy	% Cloudy/Clear	% Clear
January	555	328	174	53	59	31	10
February	508	282	174	52	56	34	10
March	547	317	175	55	58	32	10
April	517	270	169	78	52	33	15
May	527	256	156	115	48	30	22
June	445	259	107	79	58	24	18
July	475	275	128	72	58	27	15
August	445	247	144	54	56	32	12
September	443	244	148	51	55	33	12
October	518	302	172	44	58	33	9
November	507	281	172	54	55	34	11
December	542	312	182	48	57	34	9
Total/Average	6029	3373	1901	755	56	32	12

The least cloudy months were April and May. The partly clear nights were evenly distributed throughout the year with the exception of June and July when the short nights meant there was limited time for the sky to change from clear or cloudy. There was a definite seasonal trend for clear nights with a sharp peak in May and a broad minimum centred on mid winter (December).

Shrewsbury 1993 – 2010

Month	Nights	Cloudy	Cloudy/Clear	Clear	% Cloudy	% Cloudy/Clear	% Clear
January	509	275	185	49	54	36	10
February	454	235	169	50	52	37	11
March	493	253	177	63	51	36	13
April	476	226	155	95	47	33	20
May	506	281	120	105	55	24	21
June	444	285	93	66	64	21	15
July	504	324	98	82	64	20	16
August	531	309	140	82	58	26	15
September	496	259	170	67	52	34	14
October	494	259	182	53	52	37	11
November	479	259	178	42	54	37	9
December	468	261	151	56	56	32	12
Total/Average	5854	3226	1818	810	55	31	14

Overall the figures for Shrewsbury were strikingly similar to those to Manchester. April was the least cloudy month, and the partly clear nights were reduced during the summer months of May to August. The clear nights were most numerous in May though April was not far behind, and were least numerous in the period October to February.

Verification from Observing Duration Records

In conjunction with classifying the nights into cloudy, partly clear, and clear; I also kept a record of the actual observing time undertaken, which could also be analysed as an indication of relative cloudiness on a monthly basis. For the observing time analysis, as with the night classification analysis, only data recorded from the Manchester and Shrewsbury sites was included.

For Manchester during the years 1975 to 1992 the following data was recorded:

Month	Observing Time (minutes)	Nights	Nightly Average (minutes)
January	10455	555	18.84
February	9005	508	17.73
March	9595	547	17.54
April	10577	517	20.46
May	10991	527	20.86
June	6429	445	14.45
July	6261	475	13.18
August	7836	445	17.61
September	8104	443	18.29
October	9649	518	18.63
November	9263	507	18.27
December	8848	542	16.32
Total/Average	107013	6029	17.75

Despite the last third of May suffering from all night twilight it was still the month that recorded the most observing time as well as the highest nightly average. April was a very close second, and the months of April and May were well clear of all other months. The months of June and July recorded the least observing time and the lowest nightly average due to the short (2 hour) nights and all night twilight. During the eight month period August through to March the nightly average did not change much.

For Shrewsbury during the years 1993 to 2010 the following data was recorded:

Month	Observing Time (minutes)	Nights	Nightly Average (minutes)
January	14982	509	29.43
February	12105	454	26.66
March	14013	493	28.42
April	16208	476	34.05
May	13723	506	27.12
June	7845	444	17.671
July	8630	504	7.12
August	12284	531	23.13
September	13336	496	26.89
October	13394	494	27.11
November	12935	479	27.00
December	13568	468	28.99
Total/Average	153023	5854	26.14

The data for Shrewsbury showed similar monthly trends to that of Manchester with one notable exception, the month of May dropped back into the main group of months leaving April alone as the outstanding month. So we have April well clear at the top and again the months of June and July well clear at the bottom.

The next page shows:

Monthly Data combined from both sites 1975 - 2010

Both the cloud and the observing time records were combined for both Manchester and Shrewsbury in an attempt to determine the overall seasonal trend for the North West of England.

Month	Nights	% Cloudy	% Cloudy/Clear	% Clear	Observing Time Nightly Average (minutes)
January	1064	56	34	10	23..91
February	962	54	35	11	21.94
March	1040	55	34	11	22.70
April	993	50	33	17	26.97
May	1033	52	27	21	23.92
June	889	61	23	16	16.06
July	979	61	23	16	15.21
August	976	57	29	14	20.61
September	939	54	34	12	22.83
October	1012	55	35	10	22.76
November	986	55	35	10	22.51
December	1010	57	33	10	22.19
Total/Average	11883	56	31	13	21.88

The most telling data is in the final two columns in the above table. With a sample of nearly 12,000 nights averaging almost 1000 nights per month the previously defined seasonal trend for clear nights is smoothed out and the impact of the available observing hours is reflected in the observing time averages. There is a sharp rise in clear nights in April that peaks in May followed by a gradual decline which bottoms out over the period October to January. The rapid shortening of the nights in late spring means it is not possible to take full advantage of the abundant clear nights in May and that is why April turns out to be the month with the highest nightly observing time average.

Summary

One can conclude the following from the above analysis:

1. Shrewsbury has marginally (2%) more clear nights than Manchester.
2. Both sites show similar seasonal trends with clear nights peaking in the month of May.
3. Combining the observing time data for both sites reveals that the most productive month for astronomical work is April.
4. There is no evidence of overall cloud frequency increasing or decreasing during the period 1975 – 2010.

