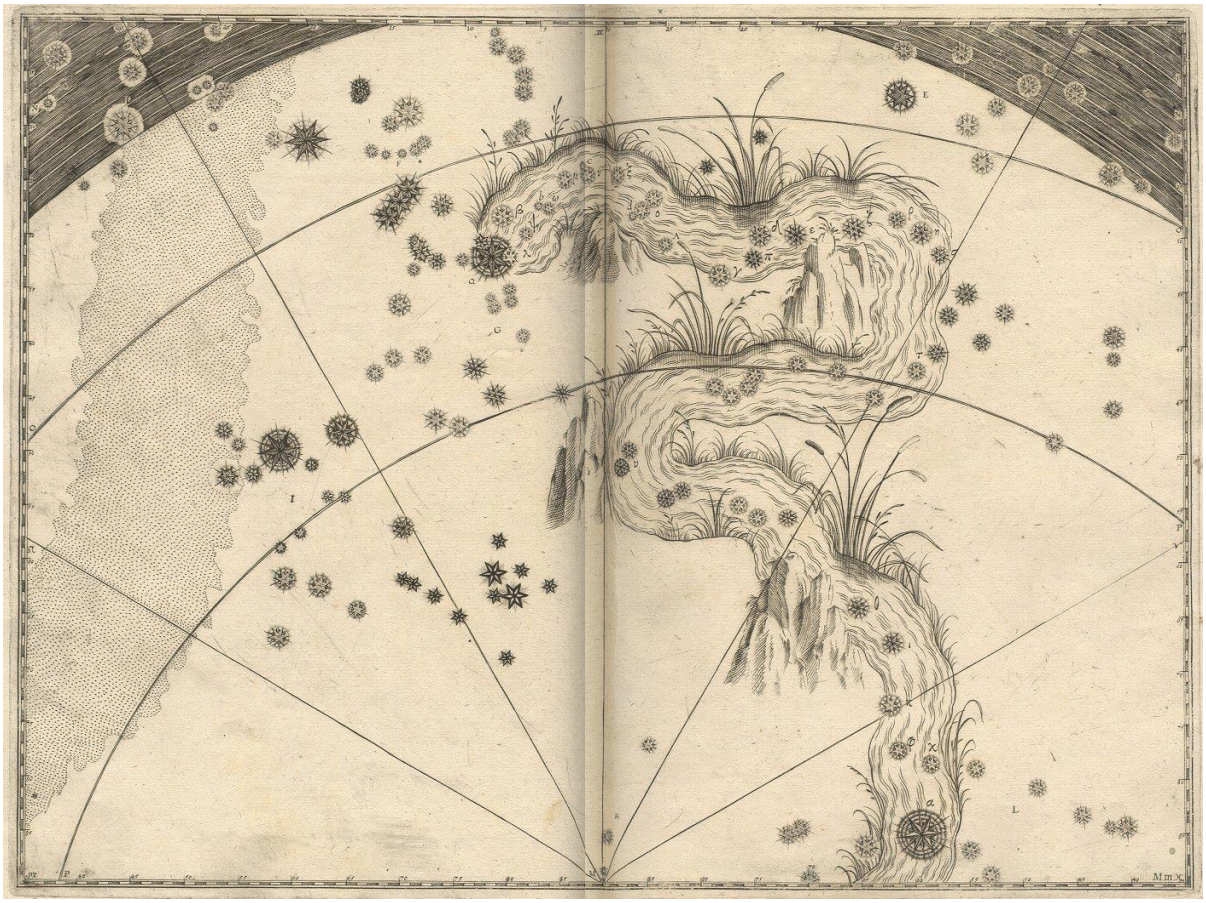
ISSN 2631-4843

The British Astronomical Association

Variable Star Section Circular

No. 179 March 2019



Office: Burlington House, Piccadilly, London W1J 0DU

Contents

Cover Picture

Eridanus – from Bayers Uranometria, 1661 (see page 18)

U.S. Naval Observatory Library

From the Director — *Roger Pickard*

Director to step down after 20 years of Service

I have decided that, after 20 years of service in the role of VSS Director, I will be standing down at the end of August this year, 2019. I'm also very pleased to advise that Jeremy Shears has agreed to take over as from 1st September!

I took over from Gary Poyner on 31st August 1999 and John Toone has advised that as of 2019 January 1st I have become the longest serving VSS Director. Not a record I purposely set out to achieve although I must admit that when I became aware of it a year or two ago, I did feel that it would be a good time to hand over. But then when I realised there was only a few months to go to make it "20 years" I thought that would be a better time to step down!

I have enjoyed my role as VSS Director, especially dealing with new observers and professional astronomers. I am sure Jeremy will derive as much satisfaction from the job as I have done.

I would like to take this opportunity to thank the other VSS officers who have helped me during my time as Director and without whose help it would not be possible to run the Section. Perhaps I should also point out that all other Officers and their responsibilities within the VSS remain unchanged. I must also thank you, the dedicated observers, without whom we would not have a Section to run!

However, you won't be losing me completely, not just yet, anyway! I shall continue to check the charts that John Toone produces as Jeremy says he has no experience of this (yet!). Also, I've been organising the inputting of old data, and particularly that which Alex Pratt found Melvyn Taylor had! This is likely to be an on-going task for the next year or two at least! And this reminds me, I must also thank the dedicated "data inputters" for their sterling work over the last few years and hopefully for the next few years as well!

SPRING MIRAS

M = Max, *m* = min.

R And	*m*=Mar/Apr
W And	*M*=Apr
RW And	*M*=Mar
R Aql	*M*=May
UV Aur	*m*=Mar/Apr
X Cam	*M*=Apr
SU Cnc	*M*=Feb/Mar
U CVn	*m*=Feb/Mar
S Cas	*M*=Feb/Mar
R Com	*m*=Mar
S CrB	*m*=Apr
V CrB	*m*=May
W CrB	*M*=Feb/Mar
R Cyg	*m*=Mar/Apr
T Dra	*m*=Mar/Apr
SS Her	*M*=Apr
	m=May/Jun
R Hya	*m*=Apr
SU Lac	*m*=Apr/May
X Lyn	*M*=May
U Ori	*M*=Apr/May
R Ser	*M*=May/Jun
T UMa	*m*=Apr

Source BAA Handbook

Stargazers Lounge

I don't know how many of you frequent the above website, but I know, for example, your next VSS Director, Jeremy Shears, does quite often.

However, one of our newer members, Dave Smith has been making some excellent observations, initially using a DSLR, but now more often a CCD. Indeed, Dave had an article in VSSC 178 about using AstroImageJ.

Anyway, he recently advise me as a result of his placing a Tutorial on the above website at:-

https://stargazerslounge.com/topic/329717-tutorial-observing-variable-stars/

he has heard of several people taking up VS observing! Have a look at it yourselves and see what you think. I think it's excellent. Well done Dave and thanks. (Admittedly, it's not for the visual observer, but with so much light pollution around nowadays perhaps it's the way to go?).

And finally –

The Future is Bright!

John Fairweather advises "The future is bright: a new technique finds variability in K2 data of the Seven Sisters". This was published on Astrobites and comes from an article in MNRAS. See

https://astrobites.org/2019/02/15/the-future-is-bright-a-new-technique-finds-variability-in-k2-data-of-the-seven-sisters/

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:

096.02 R Aqr
New 5 and 1 degree field charts replace chart 096.01. The sequence has been overhauled and now consists of measurements drawn from HD, Tycho 2, Henden & APASS. The previous sequence was non-linear (too bright) below magnitude 10.

253.02 RS CVn
The existing 5 degree field chart is retained but the sequence has been updated to adopt Hipparcos Vj measurements. Comparison stars C & E have been dropped and replaced with new comparison star N.

223.03 X Her & ST Her
The existing 9 degree field chart is retained but the sequence for X Her has been amended. Comparison stars D & E now revert to HD measurements in order to compensate for their high B-V values.

107.03 UW Her

The existing 6 degree field chart is retained but the sequence has been amended. Comparison stars B, F & 2 now revert to HD measurements in order to compensate for the colour range within the sequence.

101.03 V UMi

The existing 6 degree field chart is retained but the sequence has been updated to adopt Tycho 2 Vj, Hipparcos Vj, SAO and HD measurements.

New Charts for Pulsating Programme Stars

354.01 TW Aur

A 3 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry. This chart has been prepared in response to a specific request from Tracie Heywood.

355.01 V428 Aur

A 9 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry. This chart has been prepared in response to a specific request from Tracie Heywood.

368.01 RV Cam

A 6 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

369.01 T Cnc

A 5 degree field chart has been drawn together with a V sequence adopted from Skiff photometry.

358.01 R Cas

6 degree, 1 degree and 20 minute field charts have been drawn. The sequence consists of Tycho 2 Vj and SRO photometry. Previous VSS charts for R Cas range from EEM 1907 June 3 to RGA 1961 Feb.

359.01 S Cep

6 degree and 1 degree field charts have been drawn. The sequence consists of Tycho 2 Vj, APASS and SRO photometry.

361.01 Z Eri & RR Eri

A 9 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

364.01 V UMa

A 1 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj and APASS photometry.

