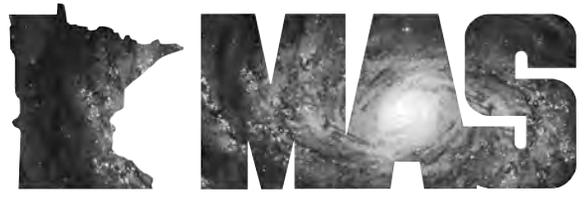


Gemini

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In the pages of
Gemini

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Stories Wanted: Gemini needs your story of how you first became interested in astronomy, what you have done over the years, what equipment you have used, what star parties you have attended in other states, and how you have encouraged others, especially young people, to get involved in this fascinating hobby. Submit your story to eugene.brown@bhshealth.org

E-mail Update: If your e-mail address has changed in the past two years, chances are that the address MAS has is not current. We need to be able to communicate with all of our members on a timely basis. Please submit new e-mail addresses to MAS vice president Steve Emert at: lakeaires@msn.com

Can Observing a Single Star Be Fun?

By Ben Mullin

Less than six months ago I would have said no. What could possibly be interesting about looking at a single star when there are so many other cool things to look at in the night sky? That is what variable star observing is, right? Looking at a single star and trying to guess how bright it is. That is what I used to think about visual variable star observing. Not any more.

Ever since getting started in astronomy, I knew that variable stars were one of the things that could be observed. I knew that my grandfather had been a variable star observer. But like many others, I suspect, the lure of the planets and deep-space objects was much greater. I spent a lot of my time hitting the same Messier objects over and over again.

A couple of years ago, Michael Koppelman and Russ Durkee gave a presentation at a general MAS meeting about the various projects they were involved in. Michael is a variable star guy and had been making CCD observations of variable stars. Russ had been doing photometry of minor planets (or whatever the IAU wants to call them now), again using a CCD camera. The observations and the data they had collected and were able to process really spoke to the geek in me. I wanted to start collecting and processing data of my own.

Long story short, I spent a lot of time thinking about doing CCD observations but never actually making any. During that time I had convinced myself of two things about visual observing of variable stars. One, it would be too hard. How can you look at a star and guess how bright it is? And two, visual observing would not have the cool geek factor that CCD observing has.

One of the purposes of this article is to convince you that I was wrong on both accounts. The other purpose is to try and convince you that visual variable star observing is fun. To achieve those two objectives I am going to describe a little bit about what I have been doing for the last five months.

How about some background basics first? Such as, what is a variable star? Quite simply, a variable star is a star that varies in apparent brightness. A star's apparent brightness can vary for a number of reasons. Some stars are part of a binary system, where one star will pass in front of the other, causing the amount of light reaching Earth to change; thus the apparent brightness changes. Another type of star that is in its later stages of life could be pulsating, growing larger and smaller cyclically and changing brightness as this happens. There are enough different types of variable stars that I could easily fill this article describing their nature and characteristics. I will save you from most of that. As I describe a few of the stars I have been observing, I will say a little bit about the type of star. If you have further interest in variable star types, there is lots of information available on the Internet or in books.

From the definition of a variable star, it would follow that variable star observing is the act of observing variable stars. In this case, though, observing means more than just looking at the star. A variable star observer makes estimates of the brightness of the star in question. The estimates can be made in a number of ways, including imaging with a CCD camera or use of a photoelectric photometer. This article's focus, however, is visual variable star observations, which rely on the observer putting his or her eye to the eyepiece and judging the brightness. As I will describe near the end of this article with the observing project, this is a simple task and is no more difficult than estimating how much gas is left in your tank if your gas gauge is between 1/4 and empty.

My first variable star observation was of Algol in Perseus. Algol is an eclipsing binary which dims by over a magnitude for a few hours every 2.8 days. Normally Algol is a 2.1 magnitude star, but during an eclipse it dips to 3.4 magnitude. You can find predictions for the times of eclipse on *Sky and Telescope's* website. That is where I went to find a convenient timed eclipse to observe.

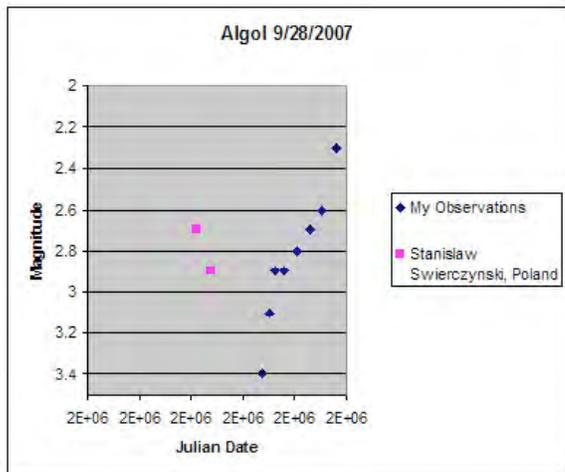
To learn how to make the actual observations, I read the *Manual for Visual Observing of Variable Stars* written by the American Association of Variable Star Observers (AAVSO). This manual, which can be found on their website (www.aavso.org), describes pretty much everything you need to know about making variable star observations. One of the primary topics is comparison stars (comp stars). Comp stars are other stars near the variable that have a known magnitude and serve as the comparison points for determining the magnitude of

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the variable in question. They serve the same purpose as the index marks on the gas gauge in your car. The AAVSO also has charts that show the position of the variable and the comp stars that you can print and take to the field to make your estimates.