LIGHT CURVES OF TWO RR LYRAE STARS, AV PEGUSI AND RS BOOTIS.

LAURENT CORP

Figure 1:
AV Pegasi

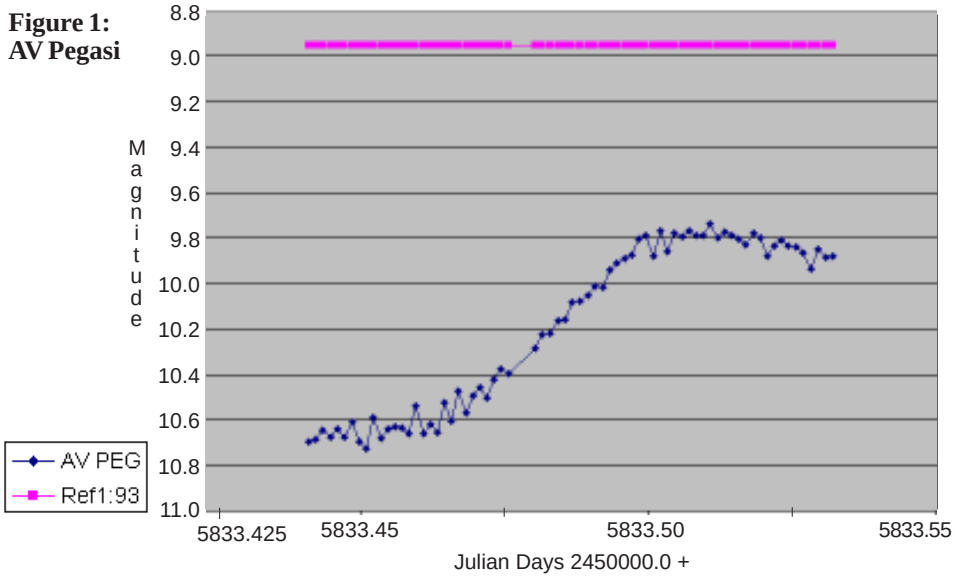
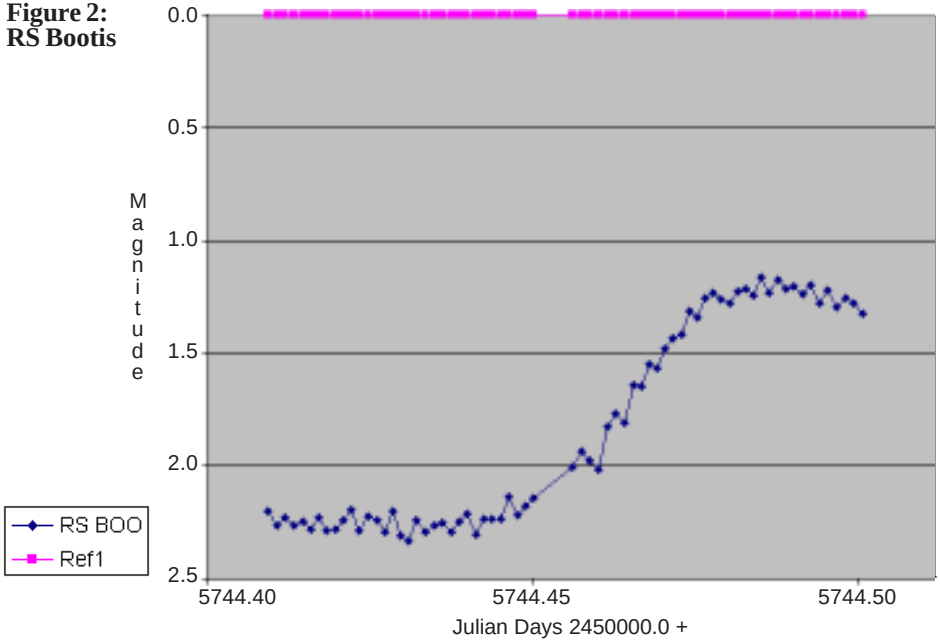


Figure 2:
RS Bootis



PR HERCULIS IN OUTBURST.

Denis Buczynski and Nick James

The image below of PR Herculis was taken by Denis Buczynski and Nick James after they received a report of the outburst from Robert Fidrich on 21 Nov, 23:15.

On 22 Nov 2011 18:42, Taicho Kato wrote: PR Her is undergoing a rare bright outburst! The quiescent magnitude is reported to be 21.0, and this object is most likely a WZ Sge-type dwarf nova (known maximum was 14.0). All types of observations are encouraged! Accurate astrometry of the outbursting object is also needed.

On 22 Nov 20:30 +0100 Robert Fidrich sent a message on cvnet: Walter Macdonald just alerted us on the #aavso IRC channel, that PR Her is in a very bright outburst near 13th mag. It is probably a rare superoutburst? Initial V-filtered images from Astrokolkhoz with AAVSONet scope K35 show PR Her tonight to be at about mag 13.4

A new file: */Astrokolkhoz/PR-Her-111122-superhumps.JPG* , was uploaded to the baavss-alert group on 22 Nov 2011 by Tom Krajci. It showed a photometry time-series plot of almost two hours of PR Her, based on uncalibrated images taken in southern New Mexico, on a AAVSONet telescope K35, Celestron 14, Vfilter, 60-second images) PR Her appeared to be displaying superhumps. Amplitude was a bit more than 0.1 magnitude. PR Her was about mag 13V.

