



Eyepiece Views: November, 2001

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E Y E P I E C E V I E W S

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1. WELCOME TO THE THIRD ISSUE OF EYEPiece VIEWS

As cold weather closes in on the northern hemisphere, the southern hemisphere will be warming up soon. We have many stars in the southern hemisphere that need more observations. If you are lucky enough to live south of the equator, please pay special attention to the southern program stars to help us fill in the gaps. Now is the time to pad those observer totals with some valuable observations!

For those of us in the northern hemisphere, we have a nice article about preparing for observing in the cold. After reading this article you have no excuse for staying indoors this Winter!

Finally, as you read this the 90th Anniversary Annual Meeting of the AAVSO will be just about underway in Somerville, MA. If you could not make it, please consider joining us in Hawaii this summer for the 90th Spring Meeting. Details are available at <http://www.aavso.org/meetings/> .

Good observing!

Gamze Menali (MGQ)
Aaron Price (PAH)
Mike Simonson (SXX)

2. CATAclySMIC VARIABLE STARS: HOW AND WHY THEY VARY- Review

"Cataclysmic Variable Stars: How and Why They Vary" by Coel Hellier is one of those rare books that successfully toes the line between being a scientific and a popular book. This book is so popular with HQ staff that it frequently is taken home and has to be tracked down when someone needs it!

It works as both a reference and a straight-through read. As a reference, one can confidently refer to it when coming across any type of unfamiliar CV. As a straight-through read, it is clearly structured and written in a lively style that makes it easy to go from start to finish.

The majority of the book is broken up into sections about the different types of CVs. Each section is well illustrated with light curves (many coming from AAVSO observations from observers like you), historical background, a breakdown of the system with easy-to-read diagrams, theory, and more. When mathematics is introduced it is always in a sidebar or appendix which allows those interested to get involved but does not require an understanding of the equations for those who wish to avoid math.

The book is not simply an encyclopedia of CVs, though. It covers everything from basic visual and CCD observing techniques to how to derive a stellar mass from your observations.

This is a book that every CV lover should own along with anyone who is interested in learning more about these enigmatic objects. The layout, illustrations, structure, and writing have all come together to create what is almost the perfect book on CVs. I hope the team that put together this book continues to work together on future endeavours. If so, the future of variable star publications looks not variable at all, but bright and steady.

"Cataclysmic Variable Stars: How and Why They Vary"
Coel Hellier
Springer-Praxis, 2001. 210pp \$39.95
ISBN 1-85233-211-5

Amazon.com URL:

http://www.amazon.com/exec/obidos/ASIN/1852332115/qid=1004109362/sr=1-2/ref=sr_1_10_2/002-2321889-8516852

Barnes & Noble.com URL:

<http://shop.barnesandnoble.com/booksearch/isbnInquiry.asp?userid=65L9K4YA27&mscssid=22802F5WNB0R9P0GC11Q2R186659D033&isbn=1852332115>

3. COLD WEATHER OBSERVING

By Mike Simonsen SXN

When winter arrives in the Midwest it is rarely subtle. Suddenly, sometimes overnight, we have to deal with snow on the ground, below-zero wind-chill, low clouds that never seem to part, and a whole new set of rules for survival.

Here are some rules I have learned, observing from Michigan in temperatures down to -40C :

1- Wear warm boots. When I meet people new to astronomy, they always want to know what the best telescope is and what accessories to buy. I always tell them, "the most important piece of equipment you will ever buy is warm boots". When it is clear, it is cold. If your feet are cold,

you are miserable. If you are miserable, you are done.

2- Wear a hat. Most of the heat in your body escapes through the top of your head like a chimney. Cover your head and retain body heat.

3- Keep your hands warm. Mittens are better than gloves, but they are awkward to use when dealing with focuser knobs, charts, pens, pencils, etc. If you insist on wearing gloves, keep your hands in your pockets as much as you can and out of the wind. If your fingers begin to hurt from the cold, go inside or get in your car and warm them up thoroughly. Frostbite can be very painful.