374.01 Y UMa

A 5 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

365.01 R UMi

A 3 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

New Charts for Non-Programme Stars

367.01 T Ari
A 3 degree field chart has been drawn. The sequence consists of Tycho 2 Vj and BSM NM measurements.

356.01 T Boo
1 degree and 30 minute field charts have been drawn for this suspected nova from 1860. On the 30 minute field chart a proposed search area of 3 minutes of arc has been indicated. The sequence consists of Tycho 2 Vj and APASS measurements.

357.01 RT Cap
A 6 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

370.01 T Cet
A 12 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

366.01 SV Crv, VW Crv & KV Vir
A 9 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

371.01 S Crt & TY Vir
A 6 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

360.01 AZ Dra
A 9 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

362.01 V Hya
New 5 degree and 1 degree field charts have been drawn. The sequence consists of Tycho 2 Vj and APASS photometry.

363.01 RT Hya, RV Hya & FK Hya
A 9 degree chart has been drawn together with a sequence adopted from Tycho 2 Vj and Hipparcos Vj photometry.

372.01 S Lep
A 9 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

373.01 RT Sex
A 6 degree field chart has been drawn together with a sequence adopted from Tycho 2 Vj photometry.

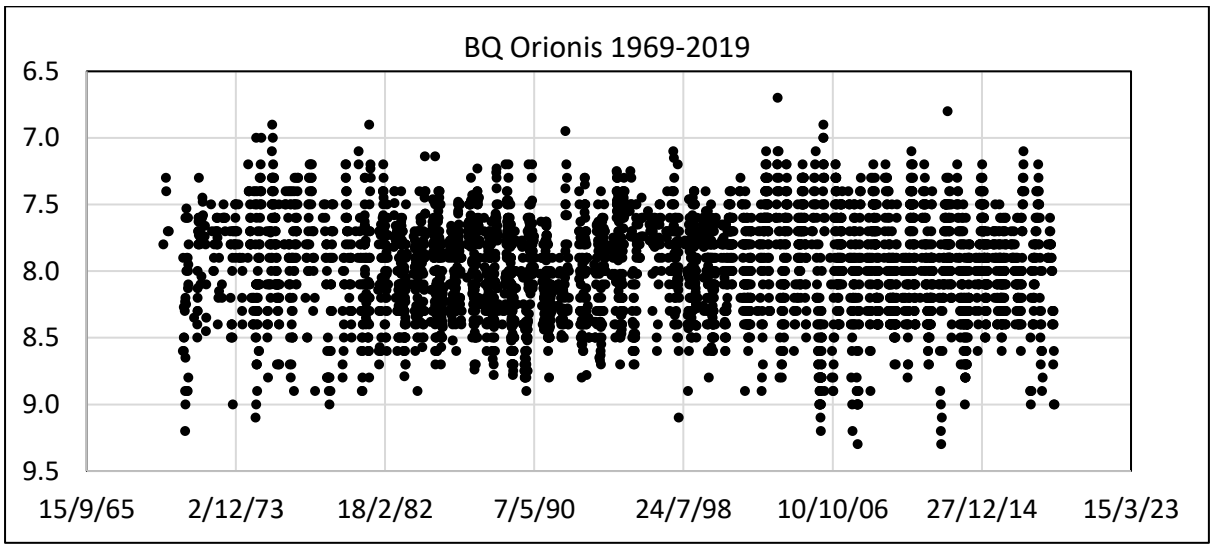
Thanks are due to Rod Lyon who drew the charts for R Aqr, R Cas, S Cep & V Hya.

BQ Orionis

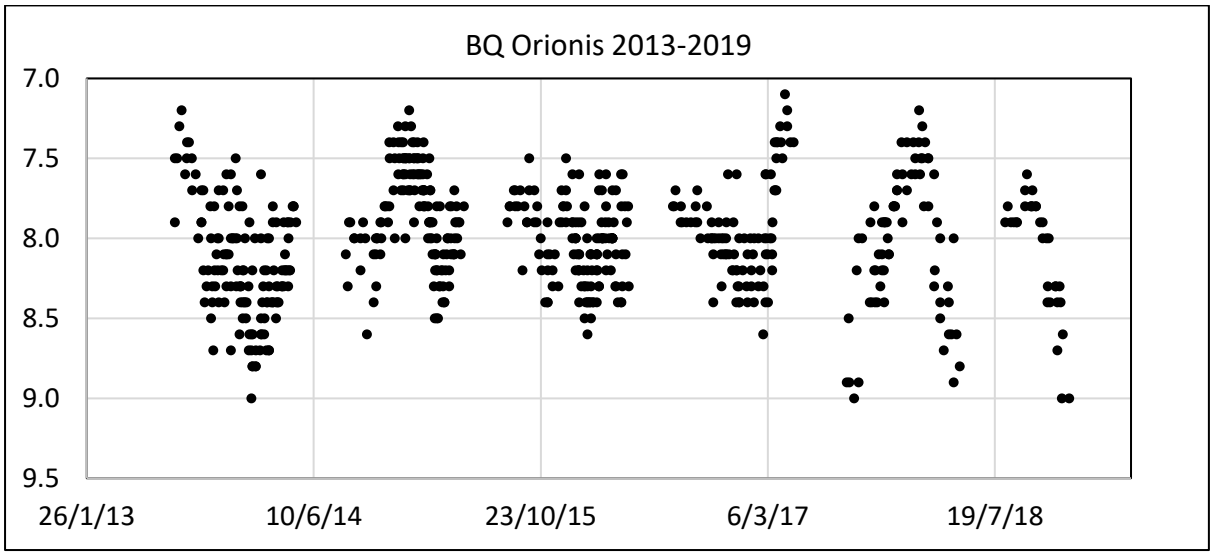
Shaun Albrighton

BQ Orionis is listed in the VSX catalogue as a SRb variable, spectral typeM5IIIe-M8III, with a range of 7.1-9.0 in a period of 243d. A note (Otero, Sebastian Alberto) gives a secondary period of 127.6d.

Lying near to the ecliptic means that each year there is a season gap between approximately May and August. This analysis is based upon 4,966 observations made between 1969 and 2019. From the below plot it is evident that the range is consistent with the VSX range, be it slightly fainter, dipping below 9.0 on occasions. At the time of writing (Feb 2019) BQ Orionis is currently going through its faintest minimum recorded, being of the order of 9.6.



As is typical of SRb type variables the star undergoes periods of heightened variation, whilst at others the variation is reduced or has more random fluctuations. This is clearly seen in the plot for 2013 to 2019, where between 2014-2017 the fluctuations appear more random.



Analysis of observation using the AAVSO, VStar programme reveals the following top results (it should be noted that the amplitude is half the full range).

Period	Power	Amplitude
246.5	309.0	0.19
126.6	167.3	0.14
756.6	160.5	0.13
237.5	157.1	0.13
128.3	135.7	0.12
240.0	105.0	0.11

As will be seen the dominant period of 246.5 days is very close to the catalogue value of 243 days. In addition, two further periods of 237.5d and 240.0d, are likely to represent slight fluctuations in this main period. The second highlighted period of 126.6d is also a close fit to the possible secondary period of 127.6d. Finally, there is suggestion of a possible third period of 756.6d. Continuous observation of this variable may help to resolve this issue.

To sum up BQ Orionis is a highly rewarding star for binocular observers, which currently is showing the deepest minima on record. BAAVSS results generally confirm VSX catalogue values, with the addition of a possible third period of 756.6d.

VSS Chart / VSX

Narrow range Pulsating Variables – periodic or not?

Geoff Chaplin

Many of us have looked at Fourier periodograms and found it hard to see a clear signal or, if there is a signal, have any understanding how significant it might be. Signal processing methods can be very helpful in identifying patterns in noisy data which can then give a much clearer Fourier pattern. Figure A1 shows magnitude estimates from experienced observers (those making over 100 observations of the star) collected into 20-day buckets and covers the period from 1974 to date.

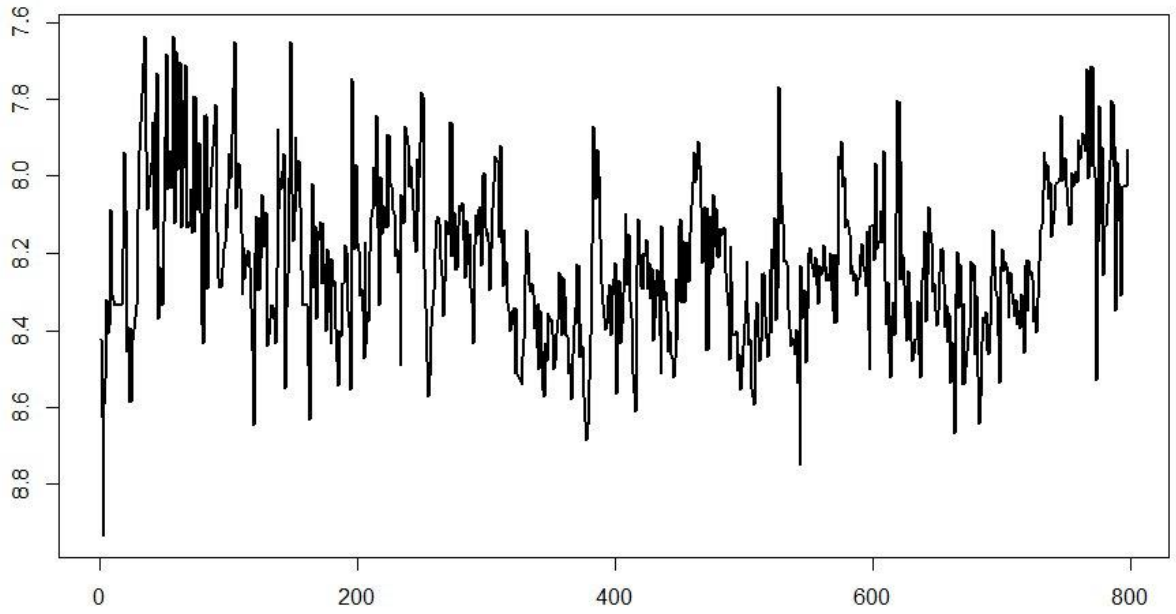


Figure A1.