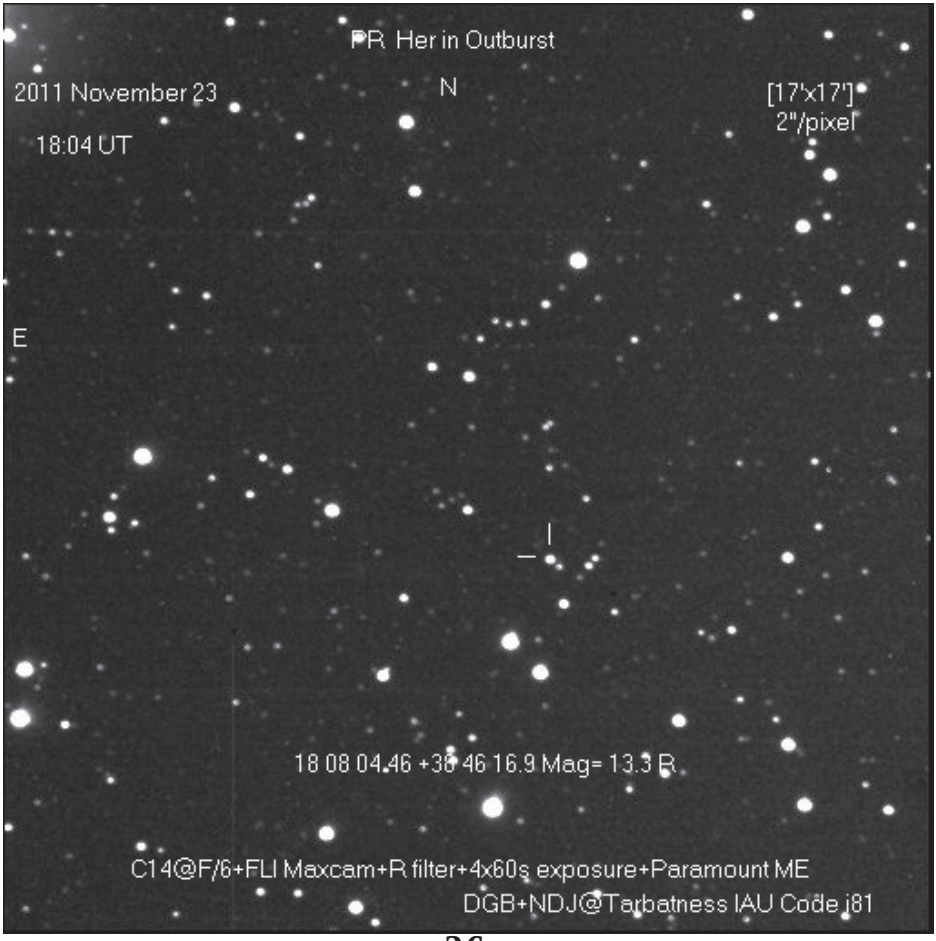


CHART NEWS

JOHN TOONE

The following new charts are now posted to the VSS web site and are available in paper form from the Chart Secretary:

Telescopic Charts

074.03
UV Aurigae
New 3 degree and 1 degree field charts replace chart 074.02. Comparison stars G and L are dropped on account of their blue colour. Comparison stars N and P have been introduced. The new sequence consists of V measurements from Tycho and SRO. The previous sequence was poorly calibrated below magnitude 9.

039.03
Omicron Ceti
New 60 degree, 18 degree and 5 degree field charts replace chart 039.02. Comparison stars D, J, N and Q have been dropped. The new sequence consists of V measurements from Tycho.

045.02
Chi Cygni
New 18 degree, 5 degree, 1 degree and 20 minute field charts replace chart 045.01. Comparison stars Gamma Lyr, FL8 Cyg, D (V1765 Cyg), H (red variable), P, Q, U, GG and MM are dropped. The new sequence consists of V measurements from Tycho and Pickard.

Binocular Charts

231.02
X Cancri
A new 9 degree field chart replaces chart 231.01. Comparison stars E, H, N and O (B-V range of +0.9 to +1.4) have been dropped and comparison star R has been added. The new V sequence is taken from Tycho and has a much reduced colour range.

312.02
W Cephei and RW Cephei
Formally chart 312.01 the existing 6 degree field chart is retained. The only change to the sequence is the reintroduction of comparison star F which had previously been dropped on account of its red colour. F is ideally positioned close to W, and the HD catalogue value is used to counteract the red colour and visually align with the Tycho V sequence.

220.02
RR Coronae Borealis and RS Coronae Borealis
A new 9 degree field chart replaces chart 220.01. SW Coronae Borealis which was on the former chart has been dropped from the Binocular Programme on account of its lack of variation. RS CrB which shows a good range of variation in binoculars has been added

to the Binocular Programme and is included on the new chart. Comparison stars B, C (NSV20376), D, E and H have been dropped, and comparison stars M and L have been added for RR CrB. For RS CrB a sequence of N, P, R, S, T and W has been introduced. Both sequences use Tycho V measures.

106.03
TX Draconis and AH Draconis
Formally chart 106.02 the existing 9 degree field chart is retained. The only change to the sequence is the reintroduction of comparison star K which had previously been dropped on account of its red colour. K is ideally positioned close to TX and the Harvard value is used to counteract the red colour and visually align with the Tycho V sequence.

