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E Y E P I E C E V I E W S #322

November, 2007

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1. INTRODUCTION

Welcome to our holiday issue! While we in the northern hemisphere are enjoying the beauties of autumn and preparing for the cold winter, our fellow observers in the southern hemisphere are seeing the signs of spring and are starting to warm up for more comfortable summer observing experiences.

Since the September issue, the 96th Annual Meeting of the AAVSO was held at our new headquarters in Cambridge, MA.

Click here for "Meeting Highlights"

Our holiday issue of Eyepiece Views comes to you again with enthusiastic articles for our tireless observers to enjoy, including: a great, informative piece for our observers by our director, Dr. Arne Henden; the discovery story of V597 Puppis (Nova Puppis 2007) by Alfredo Pereira himself; a recap of the galactic novae of 2006 by AAVSO observer Erwin van Ballegoij; a neat piece penned by our staff astronomer, Dr. Matthew Templeton. You will also enjoy reading the book review by AAVSO observer Chris Stephan. The grand finale is a short but heartwarming tale from an ocean away by AAVSO observer Yenal Ogmen. Not only it will touch your hearts but it will reiterate the important fact we always mention... Variable Star Observing brings people together in a way nothing else seems to be able to in today's world. It makes us feel like we are part of this big family, it brings warmth to our hearts, and it reminds us of the fact that we are the children of the same universe no matter what our differences may be.

With that we wish you all a very enjoyable season with the best dark, clear skies.

Thanks and good observing!

Gamze Menali, AAVSO Technical Assistant

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2. THE DEATH OF VISUAL OBSERVING - NOT!
By Dr. Arne Henden, Director, AAVSO

About once per year, some article gets printed in a general-audience publication, or on a website, or in a maillist posting, that states visual observing is on its last legs and everyone should prepare for the future. This has been a touchy issue with many visual observers, and I think it has been even more so since I've been Director, as some people feel I am a true-blue CCD observer and could care less about the visual community. Luckily, these people have no basis for their arguments, and I thought I would say a few words about the reality of visual observing.

I'm interested in *all* aspects of photometry: the instrumentation used, the calibration process, the science made possible by the observations. I don't care whether an observation is made by eye, by a CCD system, or a near-infrared photometer. They are all measurements to me, and within their limitations, all are valuable. I may have decided to use CCDs for my own observations, but that solution is not the best solution for others.

The eye can be a calibrated photometer. It may have an estimation error of 0.1 - 0.2 mag, and it may have systematic problems such as color effects between observers, the Purkinje effect, etc. You will get different estimates depending on field orientation, brightness of the field, etc. These effects are well described in the AAVSO Manual for Visual Observing of Variable Stars. There are some visual observers who are extremely precise: Sebastian Otero has shown that, for a selected set of bright variables, he can estimate to within a few hundredths of a magnitude. Mike Simonsen has done simultaneous observations of cataclysmic variables while I was observing with a CCD in Flagstaff, and his estimates were always within 0.1mag of my measures, which means his real error was even less. Likewise, there are amateur CCD observers who can precisely measure millimagnitude variations. So each technique has a few special observers who do better than the average. Experienced visual observers are those who do consistent work, rarely misidentify fields, get the observation recorded properly, etc. Everyone can strive towards that goal, and if you calibrate your eye better in the process, your observations will become even more valuable.

We get about 400,000 visual observations every year. The majority of these are from international observers. We have a higher proportion of domestic CCD observations than visual observations. To some extent, the larger fraction of international visual observers is because of organizations like BAV and AFOEV, who provide encouragement and mentoring for their observers. Other countries may have a poorer standard of living, so that a pair of binoculars is a major investment. Still others have limited internet access, poor computers and lack of vendors. You must also remember that CCD observers often do time-series, contributing hundreds of observations of a single object per night, and so the increasing fraction of CCD observations in our totals does not necessarily mean there are more CCD *observers* than visual observers. We may spend more time catering to the CCD observer, but that is often because the process is harder than visual observing, and new observers need more mentoring.

However, I think there is one big reason why visual observers survive: people like to go out under the nighttime sky and see the stars. Not only are the fields beautiful with their colored stars, patterns, changing transparency and seeing, but also it is just plain fun to see a star change in brightness before your own eyes. Every telescope is sold with an eyepiece - you have to go out of your way to purchase the CCD camera. Some people don't have the computer skills to run

the cameras; many telescopes (like Dobs) can't take time exposures; to some people, this is a *hobby* and not something to spend a life's savings upon!

Therefore, it is obvious why observers like to make visual estimates. The next question is: are those estimates scientifically valuable? The answer from this professional astronomer is "of course." As long as you understand the limitations, you can find a niche for which your observations will be useful. The obvious choices are high amplitude variables like Miras, where the 0.1 - 0.2 mag estimate errors are insignificant compared to the amplitude, especially if the random errors from many observers are averaged; and targets of opportunity, where geographical location, time of day, weather etc. give the thousands of visual observers an overwhelming advantage.