So on the night of the eclipse, armed with my AAVSO chart and knowledge from the observing manual, I set out to make my first set of observations. Over the course of several hours I ran outside every fifteen minutes or so to make an estimate of Algol's brightness. By the end of the evening I had made eight observations. When I plotted my observations in Excel, I was elated to see that my observations made a nice increasing slope. Unfortunately, it looked like I missed the time of maximum eclipse and only had observations of the ascending portion of the light curve (plot of magnitude versus time). However, the AAVSO collects observations from amateurs around the world, and a few nights later, when I checked for observations on the same night I made mine, I found that Stanislaw Swierczynski from Poland made two observations on the descending portion of the eclipse. Between the two of us we bracketed the time of minimum. How cool--global collaboration on my first set of observations!



Part of the geek factor that visual observing still provides is the ability to process your data. I was curious about how my observations lined up with historical observations of Algol. Because the period is well known and stable, you can take a set of historical observations and fold the data on the period. Essentially, you just plot the 2.8 days over and over again. If you have the right period, you should see all of the data overlap itself pretty well. As you can see in the phase plot of my data from that night and the one other night I have observed Algol, my data fits reasonably well. I would call that a success, and I had fun processing my data on a cloudy night.

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MAS Board Report March/April 2008

By Bill Kocken, MAS Secretary

Astronomy Day

Bob Benson volunteered to coordinate the Astronomy Day activities on May 9 and 10. Bob Young will help. We listed a few ideas: Friday night star party, have the 24" BAD brought up from Cherry Grove, and Saturday events (get presenters, ask the SIGs to do put together a display or activity), Beginners SIG picnic and Saturday night star party/public night. Of course, Astronomy Day has come and gone as of this writing. We owe thanks to Bob for coordinating, to the Onan committee for all their effort to clean and organize the observatory, and to the presenters for putting together shows and activities.

Belwin

Steve Emert met with Steve Hobbs of Belwin on 4/21. They are still interested in going ahead with expanding our relationship with them. Possibilities include an alternate observing site and constructing an observatory to house the 10" refractor which has been donated to the MAS. Steve also did a nice presentation at the monthly meeting describing several alternate viewing sites. A tour/star party was scheduled for May 23/24. A new forum has been set up just for Belwin/Metcalf planning and discussions.

B-SIG

Ashutosh Lotlikar has agreed to be the new B-SIG coordinator. He will be assisted by Thanasi Frentzos.

MAS Merchandise

Merle Hiltner has done an excellent job of getting the Café Press site set up with a wide variety of merchandise with MAS logos and photos. To check out what's available, go to www.cafepress.com/masmerchandise. You can order directly from the site and items will be shipped to your home. The MAS makes a small profit on every item.

Onan and the 8" Refractor

Dave Olmstead and Merle Hiltner presented drawings of a possible observatory dome to house an 8" TMB refractor which has been donated to the club. Merle has done further research and design on the building. It will be a square building with 6-foot walls, built on concrete piers and 2x12 joists. It will be capped by a 15-foot dome. The dome costs approximately \$15,000, with the rest of the facility costing an equal amount.

Dave has contacted Marty Walsh at Carver County Parks about the proposed building; he has not had time to review it yet. Some

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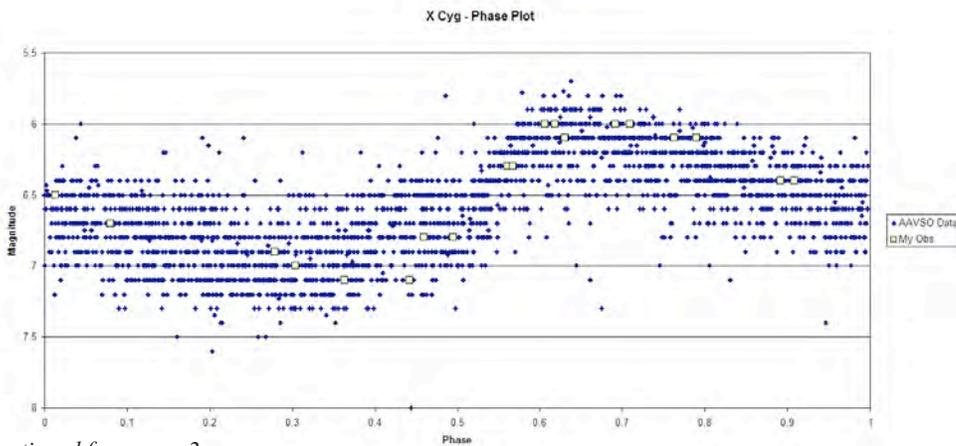
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After that I was pretty well hooked. I have spent the last five months finding other stars among the thousands of variable stars that I can observe visually with my modest equipment. All of my observations have been either naked eye, with my 12x50 binoculars, or with a 6" or 8" Newtonian reflecting telescope. Almost all of my observations have been from my moderately light-polluted home in Lino Lakes. I have been amazed at what I have been able to see from here. Before I started paying attention, I would not have guessed that I can see 9th magnitude with my binoculars hand-held or 12th magnitude with my 6" scope. My chart-reading and star-hopping skills have also improved dramatically.

