

Gemini

a publication of the Minnesota Astronomical Society



<http://www.mnastro.org>

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Eclipse in the Outback

Todd Burlet

Last December's total solar eclipse provided an opportunity for our family to combine our 'someday' dream of seeing Australia with my desire to show my wife and kids a total solar eclipse. I've been an eclipse fan since roadtripping to Winnipeg in 1979 for that February's total eclipse. My most recent attempt to view a total eclipse, from Cornwall, England in 1999, had been completely clouded out, so I was itching for another chance.

Last December's eclipse would have been best viewed from the middle of the Indian Ocean, as far as duration of totality is concerned, but that option was quickly ruled out due to problems with seasickness. The best land-based place to see the eclipse, from the point of view of duration, was Africa. After reviewing the political, military, and crime rate issues of the regions covered by totality, that option was also ruled out. That left Australia. The locale was tempting, but the eclipse conditions were less than ideal. The sun would be only 9 degrees above the horizon when the path of totality made landfall along the Great Australian Bight, and the duration of totality would only be 32 seconds. In addition, the Southern coastal area is cloudy 50% of the time that time of year. The weather conditions improve dramatically as you move into the outback, but the eclipse conditions deteriorate rapidly, with totality occurring right at sunset in East Central Australia. In the end we decided to make the trip, focusing on the vacation aspect of it, and if it turned out we got to see the eclipse that would be a bonus.

It didn't take long for our trip plans to hit their first snag. I tried to make Hotel reservations in the seaside town of Ceduna, which happened to be directly in the path of

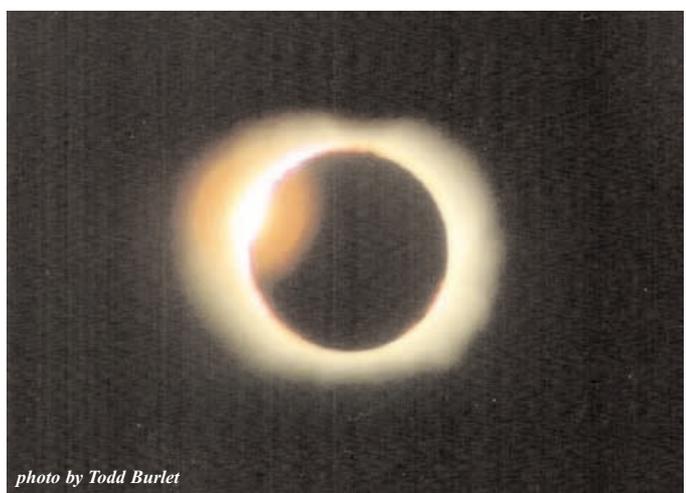


photo by Todd Burlet

The famous 'Diamond Ring' effect, 1 second after 3rd contact

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 reopen. 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 those who want to help support our activities by paying \$50 rather than the regular annual membership fee of \$20. We would like to thank the following patron members as of May 15, 2003

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GEMINI INFO

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photo by Todd Burtlet

Eclipsed sun and inner corona 15 seconds after 2nd contact"

totality. Ceduna is a town of about 5000, and it boasts a half dozen 2- and 3-star hotels and motels, along with about as many caravan parks (caravans, or RV's, are a popular vacation option in Australia). Its located about 1/3 of the way from Melbourne, on Australia's South East coast, to Perth, on Australia's South West coast. This makes it a popular stopping point for travelers and 'road trains' that travel the desolate Highway 1, the only highway that crosses that part of the continent. This also made it a popular destination for fellow eclipse chasers, and I quickly discovered that, although I was calling 11 months in advance, every room in town had already been booked for over a year, as had all of the caravan parks. In fact, the people of the town were planning on moving in with friends and neighbors, and renting out their homes for the week. We finally found a hotel 'only' 100 miles away, in the hamlet of Minnipa, and our trip planning was soon back on track. We would stay in Minnipa the night before the eclipse, drive to Ceduna for the eclipse, and drive back to Minnipa afterwards.