Signal processing can be thought of rather simplistically as averaging processes applied to the data – similar to (but much more complicate than) calculating moving averages. Using these methods, we can separate similar patterns in the data from dissimilar ones, typically building a “signal” from the strongest patterns but ignoring any long-term variations (aka “trends”). We divide the data into a first half and a second half and analyse these separately for reasons which will become apparent. Figures A2 and A3 show the signals recovered by this process (“1d-ssa” - see Chaplin [1] and references therein for details).

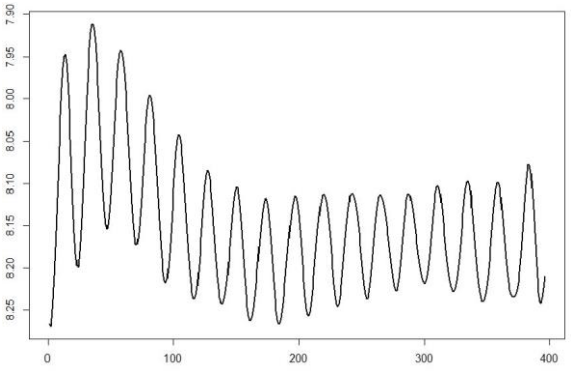


Figure A2. First half signal

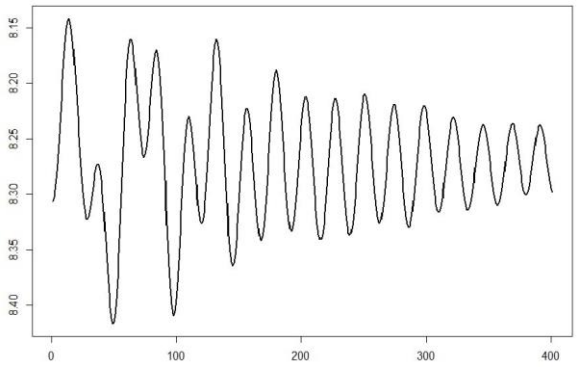


Figure A3. Second half signal

Now taking these clean signals separately into a Fourier analysis program we get the smoothed periodograms for the first and second halves shown in Figures A4 with the peaks corresponding to periods of 453 and 475 days respectively (a difference of approximately 5%).

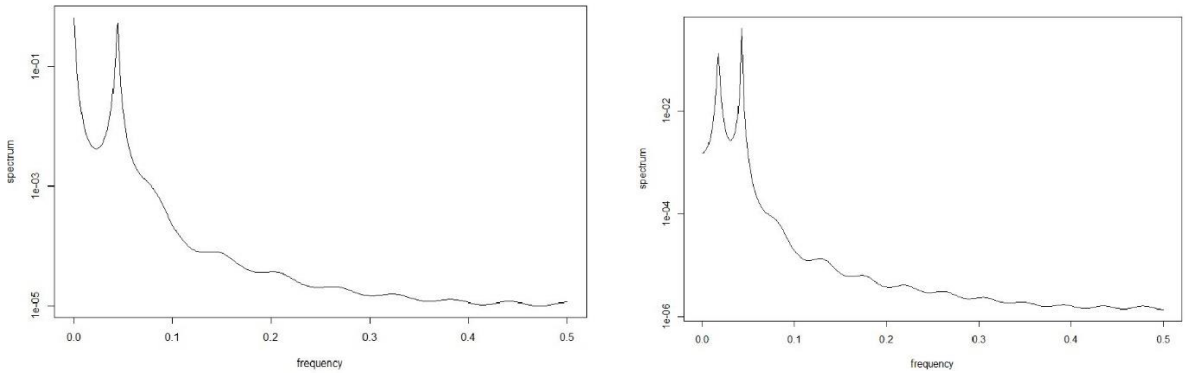


Figure 4. First half and second half spectrum

Now look at Figure B1 and the two recovered signals B2 and B3. Figure B4 and B5 shows the periodograms with a peak at 798 days in both the first and the second half.

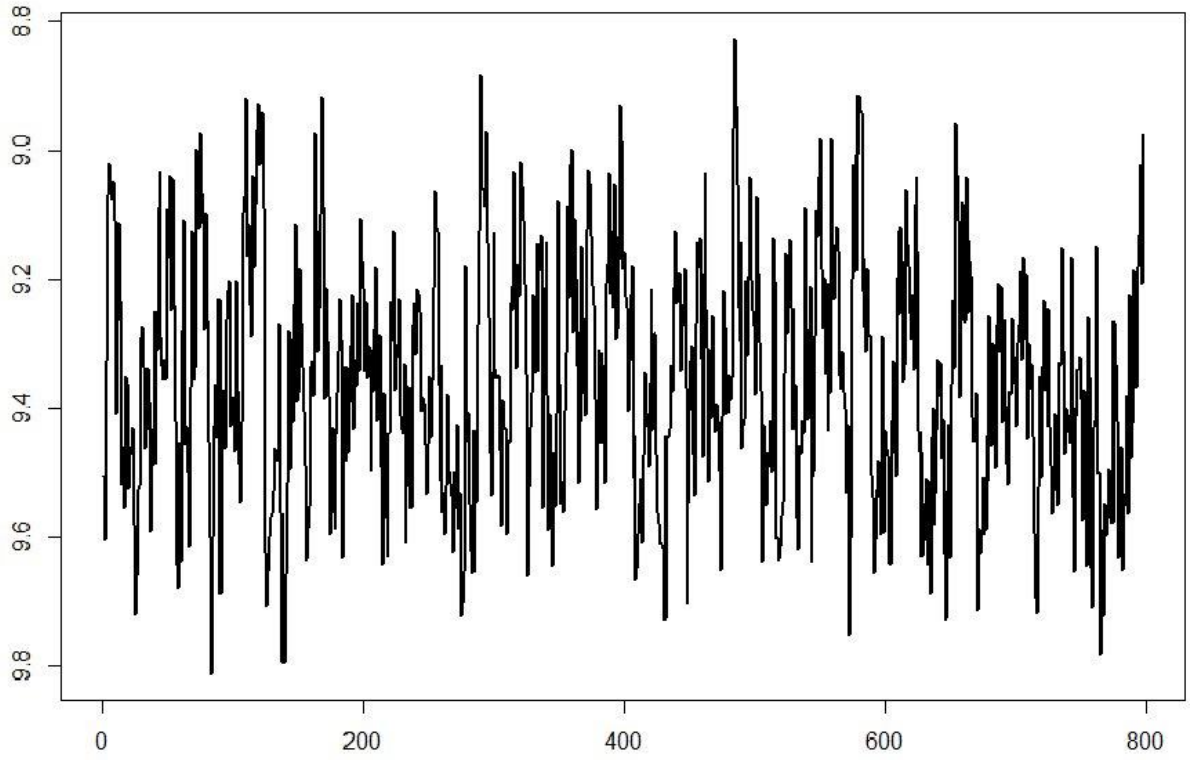


Figure B1.

