

Gemini

a publication of the Minnesota Astronomical Society



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In the pages of the Gemini

A Whiff of Skunk Hollow
David Olmstead...Page 4

Radio Astronomy SIG
Scott Hash ...Page 4

Lunar Imaging
Tom Lindquist...Page 5

Inexpensive Solar Imaging
Don Day...Page 5

**The Newtonian "Fan"
Club Tests**
John Marchetti, Greg Haubrich,
Doug Brown...Page 6

Beginners SIG
Patti Neavin ...Page 7

**Call for Committee
members and Candidates**
Ben Huset...Page 7 & 8

**A Moon light night to
remember**
Todd E Giencke...Page 8

MAS Photo Page
Matt Russell...Page 9

Aintno -Certificate
Tim Parson ...Page 10

The AAVSO Spring Meeting in Hawaii

Michael Koppelman

Earlier this year I joined the American Association of Variable Star Observers (AAVSO). The AAVSO is the leader in cooperative amateur variable star research. I started to contribute observations to the AAVSO and enjoyed and learned a lot from the AAVSO email discussion list. When I got information about their annual spring meeting in Hawaii, it did not seem realistic for me to attend but I noticed a box you could check to apply for travel grant money. I thought, if they give me some money to go, I can probably swing it. I filled out the application and indicated that if I were given a travel grant I would speak to my local astronomy club about the meeting and write an article for the newsletter. I was very pleased to receive \$1000 in



Photo by Michael Koppelman

The Gemini Telescope on Mauna Kea.

travel grant money and very excited to attend the meeting. This is my report from that meeting, held in Kona, Hawaii the week of July 4th, 2002.

I arrived on Sunday, June 30th. The hotel was very nice and situated right on the beach on the Kona side of the Big Island of Hawaii. It had a nice pool, open-air restaurants and beautiful grounds with palms trees and flowers. The first event was a Luau. It was a typical Luau with dancing, hula and fire eaters, but the fun part was finally meeting many of the people I had interacted with on the AAVSO email list. I had good conversations with AAVSO staff members, including their president and their IT guy. I also met one of the great photometrists, a professional by the name of Arne Henden. I met people from the US, the UK, Australia and New Zealand. At the end of the night we retired to the bar and talked about photometry and variable star research. I really enjoy talking about astronomy and that first night was great fun. There are a lot of really good variable star guys out there. Oddly enough, few or no women, though. Many of the professionals that presented at the meeting were women, but virtually none of the amateurs were women. This I don't understand.

Continued on Page 3

Now Showing

Compiled by Ron Schmit

Eisenhower Observatory:

Come view the night sky through a powerful telescope on top of the Eisenhower Community Center in Hopkins, MN. Viewing time varies throughout the month and is open to the general public. There is no charge, although a \$2.00 donation is requested. Space is limited, so call Diane for reservations: 612-988-4077.

University of Minnesota:

Observing from the telescope on top of the Physics building, East Bank. Open to the general public. Fridays during the school year: 612-626-0034 for more info.

College of St. Catherine's, St. Paul

The Observatory at the College of St. Catherine houses a 14" Celestron computer driven telescope as well as a number of smaller solar and wide field telescopes for group viewing. The Observatory will not be open to the public until further notice because of installation of air conditioning vents on the roof. The observatory will be moved and reopened. Phone: (651) 690-6023. Leave e-mail questions about astronomy at askastro@stkate.edu The public nights at the Observatory are run by the Student Observatory Assistants of the College of St. Catherine, Mary Wallraff and Rose Stenglein. <http://www.stkate.edu/physics/observatory.html>

Carleton College, Northfield

Goodsell Observatory is located at 93° 7' W and 44° 29' N, on the campus of Carleton College in Northfield, Minnesota. In Goodsell's main dome, there is a 16.2 inch John Brashear refractor and in the smaller dome there is an 8 1/4 inch Alvan Clark and Sons refractor. Both are over a hundred years old. Goodsell also has some modern telescopes. <http://physics.carleton.edu/Astro/welcome.html>

Open houses are held the first Friday of every month. Everyone is invited to come look through the observatory's two historic telescopes. Remember to dress appropriately as the telescope domes are neither heated nor cooled. The open house will be canceled in the event of cloudy skies. For more information contact Jesse at 646 5719 or via email: jball@carleton.edu.