Although the rest of the vacation was not uninteresting its not a story I'll tell here. One highlight, however, was getting to see the Southern sky for the first time. We took in an Astronomy program while at Ayer's Rock (now more correctly known as Ularu, since the rock's original name was reinstated when it was given back to the local aborigines). The guide pointed out the Magellanic Clouds, Canopus, and a disturbingly upside-down Orion. He also pointed out the 4 different techniques people in the Southern hemisphere have for finding the South Pole, since they have no conveniently located bright star to mark its location. All of the techniques involved multiple 'hops' and were sufficiently complicated to instill in me a desire to never get lost while in the Southern Hemisphere.

As the eclipse date approached we made frequent use of the Internet to check the latest weather forecast for Ceduna. The Department of Meteorology, Australia's equivalent of our National Weather Service, had prepared a special web page and forecast specifically for the eclipse. Internet cafes and kiosks are extremely common in Australia, so it was very easy to go online each day for the latest update.

On December 3rd, the day before the eclipse, the news wasn't good. There was only a 40% chance of viewing the eclipse along the coast. We were heading North out of Adelaide on our way to Port Augusta, which sits at the North end of the Spencer Gulf. From Port Augusta we had planned to turn west toward Minnipa and Ceduna. As we entered Port Augusta we found a roadside kiosk with eclipse information that had been set up by the local council. We learned that the Woomera council had established a viewing area within the normally restricted Air Force test range in the outback, 150 km to the North, along the Stuart Highway. Totality at that location would last only 26 seconds, and would occur with the sun a mere 6 degrees above the horizon, but the chance of clouds was virtually 0. We decided that a lower, shorter totality was better than no totality at all, so we would view from Woomera. This created a logistical problem: where to spend the night. Continuing on to Minnipa for the night, with the intention of turning around and heading back to Woomera wasn't an option, as the two towns are 500 km apart. Woomera lies 150 km North of Port Augusta, and with a population of 500 is the biggest settlement in the region. Finding lodging anywhere in that area was out of the question. Port Augusta itself, with a population of 25,000 seemed like a good bet, but a quick check of a half dozen



photo by Todd Burtlet

*The half-eclipsed sun 28 minutes after 1st contact
Half and Half. The still half-eclipsed sun sinks
below the nearly featureless horizon.*

hotels proved that it was bursting at the seams with eclipse visitors. We headed for the local library to do some searching on the Internet, but they were completely overwhelmed –there would be a 5-hour wait to get on a PC. With the help of a phone card, a phone booth, and the local yellow pages we were soon back in Business, however. Eclipse visitors had apparently largely overlooked the town of Whyalla, 70 km to the South, and we had no trouble finding a room.

We awoke on the 4th to a sky that was 80% covered by clouds. The forecasters, it seemed, had called this one right. Although the 300 km drive to Woomera would normally take about 4 hours, we headed out around 10:30 because we had no idea what type of traffic we would run into. As it turned out, traffic was relatively light, and we were in a shady park in Woomera by 1:00, eating the Kentucky Fried Chicken that we had picked up on our way back through Port Augusta. Despite its small size, Woomera had put together an impressive welcome. There were tours of the static aircraft on per-



photo by Todd Burtlet

The gathering crowd and on-site facilities

manent display in the town, there was a kiddie carnival, there were tours of the town conducted by a pickup truck pulling a trolley, and the gift shop in the combination community center/bowling lanes/town museum was doing a thriving business. We had passed the last wisps of clouds as we drove North out of Port Augusta, and the decreasing vegetation was evidence that the cloudless skies we found ourselves under were the norm for this part of the continent. By the time we reached the eclipse viewing area some 75 km North of Woomera there wasn't a plant higher than your knees for as far as the eye could see.

The local council had set up a very adequate viewing area extending for about 7 kilometer along the Stuart Highway. A first aid and public service tent had been set up, and an ambulance and police car were also on site. Also present was the port-a-loo, a semi trailer that had been purpose-built as a mobile 8-stall restroom.