4- Get out of the wind. Most of the time it's not the air temperature that gets you, it's the wind-chill. Put a building or a hedge or an observatory between you and the wind and you will be able to endure the cold for twice as long. The added bonus of not having the telescope shake will save you time in making estimates.

5- Don't breathe on optics. Breathing on cold glass means instant frost. If you wear a scarf over your face, be sure not to let the warm air you exhale spill out over the top of the scarf and down onto the eyepiece. Set up your finder so you are not breathing on the eyepiece when looking through the finder. On very cold nights I usually have a large patch of frost to scrape off the back of the mirror cell of my SCT, caused by my breathing on the cell while looking through the finder.

6- If you have dew heaters, use them right from the start of your session. They are much better at preventing frosted corrector plates, secondaries, eyepieces and finders than they are at removing frost. A heated box or holder for eyepieces can be a great benefit. If you only switch between a few, keep them in your pockets to stay warm.

7- Keep your pen warm or the ink will freeze. I keep mine tucked behind my ear to keep it warm. I have one of those "astronaut pens". Even that froze at 40 below.

8- Use a plastic flashlight. If you are like most of my friends who read charts and log observations by flashlight, you put the flashlight in your mouth to write. A very cold metal flashlight can be hard to remove from your lip without losing a bit of flesh.

9- Take breaks every hour or half hour, depending on the weather, and go warm up. Keep an extra pair of dry socks warming on the dash of your car, or go in and throw a pair in the dryer for a few minutes. It's amazing how a nice toasty pair of socks can change your attitude!

10- Be aware of battery life in cold temperatures. The batteries in your flashlight, telescope, camera, dew heaters, etc., will perform poorly in cold temperatures. Keep warm extras handy.

11- Keep your own personal battery charged. Plenty of rest, a good meal, snacks and hot coffee go a long way towards warding off the inevitable freeze. The search for a thermos that would keep coffee hot in sub-zero temperatures was my 'Holy Grail' for a long time. I finally found one at a camping supply store and it makes all the difference to me.

12- Know your limits. You have to be realistic about how much cold, discomfort or pain you can endure in order to get those last few observations. Don't wait until it's too late and then decide to tear down and pack up. That's when you will meet Mr. Frostbite.

With a little planning and common sense you can take advantage of those long, clear, cold winter nights. Orion, Gemini and Auriga are calling. Just be careful out there.

4. THE JOYS AND COMFORTS OF BINOCULAR OBSERVING

Wayne M. Lowder

The following is a revised version of a recent e-mail response of mine to a flurry of messages in the AAVSO Discussion Forum on a subject dear to my heart. I couldn't resist putting my two-cents in. This version is likely to reach a larger audience (gang), and I welcome any comments at wmlwdr@aol.com.

Hi Gang - I've read with interest the various messages on observing bright variables stimulated by Dave Strout's request for guidance on "the smallest scope to do useful work". I agree with practically all that's been said concerning the good things that can be done with just a pair of binoculars. I'd like to point out that I and my good friend Ed Oravec have each made considerably more than 100,000 observations using "just" binoculars. There are many hundreds of interesting variables whose light curves are partly or totally brighter than 10th magnitude (for example, see the AAVSO atlas). I've marked up my Uranometria atlases with AAVSO and Tycho Catalog sequences for most such variables. Anyone with access to these sources can do the same, or just use the AAVSO atlas, so that there's no need to struggle with charts. Thus there is no such thing as "the smallest scope to do useful work"! After all, the recent brightenings of the bright Be stars Delta Scorpii and Omega Canis Majoris as well as, for example, the fascinating variations of Betelgeuse are readily observable with the naked-eye.