Patron Members

MAS offers a patron membership to anyone who wants to help support our activities by paying a slightly higher annual membership fee (\$50 instead of the regular \$20). We would like to thank the following patron members who helped support MAS this year:

Tom Alm	Eric Hegmen	Scott and Beth
Frank Belgea	Victor Heiner	Mosely
Robert Benson	Gale Jallen	Douglas Oines
James Bowditch	Dennis Johnson	Jonathan Ort
Richard Brown	Chelen Johnson	Roy Sarver
Doug Brown	Sally Jorgensen	Kevin Saunders
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GEMINI INFO

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Send all MAS membership dues, change of address cards, subscriptions, and renewals to the current MAS treasurer. Subscriptions alone cost \$4.50 annually for members of astronomy clubs or \$9.00 for other persons. Materials for Gemini are due on the 1st of the month preceding the month of publication.

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The next two days were the official AAVSO meeting. We discussed the normal business issues like finances and membership. One interesting thing is that the AAVSO has an endowment. This is where someone rich gives you a lot of money but you don't touch the principle, you just have access to the income the money generates. This guarantees that you will have money every year. The AAVSO has a very nice endowment of fifteen million dollars, which generates around four hundred thousand dollars per year. I think the MAS should investigate finding a party willing to contribute to such an endowment. If you spend the money that is donated to you, it doesn't go as far as if you are able to invest the money and only spend the interest. Anyone rich out there wanna get this started? But I digress.

The AAVSO meeting also discussed membership activities, charts and outreach. Part of the AAVSO meeting was dedicated to a student group called TOPS who presented their activities in hands-on astronomy research. There were also paper presentations, which was the most interesting part for me. People presented papers on variable stars, variable star modeling, new equipment that is coming out and other interesting variable star topics. Presenters included student, amateurs and professionals. One interesting presentation was on an infrared photoelectric multiplier tube (PMT) that is coming out, allowing amateurs to start doing infrared variable star research.

On Wednesday, July 3rd we got a tour of the summit of Mauna Kea. We went inside the Gemini telescope and also saw the Keck telescopes and the Harvard-Smithsonian Submillimeter Array, which is an array of 6-meter radio telescopes. The Gemini was the highlight of the trip, because we were given a complete tour, including the control room and we wandered around right underneath the telescope. We got to ask a lot of questions of a very knowledgeable engineer about things like pointing accuracy and flat fields.

On Wednesday night we had a BBQ and then an English bloke I met and I went back up to the top of Manua Kea and took pictures. The Milky Way was so bright that at first we thought it was clouds! We got an amazing view of Omega Centauri. We also saw the Southern Cross, the Pipe Nebula and could even see the North America Nebula through binoculars. It was truly amazing. I'm still working with my film. I was doing wide-field shots of the Antares region and the Milky Way.

On Thursday and Friday was the High-Energy Astrophysics Workshop for Amateurs. This consisted of presentations by professional astronomers about the state of the science in X-ray and gamma-ray research. We discussed gamma ray bursts, magnetars, polars and cataclysmic variables. These presentations were given by

people who actually use telescopes like the Hubble Space Telescope and the Chandra X-ray observatory. We listened to people from JPL, the Keck, the Space Telescope Institute and various universities. I love learning about stuff I barely understand and it was great to see what pros are doing in these areas and how amateurs can help.

In addition to the meetings there was a lot of hanging out at lunch and at the bar talking about astronomy. I made a lot of good contacts for future research and made a lot of friends. I also got to know the AAVSO staff. I am doing some programming for them and they are including me on various special requests they have for observations. They also gave me some photometric filters so I can do multi-color photometry.

Getting involved in the AAVSO is probably the single most rewarding thing that I have ever done in the context of my astronomy habit. I

am going to continue to go to as many meetings as I can, continue to make friends and continue to work on research projects with all of the great AAVSO people. The AAVSO is a wonderful opportunity to work on science and make friends at the same time. I realized recently that I have been



Photo by Michael Koppelman

The Milky Way as seen from the top of Hawaii



Photo by Michael Koppelman

Scorpius region, including the Pipe Nebula.

involved in variable star research for only about 9 months!
Time flies when you are having fun.
For more information on the AAVSO, check out
<http://www.aavso.org/>.

Information on my astronomy can be found at
<http://www.lolife.com/astronomy/>



Photo by Michael Koppelman

The Hotel we stayed at.



Photo by Michael Koppelman

The summit view of observatories.

A Whiff of Skunk Hollow

David Olmstead

Down there on Skunk Hollow Trail, just south of Cannon Falls, the MNAA group were having a friday night stargaze. Here is a short recap: I just had to check them out, you know? The MNAA, the almost-secret order of rogue amateur astronomers, whose members have more optical hardware than just about anyone. Who were these guys? They live right here in the Twin Cities, but they are more illusive than Big Foot. Did they have a secret handshake that, if performed incorrectly, would determine inclusion or exclusion if botched? Well, no, I met a couple of them at Onan one night. Seems some members of the Minnesota Amateur Astronomers also are MAS members. They don't talk about it much, but with careful queries they do divulge.