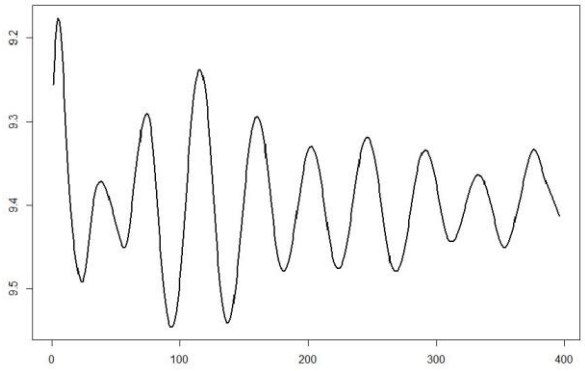


Figure B2. First half signal

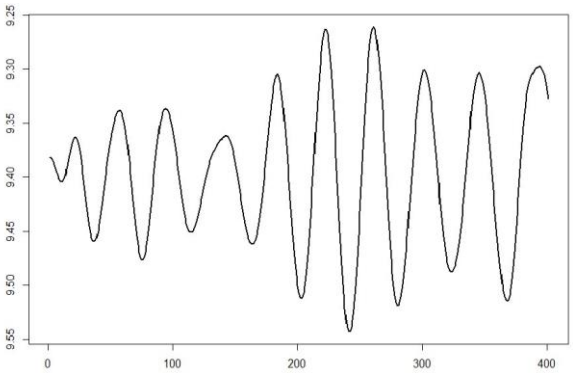


Figure B3. Second half signal

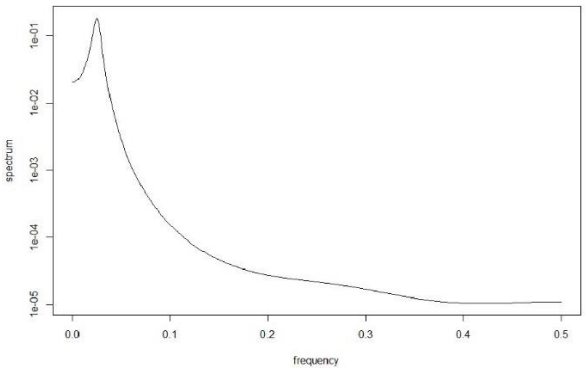


Figure B4. First half spectrum

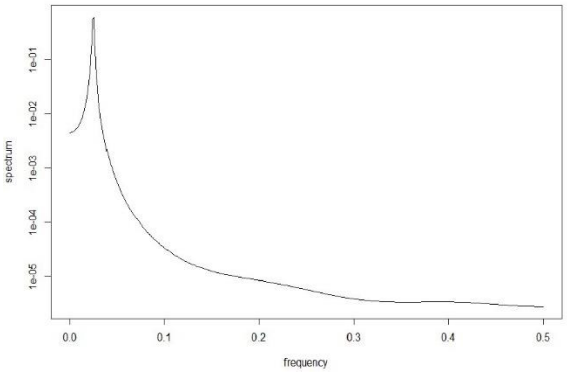


Figure B5. Second half spectrum

So, what does this tell us about the two stars? What is the period? Does star B have a precise period while star A wanders?

Figure A is data for SU Per with periods given as 533 days (BAA VSS website) and 430 +/- 70 days (Kiss et al [2]) while Figure B is a sequence of random numbers capturing the type of variability seen in SU Per. Out of 1000 random number sequences resembling the general pattern of SU Per roughly 10% generate a periodic signal in the first half matched by a similar periodic signal in the second half where the periods are within 10% of each other. Noisy data can generate apparent periodic signals, but such signals are purely chance – and temporary – coincidences.

We can conclude that SU Per has a period of 464 +/- 22 days with approximately 90% confidence, but we must be aware that noisy data – for example visual observations of narrow range variables – may show an apparent period although this may just be an artefact generated by the noise.

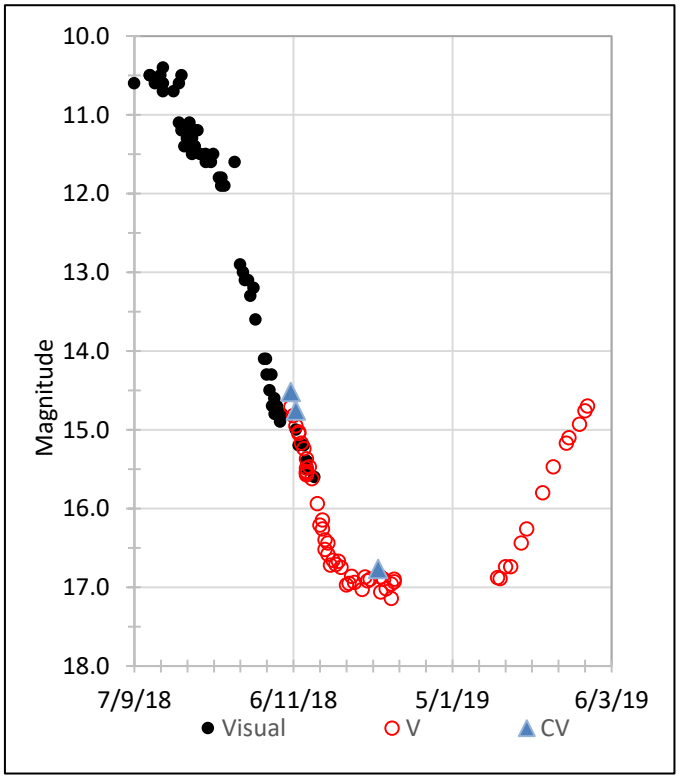
References

[1] Chaplin, G. B., 2018, JAAVSO, 46(2), 157-166, 2018
[2] Kiss, L. L., Szabo, Gy. M., and Bedding, T. R., 2006 MNRAS 372, 1721-1734

CV & E News

Gary Poyner

In VSSC 178, I reported on the deep fade of the RCB star SV Sge, and that by November 29 2018 the star had reached 16.9V with the field becoming very difficult to observe low in the western twilight. The last observation of the year was made by Martin Mobberley with iTelescope on December 14 at 16.9V. Following a gap of just 39 days Martin picked up the field again in the morning sky on Jan 22 2019 with iTelescope and recorded 16.88V. Three days later SV showed signs of brightening to 16.74V by Jan 25, which continued to 14.7V by Feb 25. So, at this stage (Feb 27) it looks like the low state is over.



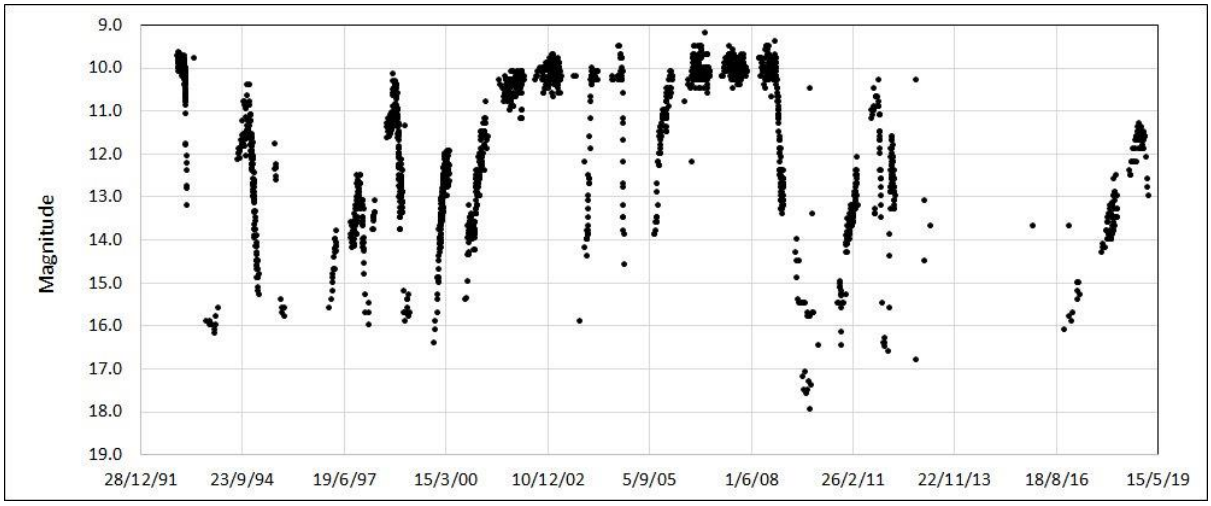
The record deep minimum of the RCB star SV Sge. From BAAVSS database

The minimum magnitude reached was 17.142V on December 13, and the duration of the low state was ~64d, taking any magnitude below 16.5 as minimum. This has been seen to be the deepest minimum on record (previous 16.5V as recorded in VSX), and in response to notification from the VSS, the AAVSO VSX team have amended the catalogue to include this new record minimum value. This was largely made possible by the persistence of Martin to image the field as late as possible in 2018 and as early as possible in 2019 to cover as much of the low state as possible and any rise which may occur.

SU Tau

After over a decade of activity, which has included a minimum low state below magnitude 19V, the RCB star SU Tau looked to be recovering back to maximum magnitude slowly from a January 2015 minimum to reach magnitude 11.5 mean for the first time since Spring 2012 by the end of 2018. However, by early January 2019 SU Tau has again started to fade, and by the time of writing (Feb 27) had faded to a mean visual magnitude of 14.2.

This is the second time in over a century that SU Tau has gone in excess of ten years without returning to maximum magnitude after fading to a deep minimum. The period of activity between Jan 1993 and Jan 2003 had SU Tau coming very close with a rise to magnitude 10.5 mean just over five years following the initial fade before fading again and not completely recovering until January 2003.



All optical band light curve for SU Tau 1991-2019. BAAVSS database

BB Ari

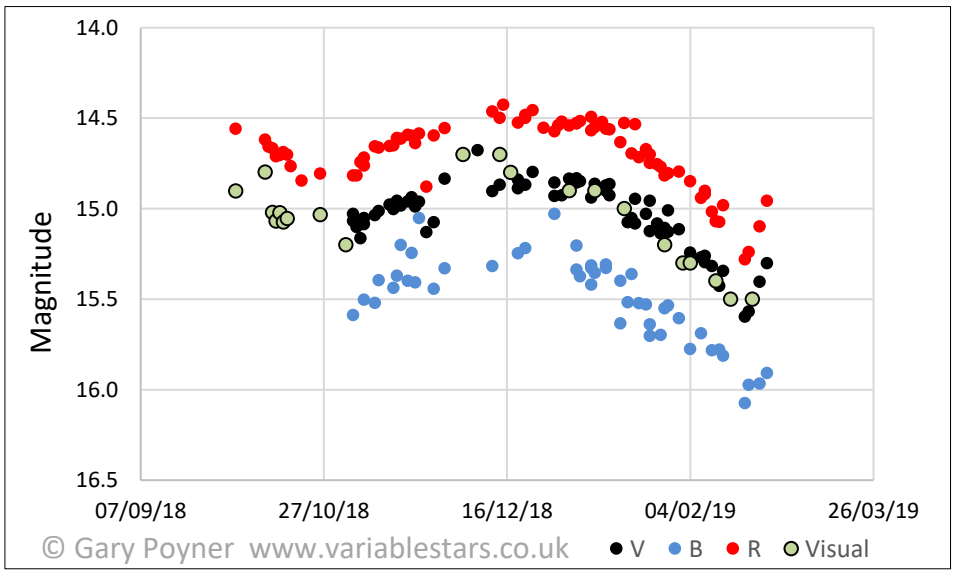
The UGSU star BB Ari was detected in superoutburst on 2019 Jan 24.86 at 13.65CV (Poyner). This was the first outburst seen since November 2016, and only the eighth observed since the first was recorded in 2004. Superhumps of amplitude 0.28V were detected, thus confirming the superoutburst status, and the whole outburst lasted just nine days.