Although I spent many years using an 8-inch telescope and observing dwarf novae and other interesting stars down to 14th magnitude, I was forced by moves to poor-horizon sites in the late '70s to take up binocular observing. I could then move around the yard and the neighborhood (occasionally just barely avoiding arrest as a suspected peeping tom.....and being innocent, of course) and defeat the trees' efforts to obscure much of the sky and louse up my observing program and totals. After a while, I discovered both the joys (many interesting stars, pop-out observing sessions scattered over many hours including pre-dawn (thus maximizing the number of available stars and length of observing seasons for each star), minimal time per observation, good atlases for finding stars, balancing observing and household demands, total portability, etc) and the comforts (no set-up and tear-down time and effort, minimal weather discomfort, light weight, etc) of using binoculars as my main instrument. By now I've become sufficiently spoiled that I have no desire to struggle with a telescope. I leave that to others who haven't discovered my big secret!

As to which binoculars, go for quality rather than the department store variety. I used a pair of Burnham wide-angle 10x50s for many years and then graduated to a fine pair of Vixen 16x70s (the type that Ed Oravec also uses). By the way, except for the increased jitters associated with hand-holding and a usually somewhat narrower field of view, I feel that 15-16x is better than 10-11x for 70-80 mm instruments. There is less clutter of stars as they're more spread out at higher magnifications, and one can see fainter stars against a darker background. And having a smaller exit pupil diameter also keeps one seeing to the edges of the field as one gets older as well as when eyes are poorly dark-adapted under bright skies. Then, in 1998, after problems with my Vixens, I really splurged and picked up a pair of Steiner 15x80s, German military binoculars with a 4 degree field and a weight of only 3.5 pounds. They are very expensive (~\$1000), but have superb optics, are ruggedly constructed with special light-weight materials, and can be hand-held without too much

jiggle, unlike most binocs of this size such as the otherwise superb Fujinons. I can get down to 10th magnitude with my Steiners near the zenith on excellent nights under my suburban skies, and would probably go routinely into the tens under better skies with a mount (though with a mount I might have gotten the 20x80s instead). I consider such an instrument as worthy of a lifetime investment. I also have a pair of Bushnell 7x32s from Orion, mainly for bird-watching and its 13-degree field, which makes for great panoramic views both in daylight and after dark (showing stars down to 8th magnitude and great for nova-hunting or Milky Way sightseeing). These are just examples of the types of binocs available from many sites on the internet, where one can balance the often competing claims of cost, quality, aperture, magnification, field of view, and weight according to one's interests, needs, and bank balance. If I had to pick one type that very often would be a good compromise, especially for inexperienced observers, it would be a \$200 pair of wide-angle 10x50s. As in my case, success with these could lead to larger investments in bigger instruments. Whatever one chooses, there's a lifetime of variable star and other astronomical (remember the great comets) observing available with an instrument that one can store in a small drawer and carry anywhere. I will never forget the spectacular views of the southern Milky Way that I obtained in my 10x50s from the top deck of a cruise ship in the Caribbean! 'Nuff said???? I don't mean to discourage anyone from enjoying the fascinating programs and great rewards available to telescope owners. Many observers use both telescopes and binoculars in their programs, with the latter being particularly handy when limited time is available on a clear night or one must deal with weather uncertainties. But for the beginning observer....or the very busy, unlucky (poor horizons, bright skies), infirm, or just lazy ones....you can't beat binoculars.

As to available stars, I indicated above that there are many hundreds of interesting variables within range of 50-80 mm binoculars, e.g., about 9th magnitude under typical skies. These are of many types, for example.....

MIRAS: Many of these can be seen while not too far from maximum (see the annual bulletin to find out which ones are bright enough at any particular time), and a few, such as Mira itself, R Leo, R and S Car, T Cep, X Oph, R Cen, and R Hya, can be followed through most if not all of their variations. It's especially interesting to see how the maximum brightnesses of these stars differ from cycle to cycle.

SEMIREGULARS: While some of these don't do too much, there are many bright ones with substantial amplitudes that deserve watching. My favorites include Z UMa, AF Cyg, T Cen, W Hya, Betelgeuse, and some very red stars like Mu Cep and TX Psc.

RV TAU STARS: There are not many of these, but following the variations of such stars as R Sct, AC Her, and U Mon is great fun as well as valuable.