We have always supported the visual observer, and I don't see that changing in the future. We publish this bimonthly newsletter for your enjoyment and education; we continue to improve charts and sequences so that your observations get better; we publish manuals and give tutorial workshops on visual observing; we create campaigns where visual observations are essential for the success of the professional's project. In the next year, we will be having some fun monthly projects that you can use to test your own eyes. We will try to give some guidance as to the best set of core objects to continue observing, but if you use scientific procedures, rest assured that your data remains valuable.

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3. A DISCOVERY STORY: V597 Puppis
By Alfredo Pereira, Cabo da Roca, November 18, 2007

Following a long row of clear nights, the best since January 2005 when I had 28 clear dry nights, the weather had returned to the typical pattern here at Cabo da Roca. Humid, windy.. and cloudy. Few of my friends in northern Europe, suspect that while southern Portugal (Algarve) or even nearby Lisbon, may enjoy 120-180 clear nights a year, at Cabo da Roca this figure drops to about 80 !

So it had been a disappointing evening, during which I barely managed a 12 minute hasty search from Scutum to Sagittae. Clouds had just left an occasional brief opening to allow seeing my memorized asterisms for a few seconds. Somewhat frustrated that I would not be able to sweep Cygnus I went in to prepare and have dinner. When for some reason I cannot scan Cygnus, I always remember two things: that back in 2001 I swept twice right over a 7th mag nova there and failed to notice it, and also that I've promised my friend Reinder Bouma, to discover a nova in that constellation so that it will be well visible from his homeland in The Netherlands, contrary to my earlier finds!

Sometime around 23 P.M., noting that there were no gaps in the clouds, I decided to go to sleep and set the alarm clock for 2 A.M. Northern Cygnus would still be visible low over the Atlantic, and I would then have time to observe outbursting comet 17P/Holmes before scanning through Cassiopeia and Puppis.

So the alarm went off at 2 A.M. and as I stumbled out of the bed to proceed to one of the windows and check the sky, I started recalling weather maps and sat pics from the evening, and trying to figure out whether there would be any chances of clear spells before dawn. I had hopes that the wind would slightly shift from NNW to NNE, which would mean good chances for a clear, but upon looking up through the window I could see it was still overcast.

I went back to bed with the feeling that I was done with what I could for that night, yet still decided to set the alarm clock once again, this time at shortly before 5 A.M. I learned to place the alarm clock at some distance, so that I don't repeat what I did many years ago that is to simply reach out for the clock with

one hand, turn it off, and get back to sleep! This one also does not turn off with just one button, thus requiring that I really get up and awake (!) in order to turn it off. The great Norwegian observer Olaf Hassel (discoverer of Nova Her 1960) who was deaf, overcame his impairment in this regard by building an "alarm clock" that would let a pillow fall on his head at wake time!

When the alarm went off the second time at 5 o'clock, I got up full of hope, and indeed it was clear. Somewhat misty close to the horizon, but with good enough conditions upwards, so I went out to observe 17P/Holmes. Afterwards, with dawn approaching, I did not have much time left, so I had to chose between scanning Cassiopeia or Puppis. And of course picked up Puppis. This constellation harbours some of the most lovely Milky Way fields. Even though it does not rise much high above my horizon (at lat 38 deg. N), the asterisms there are stunning. Besides, there is the thrill of trying to observe as far south as possible, almost into what is considered the sole province of Southern Hemisphere observers.

My friend Fraser Farrell who lives in South Australia, once told me that to see Puppis from my latitude it must be like "seeing it through a dirty window" as compared to the magnificent view he can get down under, where it is possible to view this constellation much higher in the sky. Who knows, maybe later in life I shall overcome my dislike of traveling, and go there see it for myself.

So, at 5:30 A.M., I laid back on a mattress, and pointed the 14x100 binoculars at Puppis, and an asterism, some 3 deg NE from the nova's position, came to my view. Searches tend to be somewhat easier as I came to find out if I always follow the same path, so I instantly lowered the binoculars and centered on a 5th magnitude star (HIP 40678), which is surrounded by bright stars and makes up a binocular asterism that reminds me of a caravel ship. This is an area I am pretty familiar with. It is here that I usually start when sweeping Puppis, typically proceeding Westwards for several degrees. However, this time I did not go any further. Not even a degree!

It immediately struck me the bright new object in a position where I usually only see fainter 8-9 mag stars at my recognition limit. It looked like if the caravel's sail had this one more star to the NE of it! I had seen the field hundreds of times, and knew all too well that nothing should be there.

As happened with my previous discoveries, for a few seconds I expected to see it move, like a slow satellite, an airplane or a weather balloon. However, as seconds elapsed nothing happened. The object stayed put. Then I immediately looked around for potential comparison stars and made an estimate of its brightness and position. The latter was not so easy to pinpoint as with previous finds. It was somewhat misty at an elevation of just 16 degrees above the horizon, and the faint stars around the nova were not prominent objects.