326.01
Eta Geminorum
No previous BAA VSS chart existed for this star which has been selected as variable star of the year in the 2012 Handbook. An 18 degree field chart has been drawn. The sequence consists of V measurements from Hipparcos.

029.04
U Monocerotis
A new 9 degree field chart replaces chart 029.03. Comparison stars A and B have been dropped as they are rarely if ever used on account of their brightness and distance from U. The new V sequence is taken from Hipparcos but retains HD values for the red comparison stars E and G.

Eclipsing Binary Charts

236.02
RZ Cassiopeiae
A new 9 degree field chart replaces chart 236.01. The existing sequence is retained, but with V measures from Tycho introduced. This means that comparison stars B to F have slightly amended values.

328.01
Beta Lyrae
A new 30 degree chart replaces chart TB 1993 Dec 03. A lettered sequence is introduced which retains all the previous comparison stars with the exception of Theta Her. The new V sequence is taken from Tycho.

327.01
Beta Persei
No previous BAA VSS chart existed for this star. A 40 degree field chart has been drawn. The sequence consists of V measurements from Hipparcos.

The above eclipsing binary charts will be included within the forthcoming **Eclipsing Binary Handbook**.

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.

JANUARY

2012 Jan 1 Sun
TW Dra.....05(10)07D
Z Per.....D17(17)22
X Tri.....D17(19)22
Z Dra.....19(21)24
AI Dra.....19(21)22
HU Tau.....21(25)29L
RW Tau.....22(27)29L
RZ Cas.....23(25)28

2012 Jan 2 Mon
Z Vul.....D17(16)20L
X Tri.....D17(19)21
TV Cas.....D17(21)25
SS Cet.....D17(21)25L

2012 Jan 3 Tue
AI Dra.....00(01)03
RZ Cas.....04(06)07D
Z Dra.....04(06)07D
SW Cyg.....04(10)07D
U Sge.....L06(06)07D
U Cep.....D17(13)18
X Tri.....D17(18)20
HU Tau.....22(26)28L
TW Dra.....24(29)31D

2012 Jan 4 Wed
U CrB.....L00(01)07D
RS CVn.....03(09)07D
del Lib.....L04(04)07D
V367Cyg..L05(45)07D
AI Dra.....05(06)07D
TX UMa....D17(13)18
TV Cas.....D17(16)20
X Tri.....D17(17)20
Z Per.....D17(19)24
RW Tau.....D17(21)26
V367Cyg..D17(45)23L

2012 Jan 5 Thu
V367Cyg..L05(21)07D
Z Vul.....L05(03)07D
RZ Cas.....D17(15)18
X Tri.....D17(17)19
S Equ.....D17(20)19L
SS Cet.....D17(21)25L
V367Cyg..D17(21)23L
U Cep.....20(25)30
Z Dra.....21(23)25
HU Tau.....24(27)28L

2012 Jan 6 Fri
V367Cyg.L05(<<)07D
del Lib.....05(12)07D
V367Cyg.D17(<<)23L
U Sge.....D17(16)19L
X Tri.....D17(16)18
RZ Cas.....18(20)22
TW Dra.....19(24)29

2012 Jan 7 Sat
V367Cyg.L05(<<)07D
Z Dra.....05(08)07D
U CrB.....06(12)07D
V367 Cyg..D17(<<)17
Z Vul.....D17(14)19
TX UMa....D17(15)20
X Tri.....D17(15)18
RW Tau.....D17(16)21
Z Per.....D17(20)25
SW Cyg.....17(23)24L
AI Dra.....19(21)22
RZ Cas.....22(25)27

2012 Jan 8 Sun
HU Tau.....01(05)04L
SW Cyg.....L02(<<)05
TV Cas.....03(07)07D
U Cep.....D17(13)18
Z Dra.....D17(16)19
SS Cet.....D17(20)25L
RS CVn.....22(28)31D

2012 Jan 9 Mon
AI Dra.....00(01)03
RZ Cas.....03(05)07D
TW Dra.....D17(20)25
Z Vul.....19(25)19L
Z Dra.....22(25)27
TV Cas.....22(27)31

2012 Jan 10 Tue
HU Tau.....02(06)04L
Z Vul.....L05(01)06
AI Dra.....05(06)07D
U Sge.....L05(01)06
TX UMa....D17(17)21
Z Per.....D17(21)26
U Cep.....20(25)30
U CrB.....L24(23)29

2012 Jan 11 Wed
del Lib.....L04(03)07D
SS Cet.....D17(19)24
Y Psc.....D17(21)22L
TV Cas.....18(22)26

2012 Jan 12 Thu
HU Tau.....04(07)04L
Z Vul.....06(11)07D
SW Cyg....D17(13)19
TW Dra....D17(15)20
S Equ.....D17(17)19L
Z Dra.....D17(18)20
RZ Cas.....D17(19)22

2012 Jan 13 Fri
RW Tau.....00(05)04L
del Lib.....05(11)07D
U Sge.....L05(10)07D
U Cep.....D17(13)18
TV Cas.....D17(18)22
TX UMa..D17(18)23
Z Per.....18(23)28
AI Dra.....19(20)22
RS CVn.....L21(23)30
RZ Cas.....22(24)26