CEPHEIDS: There are many bright cepheids along the Milky Way deserving of continuous monitoring by individual observers. It has been demonstrated (see Grant Foster's paper from the Sion meeting) that lots of visual observations by such an observer over many cycles can yield mean light curves of a quality comparable to those obtained by photoelectric photometry and detect small period changes. I had this experience notably with SV Vul and X Cyg, and have reams of data for about two dozen stars over many years yet to analyze and write papers about. Yes, you can do research with binoculars.

R CRB STARS: Only a few of these fascinating stars are bright enough at maximum to be worth looking for, including R CrB itself plus RY Sgr and V854 Cen. They can't be followed through their deep minima, but their variations near maxima can be observed as well as the beginnings and ends of their declines.

SYMBIOTICS: There are relatively few of these, but they're among the most interesting to observe. Try CH Cyg, which has varied by about 5 magnitudes over the past two decades, mostly within binocular range. The prototype, Z And, is also observable when in outburst, and perhaps AG Peg, usually about 8.7m, will do something significant one of these years. It was as bright as 6th magnitude in the 19th century.

DWARF NOVAE: A few of these favorites of the owners of light buckets can be seen in binocs near maximum, for example, SS Cyg, U Gem, and VW Hyi. WZ Sge recently had one of its very rare 8th magnitude maxima that aroused worldwide attention, which could have been discovered by a very optimistic binocular observer!

ECLIPSERS: There are well over a hundred of these that are bright enough to be followed through minimum in binoculars. Doing so is great fun, as one can see large changes in a short time (minutes to hours). Try U Cep or U Sge for dramatic examples. Minimum timings are always valuable, and the results are analyzed and published by Marv Baldwin's gang at regular intervals, with appropriate credit to the observers. But this observer has also followed several dozen of these stars at all phases of their light curves and caught unusual behavior in three, i.e., unexpected fadings of up to 0.7m on many occasions of EI Cep outside of eclipses, probably due to physical variations in one of the components, and unexpected intervals (months) of rapid and slow brightenings outside of eclipse of up to 0.6m above the usual maximum brightnesses in RZ Cas (winter of 1995-6) and WW Aur (spring of 1998), probably due to major mass-transfer events and activity. Moral - observers of eclipsers with any instrument might want to check them at least occasionally at times well outside of eclipses. This can be done especially readily with binocs. Again, much potential for research with such instruments.

NOVAE: Many become bright enough to be followed for some time in binoculars, as several recent examples demonstrate. Moreover, binocs are great for nova search and occasional discovery, as quite a few amateur observers have shown.

Unfortunately, I "saw" several 6th magnitude novae in variable star fields at about the times of discovery without noticing them, so to speak. These were cases of me being too busy observing my program stars to check out somewhat strange-looking fields. Another experienced observer missed the 5th magnitude HR Del several times prior to discovery in 1966 while busy estimating EU and U Del nearby. There's a lesson here somewhere! One interesting project might be frequent checking of the fields of sufficiently bright old novae that might have recurring outbursts or might be WZ Sge stars (large amplitude, long period dwarf novae), and of course monitoring the fields of known recurrent novae or WZ Sge stars, especially those now overdue, like T Pyx and RS Oph.

And I could go on. For example, even though very few RR Lyr stars are bright enough for binocular observation, RR Lyr itself is bright and fascinating to watch going through its paces. And Eta Car, now near 5th magnitude and brightening, is a very important star to keep watch on, as it once was the second-brightest star in the sky and may someday become even brighter as a supernova! Lists of stars suitable for binocular observing can be found in (or can be made from) the AAVSO Atlas, supplements to other atlases, the AAVSO Validation File, and various sites on the internet, e.g., Scovill's list (12/1/96) and other discussion in the AAVSO Forum, the list on the BAAVSS web site (link from the AAVSO site), and Fraser Farrell's list of southern stars. This last and others can be found by websearch using "binocular bright variable stars" as keywords. Anyhow, I think I've made my point, namely, that there is no such thing as the smallest instrument for serious observing. See also Ed Oravec's article in the AAVSO Newsletter No.

