British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

No 165, September 2015

Contents

ISSN 0267-9272

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

FROM THE DIRECTOR

ROGER PICKARD

VSS Binocular Secretary

I am not sure how many of you were aware that Melvyn Taylor has been seriously ill this summer, but I am pleased to advise that he is now very much better.

He was admitted to hospital back in May 2015, ostensibly for a hernia operation, but following that he caught a serious infection and was found to have a heart condition. After much worry to his friends and family, Melvyn was finally allowed home towards the middle of July.

As I was lecturing to York Astronomical Society on 17th July, I arranged to call in and see Melvyn on my return home and collect a number of VS papers. It was then that he gave me the sad news that he wished to step down as Binocular Secretary as soon as we had found a replacement.

Melvyn has served the VSS extraordinarily well for almost 40 years in one capacity or another, so who could we find to replace him?

Melvyn himself suggested we could ask Shaun Albrighton and I am delighted to advise that he has agreed to take on the role. Therefore, those who still submit their observations on paper, could you please now send them to Shaun and not Melvyn. (Contact details on back cover.)

Shaun Albrighton

See the separate note for a short biography of Shaun. In the meantime, welcome to the VSS Committee, Shaun.

Spectroscopy Workshop

The full programme for this workshop can be found on pages 3-4, as can information regarding Bed and Breakfasts etc. in the area. However, if you intend to attend but have not yet notified me please do so at your earliest convenience.

Full Members Meeting 2016

The next Full Members' Meeting will be held on Saturday 19th March 2016 at the Northamptonshire Natural History Society, Humfrey Rooms, Castilian Terrace, Northampton NN1 1LD. We have not been back there for a full meeting since 2003, so it is high time we returned. I hope to have the Programme in the next VSSC, but please place the date in your 2016 diary.

Entering Old VSS Data into an Excel (or similar) Spreadsheet

We still have quite a lot of old data to enter into a spreadsheet and then into the online database. I am very grateful to the three volunteers who are currently carrying out this task, but it would help to speed up the process if we could have more volunteers – please. Contact me if you would like to help.

SHAUN ALBRIGHTON - A BIOGRAPHICAL NOTE

Roger Pickard

Shaun joined the BAA in 1976, when a then young man of 15 years, and immediately became an active observer of variable stars. He studied physics at Salford University between 1979 and 1982, and it was whilst there that he met Colin Henshaw and John Toone, assisting them with the running of the North Western Association of Variable Star Observers.

Whilst Shaun has used a number of telescopes to make his observations, it is fair to say that his real passion is for binocular observing, in particular his beloved 20x80mm set, (he did lose one pair of binoculars, driving off having forgotten that they were on the roof). His total number of estimates is fast approaching 100,000. As to favourite stars, other than the more obvious CH Cyg, R Sct and Z UMa, he places U Cam and RY Cam (beautiful star field) together with AC Her and V UMi high on his list. As binocular secretary he looks forward to promoting the work of the Section and encouraging new members to become actively involved in observing.

Shaun's other astronomical interest is in education. He gives talks to both astronomical societies on various aspects of the history of astronomy, and to primary school children at schools and within local libraries, where he now works.

Away from astronomy Shaun's interests include: photography (landscape and street photography), family history, progressive rock and classical music and cricket (Warwickshire of course).

Shaun is married to Wendy and has two grown up children who are both teachers in the London area and specialise in music.

roger.pickard@sky.com

SPECTROSCOPY WORKSHOP, NORMAN LOCKYER OBSERVATORY

10th October 2016

Programme

10:50 Welcome and introduction - David Strange/Roger Pickard

General Overview Of Spectroscopy

11:00 Why we do Spectroscopy - Olivier Thizy

12:00 How we do Spectroscopy: preparation, acquisition and data reduction - Robin Leadbeater

12:30 My first steps in slit spectroscopy - Andy Wilson

13:00 Lunch

Examples of Work and Results

14:00 Low resolution slitless spectroscopy - observing a fast transient of a T Tauri star - Robin Leadbeater

14:30 Low resolution slit spectroscopy - Confirming and classifying a supernova - Robin Leadbeater

15:00 Observations with a LISA spectrograph - David Boyd

15:45 Tea

16:15 High resolution spectroscopy – Radial velocity measurements of Deneb - Robin Leadbeater

16:45 Eruptive stars, cataclysmics, symbiotics, novae – Contributions that amateurs can make in spectroscopy - François Teyssier

17:30 Be stars long term monitoring, BeSS database and general pro/am collaboration in spectroscopy - Olivier Thizy

Plus poster papers to view in the breaks.

18:00 Closing remarks

On the Friday and/or Saturday evenings there may be general discussion and possibly software demonstrations and eventually live observations if the weather allows!

Accommodation:

For those looking for overnight accommodation for this workshop, David Strange, NLO has supplied the following links:-

Bed and Breakfast lists:

https://www.choosewhere.com/sidmouth-bed-and-breakfasts?gclid=CNy_wKSk-cYCFSjJtAodz6YCdQ

http://www.blueballinnsidford.co.uk/

Or right next door to NLO, The Longhouse (Lockyer's office and lab.):

http://www.tripadvisor.co.uk/Hotel_Review-g190743-d1517255-Reviews-The_Longhouse-Sidmouth_Devon_England.html

NSV 2026 A NEW DWARF NOVA IN TAURUS! A BAAVSS OBSERVING CAMPAIGN FOR THE 2015 – 2016 SEASON.

GARY POYNER

NSV 2026 was discovered by Doris Hoffleit in 1935, and was first announced in the Harvard College Observatory Bulletin 901, as one of 115 new variables discovered on photographic plates. Since that time very little attention has been paid to this new variable star, and despite being recognised for over 70 years, monitoring of NSV 2026 only began in 2011, with a few CCD observers detecting occasional outbursts. NSV 2026 is also associated with the faint ROSAT X-ray source 1RXS J052954.9+184817.

Since 2011 further attempts by both visual and CCD observers have revealed that the star enters outburst at fairly frequent intervals – possibly three times per month! During outburst the star can reach magnitude 13.6V, whilst at minimum its range varies between 17.0C - 18.0C.

One might ask why automated sky surveys have not detected further outbursts during the course of their patrol work. The CSS (Catalina Sky Survey) for example, rarely visits this area of sky due to its galactic latitude (-8d), and once per month the field is also in conjunction with the Moon, hence the few reported outbursts so far.