Back at the computer, I got the position with the mouse on my planetarium software and checked the magnitude of the stars I had used for comparison. Then I started the usual careful checks: no known solar system objects there, no stars close to its estimated 7.0 magnitude brightness on blue POSS2/ UKSTU plates, no variable stars there either.. The object was ostensibly a galactic nova. I filled the relevant data onto the e-mail template that I always have ready to go. Then I went out to see the object one last time before sending the mail.

No change in position, or brightness. Time to send the mail to CBAT, and immediately back again to the nova to make follow up estimates of its brightness, this time armed with a good sequence of selected non reddish comparison stars. I noted that there were several potential comparison stars that looked quite close in brightness to the nova but had to be discarded because they were K spectrum stars.

Meanwhile twilight was increasing and the observations were cut short after a couple of magnitude estimates which showed no change; contrary to what happened with V1494 Aql and V4739 Sgr which showed definite rising trends in the minutes following the discovery.

It was only when back at the computer that I realized that this time I had not continued to nova search after sending the discovery mail. With dawn approaching there was no time left and I'm afraid this morning Puppis went unscanned for the most part.

After having breakfast, I started checking global sat pics to see who would have clear skies to do follow up on the nova. This was my first "morning" discovery, so it was rather late into the night, even in longitudes significantly west of me, when CBAT requested confirmation. As the hours passed, I kept wondering... Was the nova brightening? Fading? What would the spectra look like? Would a progenitor be found as a result of precise astrometry? It was once again a painful wait, just like with the previous finds. I walked a lot back and forth, checking the mail/web at a few minutes intervals the whole day! Confirmation finally came around dinner time, as I was preparing for another search session.

Half of my discoveries were made with 14x100 binoculars tripod mounted (V4739 Sgr and V4740 Sgr), the other half, hand-held (V1494 Aql and V597 Pup). Between the discoveries of V4740 Sgr in 2001 and V597 Pup, 625 hrs. of search time elapsed. The grand total since I started binocular patrol on a significant enough scale (back in June 1991), is 1250 hrs.

My second and third discoveries had come just 10 days (7 hours effective search) apart, but this one took over 6 years (and 625 hours effective search time). My friends were very surprised in both instances, nevertheless, in both cases it was "business as usual" for me. I think this is part of the necessary frame of mind in this endeavour.

Years pass and colleagues that don't see my name on the IAU circulars start wondering what I'm doing; and if they see the occasional observation of a bright (or otherwise interesting) object published they ask me if I'm "back in astronomy". Yet, I'm nearly always here, searching for about 3h each clear night regardless of the Moon or patches of clouds. As long as conditions allow me to see my memorized patterns, search continues.

Memorizing the binocular constellations is very easy, since what is involved is recognition memory, not recall memory. This point is paramount to understand, and a source of many misunderstandings. Much more difficult is to keep the necessary assiduity, and indeed there happen occasional gaps when for a few months (mainly due to other commitments) I do not search. I have family, friends, and other interests like composing music, besides daytime commitments like everyone else.

Today this field is more competitive than it ever was, and those using imaging devices for their searches are picking up more and more novae while they are still in faint stages. The discovery magnitude has been getting gradually fainter due to the efforts of great nova searchers like Liller, Camilleri, Nishimura, Haseda, Nakamura, Takao, Sakurai and numerous others. I have the highest regard and friendly feelings for all these individuals.

Further, most of my forebears in this endeavour did not have to contend with so much light pollution. It is a waste of energetic resources and a crime against the planet to burn coal at a power station just to send light into the sky or driver's eyes! I have heard of residents who could not ascertain whether there was a robbery going on in the neighbourhood because of lights shinning on their

window instead of down on the street! I always wonder: if cars are not allowed to point their strongest headlights to incoming traffic, then how come it is possible to have high power lights shining horizontally into roads? The local authorities should realize that people need better visibility, not stronger lights pointed at their eyes, which cause glare and end up reducing security. They will spend huge sums on publicity to have consumers save power in their house-hold appliances, but I think they should also reconsider their outdoor lighting policy.

My search area is ~3000 square degrees, with several thousand stars memorized, and includes parts of: Sgr, Sco, Oph, Sct, Ser, Aql, Her, Lyr, Sge, Vul, Cyg, Cep, UMi, Lac, Cas, And, Aur, Gem, Tau, Ori, Pup, and Pyx. Generally I search down to mag 7.5-8.0, but in some areas try to go deep to mag 8.5-9 (if necessary using my old rich-field 15-cm f/4 Newtonian at 26x).

Variable stars and asteroids are usually picked up when around mag 8.5, but the location of the object within memorized patterns is important. Pallas easily caught up in Pup at mag 8.5, later when at mag 7.5, there were occasions when its position "disguised" it a bit. Also if humidity is high, the sodium lit sky will tend to obliterate an orangish nova (e.g. V4740 Sgr) as opposed to a whitish nova (e.g. V4739 Sgr).