A steady 20 mph breeze blew throughout the afternoon, and every footstep whipped up a cloud of the fine red dust that prevailed throughout the area. The temperature was in the mid-80's most of the afternoon, but dropped into the 70's as the sun sank low. The sky was a very dark blue right to the horizon. The band of haze that blankets the last 10-15 degrees above the horizon at most observing sites was absent. This fact, along with the flat terrain and the absence of any significant foliage, convinced us that we would not regret coming to a location where totality would occur with the sun only 6 degrees above the horizon. First contact was at 6:41, and second contact was exactly an hour later, at 7:41 local time (UT + 10.5). Due to travel considerations I had not brought a telescope with me.

Beginners Special Interest Group

Patti Neavin

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.

June 25th 6:30 pm monthly meeting – Accessories at the Burnsville Public Library.

July 23rd 7:00 pm monthly meeting – Topic and location to be determined. Check the MAS website for updates.

Instead, I shot the eclipse using a Tamron 200-400 mm F5.6 telephoto mounted on my Nikon N80 camera body. During the partial phase I used ASA 50 Konica Impresa color print film with a Polymer Plus® solar filter, with an optical density of 5, from Thousand Oaks Optical. I used the camera's auto exposure setting, using spot metering and bracketing at -1.5 f-stops, 0 f-stops, and +1.5 f-stops, taking a set of exposures every 7 minutes between first and second contact.



photo by Todd Burtlet

The author and family with their oh-so-fashionable eclipse viewing glasses at the viewing site near Woomera

Although totality would only last 26 seconds, I still wanted to take a wide range of exposures, in order to capture both the inner corona and prominences and the outer corona. I removed the solar filter and loaded the camera with ASA50 Fuji Velvia. I set the metering to manual exposure, with automatic bracketing at -1.5, 0.0, and +1.5 shutter stops and F5.6. My first exposure was centered on 1/5000 second, and for each subsequent exposure I slowed down 3 shutter stops. The result was a continuous sequence of exposures, each 1.5 shutter stops apart. At 3rd contact I captured the diamond ring effect with an exposure sequence centered at 1/50th second.

Considering the effort that even the native Australians must have gone through in order to arrive at this spot in the outback, I was amazed at how quickly everyone jumped in their cars and headed home just minutes after 3rd contact. Fourth contact occurred after sunset, but those of us who stayed through sunset were treated to the unusual shape presented by the ?-set, ? eclipsed, atmospherically distorted setting sun. ■

The Beginners SIG also has a self-education group. We meet 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. Patti Neavin Coordinator (patti@seamsmith.com) or days at (651) 291-7199 ■

Marathon Wrapup

Greg Haubrich

About 20 eager amateur astronomers started the evening prior to sunset fully prepared to meet the on-rushing astronomical twilight with a frenzy.

The strategy for seeing all 109 Messier Objects (visible from our latitude) in one night is to start OBSERVING Messier



photo by Greg Haubrich

A wide view of the Cherry Grove Observing Site as members setup and prepare for a long evening.

Objects in the west and work your way east (hopefully staying ahead of the Earth's rotation) over the course of the night. For the 8 hours, or 480 minutes of Astronomical Twilight available in one night, this translates to a pace of one Messier Object OBSERVED every 4.5 minutes. But surprisingly enough, many OBSERVERS had time for at least one half-hour or more break in the warming house to sip on hot apple cider and eat cookies. This is traditionally done by Star-Hopping/Manual guiding of the telescope.

While the clouds were very iffy in the Mpls/St. Paul area, the sky grew more clear as one approached Cherry Grove. The skies were quite clear and transparent the whole evening, except for one crucial period about an hour and a half after Astro-Twilight when M74, M77, M31, M32, M110 and M33 needed to be OBSERVED pronto, as they were setting. Everyone missed M74 and M77 due to the inopportune small cloud bank that passed through. OBSERVING through "sucker holes" in the clouds was done in earnest, adding a new challenging dimension to the start of the Marathon. Most missed M33, but several OBSERVERS picked up M110 as it rose in the east before morning light (not quite circumpolar, but a second chance!) The rest of the night was beautiful (20 F and about 5mph wind or so).