BAAVSS observers Ian Miller, Jeremy Shears, Roger Pickard and Gary Poyner have monitored the star since 2012, detecting a number of outbursts for their efforts and obtaining some patchy time series photometry – usually interrupted by bad weather. The light curves obtained so far reveal very tantalising glimpses that NSV 2026 may be a UGSU type Dwarf Nova – showing both normal and superoutbursts. However more data is needed to confirm our suspicions.

A new observing campaign to monitor NSV 2026, following its 2015 solar conjunction, is to be introduced by the BAAVSS when the observing season for Taurus begins in September 2015. It is hoped that both Visual (to monitor for outbursts) and CCD (for time series photometry) observers will combine their efforts to monitor the star as closely as possible for at least one observing season to finally unravel its true Cataclysmic nature.

Observers are asked to monitor the star on a nightly basis, to report all observations to the BAAVSS database < *www.britastro.org/vss/* >, and to announce any outburst detected to the BAAVSS alert group < *https://groups.yahoo.com/neo/groups/baavss-alert/info* > as soon as detected. Charts are available from the AAVSO online VS Chart Plotter < *www.aavso.org/vsp* >, with a sequence limit faint enough to measure the star at minimum.

Dwarf Nova in Taurus continued pages 6 - 7

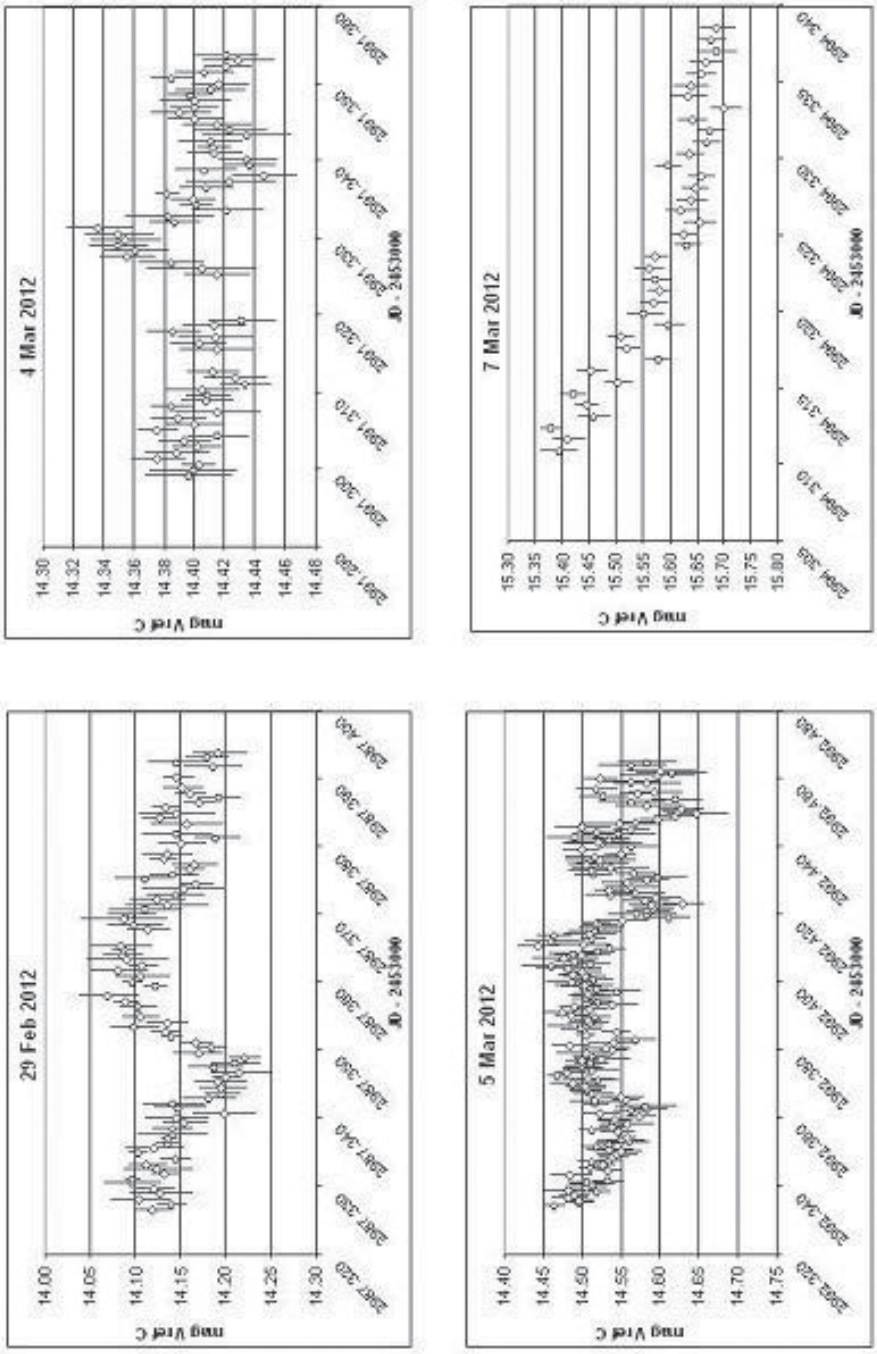
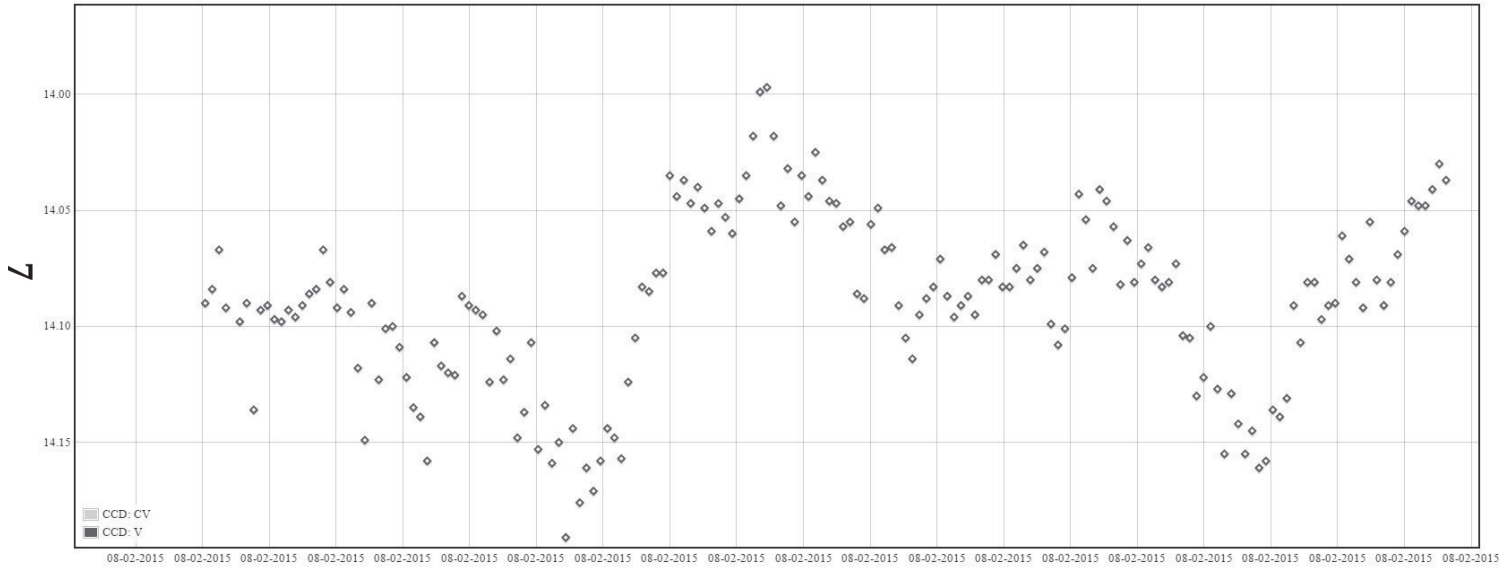