Dave and Chris, whose last names will remain absent from this post, so as to protect their identity, invited me to subscribe to their Yahoo Group. I have been secretly receiving their chit chat unbeknownst to the MAS Board for a while now. These guys are just like us, some of them are us, and they gather, like us, at their favorite secret starparty places. Down on Skunk Hollow Trail, just south of Cannon Falls is one of their sites. Skunk Hollow called to me Friday evening, and the aroma wrapped around my nostrils like the misty bouquet of a fine wine. The gravel road winds through the countryside, and just past Buckshot Farm the field appears. Big dobs, Big refractors, exotic glass pointed to the sky just waiting for night to fall. And it falls gently and slowly, on Skunk Hollow Trail. Frogs make frog sounds and fireflies fire and dart. A slight breeze stirs and the heavens open up to the light buckets lined up and ready to go.

This was great fun, and a fine night outside with fellow nocturnal-types. Phil was there from that place that sells telescopes. Dave and Jim and Steve, and Chuck, plus others shared the views through their scopes. The field on the farm was mowed and smooth, and the bugs - they were not. I think it would be great fun to have a joint MAS/MNAA star party soon. Perhaps they will invite us to Skunk Hollow for an evening of good times. I hope so, and then we could reciprocate and throw a bash. Cherry Grove isn't far from Skunk Hollow. How about it MAS and MNAA? Should we party!?

Radio Astronomy Special Interest Group

Scott Hash

This month marks a start of the Radio Astronomy special interest group. Basically, we can observe in the radio spectrum night and day. We can either take data and send it out to S.E.T.I. or we can take images. Imaging is practically the same thing as from an optical telescope but We can image during the daytime (but the images are better at night). We can also do more than take pictures, like listen to Jupiter or to Solar Flares. If you want to learn more about Radio Astronomy, you could stop at one of our meetings, usually held on the first or second Saturday of the month. The first meeting was held at Radio City, Inc. on Saturday, September 14th at 10:00am. If you need directions, please feel free to call me, Scott Hash (KC0BZG) at (763)574-9773 or email at kc0bzb@hotmail.com. I hope to see you there.

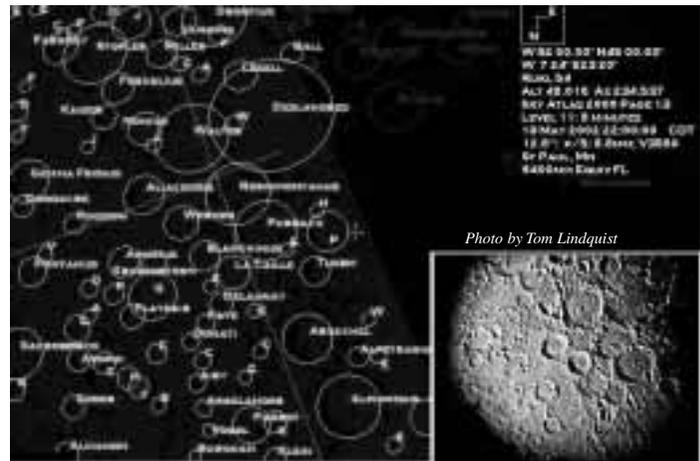
Lunar Imaging

Tom Lindquist

At the Texas Star Party in early May there was a talk given on the use of digital snapshot cameras, and when I got home (the moon being banned from TSP due to light pollution considerations) I tried a few in the back yard under the "street-light". The TSP presentation was taped and not too long and hopefully we'll be able to run it at MAS sometime. This is a great way to get people interested in the astrophoto aspect of astronomy and have quite a bit of fun doing it and get a little hands-on experience.

The camera is a basic "entry level" device retailing at Target, etc, for less than a hundred dollars and is designed for general use rather than astronomy, naturally. This image was converted to grayscale to suppress color noise, and fairly strongly unsharp-masked to bring out detail With Photo-Deluxe HE 3.0. The rather grainy B&W result will win no prize, perhaps, but it does contain interesting detail for a night with not such good seeing & an early trial exposure.

