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E Y E P I E C E V I E W S #325
May, 2008

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1. INTRODUCTION

Years are moving past quickly, perhaps faster than we would like. Summer, fall, spring, winter... To observe the inspiring changes throughout seasons just add up to our appreciation for nature. We are thrilled to have our observers, members, our contributors and our readers along this joyful ride we call 'life'.

Warm weather is not the only thing arriving in the northern hemisphere! For the AAVSO, quite a bit is in store. We expect a wonderful summer and hopefully a productive one as well.

Although we don't have as many articles in this issue, the ones that we are lucky to have are inspiring with a scientific flavor too, and they make for wonderful reading.

We are grateful to all our contributors, and we would welcome your contributions, too. As always, please send us your comments and questions.

Have a wonderful summer or winter!

Thanks, and good observing!

Gamze Menali, AAVSO Technical Assistant

2. AAVSO OBSERVING CAMPAIGNS
By Dr. Matthew Templeton

It has been a very busy year for AAVSO campaigns, and the observer community has done a fantastic job of providing data for the many astronomers doing research in variable star astronomy. There have been twenty campaign announcements issued since my last campaign recap in the May 2007 issue, and just like your observations, the data requests keep coming in. And of the eight

campaigns currently active, four of them strongly encourage the participation of visual observers! (Please visit our campaigns page for the details!)

Visual observers have a tremendous advantage over instrumental observers when it comes to quickly estimating and recording the brightness of a star. An experienced observer familiar with a given field and sequence can make a variable star estimate in just a few moments, while instrumental photometry with a CCD camera or photoelectric photometer requires additional time to download and process images and reduce the photometric measurements. For some campaigns, those few moments can be precious, and so visual observers have an important role to play in many of the AAVSO campaigns we run.

Currently we have four campaigns that involve monitoring of transient or outbursting objects and providing rapid notification to professional astronomers using large telescopes for follow-ups. Many of the physical changes in an outbursting variable can occur in seconds, minutes, or hours, and the sooner astronomers can train their instruments on target, the more they can learn. As an example, we are providing support for Dr. Bradley Schaefer (LSU) for a long-term monitoring project of the recurrent nova U Sco. Dr. Schaefer has predicted that nova outbursts may be preceeded by precursor events, and has requested that observers around the world monitor this star during the next year (it is predicted to go into outburst in the first half of 2009). Visual observers can quickly and efficiently monitor this field by simply checking the variable's position against the faintest comparison star you're capable of reaching. U Sco is near 20th magnitude in quiescence, so really all you need to check is "do you see it or not?" That's it! (And if you do see it, let us know right away!)

We also just finished a large campaign series for Dr. Paula Szkody (U. Washington, and AAVSO President) to monitor six faint dwarf novae in support of Hubble Space Telescopes. Again, these were all faint sources, but in the event they went into outburst, the light could damage the sensitive cameras on HST. Several visual observers provided fainter-than estimates in support of this campaign, and all of the HST observations were conducted as scheduled with no interruptions.

Finally, we just launched a year-long campaign for Dr. Steve Howell to monitor a set of large-amplitude dwarf novae -- the "tremendous outburst amplitude dwarf novae" or "TOADs". Dr. Howell is hoping to see changes in the infrared light emitted by these objects as a consequence of superoutbursts. He'll be using the Spitzer Space Telescope and needs the AAVSO's help in monitoring his list of stars. Many of these stars are visible to some visual observers during quiescence, so some of you may be able to contribut observations throughout the entire cycle. Others are very faint, and so fainter-than observations will be used for those. If and when any of these objects go into outburst, we'll begin intensive observations to see whether it is a true "superoutburst", and if so, the object will be added to Spitzer's observing schedule over the coming 8-12 weeks.

AAVSO observing campaigns are important collaborations between amateur observers and researchers, and are yielding important scientific results, while making efficient use of limited observing time on large telescopes. All of these projects have to be set in motion with one observation, and it could be yours that does it. Please visit the AAVSO campaigns page, linked on the sidebar of our homepage, and see if there are any projects you would like to contribute to. Every observation really does matter!

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3. BOOK REVIEWS
By Kate Hutton

BOOK REVIEW: Cosmic Catastrophes: Exploding Stars, Black Holes, and

Mapping the Universe (2nd edition) by J. Craig Wheeler, 2007 Cambridge University Press.

In keeping with the title, the through-going theme of this book is supernovae. In support of this theme, the range is wide: stellar evolution, quantum physics, some particle physics, relativity, white dwarfs, neutron stars & pulsars, accretion disks, black holes, gamma ray bursts, dark matter, dark energy, wormholes, string theory, and so on. There is not a single equation, although there is a thorough discussion of multi-dimensional space & some topology. There are also a plethora of clever & helpful illustrations. A great deal of information is packed into a small book, however, all of it explained in Wheeler's extremely lucid fashion. The book is up to date as of the publication date, even on topics that are so far unresolved among specialists. Cosmic Catastrophes originated from & is used in a science class for non-science majors, but definitely not for dummies. In this book, I have found one of the clearest explanations of the accretion disk instability, implicated in dwarf nova outbursts, that I have found anywhere. Five or six thumbs up for this one!

As an aside, Wheeler has also written a very entertaining sci-fi novel called The Krone Experiment, involving the CIA, a mad scientist & an artificial black hole on the loose.

BOOK REVIEW: An Introduction to the Study of Variable Stars by Caroline E. Furness, published in 1915 by Riverside Press, reprinted recently (no date given) by Kessinger Publishing.