Figure 1: CCD time series observations of NSV 2026 undertaken by Ian Miller during February-March 2012, Furzehill Observatory, South Wales.

Figure 2: CCD time series observations of NSV 2026 taken from the on-line VSS database, undertaken by Roger Pickard on February 8th 2015, Shobdon, Herefordshire.



garypoyner@blueyonder.co.uk

RR TAURI

GARY POYNER

In the Autumn of 2012, a new observing project was set up, in conjunction with the BAA Deep Sky Section, to monitor both the variable star RR Tau and its associated suspected variable nebula GN05.36.5.0. RR Tau was also chosen as 'Variable Star of the Year' for the 2013 BAA Handbook in order to help promote the project, as well as to bring to the attention of observers everywhere a relatively bright, very active eruptive variable star. See VSSC 153 September 2012 for details of the project.

Despite several new visual and CCD observers adding RR Tau to their observing programme, the response from CCD observers in attempting to capture and measure the brightness of the nebula has been somewhat disappointing. I had particularly hoped that CCD imagers who report to the Deep Sky Section would make a useful contribution to the programme, as the nebula surrounding RR Tau is of course a deep sky object suspected of variability. This has not been the case however, and with this in mind the VSS have decided to call time on this project.

The data we do have for the nebula itself does show that variations in the V-band in excess of 1.5 magnitudes reveal themselves in the light curve. We have CCD observers D. Buczynski, G. Darlington, J. Moore, R. Pickard, A. Rodda and D. Spooner to thank for attempting what is an extremely difficult observation to make. Unfortunately there is insufficient data to show any reliable correlation between the variations of RR Tau itself and the Nebula, the main aim of the project.

Figure 1 shows the period December 2011 – February 2013, where we have the most images and measures of the nebula taken, so that we can compare with observations of the star during the same time period. One might see similar trends in fading and recovery in both star and nebula on two occasions – March 2012 and Jan/Feb 2013 – but the data is too sparse to draw any conclusions.

Figures 2 and 3 show pre- and post- conjunction plots for the March 2012 and Jan/Feb 2013 data respectively, but with a corrected magnitude added to the values of the nebula in order make a direct comparison of the variation and trend.

The light curve in Figure 4 shows just how active RR Tau is, and it remains an exciting star for observers with moderate sized telescopes (8"-12") to follow on a nightly basis. Visual observers are therefore urged to keep RR Tau on their observing programme indefinitely, and to report their observations to the VSS database in the usual way.

garypoyner@blueyonder.co.uk

RR Tauri continued pages 9 - 12

Figure 1 Visual and V-band measure of both RR Tau and Nebula 2011-2013

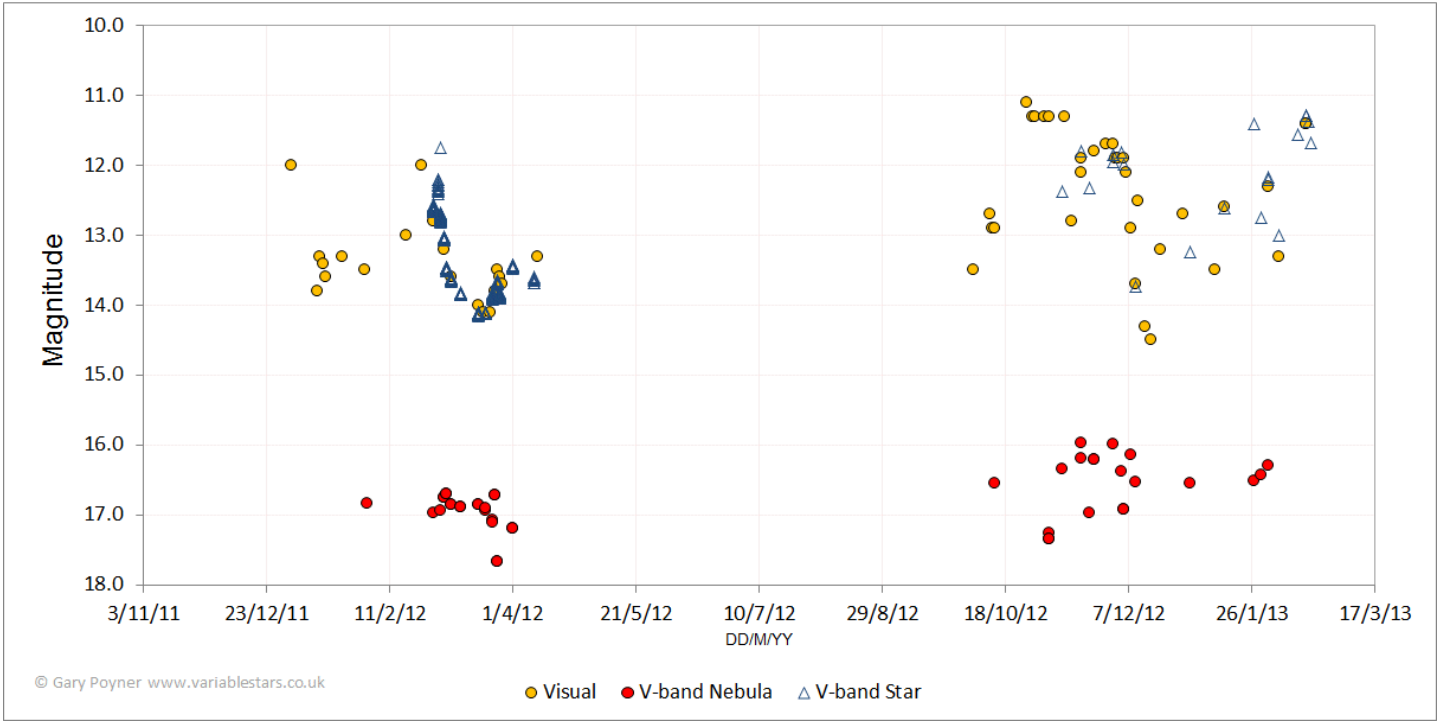


Figure 2: Pre-conjunction light curve showing a corrected magnitude for the nebula.