EG Cnc

In VSSC 178 I gave details of the rare outburst of the UGWZ star EG Cnc, detected by Patrick Schmeer on Oct 05.147, 2018. Following on from the major outburst, six echo outbursts were observed in the light curve – the last one occurring on November 28, 2018 – each reaching a similar magnitude at peak brightness (13.4V). This is coincidentally the same number as that observed during the 1996 outburst. Following the last echo outburst, EG Cnc slowly faded back to quiescence, reaching magnitude 18.0V by early January 2019.

OJ 287

In VSSC 178, Mark Kidger wrote about the forthcoming disc encounter in this binary black hole. Predictions for a July event are still good, and the optical behavior of OJ287 seems to be going to plan – slow fade to early Spring followed by a rise to maximum on July 31. The authors light curve shown here includes all post 2018 solar conjunction data - Oct 2018 to Feb 25, 2019. CCD data from the OU COAST telescope. More information on this object in the next VSSC.

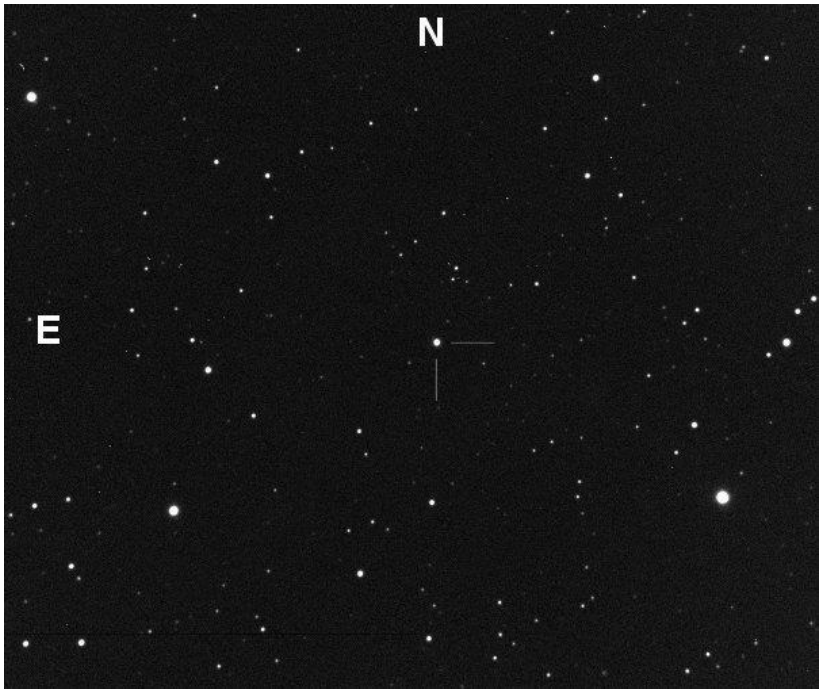


V386 Ser

Eddy Muyllaert

On January 18.838 UT, 2019, the Japanese observer Masaru Mukai, detected a bright outburst of the cataclysmic variable V386 Ser at visual magnitude 10.7. Tonny Vanmunster (CBA Belgium) confirmed the outburst. He had V386 Ser at mag 10.88V +/- 0.01 on Jan 19.26 UT. In quiescence V386 Ser is at magnitude ~19.0 so this means a rise of about 8 magnitudes!

Soon after this discovery Tonny started time-series photometry. The object showed small but clear superhumps with the amplitude of 0.11 mag. The superhumps seemed to be double-peaked, so it suggests the object might be a WZ Sge-type dwarf nova.



Jan 19.278 UT. Mag. 11.35C, 30s exposure COAST (*truncated field*)

V386 Ser formerly known as SDSS J161033.64-010223.3 was originally discovered in June 2003 and was selected as a candidate on the basis of its spectrum as published in the first release of CVs in the Sloan Digital Sky Survey in 2002 [1]. V386 Ser resembled GW Lib in clearly showing absorption lines in the underlying white dwarf primary, as well as the emission lines characteristic of an accreting system.

They obtained its orbital period to be 0.05591 d (80,52 min), corresponding with the 0.0553–0.0592 d orbital periods of WZ Sge-type dwarf novae.

At the moment (Feb 12, 2019) V386 Ser is at magnitude 13.4 and slowly fading. After the rapid decline to quiescence we can expect post-outburst rebrightening(s) which have been detected in most other WZ Sge-type dwarf nova.

Other CV's, not seen in outburst before, and according to their orbital period and where their spectra are dominated by emission from the white dwarf are for instance PP Boo, LV Cnc, MT Com, V1247 Her and some SDSS cv's. These are well worth following for future outbursts!

1: Cataclysmic Variables from SDSS 1. The first results Szkody et al

Editor's note: V386 Ser faded quickly from mag 13.5CV on Feb 10.224 to 15.7CV on Feb 13.256. Up to the time of writing (Feb 23), four further re-brightenings have occurred to mag 13.8V on Feb 16,18,20 & 23

Request for help in monitoring the Cataclysmic Variable HS 0229+8016

Jeremy Shears

HS 0229+8016 was identified as a cataclysmic variable star during follow-up observations of optically selected CV candidates from the Hamburg Quasar Survey by Aungwerojwit et al. [1]. Its orbital period is 232.550 ± 0.049 min (0.16149 d).

The light curve over the last 12 years appears to show almost continuous low amplitude outbursts of ~0.7 mag for much of the time. Each outburst lasts ~12 - 14 days and the star varies between mag ~13.6 and 14.3. There are two intervals of 100 - 200 days when these appear to reduce or even stop. This is reminiscent of Z Cam behaviour, although this classification is by no means certain. Prof. Boris Gänsicke (University of Warwick, UK) suggests that the low amplitude could mean that only part of the disc takes part in the outbursts, so it may be very close to the borderline of disc stability.

Boris has suggested that intensive observations over a few outburst cycles may shed further light on the behaviour of the system. I would therefore like to request observations of HS 0229+8016. The campaign was officially launched on BAAVSS-alert and on the BAA Forum at the end of 2018 Nov and the plan was to continue until the end of 2019 Feb. However, observations would also be appreciated after this time. Since this is a circumpolar object, there is no real reason to stop! We would like one (or a few) observations per night to define the overall outburst light curve and whether there is a quiescence period between outbursts. CCD observations with a V-filter are preferred, but unfiltered is fine if you don't have a V-filter. Visual observations are also gratefully received. Continuous photometry is not required at this point.

A chart and sequence for HS 0229+8016 is available from the AAVSO website. Please submit your observations to the BAA VSS or the AAVSO database.

HS 0229+8016 is a far northerly object in Cepheus at RA 02 35 58.23, Dec +80 29 44.2 (J2000.0).

Figure 1 (below) shows that the star varies by about 0.4 mag in a systematic way. Since the campaign started, we have identified eight of these small oscillations which occur roughly every 8 to 10 days. The 5th oscillation looks slightly different from the others in that it's rise to max was slower.

Many thanks to everyone who has contributed data so far: Richard Sabo, Ken Menzies, Gary Poyner, David Boyd, Dave Smith, Ian Miller, David Storey, Sjoerd Dufoer, Martin Mobberley, James Boardman, George Fleming, Mel Joslin, William Kautter, Erik Schwendeman, and the author. As ever, more observations would be appreciated!