Some highlights include the using of the newly refurbished Cherry Grove Observatory 16" equatorially mounted reflecting telescope. Great Job to the restoration crew! Jupiter moving within 1/2 a degree of the Beehive Cluster, and Saturn a beacon near M1 looked pretty good through the Observatory Scope! Thanks to Bob Schmitt and company who were on-hand to help assist in using the telescope. Doug Brown had the most comfortable OBSERVING setup with his Binocular OBSERVING Chair and 80 mm binoculars (Doug got 30 of

his 50 binocular objects logged for his Astronomical League's Binocular Messier Certificate). Scopes ranging from 4" to 20" aperture were used in addition to several types of Binoculars. Thor was also taking some astro-photos of a few Messier Objects too (please let us know how they turn out Thor!)

About 9 rugged Marathoners made it all the way until dawn! Don Gazdik gets the unofficial award of pulling M2 out of the relatively bright morning twilight that almost seemed impossible (he would have needed a solar filter if he kept at it much longer, but the persistence paid off!) We were cold, tired, somewhat hungry, but very satisfied with an excellent OBSERVING adventure! What a way to start the season.

Thanks to Dan Fish of Radio City for donating the prizes at this year's MAS Messier Marathon. The standing is as follows for those that logged out:

Tim Parson 106 Star-Hopping! (not in running for prizes).

Greg Haubrich 106 Star-Hopping. (not in running for prizes).



photo by Thor Olson

The starting team for the Messier Marathon. About an equal number joined and participated as the night went on.

Aaron Rowe 105 Star-Hopping! (Winner of a prize voucher for most objects via Star-Hopping: an Eyepiece Case - sorry, I said earlier it was an eyepiece until I reread it!) 8" Telescope, and only 2nd year of Marathonning!

Cort Sylvester 102 Star-Hopping!

Don Gazdik 101 Star-Hopping!

Tom Youngblood 95 Star-Hopping!

Steve Emert 56 Star-Hopping!

John Skorezewski and Skyler Dahlseng 51 Star-Hopping!

Doug Brown 30 Binocular Star-Hopping!



photo by Thor Olson

Marathon host Greg Haubrich (left), next to an eager Tom Youngblood, Dobsonian, and table, filled with charts, equipment, and supplies to get.

Graham Wright 16 Device Assisted! (I hope that I got the count correct Graham).

Aaron Svobodny 11 Star-Hopping!

Tom Sinks 11 Star-Hopping!

Darrel Rowe 5 Star-Hopping! (Winner of the Random Prize

#1 Drawing!)

Thor Olson Astro-Pics! (Please let us know how they turn out Thor.)

Craig Borchard, OBSERVING! (no count listed)

Mark Norby, OBSERVING! (no count listed)

Eric Smestad, OBSERVING! (no count listed)- - Winner of the Random Prize #2 Drawing (no-one competed in the 13 yrs. or younger category).

Thanks to Bob Schmitt and company that assisted in operating the 16" Cherry Grove Observatory Telescope. Hats off to the telescope refurbishment team; and to Vic Heiner for maintaining the Cherry Grove site.

We had a blast!
- - Greg Haubrich
(MAS Messier SIG/Marathon Coordinator)

Observing Certificates

Greg Haubrich

Recent Astronomical League Observing accomplishments include: Megan Eagan: Regular Messier Certificate Dave Venne: Honorary Messier and Lunar Certificates Tim Parson: Honorary Messier, Binocular Messier, and Silver Caldwell Certificates Tom Youngblood: Honorary Messier Certificate Vic Heiner: Honorary Messier Certificate Doug Brown: Lunar Certificate Greg Haubrich: Binocular Messier and Herschel 400 Certificates Cort Sylvester: Honorary Messier Certificate.



photo by Greg Haubrich

Competing with his daughter, Tim Parsons was awarded the Caldwell (Silver Level) Certificate. Tim also received both the Messier, and Binocular Messier observing awards!



photo by Greg Haubrich

Tom Youngblood receives his Messier Certificate.



photo by Greg Haubrich

David Venne also receives a Messier Certificate.

MAS Photo Page

Mike Conley

(Editors Note: Mike Conley's photographs of Saturn and M1 were inadvertently misprinted in the last issue. Here they are again, this time correctly identified and presented, along with a shot of another planet as Mike continues to build his prime focus photography skills.)