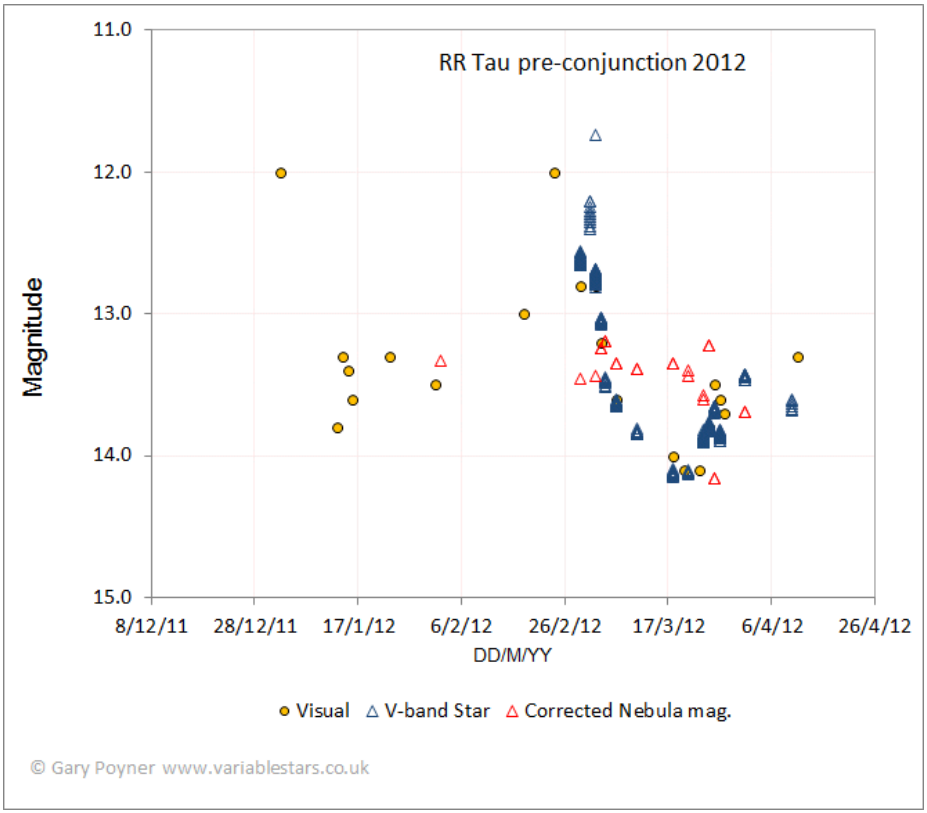
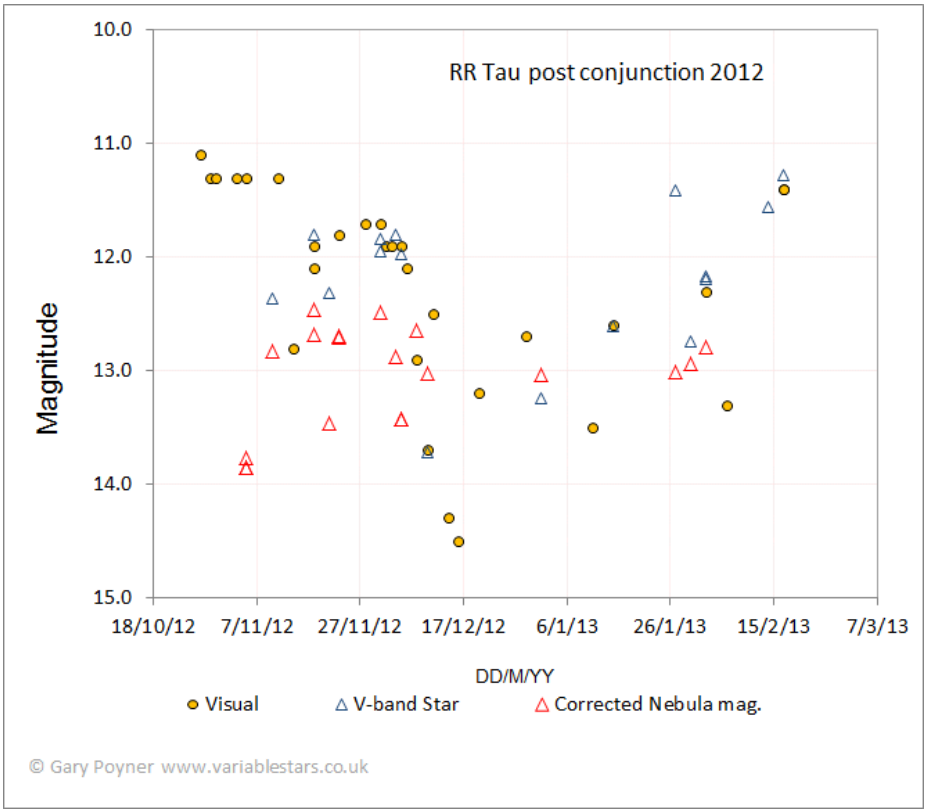


Figure 3: Post-conjunction light curve showing a corrected magnitude for the nebula.