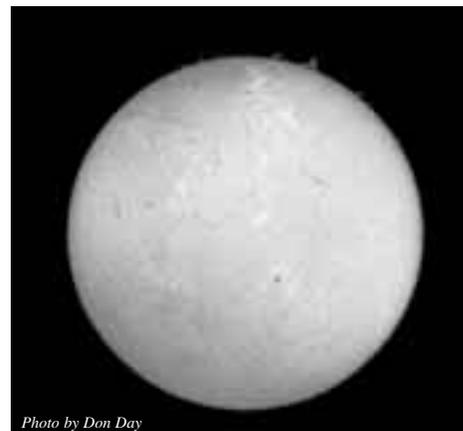
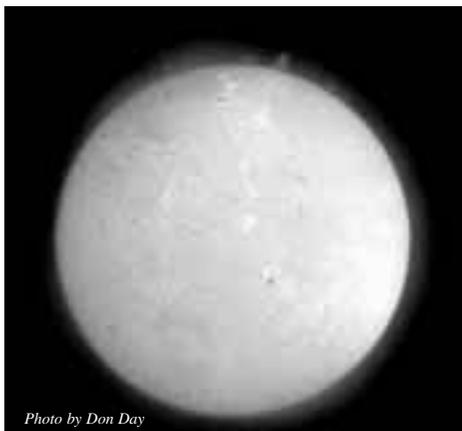
To aid in interpretation, I've included an 8' screen from Guide 8.0 (normally used for deep star charting) indicating the major features. Taken night 19 May 2002, St Paul, Mn., 3 miles NE of MSP airport. 🇺🇸



Inexpensive Solar Imaging

Don Day

While at the Texas Star Party in May, I had a chance to look through one of the new Coronado H-alpha solar filters. Having my new \$60 digital camera along (that's not a typo), I put it up to the eyepiece and took a few shots. Here are two I thought you might enjoy. I included an overexposed one as it shows the surface detail better. 🇺🇸



The Newtonian "Fan" Club Tests

John Marchetti, Greg Haubrich, Doug Brown

A few months ago, I asked if anyone had experience with using fans to remove thermal boundary layers from their Newtonian primary mirrors. I've researched this topic on the 'net, read about it in "Sky and Telescope," and talked to the folks at AstroSystems down at TSP this year, and I gotten a lot of information about the subject (some of it conflicting). I finally decided to take the plunge and test a cooling configuration last night.

Greg Haubrich and I both have very similar telescopes. Both are the same brand of f/4.5 16" Newtonians. Both are highly modified telescopes and their optics and physical configurations are almost nearly identical. The only significant difference between the two telescopes is my primary holder is an open design, while Greg's is the stock primary holder that came with his telescope. I added a 3" brushless electric fan to the primary holder to blow across the back of the mirror. The mirror, by-the-way, weighs approximately 40 pounds and is made of Pyrex glass.

Here's what we did "out in the field", on Thursday, July 11:

Telescope 1 – ventilated f/4.5 16" Newtonian

Telescope 2 – stock f/4.5 16" Newtonian "Seeing" is the same for both telescopes. All comparisons using identical eyepieces. Temperature fall was approximately 20 degrees in 3 hours. Physical orientation and construction of telescopes is either identical or extremely similar. Both telescopes were collimated using a collimation laser.

Test one – low power (78x) deep sky

On deep sky objects, such as M57, no differences were detected.

Test two – high power (234x) deep sky, M13

The core of M13 looked a little more resolved with the ventilated telescope, but there was not a huge difference between views. You had to "A-B compare" the views to see any difference.

Test three – high power (234x), Epsilon Lyrae (the double double) Here's where things change dramatically. The double pairs were split cleanly, with no blurring or wavering in the ventilated telescope. Both double pairs were tiny blue pinpoints of light with dark space between them. The pairs were also split in the stock telescope, but the pairs looked blurred together, much like figure 8's. The pairs were split, but not cleanly.

Test four – high power (234x), Vega defocused Again, this is where the two telescopes differed widely. In the stock

telescope, the defocused image was roiling. If you put your hand in front of the objective, you could hardly make out its outline. In the ventilated telescope, the image was wavering a little (the seeing wasn't perfect that night), but it was also "quiet" enough for you to put your hand in front of the objective and see the heat coming off your hand and falling into the tube. I now can see why some high power, planetary viewers wear gloves even in the summertime when observing.