If you have any questions, please contact me at bunburyobservatory@hotmail.com

[1]. Aungwerojwit A., Gänsicke B.T., Rodríguez-Gil P. et al., A&A, 443, 995-1005 (2005)

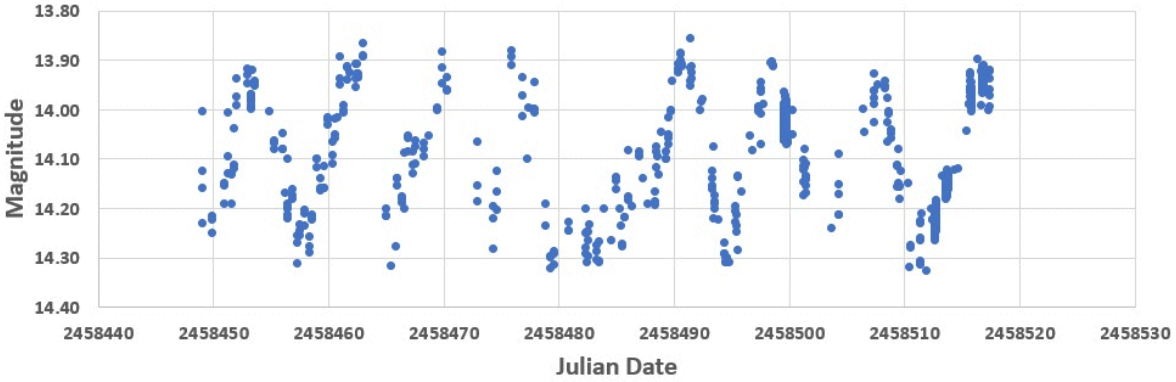


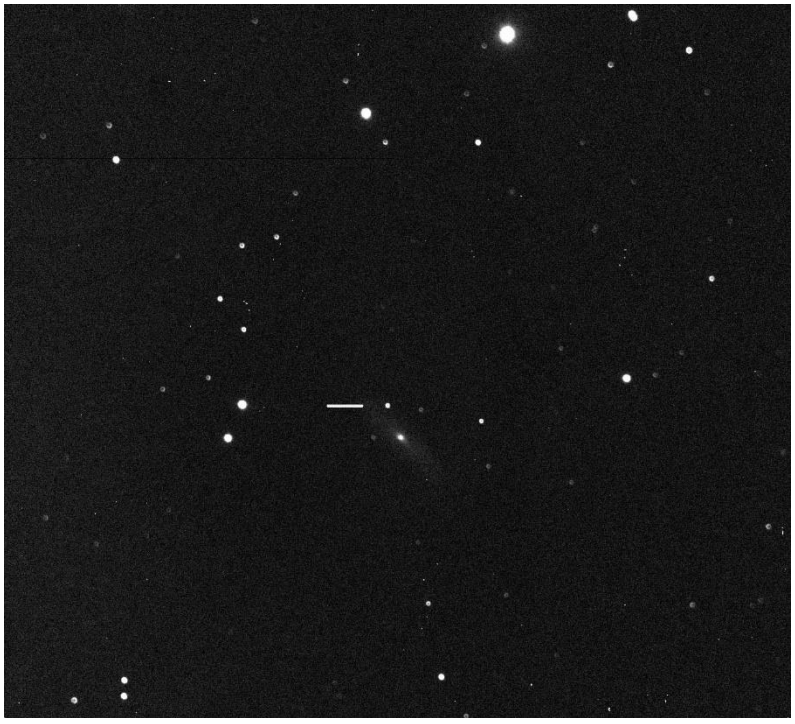
Figure 1. Nov 2018 – February 2019

Supernova 2019np in NGC 3254
Caught on the rise!

Guy Hurst

According to TNS Astronomical Transient Report No. 28550, Koichi Itagaki, Japan, reports the discovery of a new astronomical transient on 2019 January 9. The initial brightness was quoted as Vega magnitude 17.8.

The event was presumed to be a supernova in NGC 3254. This is a Hubble type Sbc galaxy in Leo Minor located at the distance of 105 million light years and of total magnitude 11.5



The new object is located at:

RA 10:29:21.960 (157.3415)
DEC +29:30:38.40 (29.510667)

and received the IAU designation: SN 2019np

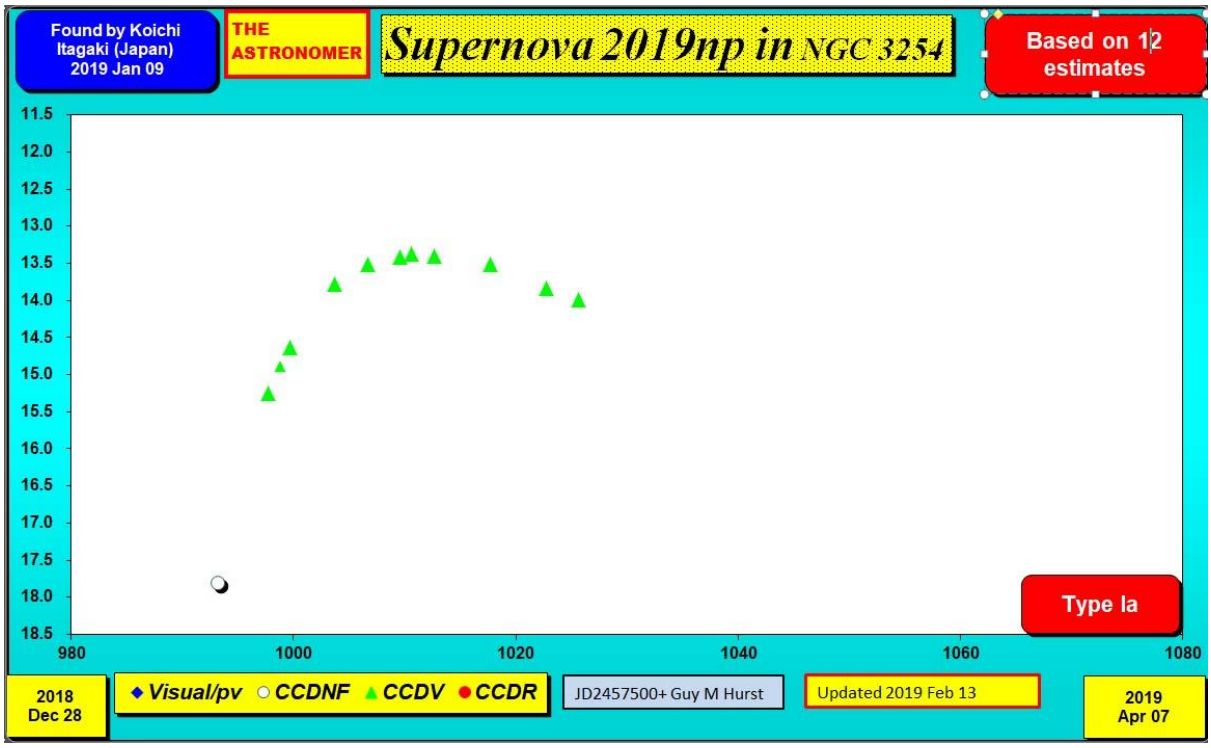
Despite the initial faint magnitude which might have deterred amateur astronomers from seeking much needed follow-up photometry, an early spectrum with the Li-Jiang 2.4 telescope on January 10, was consistent with a type Ia supernova at an early phase after explosion.

SN 2019np in NGC 3254. 2019 Jan 20.225 UT, OU COAST

It matched the spectrum of SN 1995cp at t=-14 days from maximum light (ATEL 12374). This suggested a further climb to maximum made it a priority object. The preliminary light curve (below) shows Johnson V photometry by the author using the Open University's robotic COAST Celestron 14 (35cm aperture) at Observatorio del Teide. At the start of the sequence on January 14 the object had already brightened to V=15.3 as predicted. Maximum magnitude of 13.4 occurred at approximately 2019 January 27-29.

A preliminary sequence based on Simbad V magnitudes was prepared by John Murrell and copies can be obtained from the author. The initial fade seems slow so further observations of the decline would be welcomed. Please send these to the BAAVSS database with copies to the undersigned.

Guy M Hurst
Coordinator, UK Nova/Supernova Patrol



V-band photometry by the author using the OU COAST telescope

Sigma Enigma
The case of sigma Eridanus

John Toone

Whilst undertaking a review of the chart 361.01 for Z and RR Eri, Tracie Heywood noted that Guide 8 listed comparison star A (HD17943) as sigma Eri. This initiated a short investigation because no modern-day star atlas had any star in Eridanus labelled as sigma.

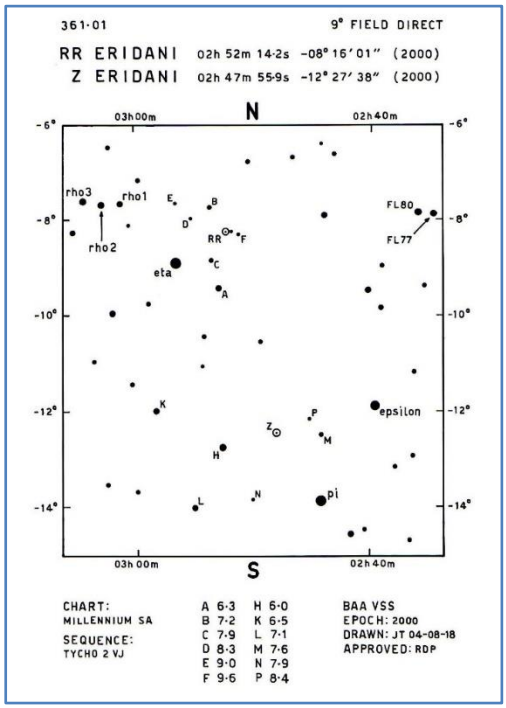
HD17943 at magnitude 6.3 was probably never seen by Bayer (pre-telescopic era) and I did not see how it could have been assigned a Greek letter (supposedly the brightest 34 stars in the constellation) when there are 79 stars brighter than magnitude 5.5 in present day Eridanus and the other stars assigned Greek letters range between magnitudes 0.5 (Achernar) and 5.2 (xi).

All of the star atlases reviewed between Bode in 1801 and Millennium in 1997 do not assign sigma to HD17943. It would appear that each cartographer assumed Bayer made a mistake because there is no naked eye star in the position where he drew it.