Optimizing the design of one's asterism patterns is not easy, because of variable field orientations and seeing limits. I think that the observer has a natural tendency to move from asterism to asterism, and the gaps may not get properly checked, and a bright nova be missed there. I always try to have this present and make an effort to go check those gaps. Visual patrol may have its flaws, but has the advantage of an extremely prompt alert, and I am very happy that my swift reports provided the opportunity for very early stage observations at four occasions.

I would take the present chance to call the attention of those with access to large apertures and CCD's, to V4739 Sgr. According to Livingston et.al. in IBVS 5172, this object was the fastest classical novae ever recorded. I wonder what is the current magnitude, and what was the magnitude range of this object. The light curve reminded me of some fast recurrent novae, however the spectra does not quite match. I would be very grateful if any of the readers can obtain deep CCD images of this object next year when Sgr gets well visible again. Even negative results will be interesting.

Nova searching also has its hazards. A couple of years ago I was scanning Sgr and put down the binoculars on the mattress to check a suspect. When I got back and grabbed the binoculars I felt an initially slight burning pain on my little finger. I still lifted the 14x100's wondering what it was, but as the pain was increasing by the second I realized I must have been bitten by a spider. I quickly laid down the binoculars and turned on the lights. There it was, running away from the mattress; a huge Tegenaria Agrestis (Hobo Spider)! Fortunately there were no consequences besides swelling and pain, but I gather the outcome might also have not been so fortunate.

The most extreme weather I ever experienced during nova searching, came on 1/2 August 2003, when at midnight the temperature was +34 C, with a strong hot East wind! Had I not known it was night time, by the feeling of the hot wind on my body, I would have believed to be sunbathing in the beach! I will note that the maximum temperature ever recorded here in 30 years climate records, was +35 C, which of course happened during the day.

In closing, I would like to thank Gunnar Glitscher who kindly provided the 14x100 binoculars and was one of the few persons who believed I could find a nova, back in those days when I was just a "wanna-be" nova searcher; Reinder Bouma was also among those few who encouraged me in this endeavour. Besides being

a loyal friend and outstanding observer, he is without doubt and by far the person with whom I learned more astronomy; Rui Goncalves is a long time friend, who also provided invaluable help in my early days of searching via access to a reliable photo-atlas to check suspects against; Fraser Farrell was also very helpful, among other things in overcoming the shortcomings of having a slow computer like I did back in the 90's, and was also great chatting with; I'm also deeply grateful to those who contributed the countless comet observations to my web site, many of whom encouraged me a lot; and last but certainly not least, my parents, Helena and Vitor; without their support all this would not have been possible.

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Note from the editor: Special thanks to Reinder J. Bouma for his assistance in file conversion and for his editing of the original article.
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4. EXTRA LARGE LIGHT CURVES FOR EXTRA LARGE STARS
By Dr. Matthew Templeton, AAVSO

Although there are many reasons why a person might want to study variable stars, there is one fundamental physical reason why they're interesting: you can figure out how the universe works by watching it change. By understanding the various ways that variable stars behave and how they change with time, you learn something more about the underlying nature of things. And the longer you watch, the more you can learn. Some stars change very quickly -- supernovae, for example -- so you can at least gather the information you need in a short time (even if it takes you awhile to figure it all out). Other stars take a very long time to change. Even "non-variable stars" will change if you were able to watch them long enough. The timescales for main-sequence stellar evolution are millions and billions of years, and so are beyond human measurement, but we are at a point in human history where a single human lifetime isn't a limit for measuring how things change anymore. There are records of celestial phenomena spanning thousands of years, and our own field of variable star astronomy has pretty good records for a few objects spanning over 300 years. Many, many more objects have light curves that date to the founding of the AAVSO and slightly before. This is very exciting from an astrophysical standpoint because for some very important stars -- namely those near the ends of their lives, and changing very quickly -- a century or more of data can tell you a lot about what these objects are like.

Some of the brightest variables in our sky are also some of the most physically interesting (and the easiest to follow). Giant stars in the later stages of their lives are undergoing dramatic internal changes, and although their inner workings are hidden away deep inside, we can deduce what might be happening to these stars by watching how they change. There are many Mira variables in the AAVSO International Database with light curves spanning a century, and a few have even longer light curves. But the AAVSO isn't (or wasn't) the only source of data for these light curves. If you go back to the literature on variable stars published prior to the founding of the various variable star organizations, there is much more data to be found. Mira itself was one of the earliest of the modern variables discovered, and there are times of maxima dating to the seventeenth century. The same is true for R Hydrae. And there are other variables for which very long light curves exist-- not just times of maximum and minimum, but magnitudes as well.

Although there are observations of some variables dating to the late eighteenth century, variable star observing really started to take off when Friedrich Wilhelm Argelander began observing in the early nineteenth century. Like many of you

reading this, Argelander used only his eyes to make his magnitude estimates, and luckily for us, there are extensive records of Argelander's observations available in the literature. Another example is the archive of observations by the South African observer A.W. Roberts, a prolific observer of the southern sky between 1890 and 1920. For these observers (and more) the data were known to exist, but getting them into electronic form where they could be more easily analyzed would take a lot of work. Thanks to some very dedicated individuals, some of these data are starting to become available.