David Schultz



hoto by David Schultz

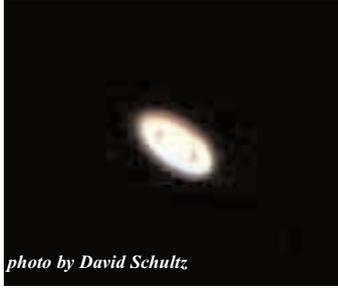


photo by David Schultz

David Schultz

Here are three pictures I recently did with a digital camera on my LXD-55 10. Saturn is great but Jupiter is fair.



photo by Mike Conley, 2003

In this photo M1 is super-close to Saturn just below and to the right of the over exposed planet.



photo by Mike Conley, 2003

In this second picture, M1 is above and to the left as Saturn passes by the famous Messier object over the course of just a few days.



photo by Mike Conley, 2003

This time it's Jupiter just outside the stars of the Beehive (M67). In this and the previous shot, a blue mystery object shows: an alien spacecraft, a secret military X-wing satellite, or an artifact of an internal reflection from the very bright planet in the scene.

Michael Koppelman

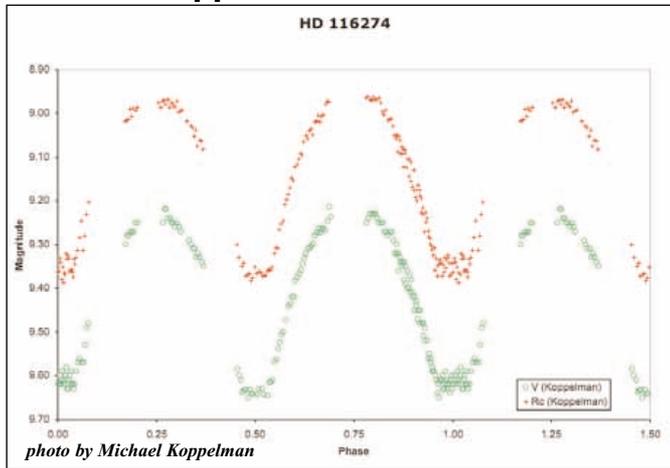


photo by Michael Koppelman

Light curve obtained from Starhouse Observatory.

Steve Leikind

I didn't look at them last night, but here is an image of the M86 region in Virgo that I took 2 weeks ago at TSP. A couple of the fainter galaxies that appear here are listed at magnitude 19 in "The Sky". A number of fainter galaxies in the image are identified in The Sky without any listed magnitude at all. Click on the image to go between larger and smaller sized images:<http://www.visi.com/~sleikind/m86.html>



photo by Steve Leikind

M83 in Hydra taken on April 23, 2003 at the Texas Star Party. It consists of 24 five-minute exposures (2 hours) that were dark subtracted and flat fielded.

Virgo Cluster centered on M86

CCD Camera ST8E

Optics APM 152 mm Mak-Newt. F/6. 912mm focal length f/5

Location: Ft Davis, TX. Limiting visual magnitude 7.0

Date 05/02/2003

Exposure Nine ten minute exposures; dark subtracted.

Comments Virgo Cluster centered on M86. Includes M84, NGC4413, NGC 4435, NGC 4425, NGC4388, NGC 4402, NGC 4438, NGC 4387 and numerous others.