2012 Jan 14 Sat
Z Dra.....00(03)05
U CrB.....04(10)07D
SS Cet.....D17(19)23
Z Vul.....D17(22)19L
AI Dra.....24(25)26

2012 Jan 15 Sun
RZ Cas.....02(05)07D
TW Dra....05(10)07D
Y Psc.....D17(15)20
RW Tau.....18(23)28L
U Cep.....20(25)29

2012 Jan 16 Mon
AI Dra.....05(06)07D
U Sge.....D17(19)18L
TX UMa..D17(20)24
Z Dra.....D17(20)22
Z Per.....19(24)28L
SW Cyg....21(27)23L

2012 Jan 17 Tue
SW Cyg..L01(03)07D
Z Vul.....L04(09)07D
TV Cas.....04(09)07D
SS Cet.....D17(18)23
U CrB.....L24(21)27

2012 Jan 18 Wed
TW Dra.....01(06)07D
Z Dra.....02(04)07
del Lib.....L03(03)07D
RW Tau.....D17(18)22
RZ Cas.....D17(19)21
RS CVn.....L21(18)25
TV Cas.....24(28)31D

2012 Jan 19 Thu
S Equ.....D17(14)18L
Z Vul.....D17(20)19L
TX UMa...D17(21)26
AI Dra.....19(20)22
Z Per.....21(26)28L
RZ Cas.....21(23)26

2012 Jan 20 Fri
del Lib.....04(11)07D
U Sge.....L05(04)07D
SS Cet.....D17(18)22
Z Dra.....19(21)24
TV Cas.....19(24)28
U Cep.....19(24)29
TW Dra.....20(25)30
AI Dra.....24(25)26

2012 Jan 21 Sat
RZ Cas.....02(04)07
U CrB.....02(08)07D
SW Cyg.....D17(17)23

2012 Jan 22 Sun
Z Dra.....04(06)07D
Z Vul.....L04(07)07D
AI Dra.....04(06)07D
RZ Cas.....(09)07D
HU Tau.....D17(14)18
TV Cas.....D17(19)23
V367Cyg.D17(59)22L
TX UMa.....18(23)27
Z Per.....22(27)28L

2012 Jan 23 Mon
V367Cyg.L04(35)07D
U Sge.....D17(13)18L
SS Cet.....D17(17)22
TW Dra.....D17(20)26
V367Cyg.D17(35)22L

2012 Jan 24 Tue
X Tri.....01(04)01L
RW Tau.....02(07)03L
V367 Cyg.L03(11)07D
V367 Cyg.D17(11)21L
TV Cas.....D17(15)19
HU Tau.....D17(16)19
Z Vul.....17(18)18L
RZ Cas.....D17(18)21
Z Dra.....21(23)26
U CrB.....L23(18)24

2012 Jan 25 Wed
X Tri.....00(03)01L
del Lib.....L03(02)07D
V367 Cyg.L03(<<)07D
V367 Cyg.D18(<<)21L
AI Dra.....19(20)21
U Cep.....19(24)29
TX UMa.....19(24)29
RZ Cas.....21(23)25
Z Per.....23(28)28L
X Tri.....24(26)25L

2012 Jan 26 Thu
SW Cyg....L01(06)07D
V367 Cyg.L03(<<)07D
Z Dra.....05(08)07D
TV Cas.....06(10)07D
TW Dra.....D18(16)21
SS Cet.....D18(16)21
HU Tau.....D18(17)21
Y Psc.....18(23)21L
RW Tau.....20(25)27L
X Tri.....23(25)25L
AI Dra.....24(25)26

2012 Jan 27 Fri
RZ Cas.....01(04)06
Z Vul.....L04(05)07D
del Lib.....04(10)07D
Z Dra.....D18(16)19
X Tri.....22(25)25L
U CrB.....24(29)31D

2012 Jan 28 Sat
TV Cas.....01(06)07D
RS CVn.....02(09)07D
AI Dra.....04(06)07D
RZ Cas.....06(08)07D
HU Tau.....D18(18)22
TX UMa.....21(26)30
X Tri.....22(24)25L
Z Dra.....22(25)27

2012 Jan 29 Sun
Z Per.....01(06)04L
TW Dra....06(11)07D
SS Cet.....D18(16)20
Z Vul.....D18(16)18L
RW Tau....D18(19)24
X Tri.....21(23)25L
TV Cas.....21(25)29

2012 Jan 30 Mon
U Sge.....L04(07)07D
Y Psc.....D18(17)20L
RZ Cas.....D18(18)20
HU Tau.....D18(20)23
SW Cyg..D18(20)22L
U Cep.....19(24)28
X Tri.....20(23)25L

2012 Jan 31 Tue
SW Cyg....L00(<<)02
Z Dra.....D18(18)20
TV Cas.....D18(21)25
AI Dra.....19(20)21
X Tri.....20(22)25
RZ Cas.....20(22)25
TX UMa...22(27)31D

February

2012 Feb 1 Wed
TW Dra....02(07)07D
Z Per.....02(07)03L
del Lib....L02(02)07D
Z Vul.....L03(03)07D
RW Tau....D18(14)19
SS Cet.....D18(15)20
HU Tau....D18(21)25
X Tri.....19(21)24
RS CVn....22(28)31D
AI Dra.....23(25)26

2012 Feb 2 Thu
Z Dra.....00(03)05
RZ Cas.....01(03)05
TV Cas.....D18(16)20
X Tri.....18(21)23

2012 Feb 3 Fri
del Lib.....04(10)07D
AI Dra.....04(05)07D
RZ Cas....05(08)07D
X Tri.....D18(20)23
HU Tau.....18(22)26
TW Dra...21(26)30D
U CrB...L22(27)30D
TX UMa.24(29)30D