If you'd like to see a very fine example of this, visit the AAVSO's light curve generator and ask for the last 62000 days -- 170 years! -- of mu Cep. Mu Cep is a lovely, bright, red supergiant, pulsating irregularly with a range of about two magnitudes. The AAVSO archives for this object only extended back to the early twentieth Century until very recently. But due to the work of Brian Skiff at Lowell Observatory the extensive published archives of mu Cep observations dating to the days of Argelander are now in the AAVSO archives and are available online. Thanks to Brian, the historical light curve of mu Cep doubled in size. Do you think you can learn something new from a century and a half of data? Go for it! The data are all there for you right now.

Those of you who attended the recent AAVSO meeting heard that we had other new large data sets going online, including those of A.W. Roberts, and New Zealand observer Albert Jones who recently made available several tens of thousands of as-yet undigitized observations. Thanks to the work of some dedicated people these data are coming online for everyone to use, but there's a lot left to be done. There are published magnitudes and times of maximum and minimum in many old journals of the nineteenth Century, and not all of these are indexed and conveniently available. There are even some observations from HCO itself that have yet to be digitized; while writing the April 2007 "Variable Star of the Season" article on RU Vir, I discovered some undigitized observations by Annie Jump Cannon and Leon Campbell in the Harvard Annals. Those observations -- at least of RU Vir -- have been digitized but there are several other stars waiting to be checked just from that volume of the Annals alone.

Astronomers unfortunately don't have the luxury of going back in time to set up cameras and spectrographs and the other tools of modern research to fill in historical gaps in interesting stars. But sometimes these data *do exist*, if we look for them *and* have the time and resources to get them into a usable format. If you're looking for something to do on a cloudy night, browse the early days of some of your favorite AAVSO variables' light curves with our light curve generator. For some of the brightest objects, there might be more data just waiting for someone to dust off an old journal (or browse through the ADS website) and "discover" a new piece of history.

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5. A RECAP OF THE GALACTIC NOVAE OF 2006
By Erwin van Ballegoij

The year 2005 was a very active year, nova-wise. In that year 10 new galactic novae captivated the variable star observers worldwide. In contrast, 2006 was a very meager year. Only four new novae-outbursts were observed. But to our pleasure, one old friend flared up to naked eye brightness. RS Ophiuchi appeared again, after 21 years of relative inactivity. It is time for a retrospective about these novae...

V2575 Oph = Nova Ophiuchi 2006 #1
Type: NB (?)
Range: 11.0 - <17
Position: 17h 33m 13.06s -24o 21' 07.1" (2000.0)

Spectral classification: Fe II nova

Novae often appear at times when they are not favorably located in the night sky. V2575 Oph is no exception to this 'rule'. G. Pojmanski discovered this nova using the All Sky Automated Survey (ASAS) on February 10. It was ASAS's first observation of this field after the solar conjunction. This made V2575 Oph a morning object, an unfavorable time for most observers. V2575 Oph was an object of magnitude 12 on discovery. It first brightened one more magnitude before starting a rapid decline to magnitude 13. Then the nova declined more slowly until the last observation in AAVSO international database showed the object at magnitude 14. As the nova appeared in the galactic plane, it is heavily reddened. The progenitor of V2575 Oph is not yet found. Unfortunately, this object is observed less than 100 days. Here is a light curve of V2575 Oph.

Sources: GCVS
IAU Circulars 8671, 8676, 8710
Vsnet-alert 8853

RS Oph
Type: NR
Range: 4.3 - 12.5
Position: 17h 50m 13.2s -06o 42'29" (2000.0)
Spectral classification: OB+M2ep