Test five – high power on planets

This will have to wait for the Fall. However, a couple years or so ago, Greg and I, and Rich Solburg were out at Baylor in the early morning hours, about two or three AM. We looked at Jupiter just as it approached the south. That night, we not only saw the Great Red Spot on Jupiter, but we were able to make out, clearly, features *inside* the GRS using extremely high powers – 400x – 500x. This unbelievably unusual circumstance was due in part to excellent seeing and sky transparency because, in my experience with observing in Minnesota, I can almost never observe over 200-300x without the sky turning to mush. However, I think we observed another factor that night the often gets overlooked and is the point of these tests: my mirror had finally reached thermal equilibrium. This happened unintentionally and without any active devices simply because we were nearing sunrise and the air was heating up again to match the lagging temperature of the main mirror. The main mirror was trying to play catch up the whole night with the surrounding cooling air. When the air started to warm up again, the mirror didn't have to throw off heat any longer and smear its image. The air and the mirror had reached the same temperature and were finally in equilibrium. \

Conclusion:

For short focal ratio telescope like the ones we tested, collimation is the most important physical aspect of the telescope for getting good images. Optical cooling is not highly critical if you intend to do low power, deep sky observing. However, if you intend to observe at higher powers or need critical detail for such observations as lunar, planetary, or double star observing, it is necessary to ventilate your telescope. Passive ventilation would probably be sufficient for small temperature changes, but for typical Minnesota environments, active ventilation is a must. In short, for critical observing, you need to join the "fan" club. Coming up:

Planetary tests in the Fall and a test by John Marchetti. He has a 12.5" Newtonian telescope ventilated to blow outside air across the front of the primary mirror to eliminate the thermal boundary layer that exists on the face of the mirror. This test is to see whether it is more effective to eliminate that thermal boundary layer by cooling the entire mirror

(my approach), or to attack the problem directly by blowing the warm air off the front of the mirror. This approach was suggested in an article in "Sky and Telescope," but was shot down by the people at AstroSystems because they said that when they tried this, they ended up creating more image problems than the ones they were trying to solve by introducing tube currents. However, this effect may only be

noticeable in telescopes using large mirrors. The "Sky and Telescope" article referenced making changes to smaller amateur telescopes.

We'll give you the results of blowing across the mirror when we run these tests. If you have any experience with cooling your Newtonian optics, please drop us a line. We'd love to hear about other people's experiences. 🐱

Beginners Special Interest Group

Patti Neavin Coordinator

Any member of the MAS is welcome to join us for any of our meetings or field trips. Meeting locations and additional information is posted on our e-mail list. Go to <http://lists.mnastro.org/mnastro/listinfo/beginners> to sign up. September 18th 7:00 pm monthly meeting – Tim Hagen will give a presentation on using Starry Night software. Location to be determined.

October 16th 7:00 pm monthly meeting – Finding your way around the winter night sky. Location to be determined.
November 20th 7:00 pm monthly meeting – Internet resources. Location to be determined.

The Beginners SIG is also starting a self-education group. We will be meeting on the second Wednesday of every month to watch a 45 minute video on one aspect of astronomy. Each person that wishes to participate in this has a different college-level text book on introductory astronomy. Prior to our meeting, we'll each read up on the topic covered in the video, then as a group discuss what we've learned. Everyone is welcome to participate. Contact Patti Neavin for more information. Beginners Special Interest Group

Patti Neavin Coordinator (patti@seamsmith.com) or days at (651) 291-7199

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Call for Committee members and Candidates

Ben Huset

Per the MAS constitution I appoint myself Nominations Committee Chairperson and call for MAS Board member candidates and Committee members to come forth. Positions available are: President: Currently held by me (Ben Huset) but due to term limits (and wife's request) will not be seeking office this time. Secretary: Currently Held by Jackie but will not be seeking re-election. Member at large: Currently held by John Treadwell. Interested Candidates and committee members are encouraged to contact me

ASAP. e-mail (preferred) benhuset@skypoint.com
phone : 651-628-9275

MAS constitution election segments are presented below:

ARTICLE III - OFFICERS

1. The President, Vice President, Secretary, Treasurer and two Executive Board members at large will be elected by the membership of the Society.

2. These elected officers must have attained the age of majority upon taking office.

4. The officers will be elected for a term of two years. In December of the even numbered years, the President, Secretary and one Board Member will be elected. In December of the odd numbered years the Vice President, Treasurer, and one Board Member will be elected. The President and Vice President may not serve more than two consecutive terms in their respective offices.

Continued on Page 8

5. The officers duties will be those normally associated with the office held.

7. Not later than Sept. 15, the President must appoint a Nominations Committee Chairperson to prepare a slate of candidates for the offices. This slate will be presented to the members at a Society meeting not later than Nov. 15. At that time, additional nominations may be made from the floor. The Nominations Chairperson cannot run for office. All candidates must be aware of and willing to fulfill the responsibilities of such office should they be elected. The slate must be published and distributed to the membership at least one week before the December meeting.

8. Election will be by secret written ballot, to be distributed and returned at the meeting in December. Should a member be unable to attend the December meeting, that member may request in writing a ballot from the Nominations Chairperson by Nov. 15. The ballot must be received by the Nominations Chairperson by Nov. 30.