2012 Feb 4 Sat
SW Cyg...04(10)06D
SS Cet.....D18(14)19
X Tri.....D18(19)22
Z Dra.....D18(20)22
U Cep.....19(23)28

2012 Feb 5 Sun
RZ Cas....D18(17)19
X Tri.....D18(19)21
HU Tau....20(24)26L

2012 Feb 6 Mon
Z Dra.....02(04)06D
TV Cas....03(07)06D
Z Vul.....L03(01)06
U Sge....L04(02)06D
X Tri.....D18(18)20
TW Dra...D18(21)26
AI Dra.....19(20)21
RZ Cas.....19(22)24
RS CVn....L20(23)29
RW Tau....22(27)26L

2012 Feb 7 Tue
TX UMa.02(06)06D
U Cep.....06(11)06D
SS Cet.....D18(14)18
X Tri.....D18(17)20
HU Tau...21(25)26L
TV Cas....22(27)30D
AI Dra.....23(25)26

2012 Feb 8 Wed
RZ Cas.....00(02)05
del Lib...L02(02)06D
Z Vul.....06(12)06D
X Tri.....D18(17)19
SW Cyg.D18(24)22L
Z Dra.....19(22)24
SW Cyg...L24(24)30

2012 Feb 9 Thu
AI Dra.....04(05)06D
RZ Cas.....05(07)06D
U Sge.....05(11)06D
S Equ.....L06(05)06D
X Tri.....D18(16)18
TW Dra.....D18(17)22
RW Tau.....D18(21)26
TV Cas.....18(22)26
U Cep.....18(23)28
HU Tau.....23(26)26L

2012 Feb 10 Fri
TX UMa.....03(08)06D
del Lib.....03(09)06D
Z Dra.....04(06)06D
V367 Cyg....05(50)06D
V367 Cyg..D18(50)20L
Y Psc.....20(24)20L
U CrB.....L22(25)30D

2012 Feb 11 Sat
V367 Cyg..L02(26)06D
Z Vul.....L03(<<)04
RZ Cas.....D18(17)19
TV Cas.....D18(18)22
V367 Cyg.D18(26)20L
RS CVn.....L19(18)24
HU Tau.....24(28)26L

2012 Feb 12 Sun
V367 Cyg..L02(02)06D
U Cep.....06(11)06D
V367 Cyg..D18(02)20L
RW Tau.....D18(16)20
AI Dra.....18(20)21
RZ Cas.....19(21)24
Z Dra.....21(23)26

2012 Feb 13 Mon
V367 Cyg.L02(<<)06D
Z Vul.....04(09)06D
TX UMa.....05(09)06D
V367 Cyg.D18(<<)20L
SW Cyg.....D18(13)19
AI Dra.....23(24)26
RZ Cas.....23(26)28

2012 Feb 14 Tue
HU Tau.....01(05)02L
Z Dra.....05(08)06D
U CrB.....06(12)06D
Y Psc.....D18(19)19L
U Cep.....D18(23)27

2012 Feb 15 Wed
del Lib....L01(01)06D
TW Dra....02(07)06D
AI Dra.....04(05)06D
RZ Cas.....04(07)06D
TV Cas.....04(09)06D
Z Dra.....D18(16)19
2012 Feb 16 Thu
U Sge.....L03(05)06D
S Equ.....L06(02)06D
TX UMa..06(11)06D
Z Per.....D18(14)18
RS CVn.....L19(13)20
Z Dra.....23(25)27
TV Cas.....24(28)30D
2012 Feb 17 Fri
del Lib.....03(09)06D
U Cep.....06(10)06D
RZ Cas.....D18(16)18
SW Cyg....21(27)21L
U CrB.....L21(22)28
TW Dra....22(27)30D
SW Cyg..L23(27)30D
RW Tau.....24(29)26L
2012 Feb 18 Sat
Z Vul.....L02(07)06D
AI Dra.....18(20)21
RZ Cas.....18(21)23
TV Cas.....19(24)28
2012 Feb 19 Sun
Z Per.....D18(15)20
Z Dra.....D18(18)21
U Cep.....D18(22)27
RZ Cas.....23(25)28
AI Dra.....23(24)26
2012 Feb 20 Mon
TV Cas.....D18(19)23
TW Dra....D18(22)27
RW Tau.....18(23)25L
2012 Feb 21 Tue
Z Dra.....00(03)05
RS CVn....02(08)06D
U CrB.....04(09)06D
RZ Cas.....04(06)06D
AI Dra.....04(05)06D
2012 Feb 22 Wed
del Lib.....L01(01)06D
U Cep.....05(10)06D
TX UMa....D18(14)19
TV Cas.....D18(15)19
Z Per.....D18(16)21
SW Cyg....D18(17)21L
SW Cyg.....L23(17)23
2012 Feb 23 Thu
Z Vul.....L02(05)06D
U Sge.....L02(<<)05
RW Tau.....D18(17)22
TW Dra.....D18(17)23
Z Dra.....D18(20)22
2012 Feb 24 Fri
del Lib.....02(09)06D
AI Dra.....D18(19)21
RZ Cas.....D18(20)22
U Cep.....D18(22)27
U CrB.....L21(20)26
2012 Feb 25 Sat
Z Dra.....02(04)06D
TX UMa....D18(15)20
Z Per.....D18(18)23
RS CVn.....21(28)30D
RZ Cas.....22(25)27
AI Dra.....23(24)25
2012 Feb 26 Sun
TV Cas.....01(06)06D
U Sge.....03(09)06D
S Equ.....L05(09)06D
2012 Feb 27 Mon
SW Cyg.....01(07)06D
RZ Cas.....03(05)06D
AI Dra.....04(05)06D
U Cep.....05(10)06D
Z Dra.....19(22)24
TV Cas.....21(25)29
2012 Feb 28 Tue
U CrB.....01(07)06D
Z Vul.....L02(03)06D
TX UMa....D19(17)22
Z Per.....D19(19)24
2012 Feb 29 Wed
del Lib.....L00(00)06D
V367 Cyg.L01(40)06D
TW Dra.....03(08)06D
Z Dra.....04(06)06D
TV Cas.....D19(21)25
U Cep.....D19(22)26
V367 Cyg.D19(40)19L