14, December, 1994, for more on this subject. Perhaps some armchair amateurs might be inspired by all this to join the ranks of those who have already discovered the joys and comforts of following the stars with binoculars.

5. SEEING DOUBLE (PART 2)

The following article is the second of two parts written by Mike Simonsen (SXN). The first part was published in the previous issue of Eyepiece Views.

In the last issue, a number of variable stars with close companions were introduced. These close pairs can make estimating and/or identifying the variables difficult.

In researching this article, more of these pairs were found than can be covered in this format. This is not a complete list, just a sampling of some of the more troublesome or interesting pairs.

Here are a few examples for the winter season:

S ORI 0524-04A

Two for the price of one! S Ori has two close companions. One, NSV 02014 to the SW, is rather bright. The other, to the SE, is faint and marked as a possible variable on the d chart.

RU TAU 0546+15C

This variable has a close comparison/companion just NW of it.

Z TAU 0546+15A

Is on the same chart. Two variables in the same field with close companions!

ST AUR 0607+46A

Located in a very pretty star field, not far away from the popular cataclysmic variable SS Aur, this one is wedged between two close companions also. They are the 135 comparison to the SW and a star labeled var? to the NE.

VV GEM 0619+25

This star has a close 14th magnitude companion. Unfortunately, it's not shown on the currently available charts for this star. VV Gem fades to the mid-14's, so I'm sure this companion has confused the situation. If you see two faint stars where only one is indicated on the chart, which one is the variable?

S LYN 0635+58

Scatter in the data of this variable near maximum probably indicates observers with smaller telescopes reporting the combined magnitude of this star and it's close 138 companion.

SY CMA 0706-19

This is another nice star field. Plenty of bright stars in a field peppered with fainter and fainter stars. This one could be

considered a double variable. It has a close companion almost due W that varies from 8th to 14th magnitude just like SY CMa does. As if that weren't confusing enough, these two form a small triangle with another suspected variable!

T CMI 0728+11

This variable has a close companion/comparison (134 var?) which may also be variable. Near minimum, high power will be needed to make the observation.

RR AQR 2109-03

This variable transits a bit low for me. This makes distinguishing its close 136 companion/comparison difficult.

DG PEG 2158+13

This is an extremely close pair! This variable and its 14th magnitude neighbor are the Siamese twins of variables when DG Peg is near minimum.

RU PEG 2209+12

Unlike EF Peg, which can be seen as a close double only on rare occasions, this cataclysmic variable and its partner are nearly equal in brightness most of the time. The relative brightness and proximity of its companion/comparison make this a challenging star to estimate at other times.

SV AND 2359+39

The d chart for this star has a note at the bottom which reads, "SV And is the preceding companion of a close double". The companion star is not indicated on the chart however. Try observing this one and see for yourself why.

Perhaps you can pass this list on to members of your astronomy clubs or organizations who are interested in double star observing. Who knows, you may spark their interest in variable star observing after they witness the changing appearance of these interesting doubles.

My sincere thanks to Georg Comello for his insight and contributions to this list.

6. CV'S AND UNUSUAL OBJECTS FOR WINTER

By Mike Simonsen SXN

Some of the most enigmatic variables are the R CrB type variables. They can remain nearly constant in their bright state for months or years and then suddenly dive into the inner sanctum. Tracking their fitful, unpredictable returns to maximum can also be quite interesting.

Due to their unpredictable nature, these stars should be monitored every clear night.

R CrB itself will be lost to the sun for the next few months, but here are some others you may want to keep an eye on:

DY PER 0228+55

This star doesn't behave like most R CrB types. Comparing its light curve to other R CrB stars shows a more leisurely pattern of fades and recoveries. Even though there is plenty of scatter in the recent data, it seems to have brightened from 12th to 11th magnitude in the last couple years.

SU TAU 0543+19

This variable is currently in its bright state, hovering in the 10th magnitude range. However, this star seems to have reversed its pattern in recent years. Recently, it seems to spend the majority of its time at or near minimum, with occasional flare-ups into the maximum range. Before that, it behaved more like other R CrB types, spending most of its time at maximum with occasional fades.