I have also noticed that we have more clear or partially clear nights than I would have guessed. In the 150 days I have been observing variable stars, I have made at least one observation on 45 of those nights. Part of that is because I can take advantage of those clear work nights. When previously I would have lamented that the clear nights always occur on work nights and I could not take the scope out, I can now grab my binoculars, step outside and make a quick observation of a variable star. I have a purpose for observing, and that actually gets me out and looking up when the opportunity presents itself.

Back to the stars I have been observing. One of my early favorites was a Cepheid variable called X Cyg. Cepheids are interesting stars because they are one of the standard candles. Henrietta Leavitt discovered that their periods are closely related to their absolute luminosity. So if we know their period we can calculate their absolute brightness. And if we know how bright they actually are, and how bright we see them as, we can calculate how far away they are. X Cyg is a nice variable to observe because it is relatively bright (5.8-6.9), and with a short period of only 16 days it can be observed every clear night. Before Cygnus faded into the sunset, I made 19 observations of it over 72 days, which covered five cycles. Using those observations and some cool algorithms I learned about (more geek points and cloudy-night fun), I was able to calculate the period to be 16.36 days. Comparing my result with the AAVSO published period of 16.386332 days, it seems to be pretty darn good. Using more math I had some of the regulars in the AAVSO chat room help me through, I was able to calculate the distance to X Cyg as 2,339 light years. Comparing that result to the European Space Agency's Hipparcos satellite calculated distance of 2,219 light years, it seems that I am certainly in the astronomical ballpark. Not bad for a pair of binoculars!

There are a few other interesting variables that are fun to observe visually. One type, the Mira, has periods ranging from 80 to over 1,000 days and can change by more than 2.5 magnitudes. The namesake of the Mira type ranges from around 9th magnitude to about 2nd magnitude. That is far from naked eye to naked eye in considerable light pollution. Seven magnitudes is a change in brightness of over 600 fold. Thinking about the physics involved and what you are observing can be somewhat mind-boggling. I have quite a few Miras on my observing list now. They get observed no more frequently than once a week, since they do not change very fast. I find it fun to check in from week to week and see what my new friend is up to. Has it reached maximum yet? Is it fading from view nicely? Is this cycle's maximum the same, greater than, or less than the previous cycle?

Another broad class of variables I like to call things that go boom. This would include objects like supernovae and novae. While supernovae

and novae are one-time events, there is a class called dwarf novae, that periodically go boom. One of those types is SS Cyg. Most of the time SS Cyg is a 12th magnitude star, but roughly every 4-10 weeks it rapidly rises to about 8th magnitude and then over the next week or so fades back to 12th magnitude. So each night that you go to look at SS Cyg you do not know what you are going to find. Is it sleeping peacefully tonight, or is it awake? I know that M31 is probably about the same as it was last night, but not SS Cyg.

Another interesting type of star to observe is the R CrB type (R is the first variable star in the constellation Corona Borealis). These stars behave nearly opposite of SS Cyg. Most of the time they are at one magnitude, then suddenly they will dim dramatically. Then they will gradually brighten (sometimes fitfully) back to their usual state. The star of this type I have been observing is SU Tau. It usually sits around 10th magnitude but drops to 17th when it fades. Since I have started watching, it has been sleeping peacefully, but I am hoping before it disappears into the sunset I will observe it one night fading from view. If not, I will look forward to checking on it again next fall.

I hope this gives you a little flavor of the fun I have been having. The night sky is far more dynamic than you might think. Some stars may surprise you one night while observing them; others are like checking in with friends. My observing skills are being challenged and I am getting out and observing far more than I have at any time in the past.

One final thing before I talk about a little MAS project in which you could try variable star observing. I have not mentioned that all of my observations are being reported to the AAVSO. Many professionals rely on the data that the AAVSO collects to do real research. So my data may help to unravel some mystery of the universe. Variable star observing is one of the ways that amateurs can contribute directly to astronomical research.

MAS Early Spring Variable Star Observing Project

Starting at the end of February, I proposed a MAS group-observing project on the Internet forums and on the e-mail list. By the time this issue of Gemini reaches your hands, the project should be well underway and possibly nearing completion, but there should still be an opportunity to participate. I will propose another project in the next issue of Gemini that everyone can participate in from the start. The following is the project description I posted at the start of the project. You can view the progress of the project on the forums (<http://www.mnastro.org/forums/viewtopic.php?t=3270>), and I will summarize the project in a future issue of Gemini.