March

2012 Mar 1 Thu
V367 Cyg..L01(16)06D
V367 Cyg..D19(16)19L
HU Tau.....D19(16)20
AI Dra.....D19(19)21
RZ Cas.....D19(20)22
RS CVn.....D19(23)29
X Tri.....22(25)23L
2012 Mar 2 Fri
V367 Cyg..L01(<<)06D
del Lib.....02(08)06D
V367 Cyg.D19(<<)19L
TV Cas.....D19(16)20
TX UMa.....D19(18)23
Z Per.....D19(20)25
SW Cyg.....D19(20)20L
RW Tau.....20(25)25L
U CrB.....L21(18)24
Z Dra.....21(23)26
X Tri.....22(24)23L
RZ Cas.....22(24)27
SW Cyg.....L22(20)26
TW Dra.....23(28)30D
AI Dra.....23(24)25
2012 Mar 3 Sat
V367 Cyg..L01(<<)06D
U Cep.....05(09)06D
HU Tau.....D19(17)21
X Tri.....21(24)23L
2012 Mar 4 Sun
Z Vul.....L01(01)06D
U Sge.....L02(03)06D
RZ Cas.....02(05)06D
AI Dra.....04(05)06D
S Equ.....L05(06)06D
Z Dra.....06(08)06D
X Tri.....20(23)22L
2012 Mar 5 Mon
Z Dra.....D19(17)19
HU Tau.....D19(19)22
RW Tau.....D19(19)24
TX UMa.....D19(20)25
U Cep.....D19(21)26
Z Per.....D19(22)25L
TW Dra.....D19(23)28
X Tri.....20(22)22L
U CrB.....23(29)29D
2012 Mar 6 Tue
TV Cas....03(07)05D
RS CVn..D19(18)24
X Tri.....19(21)22L
Z Dra.....23(25)27
del Lib...L24(24)29D
2012 Mar 7 Wed
SW Cyg...04(10)05D
RZ Cas....D19(19)21
AI Dra.....D19(19)20
HU Tau...D19(20)24
X Tri.....D19(21)22L
TV Cas....22(27)29D
2012 Mar 8 Thu
U Cep.....04(09)05D
TW Dra...D19(18)23
X Tri.....D19(20)22L
TX UMa.D19(21)26
Z Per.....D19(23)25L
RZ Cas.....21(24)26
AI Dra.....23(24)25
2012 Mar 9 Fri
Z Vul.....L01(<<)04
del Lib.....01(08)05D
Z Dra.....D19(18)21
X Tri.....D19(19)22
HU Tau.D19(21)24L
TV Cas....D19(22)26
U CrB.....L20(16)21
2012 Mar 10 Sat
RZ Cas....02(04)05D
AI Dra.....03(05)05D
X Tri.....D19(19)21
U Cep.....D19(21)26
2012 Mar 11 Sun
Z Dra.....00(03)05
U Sge.....L01(<<)03
Z Vul.....04(09)05D
S Equ.....L04(03)05D
RS CVn...D19(13)19
TV Cas....D19(18)22
X Tri.....D19(18)21
HU Tau.D19(23)24L
TX UMa.D19(23)28
SW Cyg.D19(24)20L
Z Per.....20(24)25L
SW Cyg.L22(24)29D
2012 Mar 12 Mon
X Tri.....D19(17)20
U CrB.....21(26)29D

2012 Mar 13 Tue
U Cep.....04(09)05D
X Tri.....D19(17)19
RZ Cas.....D19(18)21
AI Dra.....D19(19)20
Z Dra.....D19(20)22
HU Tau.....20(24)24L
RW Tau.....22(27)24L
del Lib....L23(23)29D

2012 Mar 14 Wed
Z Vul.....L01(<<)02
U Sge.....L01(06)05D
TW Dra....04(09)05D
TX UMa.....20(24)29
RZ Cas.....21(23)25
Z Per.....21(26)25L
AI Dra.....22(24)25

2012 Mar 15 Thu
Z Dra.....02(05)05D
TV Cas.....04(09)05D
U Cep.....D19(21)25
HU Tau.....22(25)24L

2012 Mar 16 Fri
del Lib.....01(07)05D
RZ Cas.....01(04)05D
RS CVn.....02(08)05D
Z Vul.....02(07)05D
AI Dra.....03(05)05D
SW Cyg..D19(14)19L
RW Tau..D19(21)24L
TW Dra....23(28)29D