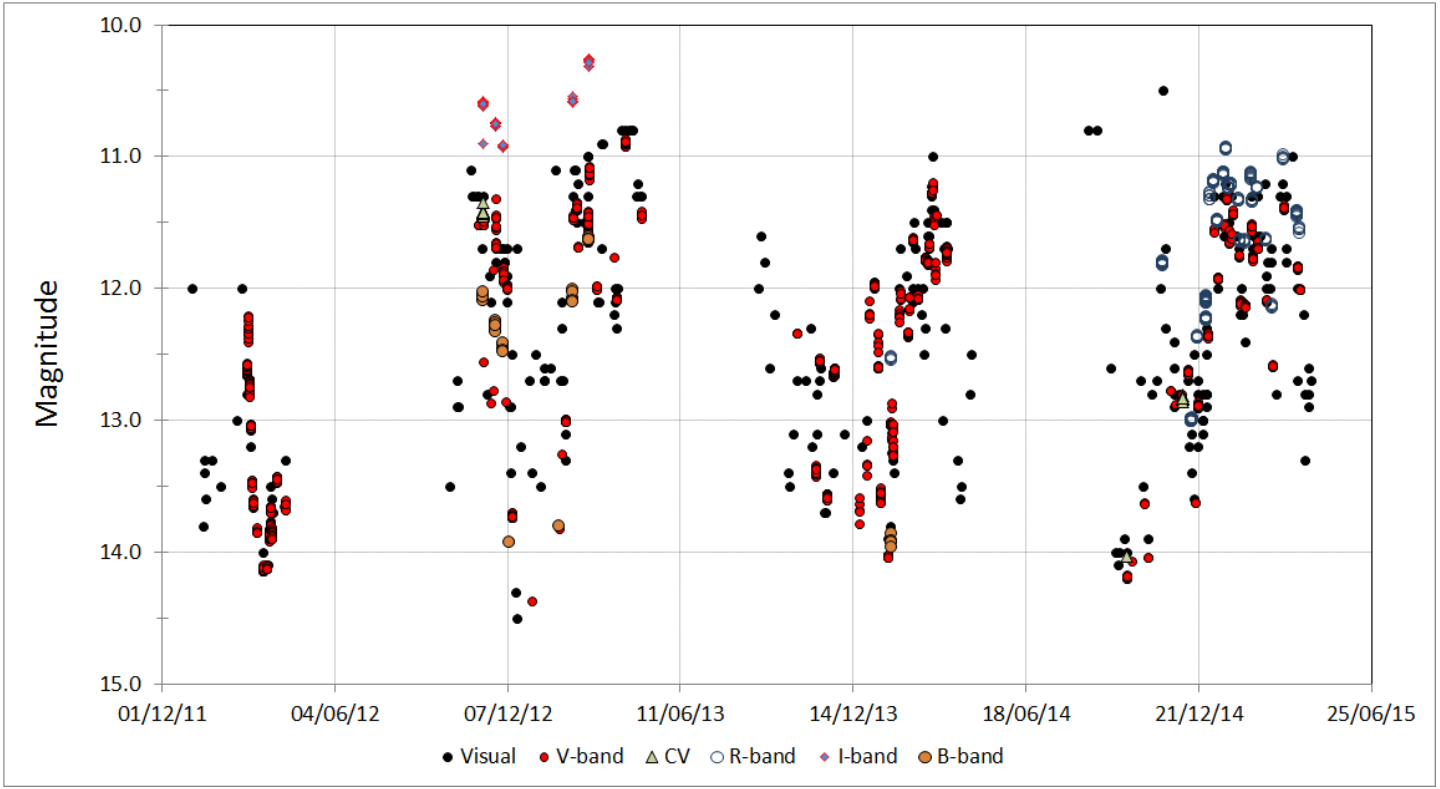


Figure 4 BAAVSS light curve for RR Tauri 2012 - 2015

garypoyner@blueyonder.co.uk

AG PEGASI RECOMMENCES MAJOR ERUPTIVE ACTIVITY

JOHN TOONE

A major advantage of visual photometry is that the observer instantly recognises the significance of an abnormal light estimate, and shortly after midnight on the 18/19th June 2015 I had first-hand experience of this fact. It was the 1,965th night that I had observed AG Peg and all previous observations, stretching back to 1979, reduced to between magnitudes 8.0 and 9.5, but on this particular night it was estimated at magnitude 7.6. I knew there and then that this dramatic increase in light signalled a new chapter in the lifecycle of this famous nova. After checking that no previous announcements had been made, I put out BAA VSS Alert Notice No 4105 at 00:54 GMT on the 19th June 2015, and independent confirmation of the abnormal bright level of AG Peg soon followed.

In the literature AG Peg is often referred to as the longest slow nova that has taken over a Century to fade back to its former brightness. Catalogue records indicate that it was approximately magnitude 9 until the mid-19th Century, when it slowly rose to magnitude 6, before even more slowly fading below magnitude 8 in the second half of the 20th Century. AG Peg is also termed a symbiotic nova because of the interaction between the two stars within the system, which are a cool M3 giant and an active hot sub-dwarf with a WN6 spectrum. The orbital period is known to be in the region of 800 days and it has been reported that there is small range (0.3 magnitude) cyclic variation due to the heating and illumination of the side of the M3 giant facing the hot sub-dwarf, and the system components orientation towards the Earth.

I decided to re-reduce all my AG Peg observations to the current 094.02 sequence, to illustrate not only the June 2015 outburst, but also to see to what extent the reported cyclic variation exhibits itself. The result is shown in the light curve (Figure 1) which consists of monthly means.

The dramatic brightening in June 2015 is well illustrated, as is the cyclic variation which can range 0.5 magnitude at times, but appears distorted in shape due to the activity of the sub-dwarf. In this respect it may be of significance that I have recorded short term brightness increases in the order of 0.2/0.3 magnitude over a few days, and occasionally weeks, which can act to either suppress or enhance the underlying cyclic variation. An analysis of this light curve results in a period of 818.3 days for the cyclic variation which is in close agreement with the following previous calculations:

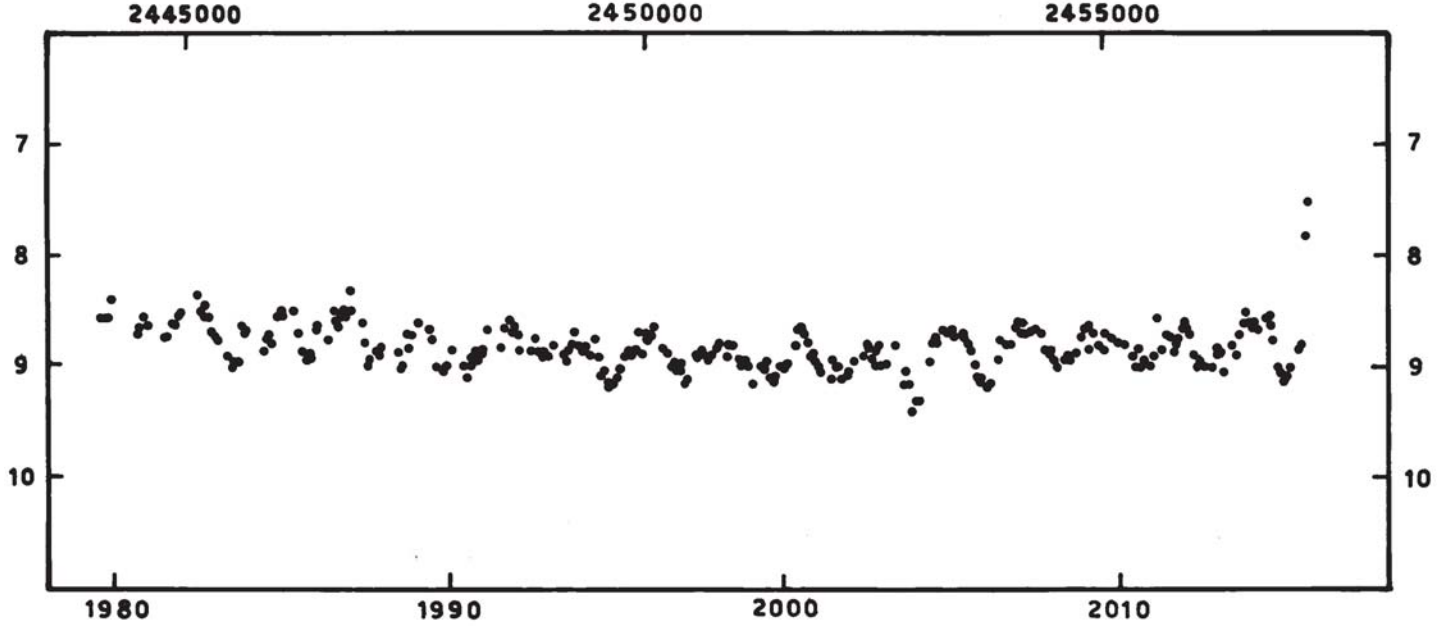
812.9 days: Komarek 1990 [(1)]
816.5 days: Fernie 1985 [(2)]
818.7 days: Slovac and Lambert 1988 [(3)]

Other interesting features of the light curve include:

1. The mean magnitude fell from 8.6 in 1980 to 8.8 in 1990 and finally to 9.0 by 2000. This is most likely to be evidence of the final stage of the 19th Century nova eruption.

2. There was significantly more activity in the 1980's compared to the 1990's when the cyclic variation became smoother and reduced in amplitude.

Figure 1: Monthly means light curve of AG Pegasi derived from 1986 visual observations made between August 1979 and July 2015.



3. Prior to 2003, whilst AG Peg was still gradually fading, the maxima of the cyclic variations alternated in brightness.

4. In late 2003 there was an extraordinary deep minimum at magnitude 9.5 that seemed to trigger an increase of the mean magnitude and enhanced the range of the cyclic variation.

5. The mean magnitude rose to 8.8 by 2006 and was maintained at that level until the major outburst of 2015.

6. The 1.1 magnitude rise to outburst in 2015 was accomplished in 11 days which is consistent with ZAND type outbursts and is in sharp contrast to the rate of rise of the 19th Century nova eruption.

Consequently, on the basis of this light curve I conclude that the original slow nova eruption ended around 2000 and that the hot sub-dwarf virtually shut-down in 2003 before rapidly recovering and commencing significant (>1 magnitude) ZAND type eruptive activity less than 12 years later.

References

1. Fernie J.D; 1985PASP, 97, 653
2. Komarek Z; 1990BAICz, 41, 131
3. Slovak M.H & Lambert D.L; The Symbiotic Phenomenon (1988), page 265

Important Note

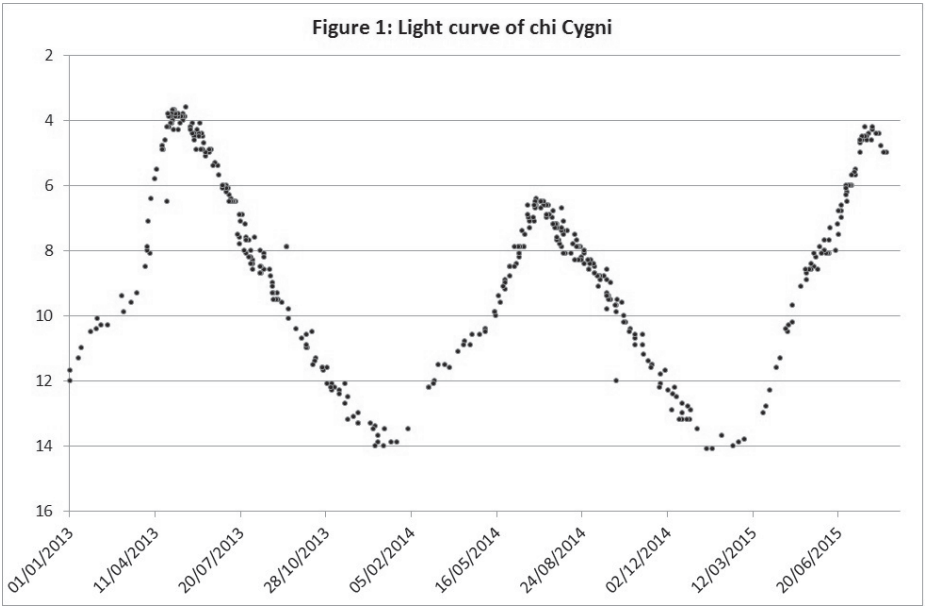
Although all my AG Peg observations are in the BAA VSS database they are not fully reduced to the current sequence 094.02. This is a contributory factor to the difference in shape between a filtered light curve derived from the database and the light curve shown here. Whilst these differences may not be large they are not insignificant and would have had an impact on the short form analysis undertaken here.

enootnhoj@btinternet.com

A LOW RESOLUTION SPECTRUM OF CHI CYGNI SHORTLY AFTER THE 2015 MAXIMUM

ANDREW WILSON

There has been a lot of interest in chi Cygni over the summer months as it approached maximum brightness in its 408 day cycle (see Figure 1 for a light curve from the BAAVSS Online Database[1]). This is a fascinating Mira variable with a huge range from about 4th to 14th magnitude. Maximum brightness occurs when the star is at its smallest physical size corresponding to its highest temperature, and as the star expands it cools and fades. Chi Cygni is near the end of its life, on the AGB (Asymptotic Giant Branch) of the Hertzsprung-Russel diagram. Such stars burn hydrogen and helium in shells around an inert core composed of carbon and oxygen.