There is a Cepheid variable star, Zeta Gem, that varies in brightness from 3.6 to 4.1 with a period of about 10 days. The magnitude range means that it should be naked eye most of the time for observers in the suburbs. There are three comparison stars, all within the constellation Gemini, that are sufficient for making estimates of Zeta Gem's magnitude. The short period means that it can be observed once every clear night, and with just a month or two of observation we can determine the period to a fair degree of accuracy. One of the cool things about Cepheid variables is that there is a relationship between the period and its absolute luminosity. So if we can determine its period we can then calculate its absolute luminosity and from there calculate how far away it is.

By memorizing the location of four naked-eye stars in Gemini and the magnitude of three of them, you can do useful science by stepping outside for just a few minutes each night and estimating where that third star lies with respect to the known three. So on your way to the mailbox, or while letting the dog out, or picking up the kids after school, you can take a moment to look up and make an estimate. It's incredibly easy to do and fun to see the light curve take shape.

I propose that all interested MAS observers make observations of Zeta Gem and e-mail them to benjamin.t.mullin@gmail.com. After we have collected sufficient data, I will explain the process for determining the period and the calculations to determine the distance. When done we can compare our results against the collected AAVSO data and the Hip-

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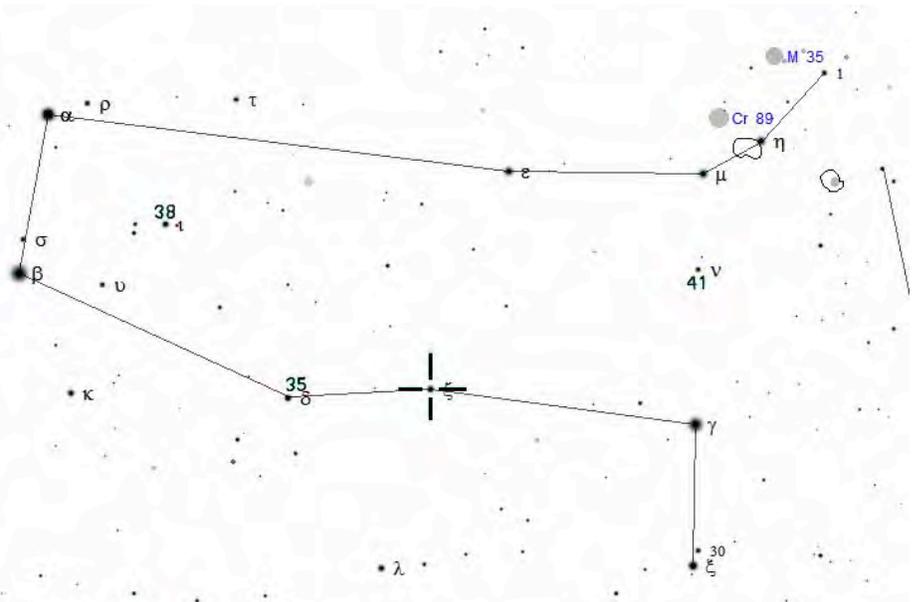
parcos parallax distance measurement.

If you are interested in participating, read on for all of the information you need. You could also register with the AAVSO and submit your observations, where professional astronomers might use your data. I'm available to help you with any aspect of the project you might need. I'm hoping a few people will want to participate. It's incredibly easy and it will give you a taste of another aspect of observing.

Making the Observation

The first step is to identify the star in question and the other non-variable stars you want to compare that star against. The above chart I made in Cartes du Ciel and have labeled the comparison stars that I got from the AAVSO. The variable is indicated by the little cross, and the magnitude of comparison stars is in tenths of a magnitude (41 is 4.1 so you don't mistake the decimal point for another star). The first couple of times out, it might be useful to bring the chart with so you can focus on finding the stars instead of memorizing the magnitudes. It shouldn't take too long to have it memorized.

The next step is to make an estimate. Look at the variable and determine which of the comparison stars bracket it in brightness. The selected comparison stars should bracket the magnitude of the variable at all times, although you might find that you think it is the same as one of the comparisons. If it is the same brightness as one of the comparisons, your estimate is simple: the same magnitude. However, if you think it is between two comparison stars you will need to interpolate the magnitude.



If you feel it is between the 3.8 and 4.1 magnitude comparison stars, do your best to decide if it is 3.9 or 4.0. Whatever you decide, you have it right. Note the time of your estimate and which comparison stars you used and submit your observation here.

That's it! Not too hard, is it?

If you are interested in learning more about visual variable star observing, I would recommend visiting the AAVSO website, www.aavso.org. I would also be happy to help anyone get started. ■

A Day in the Life of an Okie-Tex Astronomer

By Bill Kocken

The 2007 Okie-Tex Star party was held from October 6 through October 14 at Camp Billy Joe near Kenton, Oklahoma. I had the opportunity to attend this star party for the first time. Greg Haubrich and John Marchetti have both written fine articles about it. Rather than duplicating what they've done, I will try to describe one of my typical days there.



A rustic sign welcomes visitors.