Just two days after the discovery of V2575 Oph, the long awaited outburst of RS Ophiuchi materialized. The Japanese observers K. Kanai and H. Narumi picked up this outburst on February 12.829. This recurrent nova peaked previously in 1898, 1933, 1958, 1967 and 1985 and perhaps in 1945. Just like in 1985 the outburst took place just after solar conjunction and was therefore difficult to observe. However, a lot of observers seized the opportunity to see this recurrent nova in action and rose early. Their efforts resulted in a densely covered lightcurve. RS Oph followed its usual pattern after the outburst. The first 40 days showed a rapid decline of 0.1 magnitudes a day. Then the fading slowed to 0.02 magnitudes a day, before picking up speed at with a fading rate of 0.05 magnitudes a day until quiescence. The fading takes about 110 days. But even at minimum the brightness will fluctuate with an amplitude of 1 to 3 magnitudes. A nova consists of a white dwarf that accretes matter from an orbiting star. When the white dwarf has accreted enough matter, a runaway thermonuclear fusion reaction takes place on its surface. The RS Oph system consists of a white dwarf and a red giant. The red giant has lost a lot of matter in the surrounding space. The white dwarf is embedded in this nebula. When the nova outburst occurs, the explosion products have to plough through this matter. This releases a lot of energy, resulting in X-ray emission. Professional astronomers observed this outburst extensively. J. L. Sokoloski et al. used the Rossi X-ray Timing Explorer (RXTE) to detect these X-ray emissions. From these observations it follows that the blast wave expanded freely through space at a speed of 3000 km/s for less than two days. Then it started to interact with the nebula, leading to a deceleration of the ejected matter. Between February 15 and 26 RS Oph started to fade and soften in the hard X-rays. The early deceleration indicates that the ejected shell has a low mass and the white dwarf has a high mass. Furthermore J.L. Sokoloski discovered that the blast wave deviates from the spherical shell structure. This is confirmed by J. Osborne et. al. His team monitored RS Oph in also in X-Ray wavelengths, using the Swift satellite. Their observations showed that the matter is not ejected as a spherical shell, but rather as a bipolar jet. The jets are collimated by the binary system. From these observations the orientation of the binary system in the sky can be determined. These observations by Osborne's team confirm a controversial high-resolution radio observation of the 1985 outburst. S. P. S. Eyres et al. reported that RS Oph was much brighter on radio wavelengths than the 1985 outburst. On February 26, T. J. O'Brien et al. did 6 cm radio wave observations using the Very Long Baseline Array. These

observations showed radio emission from RS Oph in the form of a ring with a diameter of 18 milli arc seconds. This corresponds to a true ring diameter of 29 AU, as RS Oph lies 5000 light-years away. The ring is almost circular, clumpy and significantly brighter on its eastern side, and it appears to have a central point source. Its expansion velocity is about 1800 km/s. O'Brien et al. suggests that this ring of radio emission may be identified with a shock wave expanding through the red-giant wind following the nova explosion. Izumi Hachisu et al. performed multiband photometry of the 2006 outburst of RS Oph. Their photometry shows a midplateau phase from day 40 to day 75 after the outburst, followed by the sharp drop of the final decline. Only two other recurrent novae (U Sco and CI Aql) show such midplateau phase. They modeled the lightcurve of RS Oph based on the optically thick wind theory. Their theoretical lightcurve matches the observed lightcurve very well. For the middle plateau phase they assume that the bright accretion disk is irradiated by the white dwarf. The final sharp decline that follows the midplateau phase starts with the end of steady hydrogen shell burning. This turnoff time agrees with the end of a supersoft X-ray phase observed with Swift. From their model it follows that white dwarf in the RS Oph system has a mass of 1.35+/-0.01 solar mass, which indicates that RS Oph is a progenitor of Type Ia supernovae. Here is a light curve of RS Oph

Sources:
GCVS
IAU Circulars 8671, 8673, 8675, 8678, 8682, 8683, 8684, 8688
The Astronomer's Telegram 737, 741, 747, 754, 764, 770, 801, 838
Nature 442, pages 276-278 and pages 279-281
The Astrophysical Journal 651, pages 141-144

V5117 Sgr = Nova Sagittarii 2006
Type: NA
Range: 9.2 - < 17
Position: 17h 58m 52.60s -36o 47' 35.0" (2000.0)
Spectral classification: pec (Nova)

On February 17, W. Liller from Chile and M. Yamamoto from Japan discovered a nova in Sagittarius. This is the third nova discovery in a week! This is an exceptional week in a quiet nova year. C. Jacques and E. Pimentel from Brazil found a possible progenitor in the USNO-B1.0 catalogue with the following position end figures: 52s.61, 35".1 (equinox 2000.0). The object is also visible on a red 1979 Digitized Sky Survey plate. It has a red magnitude of 17.4 and position end figures of 52s.60, 36".2. This nova appeared like the previous two just after solar conjunction. This nova is poorly observed, by professionals and amateurs alike. The AAVSO International Database contains only 27 visual observations by three observers over a time span of less than 100 days. Here is a light curve of V5117 Sgr

Sources:
GCVS
IAU Circulars 8673

V2362 Cyg = Nova Cygni 2006
Type: N
Range: 8.5 - <20.0 V
Position: 21h 11m 32.30s +44o 48' 04.0"
Spectral classification: Fe II nova

The Japanese observer H. Nishimura discovered a nova in Cygnus on April 2. This turned out to be an unusual nova. After V2362 Cyg peaked at magnitude 8 it declined to magnitude 12. There, V2362 Cyg maintained this brightness for more than 100 days. Then the brightness started to increase again. V2362 Cyg peaked at magnitude 10 at the beginning of December 2006, before starting to

fade to quiescence. This fade was caused by dust formation. The nova is still visible for amateurs using big telescopes. Here is a light curve of V2362 Cyg.