This makes chi Cygni not just a fascinating star for visual and CCD observers, but also an excellent target for spectroscopy. I obtained a low resolution spectrum of chi Cygni at 22:25 UT on 15th August 2015 (see Figure 2[p17]). About 20 minutes earlier, at 22:04 UT, Gary Poyner observed the star, estimating it at magnitude 5.0 (BAAVSS Online Database[(1)]).

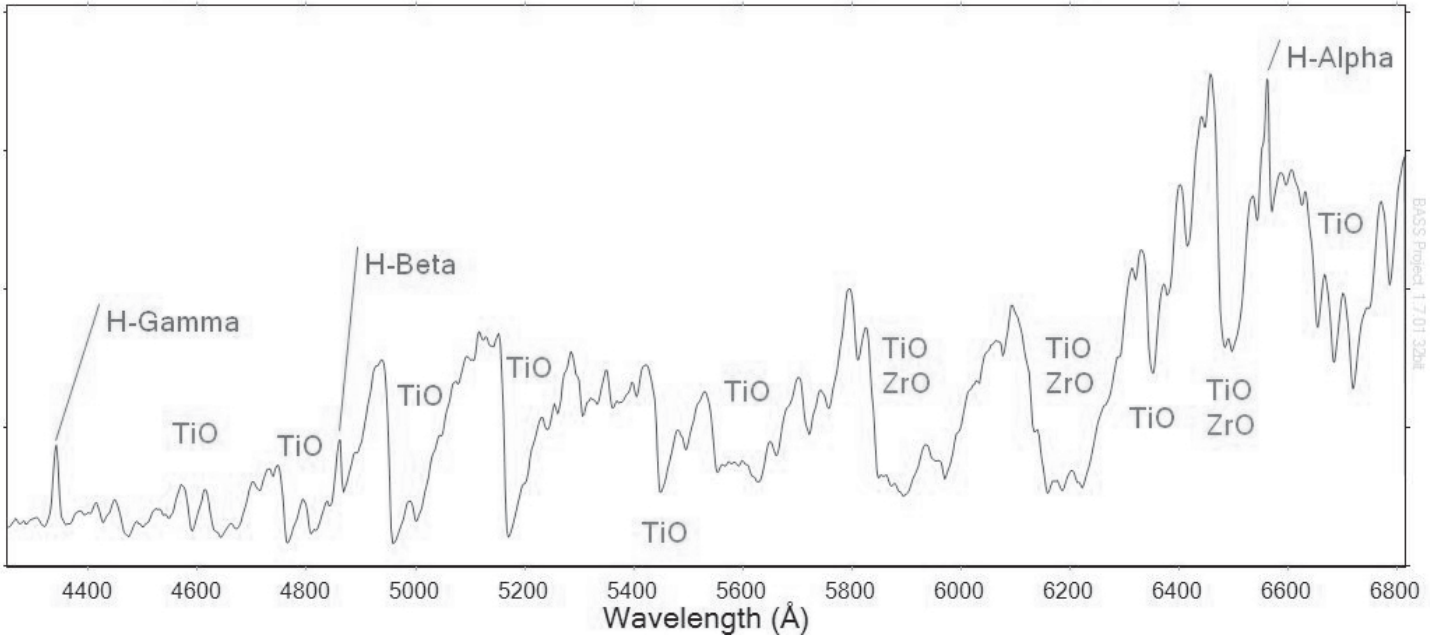
Typically a low resolution spectrum will show coarse detail over a wide range of wavelengths, while a high resolution spectrum will show great detail over just a small range of wavelengths. This spectrum covers about 2500 Angstroms with a resolution of 18 Angstroms at H-alpha, meaning details with a wavelength smaller than 18 Angstroms will not be reliably detectable. Note that 1 Angstrom is 10^{-10} metres.

The technical details of the spectrum are as follows. It was a 450 second exposure, composed of 15x (30 second) sub-exposures. The spectroscope was an LHIRES III(6) with a 150 lines / mm grating and a 23 µm slit. The imaging camera was a Starlight Xpress SXVR-H694 and the telescope a 10" F8 Ritchey-Chretien. I used a spectrum of the star HD 190603, obtained at 22:40 UT, along with a standard spectrum of this star from the Miles spectral library (copy in ISIS[(4)]) to correct for instrumental and atmospheric response. The spectrum processing was performed using ISIS[(4)], with the presentation created using BASS[(5)].

Chi Cygni is a cool red giant with a temperature of around 3000 K and spectral class S. While the spectra of hotter stars are often a good approximation of a black body curve, this is not so for cool stars. The temperature is sufficiently low that molecules form in the star's atmosphere. Due to the many rotational and vibration states that molecules can take, they tend to form bands of absorption where many individual spectral lines overlap and merge. This results in large deep absorption bands in the spectra of cool stars,

Text continued on page 18

Figure 2: Low Resolution Spectrum of chi Cygni on 15th August 2015



usually due to the presence of TiO (Titanium Oxide). In S class stars there are also absorption bands due to ZrO (Zirconium Oxide). In the spectrum of chi Cygni the majority of the absorption is due to TiO, with a few ZrO absorption features superimposed. The TiO and ZrO absorption bands were identified using Richard Walker's Spectroscopy Atlas[3].

Of particular interest in the spectrum of 15th August are the hydrogen Balmer emission lines of H-alpha, H-beta and H-gamma. Most stars do not show emission lines in their spectra. In the case of chi Cygni, the emission lines are due to a radiative hypersonic shock wave passing through the star[2]. The shock wave emerges from the star's photosphere once per cycle at around maximum light, which judging by the light curve was within a week or two of when this spectrum was taken.

I would recommend anyone with low resolution spectroscopy capability to monitor chi Cygni over the coming months while it is within easy reach of amateur equipment. Observers with a "Star Analyser"[7] may find they can even follow it down to minimum brightness, although this would be quite a challenge. It would certainly be interesting to observe how the spectrum changes over its pulsation cycle, and in particular the strength of the hydrogen emission lines.