Getting up

Most days begin with getting up in the morning. Of course, at a multi-day star party your sleep habits change. I'm not one to sleep in, so getting enough sleep proved to be my biggest challenge. I tried to get in at least 5 to 6 hours. I found myself getting up anywhere from 8:00 a.m. to 11:00 a.m. The bunkhouse was pretty quiet, although earplugs are helpful to mute the snoring. It's also relatively cool and dark, so it was my own fault for not sleeping more. I was just so excited to be there and to get going every day that staying in bed was

hard. Almost every day a brilliant sun and clear, blue skies greeted me. The first order of business was a shower and a shave.

Breakfast/Lunch/Afternoons

I generally grabbed a free cup of coffee, made my way out to my vehicle, set up my camping chair and observing table, and poured myself a bowl of cereal. I also had a piece of fruit or I made myself a sandwich if it was close to lunchtime. I did find a baby tarantula on my chair one morning, so vigilance pays. Meals are available at Okie-Tex, but they need to be ordered in advance. On Greg's and John's advice, I only ordered the evening dinners. While enjoying my breakfast, I relaxed in the warm sun and enjoyed watching people come and go. On a couple of mornings I made the rounds of the large observing area to chat with folks and sponge off one my new friends, Paul, for a cup of real, brewed Starbucks coffee and some interesting conversation. This was also a good time to check out other people's equipment to see whom I might want to visit later that night. I am partial to big Dobs, but the equipment ran the gamut, including portable observatories and an imaging rig with a Meade RCX400 mounted on a Paramount.

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John Marchetti with Rabies Shots sign. He took the joke in good humor.

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My brother Dave, who is a better sleeper than I, usually got up a little later than I did. After he ate and cleaned up, we would decide on a game plan for the afternoon. One day we took a drive to Capulin National Monument, an extinct volcano. It's about 90 miles distant but definitely worth the drive if you get an early start. The volcano erupted some 60,000 years ago, leaving behind a 1,200-foot-high cinder cone. You can drive nearly to the top and make an easy hike around. It offers spectacular vistas and a fun chance to learn about volcanoes and the geology of the area.

One other day we drove into Boise City, about 40 miles away, to replenish our groceries, replace the battery in my watch, and visit the Cimarron Heritage Center. This is the county's museum. It has several very well-kept buildings and excellent exhibits documenting the history of the area. Among other things, its claims to fame include the Cimarron portion of the Old Sante Fe trail, being the center of the dust bowl in the 1930s, and the only county in the US bordering on four other states— Kansas, Colorado, New Mexico and Texas. The county averages one household per square mile and has no stoplights. It makes for nice dark skies!

On two other afternoons, Dave and I rode our bicycles to the three-corners area, where New Mexico, Colorado and Oklahoma intersect, about 10 miles away. Despite the picture, leave your mountain bike at home, since there aren't any off-road trails in the area. The sharp needles and thorns on some of the desert-like plants would puncture your bicycle's tires. On the ride back one day, we saw a six-foot bull snake sunning itself on the blacktop. It's not a poisonous snake, but we weren't sure at the time.

Other afternoon activities were checking e-mail on the free wireless Internet, buying astro gear or goodies from the vendors, checking the forecast for the night, reviewing last night's observations, planning the next night's observations, taking a nap, and guessing what time Greg and John would get up. These guys are power-observing night owls. They didn't get to bed until 8:00 a.m. some mornings and once or twice slept almost until dinnertime. One day John awoke very late, hungry and a bit cranky. Greg teased him that if he was going to be so grouchy he should make sure he has his rabies shots. The cooks awarded him a sign at dinner that night saying, "Rabies Shots Available at Boise City Vet Clinic"

Dinner

Dinner was announced each evening with ringing of the dinner bell. The food was very tasty and filling. The fare included salad, lasagna, enchiladas, casserole, a wonderful smoked-beef brisket one evening, and dessert. I admit that by the end of the week I was craving fresh fruit. After dinner there were presentations on a wide variety of topics including astrophotography, astro gear, meteorites, and the geology of the area. One of my favorite talks was Barbara Wilson's "Observing at the Limit," which gave useful techniques for seeing the really dim, faint fuzzies. One of my least favorite talks was that of an enthusiastic young scientist speaking about the New Horizons project. His talk was interesting but way too long. We would have left, except that it was to be followed by the Great Okie-Tex Giveaway prize drawing. Nearly everyone won something. I got a cheap LensPen, but luckier people walked away with a Nagler or an Orion ED telescope. On evenings when there weren't talks or drawings for free stuff, I often took an after-dinner nap.

The Nights

Of course, this is what it's all about: the fabulous dark, dark skies. This is a genuine Bortle Class 1 site. The skies are absolutely dark. I saw the zodiacal light as an obvious bright triangle and the Gegenschein as a softly glowing circle directly overhead. I did not see the zodiacal band or M33 naked eye, but those with better vision can see them from this site. It is so dark that you need your red light just to find your way around. When Venus came up in the morning, it seemed to ruin our dark adaptation. We were blessed with the best observing weather that they've ever had in the 24 years of the Okie-Tex. Of the seven nights we were there, I observed from dark until 5:30 a.m., 2:00 a.m., 4:00 a.m., 3:00 a.m., and 6:40 a.m. We had enough wind one night to the point where we packed up the scopes and used binoculars. Clouds shortened one other night, but I didn't record the specifics.