As far as I can tell, this book is a time machine. Read it & you will travel back to the days when comparison star magnitudes may have come from the Bonner Durchmusterung, no constellation yet had 334 variables in it, a photometer was device that allowed a visual observer to adjust an artificial light source or an image of Polaris to match the program star & delta Cephei was held to be some odd kind of binary system (although Shapley's revolutionary assertion that it pulsates is mentioned). Much attention is paid to the methods of careful observing & record keeping that went into Argelander's BD & other catalogs of the era, meticulous methods that would drive us from the computer age to distraction. Mention is made that Harvard Observatory had recently converted to the practice of writing the comparison star magnitudes directly onto the charts. Reading this book has really caused me to appreciate our roots & also our chart & sequence teams all the more! Interestingly, the book already contains a hint of the era to come: a chapter devoted to "photo-electric photometry"!

Reading this book also pointed me to how far we have come, in slightly less than one century, in the understanding of the stars themselves. In 1915, no nova progenitors had been found in the plate collections. SS Cygni and U Geminorum were totally baffling. Eclipsing binaries, even the beta Lyrae types to some extent, were understood fairly well. But all short-period variables, including Cepheids, were considered to be spectroscopic binaries, since they showed radial velocity changes. Stellar evolution was still conceived as going from "early" to "late" spectral type.

Amateurs of the day were very much encouraged to participate, via the quoted words of Argelander, Pickering, and the editors or Popular Astronomay. In the "Hints for Observers" chapter, there is a brief summary of the founding of the AAVSO (did you know that in 1914, there were 35 members who contributed 14,506 observations of 255 variables?).

In spite of the many changes in the study of variable stars over the last century, some things ... such as CV alert networks ... never change: " ... as Mr. Knott wrote on one occasion to Mr. Baxendell: 'I was greatly amused at receiving your telegram this morning about half an hour after I was starting one to you, and one

to Espin, respecting our friend U Geminorum.'"

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4. FROM BINOCULARS TO TELESCOPES: A PERSONAL JOURNEY
By Doc Kinne, KQR

Observing variable stars, as we all know, can be an increasing challenge. That's part of the fun, in fact! Some of us rise in several levels during our variable star observing career - from naked eye observation to binoculars to telescopes to CCDs.

Due to the similarity with how our eyes and binoculars work there is usually not a great amount of problem moving from naked eye observation to using binoculars. Yes, you do have to learn your way around the sky (which can be great with binoculars), and you do have to go through learning about differential photometry with comparison charts, of course. But you have to do that with naked-eye variable star astronomy as well. Given all of that, the nice thing about observing with binoculars is "what you see is what you get." There is no confusion about the star field being in the "wrong" orientation, and the field you see in your binoculars is usually large enough that you can recognize it in the sky.

This is how I started, and my first recorded observation was via 7x50 binoculars of Z UMa. My Z UMa observation simultaneously showed me both the thrill of variable star observation, and the limitation of binoculars.

The limitation with binoculars, of course, is their light gathering ability. I would look at star after star and a vast percentage of them were either below 7th magnitude in brightness, or at least has a minimum that went significantly below that. I wanted to follow the more numerous fainter stars, and that meant a telescope. Telescopes offer more challenges to the beginning observer, but the increase in light gathering power is worth it.

The first challenge I found myself dealing with was a greatly reduced field of view. With binoculars you can see almost half of the bowl of the Big Dipper. With that kind of a large field to see "guide stars" in, you can usually zero in on your star without too much trouble. With a telescope and its greatly reduced field of view I found myself developing expertise in an activity called "star hopping." Star hopping is when you acquire an easily found star in the general area of your target. From that initial star you "hop," or "walk," your scope's field of view to your desired star. You find the initial star, then move the scope slightly to the direction of the next nearby known star, then again, and again, until you find yourself at your target. Star hopping will not only enable you to find your targets, but I found it really acquaints you with your star's area of the sky.

With most people using reflecting telescopes of one kind or another, including myself, the next challenge in making the leap form binoculars to telescopes was dealing with "flipped fields." In this instance, with telescopes, what you see is not what you get. Even more disconcerting, until you get used to it, is that the telescope field moves exactly in the opposite direction that you'll expect. This motion is probably the largest difference between binoculars and telescopes. Once you get used to this, the rest will be significantly easier. This, I think, was my biggest challenge.

With telescopes you'll be using AAVSO charts of "B" scale or higher. You must remember that the "B" charts and higher are made to show you how your field will look in your telescope - flipped over and turned around from the actual sky. This is where your brain must be backward because the challenge here it to remember that if your target star in your field of view is above and to the right, you need to nudge your telescope down and to the left.

If you have a Cassagrain telescope you'll be using the "reversed" charts. Here, in your field of view, the sky has been turned around, but not flipped over.

No matter what your scope, I found that if I always made a point of nudging my telescope slowly I could evaluate if the movement I was making was really in the direction I wanted to go.

Remember that magnification is a non-consideration with variable star observing. It's all about the mirror size in this game. When I got my telescope a few years before I got into variable star observing I never thought that I'd go for lower magnification, but I keep looking at those super-wide field of view eyepieces every time I look at an Orion catalog. The bigger the field you can see, the more valid comparison stars you'll be able to use.

Finally, as you are beginning your transition from binoculars to telescopes, make your first several telescopic observations outside of the galactic plane. Stay away from the Milky Way. I was surprised how many additional stars the scope picked up, especially in those environments, and until you get used to your new field of view and the orientation of your telescope, you won't want a whole forest of stars confusing you.

Variable star astronomy is a journey. Some may elect to stop at binoculars and with appropriate stars there is nothing wrong with that. Good work can be done with binoculars. However, most of us bitten by the variable star bug will, sooner or later, find ourselves moving a bit further down the road and starting to observe from a telescope. I found that they are very different instruments, but mastering the telescope for variable star observing will give you benefits both for your variable observations in particular and your knowledge of the sky and astronomy in general.

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Good observing!
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