9. The officers will take office at the first meeting of the calendar year. 🏠

A Moon light night to remember

Todd E Giencke

Saturday night was one of those few nights per year that the temperature, clouds, dew, and bugs all worked in our favor. I didn't put on a jacket until after 1am. Clouds were never a problem, Dew? What dew? Even though we had the dew heaters on our lenses. I think I was stung by 2 mosquito's even though I forgot to put bug spray on. The only thing that could have made it a perfect night is first quarter moon was up.

Bob Seabold and I were at the tennis courts with my camera tracking platform. Bob with 2 OM1's with a 50 & 135mm lenses. I was trying out a 28mm on my FM3a. We did many shots of the Milky Way (Sagittarius through Cassiopeia). We were trying different exposures with E200 to nail down the correct one for Baylor with, and without, the Moon up. Bob is getting the slides developed today and I'm scanning them tonight. We should have some to show the group. Some of my results will be posted on the astrophoto list. FYI The platform can handle 5 cameras at one time so if you want to take some pictures of the summer Milky Way get in touch with me.

Bob and I took a break and walked up to the observatory and looked at some M's through (For the life on me I can't remember his name) the huge tubed 6" TMB refractor on a dobsonian type mount. Thanks again for the views.

I have been trying using a 10nm Hydrogen Alpha filter to get very high contrast images of the summer nebulas. The first thing is the images are going to take 2-3 hours instead of my usual 30-40min. But just for kicks I pointed the 'scope on the Moon after Saturday dinner (the Sun was still up) and took a 1/100 sec shot. First I was amazed that the CCD was not saturated. Then I was amazed by the shot I had gotten.

I thought this would be interesting to the group to see so I'm posting it. This is a single 1/100sec shot with no Dark or Flat correction taken with a 8" SCT working at f/1.95 (Fastar, 3.8"/pixel resolution) through a Ha filter. Some unsharp masking was done in photoshop. The raw image also looks good and I'll send it to anyone that wants to look at it.

Not to start any ugly stuff but the 3.25" dia camera is connected to the front of the telescope so the SCT has a 41% obstruction and the optics are not in perfect columniation (I have no way of adjusting them in this configuration.). IMHO I think the contrast and resolution is way way better than it has any right to be for a 41% obstructed. scope, a very under sampled CCD, and during The Day! ;-)) I think I'm going to have to do Moon shots more often. 🏠

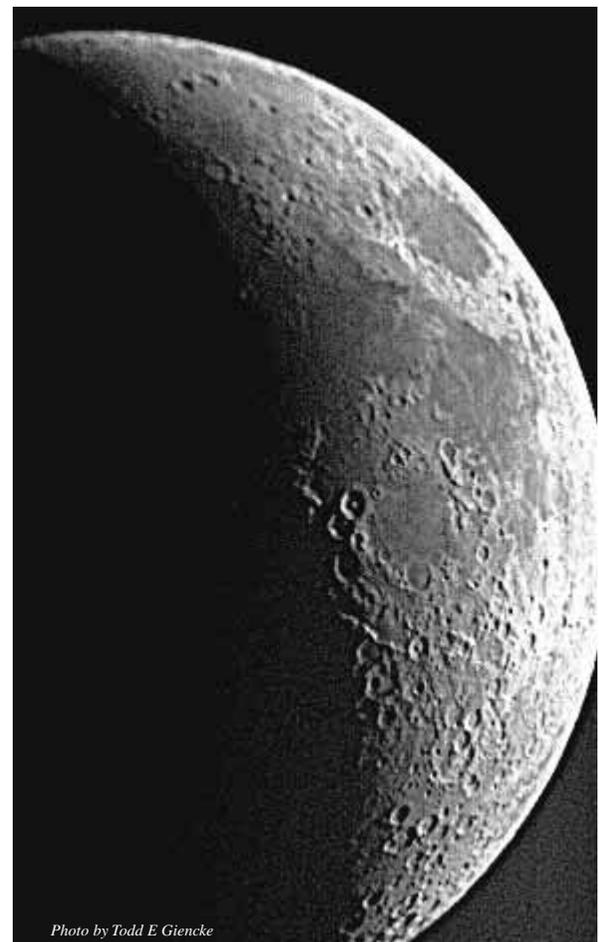


Photo by Todd E Giencke

MAS Photo Page

Matt Russell

Images were taken with a Takahashi FSQ-106n on an Astro-Physics 400 GTO mount. The camera is an SBIG ST-10E with the CFW-8 filter wheel. The FSQ operates at 530mm @ f5. All guiding was done with the internal guide chip of the camera. To see the color rendition, you can visit Matt's website at <http://www.telescopes.cc>