The Okie-Tex organizers provided three lists of 30 objects. Observing 20 of the 30 earns you a pin and a certificate. The beginner's list is mostly Messier and other relatively bright objects. The intermediate list has 30 spiral galaxies, and the large-scope list has 30 difficult spirals. I worked the intermediate list. It was much fun to find an object on the list, locate it on my charts or laptop program, and then star hop to it in the sky. Under the dark skies it was a pleasure to be able to use mag 4 and 5 stars as guides for the star hopping. Some objects presented themselves almost immediately, others took me a long time, and there were a few that I never did see. One galaxy in particular, NGC 812, proved very troublesome. I asked Greg to try his hand at it. After a couple of minutes he spotted it in his 20" Obsession and showed it to me. It was right where I'd been pointing my 16", but it was so faint that I didn't see it until I was confident that it really was there.



There were some big Dobs at Okie-Tex.

I spent most of my time working on the Okie-Tex list and on the Astronomical League's Herschel 400 list. I observed 95 of them during the week. In addition to working on my own list, we did some impromptu outreach to local high school students and families and even got the cooks out of the kitchen to show them a few things. And what would a star party be without looking through other, usually bigger, scopes?

There's no lack of big glass at Okie-Tex. I saw some incredible sights of M33 through Bill Bynum's 22" Starmaster and the Sculptor galaxy, NGC 253, through a 25" Obsession. On the eyepiece end, I had a chance to look through the new TeleVue Ethos eyepiece, which has a 100-degree apparent field of view. Star parties like Okie-Tex are an equipment junkie's and an observer's dream come true.

Midnight Snack Time

The hardworking cooks open up the kitchen and the "Cosmic Café" from midnight until about 3:00 a.m. We'd take a break sometime in there to refuel for the rest of the night and to mingle with other observers. The cooks serve excellent, artery-clogging hamburgers and hot dogs and other not-too-healthy snacks. Remember, you're on vacation! After some fuel and coffee or hot chocolate, we were ready for the rest of the night.

Morning Rush

Somewhere around 3:00 to 4:00 a.m., I found myself in one of two situations. If I was tired and cold, I called it a night. However, there were a couple of nights where I hit my second wind and put on the afterburners. It was sort of like the morning rush in the Messier Marathon. You know that the sun is just down below the horizon and is relentlessly making its way to call an end to the night. I observed several winter objects from my Herschel list, and my observing notes say "that would be a nice cluster if the dawn weren't approaching." My chances of observing some of these clusters in southern Puppis from Minnesota during the winter are pretty low. I have to admit that using the digital setting circles is a wonderful thing in this situation.

After covering my scope and putting away my charts, eyepieces and computer, it's time to get some much-needed sleep. The best thing is not having to drive home, and you get to do the whole thing over again the next day! ■

Research SIG Star Party

To anyone who has a passing interest in amateur astronomical research, the June 27/28 MAS star party at Onan is an opportunity for you to come out and see first hand how you could participate. The research SIG will be in attendance at the star party and will be demonstrating how easy it is to participate

in amateur research. The sun sets at 9:00 and astronomical twilight ends around 11:30. Arrive around 8:00 to talk about what we will be doing after dark. This event will coincide with the regular MAS star party and will follow the same on/off calls as the star party. Please watch the MAS forums or call the MAS info line for the on/off call. 📌

Amateur Telescope Making: Is it for You?

By Ben Mullin ATM SIG Coordinator

Winter in Minnesota is finally over. However, I find that I tend to do most of my observing in the winter, warding off hypothermia and frostbite instead of heat exhaustion and mosquito bites. But perhaps that isn't you. Maybe you would prefer to hole up in a nice warm shop making something. If so, you might consider hanging out with the ATM SIG at one of our semi-regular meetings.

If you aren't familiar with that acronym, ATM stands for Amateur Telescope Making. There used to be a time when making a telescope was a considerable cost savings over buying a commercial telescope. With today's inexpensive telescopes available from places like Orion and Meade, making your own telescope simply to save money is not really an option. That need not stop you from doing it for other reasons, such as the desire to make something with your hands, to custom-make it to suit your needs, or simple curiosity about what goes into

making a telescope.

The MAS ATM SIG is a loose collection of MAS members who are interested in the many aspects of making telescopes. Interests range from optics, to testing, to mechanics, to making accessories for your scope. A SIG meeting typically involves some show-and-tell where people bring current or past projects or maybe just have questions that they are hoping to find help with. Occasionally we twist a member's arm to give a more formal presentation on some aspect of telescope making. After that it is time to socialize and enjoy the camaraderie of like-minded individuals.

Meetings are held roughly once every two months (very roughly), with the most recent one happening on January 23, where I had my 6" mirror recoated during the meeting at the Eisenhower Observatory in Hopkins.