The cartographers that prepared Atlas Australis, Atlas Coeli & Sky Atlas 2000 assigned sigma to HD24626 (also labelled i) but that was another mistake because its position is approximately 30 degrees from Bayer's position.

The source of sigma being assigned to HD17943 is the Bright Star Catalogue 5th Edition (1991) which states: "Bayers Sigma Eri is in this position: no Sigma found in any other source". Earlier editions of the Bright Star Catalogue did not include this note nor listed sigma as existing.

Guide 8 includes the data from the following star catalogues: Hipparcos, Tycho, GSC, PPM, SAO, HD & BSC and has listed HD17943 as sigma because of the note included in the BSC. (The BSC note was also quoted in Guide 8).



Click for larger chart

Whoever wrote the note in the BSC made the link between HD17943 and sigma solely on the basis of its relative position. On Bayers chart (reproduced below) sigma is slightly more distant from eta than rho is on the opposite side. In reality HD17943 is much closer to eta than rho (note that rho consists of three 5th mag stars which Bayer did not separate so the probability of him seeing HD17943 at magnitude 6.3 with the naked eye is most unlikely) so the note in the BSC is flawed and unfortunately Guide 8 has simply repeated it.

Upon conclusion of the investigation comparison star A on VSS chart 361.01 was not labelled as sigma because it was assumed to be a mistake and that is aligned with the star atlas cartographers position adopted since 1801.

Eclipsing Binary News

Des Loughney

44i Boötis

This variable star was discovered by William Herschel in 1781. It was the subject of an article in VSSC 91 by J M Saxton. He describes the observations he made in May/June 1996. In his introduction he says:

“44 Bootis is a triple system, of which the fainter component (B+C) is the nearest example of a W UMa type eclipsing binary. 44 Bootis is also known as i Bootis (not to be confused, as has sometimes been done, with iota Bootis !). Confusion as to the star's identity also seems to extend to the 4th edition of the GCVS, in which the eclipsing component BC carries the label ZZ Boo. However, the GCVS lists two (!) objects with the label ZZ Boo, the other being an EA type binary with a period of 4.99 days. Since it is the latter which occupies its correct position (between YZ and AA) in the catalogue, I assume that 44 Bootis BC acquired the label ZZ in error. The GCVS gives the range of BC as 5.8-6.4; however, observation is hindered by the proximity of the brighter A component, which during this century has never been more than 2.5 arcseconds distant. If the light from A+B+C is measured together -as is usually the case - the total range is only 0.17 magnitudes. (All subsequent references to the light variation in this article will refer to the combined light of the system (A+B+C)).”

His article concludes:

“It is perhaps appropriate to finish by emphasising that, despite the small amplitude (about 0.17 in V), 44 Bootis does display a range of phenomena - such as changes in orbital period and distorted light curves - which are accessible to observers who can make observations of sufficient precision. The star can be commended for further study.”

This system is listed in the Krakow database as an EW/KW system with a period of 0.2678166 days. The eclipses are the same with a depth of 0.2 magnitude. It is a fairly bright system with an maximum magnitude of 4.76. As it is an EW system it is constantly in eclipse and can be usefully observed at any time. On the current GCVS database it is still listed as i Bootis.

For more information on this triple system see Jim Thaler’s article (2014) at <http://stars.astro.illinois.edu/sow/44boo.html>.

LY Aurigae

This would seem to be a good system to observe. It is bright at a maximum of 6.85. It is constantly in eclipse as a EB/SD system. It can be usefully observed at any time. The primary eclipse has a depth of 0.7 magnitude and the secondary eclipse 0.5 magnitude. The unusual feature of this system is that the period is nearly equal to 4 days (4.0024906 days at present). This means that the times of eclipses does not change very much - just two or three minutes from one eclipse to another. In other words years can pass at a particular longitude on the Earth when the eclipses occur in day light. At the moment, from the UK, the eclipses are occurring at around 2.30am so it will be possible to obtain a full light curve for a while, except during the summer.

For more information see: "The O-type eclipsing contact binary LY Aurigae – member of a quadruple system" by Mayer et al, A & A 559, A22 (2013). Below is the light curve from that paper.

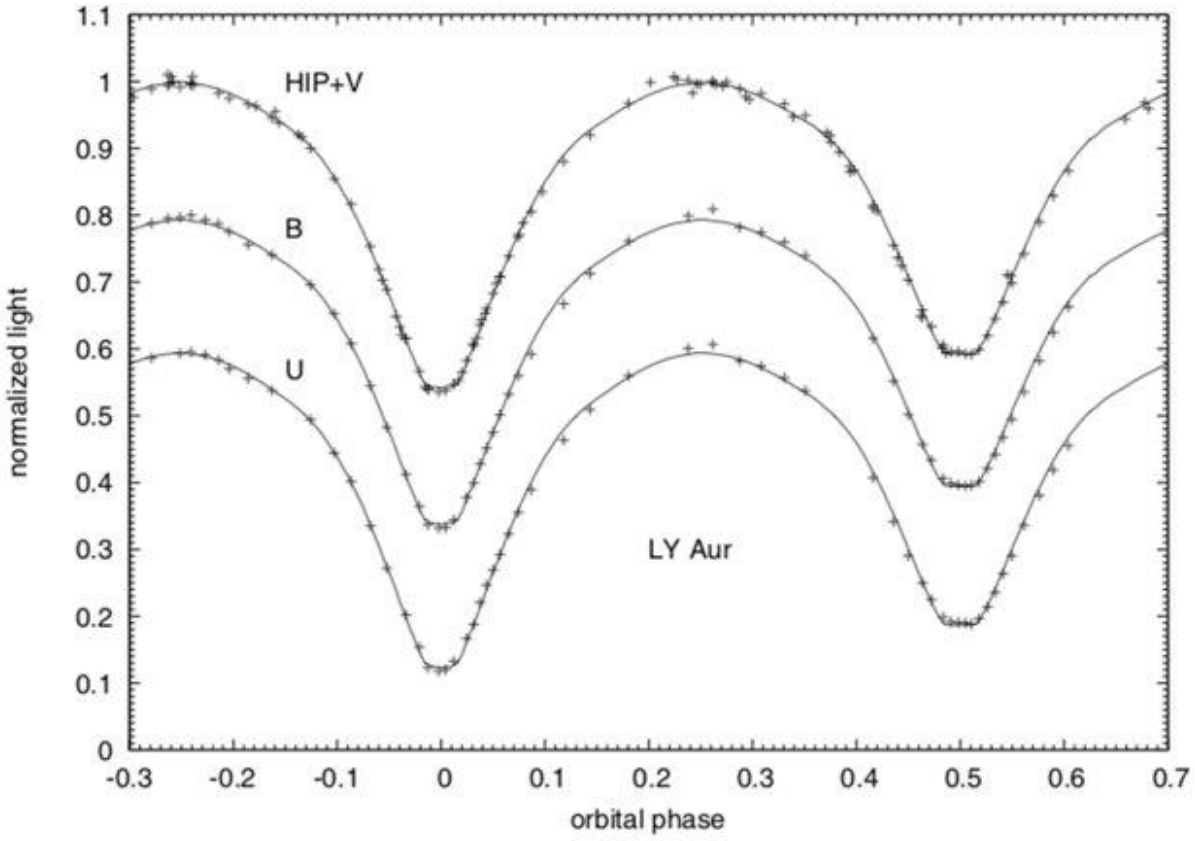


Figure 1. LY Aur

EO Aurigae

This system has an out of eclipse maximum of 7.56 magnitude, a period of 4.0656497 days, and a primary depth of 0.6 magnitude and a secondary depth of 0.3 magnitude. We have classified it as an EA system as does the GCVO. It is not classified at all as an eclipsing binary on the Krakow database.

There is a paper by P Hartigan, AAVSOJ, V10,P13, 1981, entitled ' A Photoelectric Light Curve and Elements of the Eclipsing Binary EO Aurigae'. Figure 2 below is a light curve from that paper which shows that the system is not an EA system but an EB system.

As the BAAVSS chart 283.01 illustrates, the three eclipsing binaries AR Aur, EO Aur and LY Aur are in the same field of view. The same settings for DSLR photometry may work for all three systems though it probably would be better if EO Aur was studied using a 200mm Canon lens rather than a 100mm Canon lens.