The Orion Nebula M42
Taken: November 17, 2001
Location: Crosslake, MN, elevation 850 feet
Exposure: 74 minutes



The Lagoon Nebula M8:
Taken: June 6, 2002
Location: Taryall, CO, elevation 8,817 feet
Exposure: 85 minutes



Andromeda Galaxy M31
Taken: July 4, 2002
Location: Crosslake, MN, elevation 850 feet
Exposure: 105 minutes

For Sale

Orion Skywatcher 4.5" Refractor with moon filter and "EZ Finder" red dot pointer. In new condition and was well cared for. Selling only because I'm upgrading. \$450.00
Contact *Mark* at marksheri@earthlink.net or 952-895-6120.

Aintno -Certificate

Tom Lindquist

At this years Texas Star Party, Tim Parson received the Aintno Certificate from Larry Mitchell and Barbara Wilson (who are the Aintno Committee and much else). The "Aintno List" was created about a decade ago as mostly a joke listing a hundred ridiculously unobservable objects for visual observers with huge scopes and limitless ambition. Our Tim Parson's observation of object #46 (visual observation of a galaxy within one degree of the Horsehead Nebula) is the fourth, I believe, certificate to be awarded, but in the eyes of the Committee, the first wholly worthy award not involving some sort of finagling or sorcery.

Just out of curiosity and not knowing the field well enough, I brought up a star chart & located Tim's object on the chart. I then looked at a photograph of the region taken by MAS member Thor Olson (posted on his website www.nightscaapes.net) to see if it fell into the frame. It did, close to the edge. Then, out of curiosity, I grabbed that part of the image & processed it pretty crudely wondering whether any hint of the galaxy could be detected.

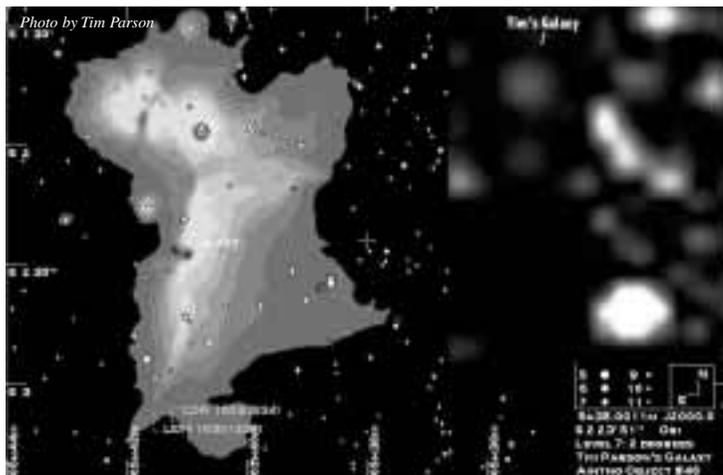


I was actually just looking to figure out whether the location of the Galaxy made it into the field of the photograph. This was reasonably Difficult since star patterns tend to differ between a photo and a chart. Once located, simple image torture was applied to the few minute field, being near maximum contrast and a brightness setting to find an image between all white and all black. The stars were of course destroyed in terms of image quality by this, but the unexpected and potentially useful exaggerated color effect appeared, along with the relatively undistorted galaxy color.

I was slightly amazed that it was found and identified in the correct position in the image. Moreover, while at this point any semblance of image quality has been callously obliterated, a really neat thing was quite noticeable.

The galaxy was a very correct whitish gray color while all the stars Had strong color associated.

Only two exceptions were noticed in the maybe 30 arcminutes of sky casually observed, but they flanked the known galaxy suggesting the possibility of being stellar galaxy companions, perhaps. I know color photography of uncolored galaxies not involving substantial redshifts, H-II regions, or O-B associations, and so on, seems absurd, but clearly this suggests a way to shoot distant rich clusters of galaxies, and include the stellar appearing galaxies in the cluster rather than visually in the star field by their whitish color match to the larger galaxies.



Shown are the original astrophoto by Thor, an enlarged area of it, a Star chart indicating the position of Tim's galaxy, including a processed enlargement showing that the galaxy was actually recorded on film! 📸

2002 Star Parties

Star parties are held on Friday if weather permits, otherwise on Saturday. Call (651) 649-4861 after 6:00 p.m. on a star party date to hear whether it will be held.