For more updates on future ATM SIG meetings, check out the ATM SIG section of the MAS forums, which can be found from the MAS homepage. 📌

Directions to the Star Party Locations

For maps and further details about the sites, please go to our website at www.mnastro.org/facilities.

Baylor Regional Park

To reach Baylor Regional Park, head west on Minnesota Highway 5, through Chanhassen and Waconia, to the town of Norwood-Young America. Turn right onto Carver County Road 33 and continue approximately two miles north. Baylor Regional Park is on the right side of the road, marked with a prominent sign. When entering the park, stay to the right and follow the road approx 1/4 mile. When visiting the Baylor Regional Park, MAS members are requested not to park or drive on the grass. There is a drive up to the observatory which can be used for loading or unloading or handicapped parking only. For an alternate route from the southern suburbs, take U.S. Highway 212 west to Norwood-Young America. Turn right at the second traffic light onto Carver County Road 33. Continue two miles north to the park entrance.

Cherry Grove

Cherry Grove is located south of the Twin Cities, in Goodhue County, about 20 miles south of Cannon Falls. To reach Cherry Grove, head south on Highway 52. On 52 about six miles south of Cannon Falls, and just past the Edgewood Inn, is a large green highway sign for Goodhue County Rd. 1 west. Turn right, and follow County 1 straight south for about sixteen miles until you arrive at a "T" intersection with County A. The observatory is immediately at your right, nestled in the shoulder of the "T." Parking is permitted on the site, or along the road, preferably County A.

Metcalf

To reach Metcalf, head east from St. Paul along Hwy. 94. About four miles east of the I-694 / I-494 crossing is Minnesota State Highway 95, also known as Manning Avenue (exit 253). Turn south (right turn) and then almost immediately turn left onto the frontage road (Hudson Road S). Continue east on the frontage road for about one and one-half miles. Turn right onto Indian Trail, checking the odometer as you turn. Follow Indian Trail south for just about one and one-tenth miles, where you'll see an unmarked chain-link gate on the right, opening onto a dirt driveway with slight up-slope. This is the the entrance to Metcalf.

Long Lake Conservation Center

From Western Twin cities: Take I-94 west to Rogers/MN 101. Go north/right on MN 101 through Elk River, where MN 101 becomes 169. Continue north on US 169 approximately 90 miles to Aitkin. At stoplight in Aitkin, turn east/right onto US 169/MN 210 and go out of town eight miles. Then turn east/right, following MN 210 toward Duluth. Proceed seven miles. A large green highway sign marks the turn off 210 to Long Lake Conservation Center. Turn north/left on County Rd. 5. After three miles, turn east/right on gravel County Rd. 88. It is approximately one mile to the LLCC gate. Follow signs to parking and unloading areas.

From Eastern Twin cities: Go north on I-35 to Finlayson/Exit 195. Turn west/left and go one mile to County Rd. 61 and MN 18. At stop sign turn right/north and go two miles. Follow MN 18 west/left and continue 19 miles to MN 65. Turn north/right on MN 65 and proceed 30 miles to McGregor. Intersect with MN 210 and follow 210 west/left (through McGregor) for seven miles. A large green highway sign marks the turn off MN 210 to Long Lake Conservation Center. Turn north/right on County Rd. 5. After three miles, turn east/right on gravel County Rd. 88. It is approximately one mile to the LLCC gate. Follow signs to parking and unloading areas.