2012 Mar 17 Sat
TV Cas.....00(04)05D
Z Dra.....19(22)24
TX UMa.....21(26)29D
Z Per.....22(27)24L
HU Tau.....23(27)24L

2012 Mar 18 Sun
U Cep.....04(08)05D
S Equ.....L04(00)05D
TV Cas.....20(24)28
V367 Cyg..L24(54)29D

2012 Mar 19 Mon
Z Dra.....04(06)05D
RW Tau.....D19(16)20
RZ Cas.....D19(18)20
AI Dra.....D19(19)20
TW Dra.....D19(24)29
U CrB.....L19(24)29D
V367 Cyg..L24(30)29D

2012 Mar 20 Tue
TV Cas.....D19(19)23
U Cep.....D19(20)25
RZ Cas.....20(22)25
RS CVn.....21(27)29D
SW Cyg.....21(27)29D
AI Dra.....22(24)25
TX UMa.....23(27)29D
del Lib.....L23(23)29D
V367 Cyg..L24(06)29D
Z Per.....24(29)24L

2012 Mar 21 Wed
Z Vul.....L00(05)05D
U Sge.....L01(01)05D
Z Dra.....21(23)26
V367 Cyg..L24(<<)27

2012 Mar 22 Thu
RZ Cas.....01(03)05D
AI Dra.....03(04)05D
TW Dra....D19(19)24

2012 Mar 23 Fri
del Lib.....01(07)05D
U Cep.....03(08)05D

2012 Mar 24 Sat
TX UMa...00(05)05D
U Sge.....04(10)05D

2012 Mar 25 Sun
TW Dra.....D19(14)20
RZ Cas.....D19(17)20
AI Dra.....D19(19)20
U Cep.....D19(20)25
RS CVn..D19(22)29D
SW Cyg.....L21(17)23
Z Dra.....23(25)28
Z Vul.....L24(27)29D

2012 Mar 26 Mon
TV Cas.....02(06)05D
U CrB.....D19(22)28
RZ Cas.....0(22)24
AI Dra.....2(23)25

2012 Mar 27 Tue
TX UMa..02(07)05D
Z Per.....L05(07)05D
RW Tau..D19(23)23L
TV Cas.....21(25)29D
del Lib....L22(23)29D

2012 Mar 28 Wed
U Sge.....L00(<<)00
RZ Cas.....00(03)05D
AI Dra.....03(04)05D
U Cep.....03(08)05D
S Equ.....L03(07)05D
Z Dra.....D19(18)21

2012 Mar 29 Thu
TV Cas.....D19(21)25

2012 Mar 30 Fri
del Lib.....00(06)05D
Z Dra.....01(03)05D
SW Cyg....01(07)05D
U CrB.....03(09)05D
TX UMa..03(08)05D
Z Per.....L04(09)05D
RW Tau....D19(17)22
RS CVn....D19(18)24
U Cep.....D19(20)24
Z Vul.....L23(25)28D
U Sge.....L24(28)28D

2012 Mar 31 Sat
TW Dra....00(05)04D
TV Cas.....D19(16)20
AI Dra.....D19(19)20

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The **deadline for contributions** to the next issue of VSSC (number 151) will be 7th February, 2012. All articles should be sent to the editor (details are given on the back of this issue).

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SECTION OFFICERS

Director
Roger D Pickard
3 The Birches, Shobdon, Leominster,
Herefordshire HR6 9NG
Tel: 01568 708136
Email: *roger.pickard@sky.com*

Secretary
Clive Beech
14 Warren Park, Woolwell, Plymouth,
Devon PL6 7QR
Tel: 01752 211799
Email: *visual.variables@britastro.org*

Chart Secretary
John Toone
Hillside View, 17 Ashdale Road,
Cressage, Shrewsbury, SY5 6DT.
Tel: 01952 510794
Email: *EnootnhoJ@aol.com*

Binocular Secretary
Melvyn Taylor
17 Cross Lane, Wakefield,
West Yorks WF2 8DA
Tel: 01924 374651
Email: *melvyndtaylor@tiscali.co.uk*

Nova/Supernova Secretary
Guy M Hurst
16 Westminster Close, Basingstoke,
Hants, RG22 4PP
Tel and Fax: 01256 471074
Email: *Guy@tahq.demon.co.uk*

Eclipsing Binary Secretary
Des Loughney
113 Kingsknowe Road North,
Edinburgh EH14 2DQ
Tel: 0131 477 0817
Email: *desloughney@blueyonder.co.uk*

Database Secretary
Andy Wilson
12 Barnard Close, Yatton,
Bristol, BS49 4HZ
Tel: 01934 830 683
Email: *andyjwilson_uk@hotmail.com*

Recurrent Objects Co-ordinator
Gary Poyner
67 Ellerton Road, Kingstanding,
Birmingham, B44 0QE.
Tel: 07876 077855
Email: *garypoyner@blueyonder.co.uk*

Circulars Editor
Janet Simpson
Goatfield Cottage, Furnace, Inveraray,
Argyll, PA32 8XN
Tel: 01499 500234
Email: *sim_jan@btinternet.com*

Webmaster
Gary Poyner: 07876 077855

TELEPHONE ALERT NUMBERS

Nova and Supernova discoveries
First telephone the Nova/Supernova Secretary, Guy Hurst: 01256 471074
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