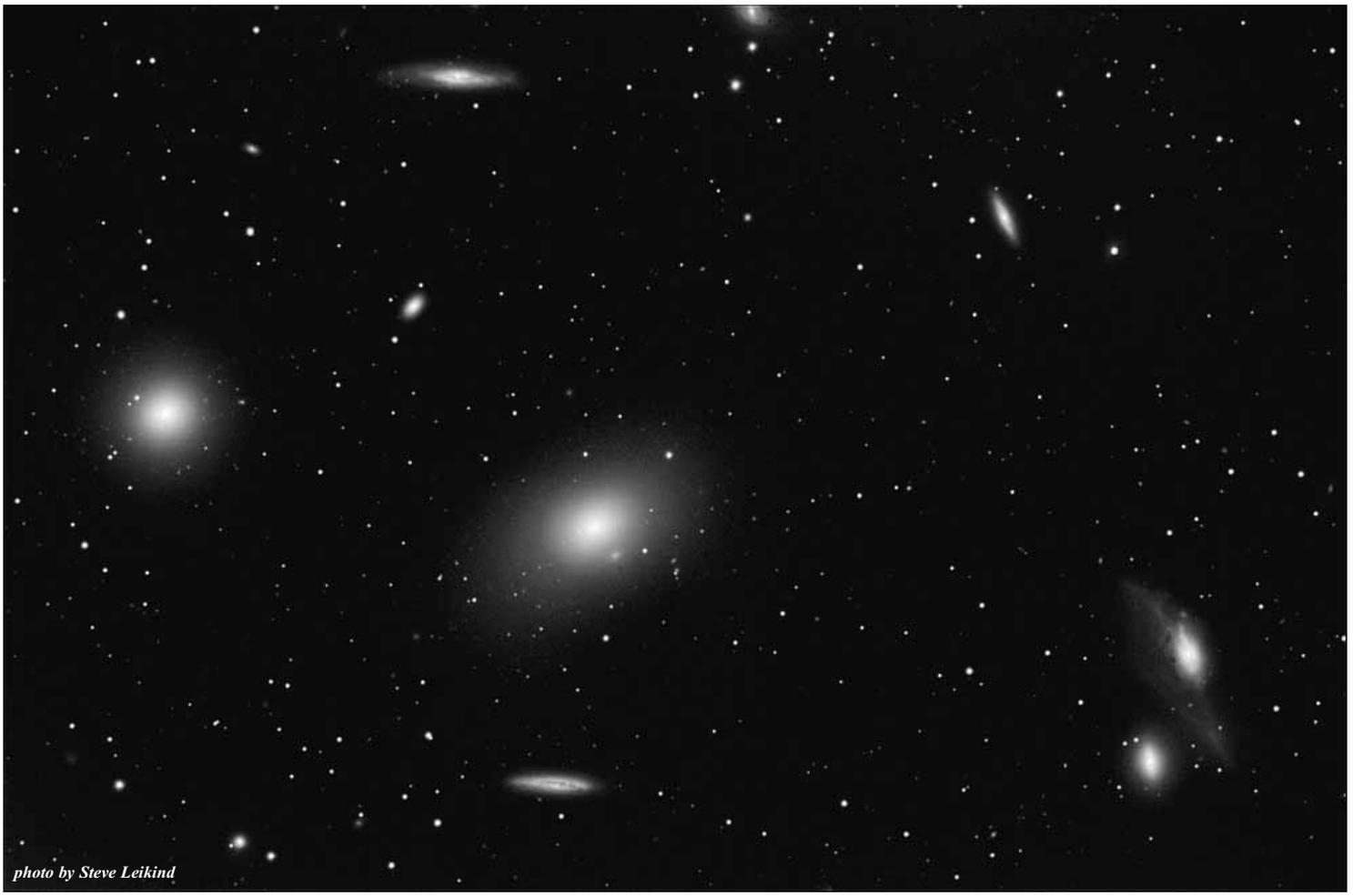


photo by Steve Leikind

Bob Brose

The film was an old roll of Photoworks 200 ASA negative film. I used my home made 4.5" f-8 scope on a roughly aligned equatorial mount with a clock drive. Approximately 4 second exposure, using an old ricoh camera body at prime focus, cable release and the hat-trick shutter method.



photo by Bob Brose

Craig Cotner

email: craig@cotnerfamily.com

All photos were taken from my driveway in Cologne, MN with an 8 inch Meade LX90 SCT telescope shot at prime focus with a Vivitar V3800 SLR camera. I used Kodak Elite Chrome 200 slide film. The slides were then digitized with a Minolta Dimage Scan Dual 3 slide scanner.