References

1. BAAVSS Online Database: *http://britastro.org/vssdb/*

2. "Shock-Induced Polarized Hydrogen Emission Lines in the Mira star omicron Ceti", N. Fabas, A. Lèbre, and D. Gille, Astronomy & Astrophysics (30 September 2011) *http://arxiv.org/pdf/1109.6500v1.pdf*

3. Spectroscopic Atlas for Amater Astronomers, version 5.0, Richard Walker: *http://www.ursusmajor.ch/downloads/spectroscopic-atlas-5_0-english.pdf*

4. ISIS: *http://www.astrosurf.com/buil/isis/isis_en.htm*

5. BASS (Yahoo group for obtaining the software and support): *https://uk.groups.yahoo.com/neo/groups/astrobodger/info*

6. The LHIRES III is a spectroscope manufactured by Shelyak Instruments: *http://www.shelyak.com*

7. The Star Analyser is a transmission diffraction grating mounted in a standard 1¼" thread cell to fit into a camera filter wheel or eyepiece.

andyjwilson_uk@hotmail.com

OBSERVATOIRE DE HAUTE PROVENCE SPECTROSCOPY WORKSHOP – 2015

David Boyd

This year's spectroscopy workshop was held once again at the Observatoire de Haute Provence from 13th to 18th August and was organised by Francois Cochard of Shelyak, the spectrograph manufacturer. There were 48 participants, mostly from mainland Europe, plus myself from the UK, two from the US and one from Australia. Many of those attending had brought telescopes and spectrographs which were set up on the observing field for the duration of the workshop. Several of the participants were beginners in spectroscopy with relatively little practical experience and were using the workshop to get up to speed. The temperature was hot during the day with a pleasant breeze but cool at night and the sky was remarkably transparent compared with typical skies we experience in the UK. Only two nights were seriously affected by clouds.

The focus of this annual workshop is on gaining practical experience of spectroscopy and on understanding its scientific potential. The programme this year consisted of a series of talks in the morning by Francois Cochard explaining the process of recording and processing spectra, short talks by participants describing their own projects, four afternoon lectures by Steve Shore, a professor at Pisa University, on the astrophysics of novae, symbiotic stars and other objects relevant to the workshop and, on the final day, a review of spectra recorded by participants during the workshop with helpful hints on how these could be improved. Talks were given in either English or French with in-line translation by Olivier Thizy into the other language. This in itself was an impressive achievement given the wide range of topics covered.

The Observatoire de Haute Provence houses several large telescopes, the largest being a 1.93m reflector which was until recently equipped with the Elodie spectrograph used to confirm the existence of the first exoplanet 51 Peg b by Mayor and Queloz in 1995. Due it seems to funding problems, several of the scopes are no longer in active use which seems a shame as they could provide a useful teaching resource for students. The observatory hosts public visits and is worth visiting if you are in the area. The atmosphere of the place is quite rustic. Accommodation and all meals were taken in the Maison Jean Perrin within the observatory grounds. The food was good and plentiful and the rooms sparse but comfortable with en-suite facilities.

As a first-time participant I found the atmosphere welcoming and the immersion in all things spectrographic a very enjoyable experience. My French is a dim memory from my school-days but I found most people could speak reasonable English. I would recommend the workshop to anyone interested in practical spectroscopy and, although it is in the south of France, remember to take warm clothing as the nights get quite chilly.

All the presentations were recorded and are available on the Shelyak website at:
http://www.shelyak.com/contenu.php?id_contenu=117&id_dossier=7_lang=2

I am grateful to the Royal Astronomical Society for a grant which supported in part my attendance at the workshop.

Figure 1: The group photograph.

Figure 2: The telescope field with scopes shielded from the fierce sun.

ECLIPSING BINARY NEWS - SEPTEMBER 2015

From the Editor

Des Loughney has been writing Eclipsing Binary News for the Variable Star Section Circular every quarter since December 2006, but for the first time he has warned that he may not manage to send it in time for this quarter due to work commitments and a family holiday.

A Correction

In VSSC 164, EB News, under Low Amplitude Eclipsing Binaries on p.8, it should have read:

"Last on the list of ten LAEBs (published in EB News, in VSSC No 160, June 2014,) is V1061 Tauri."

Although this was corrected in the pdf version of the Circular it was unfortunately too late to correct it in the printed version.

* * *

BINOCULAR PROGRAMME

Shaun Albrighton

Please see "From the Director" in this issue for news concerning the Binocular Secretary.

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

http://www.britastro.org/vss/bin_prog_priority_191013.htm
or for a full listing in constellation order at:

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

In addition, these listings can be obtained in paper format from both:

Shaun Albrighton < ***shaun@albrighton1.wanadoo.co.uk*** > and

Roger Pickard < ***roger.pickard@sky.com*** >

They can also be viewed in Circulars 157 - 160.

ECLIPSING BINARY PREDICTIONS – WHERE TO FIND THEM

DES LOUGHNEY - *desloughney@blueyonder.co.uk*

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

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

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

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

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

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

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

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

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

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

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

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

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

CHARGES FOR SECTION PUBLICATIONS

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

	UK	Europe	Rest of World
BAA Members	£5.00	£6.00	£8.50
Non-Members	£7.00	£8.00	£10.50

Pay On-line: From the BAA home page: *http://britastro.org/baa/* , click "Shop" centre top of page, and in the panel on the right hand side click "Section Newsletters". (Could members using this method also **notify Roger**: *roger.pickard@sky.com*, to ensure they receive their circulars).

* * *

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

	Order From	Charge
Telescopic Charts	Chart Secretary	Free
Binocular Charts	Chart Secretary	Free
Eclipsing Binary Charts	Chart Secretary	Free
Observation Report Forms	Director or Binocular Secretary	Free
Chart Catalogue	Director	Free
Observing Guide to Variable Stars	BAA Office	£5.00
CCD Guide	BAA Office	£7.50
Binocular Booklet	Director or BAA Office	£2.50
CD-ROM of the last 3 items	BAA Office	£7.50

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

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

CONTRIBUTING TO THE CIRCULAR

If you would like to prepare an article for consideration for publication in a Variable Star Section Circular, please read the *Notes for Authors*, published on the web pages at:
http://www.britastro.org/vss/circs.htm; reproduced in full in VSSC132 p 22, or contact the editor (details on back cover) for a pdf copy of the guidelines.

If you are unsure if the material is of a suitable level or content, then please contact the editor for advice.

The **deadline for contributions** to the next issue of VSSC (number 166) will be 7th Nov 2015. All articles should be sent to the editor (details are given on the back of this issue).

Printed by RAMPrint 07973 392975

SECTION OFFICERS

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

Secretary
Bob C Dryden
21 Cross Road,
Cholsey,
Oxon, OX10 9PE
Tel: 01491 652006
Email: *visual.variables@britastro.org*

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

Binocular Secretary
Shaun Albrighton
4 Walnut Close, Hartshill,
Nuneaton,Warwickshire, CV10 0XH
Tel: 07794420231
Email: shaun@albrighton1.wanadoo.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
(see above)

TELEPHONE ALERT NUMBERS

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

Variable Star Alerts
Telephone Gary Poyner: 07876 077855