Sources:
GCVS
IAU Circulars 8697, 8698, 8702, 8731, 8785, 8788
The Astronomer?s Telegram 792, 795, 928, 963, 1226
Central Bureau Electronic Telegrams 466, 671, 696

V2576 Oph = Nova Ophiuchi 2006 #2
Type: NA?
Range: 9.2 - <17.0
Position: 17h 15m 33.00s -29o 09" 40.0" (2000.0)
Spectral classification: Fe II nova

Most galactic novae are nowadays discovered photographically by dedicated amateur astronomers and by surveys like ASAS. Some keen amateur astronomers are very familiar with the night sky and scan it every clear night with large binoculars. And from time to time they get lucky and discover a nova. But the story behind the discovery of V2576 Oph is truly remarkable. The well-known AAVSO observer Peter Williams from Australia was trying to make an estimate of the RCB star V517 Oph on April 6, 2006. As V517 Oph was near minimum, Peter couldn?t make a positive estimate, but he noticed a nearby magnitude 10 star that he didn't see before. Was this a nova? Peter of course considered alternative explanations, like minor planets. But there were no bright asteroids in the vicinity. Furthermore, there was no discernable movement in one hour. Then he informed the (amateur) astronomic community via several mailing lists. The discovery was soon confirmed visually by Maciej Reszelski (Poland), photographically by B.Liller (Chile) and by CCD by Tom Krajci (USA). The nova brightened to magnitude 9 before it started its rapid fade. Besides the spectral confirmation and some follow-up spectral observations, this nova didn't attract much attention from professional astronomers. Visual observers monitored this nova extensively, as you can see from this lightcurve of V2576 Oph.

V2576 Oph is an accidental discovery by an enthusiastic variable star observer. It could have happened to any of us! Next time you estimate a variable star, keep an eye to the rest of the field as well! You never know what you might discover!

Sources:
GCVS
AAVSO Special Notice #11
AAVSO Alert Notice 338
IAU Circulars 8700, 8710
vsnet-alert 8905, 8907

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6. BOOK REVIEW: "OBSERVING VARIABLE STARS, NOVAE, AND SUPERNOVAE" by Gerald North, Cambridge University Press, 2004, ISBN 0-521-82047-2
By Chris Stephan

I am always looking for good books about variable stars and how to observe them. When I heard that Cambridge University Press (CUP) was publishing a new book on variable stars by well-known British professional and amateur astronomer Gerald North, I made contact with CUP asking for a copy. They kindly sent me one for review. Gerald North has made a excellent name for himself with his books Astronomy In Depth, Springer-Verlag, 2003; Advanced Amateur Astronomy, CUP 1997; and Observing the Moon, CUP 2000. North has a degree in physics and astronomy. He has been a guest observer at the Royal Greenwich

Observatory and is now a freelance astronomer. He has been a member of the British Astronomical Association since 1977.

I began reading this book and was quickly impressed with its quality. In fact, it is my opinion that this is the best book on variable stars since J.S. Glasby's Variable Stars, Harvard University Press, 1969 and M. Petit's Variable Stars, Wiley and Sons, 1987. The up-todate coverage of the different types of variable stars, the " how to's" of observing them, and the science of what causes these stars to change in brightness was quite enlightening. I have been observing variable stars since 1973, and I found myself learning a tremendous amount from this book. The only short-coming that I found, if you want to call it that, is that most of the individual stars mentioned in the book and the accompanying CD-ROM are pretty much for northern hemisphere observers. It would have been good to have included more stars and star charts for our southern hemisphere comrades.

I really like the accompanying CD-ROM by Nick James that includes hundreds of light curves, star charts, miscellaneous information, and a few simulated movies of stars. Just be aware that all of the light curves are from BAAVSS archives, and the variable star charts are BAAVSS charts or TA (The Astronomer Magazine). I do not mean this to be negative. Just be aware that when using these star charts, they will have different comparison stars than the AAVSO charts. The charts themselves are quite good. I was so happy to find that the CD-ROM operates on my Mac computer as well as Windows.

Being a former twenty year science teacher, I can see that Gerald North has a real knack for teaching. He explains so many complicated topics in easy to use illustrations and easy to understand text. The average amateur astronomer will find this book very understandable.

North proposes the generic term "astrovariables" for all of the different types of variable objects in the night sky, from variable stars to quasars, to Seyfert galaxies, to gamma ray bursters, and many more. I especially appreciate North's effort to get the reader to stick to the GCVS system of nomenclature for variable star classification. He makes it very clear that there are so many more classes being proposed that it can get very confusing.

The section on using variable star charts, making observations, recording observations, and using the JD calendar are more than adequate, The author is obviously quite knowledgeable of telescopes and CCD cameras. Just be aware that when he talks about optics, all measurements are in metric, which is actually good. The thing I noticed on pages 30 and 31 was the spelling for "Plossyl" eyepiece. Perhaps this is the British spelling. In the USA, we spell it "Plossl". I completely agree with North that the best size of binoculars for variable star observing is 10x50's. I have used 7x35's, 7x50's, 8x40's, 10x50's, and 15x70's and I have found 10x50's the best by far. The author suggests several star atlases in his Section 3.3 "Finding your chosen variable." Unfortunately, the AAVSO Variable Star Atlas is not mentioned. I highly recommend the AA VSO Variable Star Atlas and use it regularly. This well-known resource is one of the best atlases for finding and observing variable stars.