Minnesota Astronomical Society 2008 Star Party Schedule

Date	Star Party Location	Onan Public Night	Other	Astronomical			Moon % Illuminated	Moon Phase
				Twilight Begins	Moonrise	Moonset		
6/6/08	Baylor & LLCC	6/7/08		11:25 PM	8:19 AM	After midnight	9%	3 days past new
6/13/08				11:33 PM	4:36 PM	2:30 AM	75%	5 days before full
6/20/08			6/21/08		11:36 PM	10:52 PM	7:58 AM	98%
6/27/08	Baylor			11:35 PM	1:01 AM	3:03 PM	42%	1 day after last qtr.
7/4/08	Cherry Grove & LLCC			11:30 PM	7:12 AM	10:31 PM	2%	2 days after new
7/11/08	Metcalfe & LLCC	7/12/08		11:22 PM	3:32 PM	After midnight	60%	1 day after 1st qtr
7/18/08				11:11 PM	9:23 PM	6:57 AM	100%	Full
7/25/08	Metcalfe	7/26/08		10:58 PM	11:54 PM	3:27 PM	56%	3rd qtr.
8/1/08	Cherry Grove & LLCC			10:43 PM	6:05 AM	8:56 PM	0%	New !
8/8/08	Baylor & LLCC	8/9/08		10:28 PM	2:25 PM	11:27 PM	44%	1st qtr
8/15/08				10:12 PM	7:51 PM	5:54 AM	97%	Full
8/22/08	Metcalfe	8/23/08		9:57 PM	10:29 PM	2:33 PM	69%	3rd qtr
8/29/08	Cherry Grove & LLCC		Mini Messier Marathon	9:41 PM	5:01 AM	7:21 PM	3%	New !
9/5/08	Baylor & LLCC	9/6/08		9:25 PM	1:16 PM	9:58 PM	29%	2 days before 1st qtr
9/12/08				9:10 PM	6:16 PM	4:47 AM	89%	2 days before full
9/19/08		9/20/08		8:55 PM	9:10 PM	1:38 PM	82%	4 days after full
9/26/08	Cherry Grove, Metcalfe & LLCC			8:40 PM	4:01 AM	5:46 PM	11%	3 days before new
10/3/08	Baylor & LLCC	10/4/08		8:26 PM	12:05 PM	8:33 PM	15%	4 days after new
10/10/08				8:13 PM	4:39 PM	3:37 AM	77%	4 days before full
10/17/08		10/18/08		8:02 PM	7:54 PM	12:36 PM	92%	3 days after full
10/24/08	Baylor, Metcalfe & LLCC			7:51 PM	3:04 AM	4:12 PM	22%	4 days before new
10/31/08	Cherry Grove & LLCC	11/1/08		7:41 PM	10:55 AM	7:12 PM	5%	3 days after full
11/7/08		11/8/08		6:33 PM	2:01 PM	1:26 AM	61%	2 days after 1st qtr.
11/14/08				6:27 PM	5:38 PM	10:24 AM	98%	1 day after full
11/21/08	Baylor & LLCC	11/22/08		6:22 PM	1:06 AM	1:36 PM	36%	2 days after 3rd qtr.
11/28/08	Cherry Grove & LLCC			6:19 PM	8:44 AM	4:56 PM	0%	1 day after new
12/5/08	Metcalfe	12/6/08		6:18 PM	12:23 PM		44%	1st qtr.
12/12/08				6:18 PM	4:20 PM	9:03 AM	100%	Full
12/19/08	Baylor	12/20/08		6:21 PM	12:05 AM	12:00 PM	52%	3rd qtr.
12/26/08	Cherry Grove			6:24 PM	7:31 AM	3:43 PM	2%	New !

This schedule is subject to change. You can also check the MAS online calendar at www.mnastro.org for a complete schedule of all MAS events. Onan, Cherry Grove and Metcalfe Star Parties are held on Friday nights, with Saturday reserved as the backup night if Friday is cloudy. LLCC Star parties are held on both Friday and Saturday night. Onan Public Nights are held on Saturday nights only. In 2008 Daylight Saving Time begins April 9 and ends on November 2.

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initial response was concern about the location; they were thinking about where the tennis courts currently sit. We don't like that place because the big observatory would be in the way.

Other Onan News

About 30 members attended a keyholders refresher training session; another one will be scheduled. We hope to get more keyholders active in helping on public nights and for other outreach. Mike Kibat is looking for people to review the Onan Wiki to make sure it is thorough and up-to-date. Merle will put together a start-up checklist. We have a shut-down list, but he felt that a start-up list would be equally valuable.

Cherry Grove

Steve presented a request from the CG committee to purchase a 13mm TeleVue Ethos eyepiece. The eyepiece has been purchased at Radio City using \$588 of unspent funds in the original BAD account plus additional cash donations from several board and CG committee members. The eyepiece was used at the

Virgo Venture in early May, and it is fantastic! In the BAD it gives 185 power with .55 degree field of view.

LLCC

The preliminary cost of the garage is about \$4,600. We've been asked to pay 60%. One minor issue is that they cannot run underground electricity to the building. We will work with the LLCC to put together a final proposal and reach an agreement with the LLCC about a buyout clause. The construction will be in June or July, with help from LLCC and MAS. We also noted that we could sell the Wells Cargo trailer to raise funds.

Upcoming Events

On the weekend of August 1, REI, *Astronomy Magazine* and the MAS will team up to present an astronomy campout weekend at Baylor. Bob Young, Dave Olmstead and Jon Hickman are coordinating the event. Look for updates on the MAS website as the event draws near. ■



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To Renew Your *Sky and Telescope* Subscription

If you like, you may mail your renewal notice with payment directly to S&T or renew via phone with Sky Publishing at 1-800-253-0245. This new process will especially be of benefit to those of you who wait until your subscription is about to expire before renewing.

You will still need to send in your MAS membership renewal to the MAS Membership Coordinator at the MAS Post Office box address, or renew your membership via PayPal.

If you wish, you can still submit your S&T subscription renewal to the MAS when you renew your membership in the MAS, and we will enter your renewal on your behalf just as we always have done.

New subscriptions to Sky and Telescope at the MAS member discount must still be sent to the MAS for group membership subscription processing. Send new subscriptions to the attention of the Membership Coordinator at the MAS at the Post Office box address shown on the back cover of the *Gemini* newsletter

To subscribe to the MAS e-mail list visit:
<http://lists.mnastro.org/mnastro/listinfo/>
and follow the subscription instructions.

There is a general list (MAS) as well as special interest group (SIG) lists. Archives of the lists are also available by visiting the listinfo page for a specific list.

The MAS list has about 40% of the membership on it.