Z UMI 1501+83

This R CrB variable is just recently recovering from a deep fade. It may recover to full maximum, or it may again dive below the detection of modest telescopes. Only time and your observations will tell. Data for this star doesn't go back very far, but in the time we have been monitoring it, it has exhibited quite a bit of activity.

SV SGE 1903+17

This variable has just faded as of this writing. It dropped from 11th magnitude to nearly 15th magnitude in a month. This is a fairly active star, showing some variations even at maximum. Trying to catch this one on the rise may be challenging as it sets into western horizon.

V482 CYG 1955+33

V482 Cyg has been holding steady around 11th magnitude for several years. It fades into the 14th magnitude range when it goes. When will the next fade begin?

U AQR 2157-17

For several years prior to 1998, this star was reported as being between 11th and 12th magnitude. Then suddenly it dropped off the R CrB cliff. Positive observations over the last couple seasons have been in the 15th to 16th magnitude range. Recently, observations have begun to trickle in at 13th magnitude. Two other precipitous fades have occurred in the past ten years. This one is an interesting object, and apparently on the rise.

UV CAS 2258+59

Not much action here. UV Cas has been nearly constant in the 10th magnitude range as far back as records go. Maybe 2002 is the year for something surprising from this star. Don't get your hopes up.

7. POSTPONED SCHEDULE OF CATAclysmic VARIABLE MONITORING FOR XMM-NEWTON OBSERVATIONS

Astronomers at University of California, Santa Barbara, will be observing several cataclysmic variables in the coming weeks in X-ray and near-ultraviolet wavelengths with the X-Ray Multi-Mirror Telescope (XMM-Newton) orbiting observatory. As mentioned in Alert Notice #290 & News Flash #850, they have requested our assistance in monitoring these objects before, during, and after the satellite observations in

order to provide optical data for correlation.

However, observations of IX Vel, PQ Gem, U Gem, and EI Uma have been temporarily postponed. Please continue to monitor the stars so that we have good data prior to the beginning of their monitoring run. Stay tuned to the AAVSO News Flash for an update as soon as we are given new observing dates.

Charts for all four stars are available at <http://charts.aavso.org/> .

8. PCOBS 1.4 RELEASED

Version 1.4 of PCObs, our Windows data-entry software, has been released via the AAVSO web site. This is an optional upgrade so if you are happy with the version of PCObs you are using now then there is no need to upgrade.

New features include:

- * Personal Database - You can now add/modify/remove stars to your database without having to wait to update it via the AAVSO web site.
- * Speed Interface - For CV and EB observers this new optional interface makes entering large number of observations much quicker.
- * Persistent codes - Setup comment codes that load by default.
- * Ability to disable error checking (in configuration menu)
- * Minor changes to some of the error checking routines.

It can be downloaded from the URL below:

<http://www.aavso.org/cdata/pcobsinfo.shtml>

9. AAVSO OBSERVER CODE FORMAT REMINDER

This is just a quick reminder about the Official AAVSO Format for submitting observations. The "Observer Code" field is 5 columns long. So if your observer code is only 3 letters please put 2 spaces between it and any comments you use. Recently we have been receiving observations where people have been moving their comments into the "Observer Code" column. This takes alot of staff time to fix since it cannot be automated.

Here is an example of a bad observation:

```
2039+37 DR CYG      2452129.5694 14.5 O      137,142,135PE1979  XXX ACTIVITY
```

And here is a correct version:

```
2039+37 DR CYG      2452129.5694 14.5 O      137,142,135PE1979  XXX  ACTIVITY
```

For more information on the Official AAVSO Format visit <http://www.aavso.org/cdata/official.stm> .

Remember we have a wide variety of free software you can use to automatically format your observations that can be downloaded at <http://www.aavso.org/cdata/software.stm> . Thanks.

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The AAVSO has many free online publications including "CCD Views", a similar newsletter intended for ccd observers. To learn more and subscribe visit: <http://www.aavso.org/maillinglists.stm>

Good observing!

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