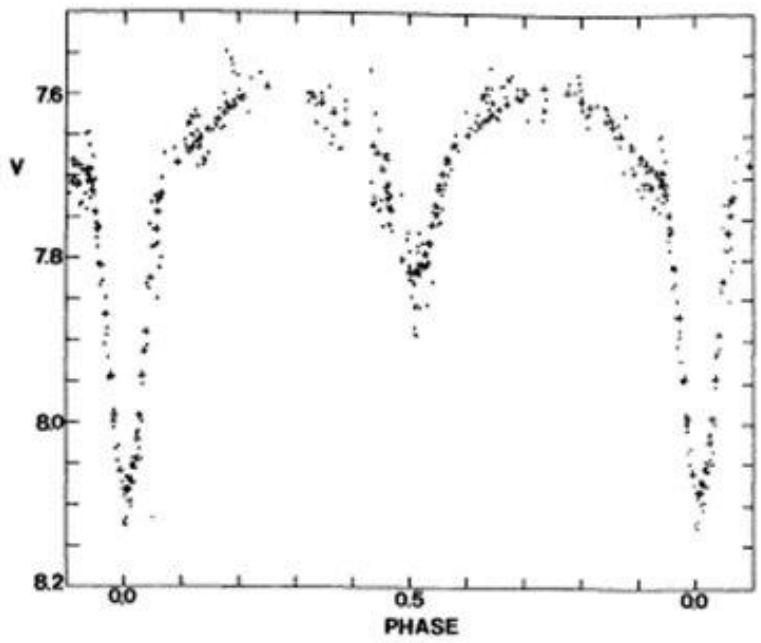


Figure 2. EO Aur

National Astronomy Meeting 2019

Lancaster University: 30th June – 4th July 2019

Full details for the 2019 NAM can be found at https://nam2019.org

Of special interest to amateurs may be the parallel sessions, organised by Callum Potter and Dirk Froebrich. The description from the web page reads "*Observational Astronomy is greatly benefiting from contributions made by Amateur Astronomers. These are extremely wide-ranging and e.g. include follow up of gravitational microlensing events, supernovae or GAIA (and other photometric) alerts, monitoring of young stellar objects, cataclysmic variables, planetary debris around white dwarfs, Exoplanet Transits, pulsating variables, as well as Solar System observations such as Asteroid light curves, and positions. The aim of this session is to highlight the existing and forge new links between Amateur and Professional Astronomers and to discuss how professionals can better utilise the amateur resource pool and how organisations like the BAA can support this.*"

Callum Potter also notes on February 20 "*The NAM proposal was successful with a 90-minute session allocated, and the NAM website is now open for abstract submissions, which should be in the next few weeks. Talks should be 15 to 30 mins at most, and there can also be poster displays. If we have too many good talks for the 90 mins, it's possible we might get an additional session*"

Section Publications

Please make cheques payable to the BAA and please enclose a large SAE with your order.

Hard Copy Charts	**Order From**	**Charge**
Telescopic	Chart Secretary	Free
Binocular	Chart Secretary	Free
Eclipsing Binary	Chart Secretary	Free
Observation Report Forms	Director/Red Star Co-ordinator	Free
Chart Catalogue	Director	Free
Observing guide to variable stars	BAA Office	£2.50 £2.75 non-members
Binocular VS charts Vol 2	Director or BAA Office	£1.00 £1.25 non-members

Charts for all stars on the BAAVSS observing programmes are freely available to download from the VSS Website www.britastro.org/vss

Contributing to the VSSC

Written articles on any aspect of variable star research or observing are welcomed for publication in this Circular. The article must be your own work and should not have appeared in any other publication. Acknowledgement for light curves, images and extracts of text must be included in your submission if they are not your own work! References should be applied where necessary.

Please make sure of your spelling before submitting to the editor. English (not American English) is used throughout this publication.

Articles can be submitted to the editor as text, RTF or MS Word formats. Light curves, images etc. may be submitted in any of the popular formats. Please make the font size for X & Y axes on light curves large enough to be easily read.

Deadlines for contributions are the 15th of the month preceding the month of publication. Contributions received after this date may be held over for future Circulars. Circulars will be available for download from the BAA and BAAVSS web pages on the 1st day of March, June, September and December.

Notes for readers: *All text bookmarks, www and e-mail links are active. Clicking on an image with a blue border will take you to a relevant image or text elsewhere in this Circular.*

Deadline for the next VSSC is May 15th, 2019

BAA www.britastro.org
BAAVSS www.britastro.org/vss
BAAVSS Database http://britastro.org/photodb/
VSSC Circular Archive http://www.britastro.org/vss/VSSC_archive.htm

Section Officers

Director
Roger Pickard
3 The Birches, Shobdon, Leominster, Herefordshire HR6 9NG
Tel: 01568 708136 E-mail roger.pickard@sky.com

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

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

Pulsating Stars Co-ordinator
Shaun Albrighton
4 Walnut Close, Hartshill, Nuneaton, Warwickshire CV10 0XH
Tel: 02476 397183 E-mail shaunalbrighton93@gmail.com

CV's & Eruptive Stars co-ordinator, Circulars Editor & Webmaster
Gary Poyner
67 Ellerton Road, Kingstanding, Birmingham B44 0QE
Tel: 07876 077855 E-mail garypoyner@gmail.com

Nova/Supernova Secretary
Guy Hurst
16 Westminster Close, Basingstoke, Hants RG22 4PP
Tel: 01256 471074 E-mail guy@tahq.demon.co.uk

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

Database Secretary
Andy Wilson
12, Barnard Close, Yatton, Bristol BS49 4HZ
Tel: 01934 830683 E-mail andyjwilson_uk@hotmail.com

Telephone Alert Numbers

For Nova and Supernova discoveries telephone Guy Hurst. If answering machine leave a message and then try Denis Buczynski 01862 871187. Variable Star alerts call Gary Poyner or Roger Pickard or post to BAAVSS-Alert – but please make sure that the alert hasn't already been reported.

361·01 9° FIELD DIRECT

RR ERIDANI 02h 52m 14·2s −08° 16′ 01″ (2000)

Z ERIDANI 02h 47m 55·9s −12° 27′ 38″ (2000)

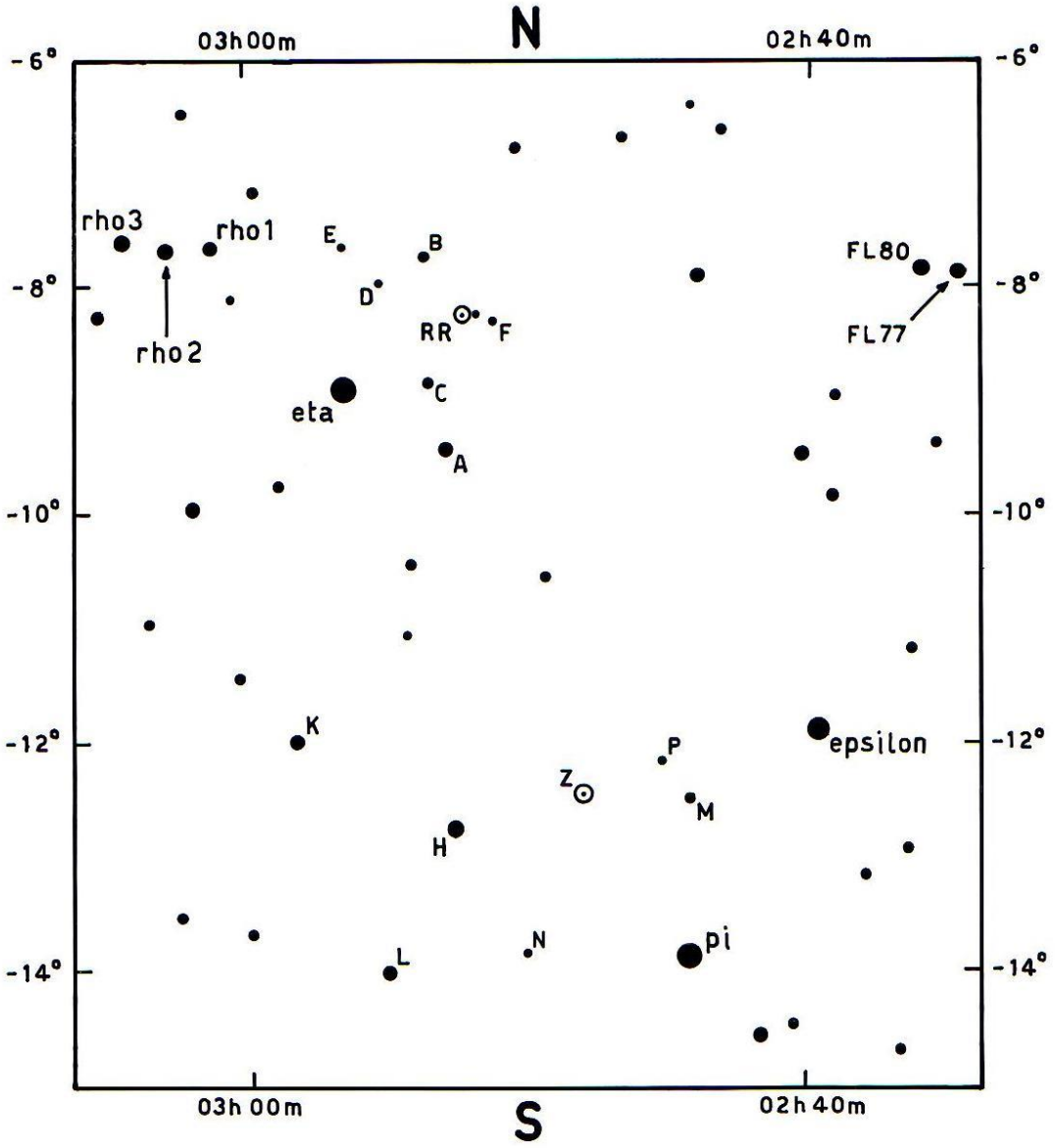


CHART:
MILLENNIUM SA

SEQUENCE:
TYCHO 2 VJ

A	6·3	H	6·0
B	7·2	K	6·5
C	7·9	L	7·1
D	8·3	M	7·6
E	9·0	N	7·9
F	9·6	P	8·4

BAA VSS
EPOCH: 2000
DRAWN: JT 04-08-18
APPROVED: RDP