Metcalf

Metcalf is the grassy parking lot of Metcalf Nature Center, about 20 miles east of St. Paul along highway 94. About 6 miles E of the 694/494 crossing is county road 15 (Manning Ave.). Turn right, then left onto the frontage road and continue east, crossing over county road 71. Turn right (south) onto Indian Trail; follow it 1.1 miles to an chicken-wire gate on the right, (marked by three blue reflectors), opening onto a dirt driveway, which is the entrance to Metcalf.

Baylor Regional Park

Baylor Regional Park is roughly 25 miles W of the SW corner of 494. Head west on highway 5, through x, to Young America. Turn right onto county road 33 and follow it about 2 miles to the park, a right turn. The observing site is through the gate and roughly 100 yards beyond. Card-carrying MAS members may observe at Baylor at any time; call the park keepers in advance at 448-6082.

When visiting Baylor Regional Park, MAS members are requested to NOT park on the grassy areas next to the observatory (or any other grassy areas for that matter). This is a matter of being considerate to the park, its caretakers, and other visitors, so PLEASE PARK in the PARKING AREA.

Annual Park Permits (optional, not required for observing) can be purchased by sending a check to Carver County Parks, 10775 County Road 33, Norwood Young America, MN 55397. The cost for the Annual Permit is \$16. Permits are also available at the Park Office at Baylor Park, the Carver County Government Center located at 600 4th St. in Chaska, through the honor box systems and gate houses when staffed at both Baylor and Lake Minnewashta Regional Parks. Lake Minnewashta Regional Park is located in Chanhassen off of Hwy. 41 between Hwy. 5 and Hwy 7 .

Cherry Grove

Cherry Grove is about 20 miles south of Cannon Falls. Head south on Hwy 52. Around 6 miles south of Cannon Falls, take a right onto Goodhue County 1 and follow it around 16 miles, where it ends in a T with Dodge County A. The observatory and warming house are at your right, nestled in the corner of the T.

Date	Location	Sunset	Twilight
March 8 or 9	Baylor	19:50	20:01
March 15 or 16	Cherry Grove	18:21	20:01
March 22 or 23	Metcalf	18:30	3:20
April 5 or 6	Baylor	18:48	20:31
April 12 or 13	Cherry Grove	18:57	20:43
April 19 or 20	Metcalf	19:05	2:07
May 3 or 4	Baylor	19:23	21:22
May 10 or 11	Cherry Grove	20:31	22:35
May 17 or 18	Metcalf	20:39	1:51
May 31 or June 1	Baylor	20:53	23:16
June 7 or 8	Cherry Grove	20:59	23:26
June 14 or 15	Metcalf	21:03	0:30
July 5 or 6	Baylor	21:04	23:30
July 12 or 13	Cherry Grove	21:01	23:22
July 19 or 20	Metcalf	20:55	2:18
August 2 or 3	Baylor	20:40	22:43
August 9 or 10	Cherry Grove	20:30	22:28
August 16 or 17	Metcalf	20:20	1:00
August 30 or 31	Baylor	19:56	21:41
September 6 or 7	Cherry Grove	19:43	21:26
September 13 or 14	Metcalf	19:30	23:39
September 27 or 28	Baylor	19:03	20:41
October 4 or 5	Cherry Grove	18:50	20:28
October 11 or 12	Metcalf	18:38	22:23
October 25 or 26	Baylor	18:14	19:52
November 1 or 2	Cherry Grove	17:04	18:43
November 8 or 9	Metcalf	16:55	20:06
November 29 or 30	Baylor	16:37	18:21
December 6 or 7	Cherry Grove	16:35	18:50
December 13 or 14	Metcalf	16:35	2:28



Dusk at Onan

Photo by Ben Huest

How to pay your dues

Your MAS membership expires at the beginning of the month shown on your Gemini mailing label and your membership card. Send your payments to the MAS treasurer (Chuck Jorgensen) at 1615 E. River Parkway Minneapolis, MN 55414-3627. Make checks payable to MAS. The current annual membership dues and subscription fees are:

<i>Regular membership</i>	\$20.00
<i>Patron membership</i>	\$50.00
<i>Student membership</i>	\$10.00
<i>Subscription to Gemini for members of other astronomy clubs</i>	\$4.50
<i>Subscription to Gemini for other persons</i>	\$9.00

To Renew Your Sky and Telescope Subscription

If you get *Sky and Telescope* at the club's discounted rate, you must renew your subscription through the club. When you get a renewal notice from S&T, send the notice along with a check for the amount indicated on the notice (currently \$29.95) to the MAS Treasurer (Chuck Jorgensen) at 1615 E. River Parkway Minneapolis, MN 55414-3627). Make checks payable to MAS. If desired, you may renew your MAS membership at the same time, and write one check to cover both payments.

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.



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