Beginning in Chapter 5, the author delves into the anatomy of stars and spectra. It is very nicely done. I would have liked to have seen "chromosphere" added to Figure 5.1 of the structure of the Sun on page 82. However, he does not forget the chromosphere in the text. The H-R Diagram is very well done and is used often from here on in the book. It is very helpful to see where different types of variable stars fit on the H-R Diagram.

I am not so sure that the AAVSO RR Lyrae star observers would agree with North's statement on page 132 that "There is little point in us observing these

clockwork stars. Another put-off is the fact that as a class they tend to be faint." However, The AAVSO RR Lyrae Committee is a very forgiving group and will overlook that comment. Chapter 9 on "Eclipsing binary stars and novae" is excellent. Since eclipsing binary stars are my particular interest, I really paid attention here. North does a great job here, which I very much appreciate. His discussion on "Roche Lobe", Langrangian Point, semi-detached, detached, and contact binaries is very informative. I actually learned a lot just from this section.

The chapter on "Cataclysmic Variables" is also wonderfully covered. Again, the illustrations are well done. Cataclysmic variable stars are very popular at this time for the amateur to observe, and quite fun. Chapter 11 covers extra-galactic objects. I especially like his coverage of supernovae. The only suggestion I have is that Tycho's supernova in Cassiopeia, the great supernova of 1572, be included in this section. I like how he includes nice photos of SN 1993J in M81, and SN 1994 I in M51. I remember observing these well. The author also mentions famous supernova discoverer, Reverend Robert Evans, from the USA. To the best of my knowledge, Reverend Evans actually lives in Australia.

I commend Gerald North on what I consider an outstanding book on variable stars. I think it is the best one to come out in at least a decade. I strongly encourage variable star observers everywhere to get their hands on a copy of this book and read it, I am keeping my copy in my library with my other reference books here at the Robert Clyde Observatory.

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7. VARIABLE STARS: MY EXTENDED FAMILY
By Yenal Ogmen

Greetings All,

This is Yenal Ogmen from North Cyprus. I am a variable star enthusiast like you and I am an AAVSO observer. In this short write up, I am going to share my feelings and my story about how I fall in love with these interesting celestial beauties.

I am not as lucky as most of you may be as far as being able to share my passion for observing variable stars and astronomy in general, in this corner of the world. Even today, I cannot find anybody to ask, talk or share my feelings face to face. I have always had this love inside me but not being able to share this passion had always prevented me from acting on it and doing something about it until 2000. This was the year when I had enough money to purchase my first scope. I was 24 years old but it is never too late to pursue one's dream. When I started using my first scope, I remember asking myself "How can I pursue my passion of making observations and also somehow be useful and contribute to science?" I didn't know that even with my modest sized (5") scope, I could do a real science until I became aware of the AAVSO. I remember that day as it were yesterday and how amazed and surprised I was when I started reading the Visual Observing Manual of AAVSO. "This is what I want to do", I said to myself. I was so full of enthusiasm to do something valuable and the idea that I can contribute to science through my backyard and that the scientific community actually would appreciate my work and my contributions.

Soon after this, I started observing variable stars without knowing exactly what to expect to see. I can't tell you how and what I felt when I observed my first variable; V Boo during my second night, one week later than the first night. During the first night, my estimate for V BOO was 9.0, during the second night I found it to be 9.4!! 'What kind of "catastrophic things" going on in this star and in many others?', I asked myself. I couldn't imagine how it would be, to be near those stars when their brightness change so rapidly and substantially. I kept

imagining explosions throughout the star like fireworks and imagined being able to actually see those explosions through my 5" telescope's eyepiece! It felt amazing to think and to imagine these things in a romantic sense of way. Don't think those feelings were just a novice's compassionate start to something new...To this day, I still feel the same whenever I am at my telescope, looking at variable stars. It is an addiction, which seems to never end. Not that I'd ever want it to end.

I always check the light curves of the variable stars after sending my observations, to see my "dots" on the light curve. For me, this is just another motivating part of variable star observing. When I see my observations in the right place on the light curve, this is what I call satisfaction! Then you feel like you actually become a part of that light curve. This feeling forces me to continue observing the same star just so I can continue contributing to its light curve as long as it is possible. If this is not an addiction, then what is it? After a few years of visual observing, I started doing CCD observations of variable stars. I guess in a way I evolved in my observing technique like all stars evolve during their lifetime! Actually all methods are great and one can never replace one method with the other. It doesn't matter how as long as you contribute.

I feel like I am the grandson of these good old stars... Some brightening, some fading... And it feels like I am catering to the needs of those old (comparing to my age anyway!) bodies by observing and by being part of their light curves. It feels like I am part of family as you are and as... they are. I plan to do this until the end of my life.

Clear skies from the Green Island Observatory,
Yenal Ogmen

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Good observing!
Gamze Menali,AAVSO Technical Assistant (MGQ)

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