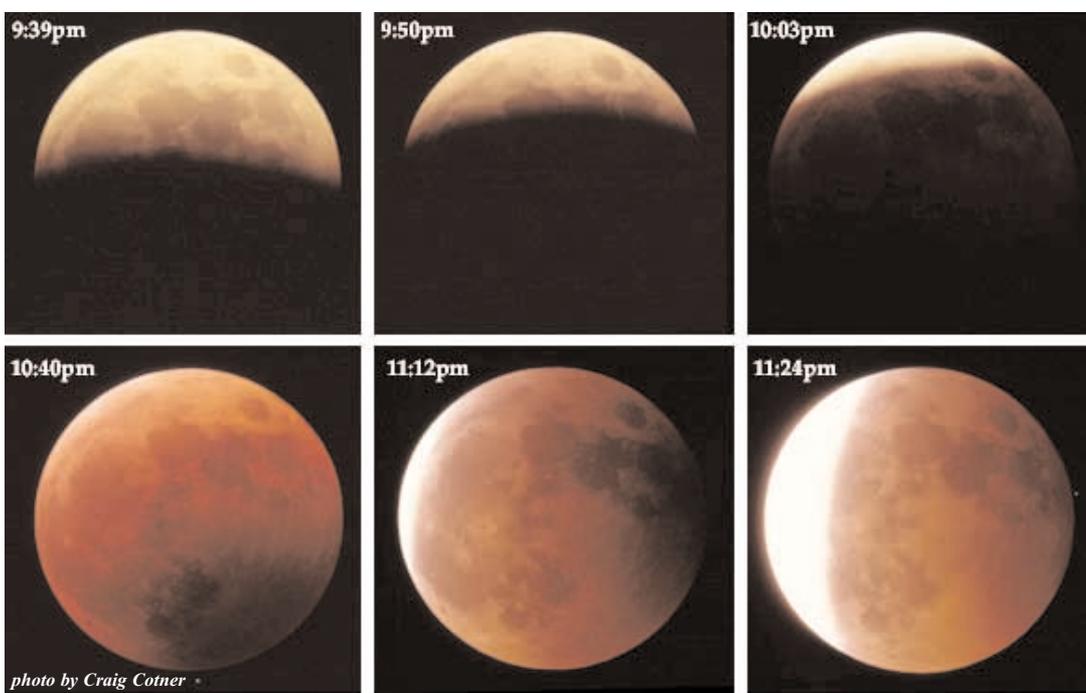
photo by Craig Cotner

MidEclipse file:10:40pm: 45 sec. exp.

MidEclipse file:
10:40pm: 45 sec. exp.

Composite file:
9:39pm: 1/15th sec. exp.
9:50pm: 1/15th sec. exp.

10:03pm: 1 sec. exp.
10:40pm: 45 sec. exp.
11:12pm: 10 sec. exp.
11:24pm: 10 sec. exp.



Dale and Cheryl Malheim

The moon on May 12, 2003 at 9:29PM, taken using an LX55 10" UHTC with a Panasonic Super Disk camera set in manual mode on slow shutter speed.



photo by Dale and Cheryl Malheim

Thor Olson

During the evening of the lunar eclipse, I took this photo on Provia-400 through a Televue-85 at f/5.6. The moon was rising and showed briefly between two buildings in downtown Minneapolis. It quickly moved behind them and when it appeared again, the eclipse had progressed to taking its first bite.



photo by Thor Olson

2002 Onan Observatory Public Star Parties

Star parties are held on Friday if weather permits, otherwise on Saturday. Call (952) 467-2426 after 6:00 p.m. on a star party date to hear whether it will be held.

Current as of: May 16, 2003

| | | | |
|------------|--|---------|----------|
| 3/21/2003 | Onan Public Event: Vernal Equinox | 6:00 PM | 10:00 PM |
| 4/11/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 4/12/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 5/9/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 5/10/2003 | Onan Public Event: Astronomy Day | Noon | 10:00 PM |
| 5/15/03 | Onan Public Event: Lunar Eclipse Observing | 8:00 PM | 11:30 PM |
| 6/6/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 6/7/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 6/21/2003 | Onan Public Event: Summer Solstice | 6:00 PM | 10:00 PM |
| 7/4/2003 | Onan Public Event | 7:00 PM | 10:00 PM |
| 7/5/2003 | Onan Public Event | 7:00 PM | 10:00 PM |
| 8/1/2003 | Onan Public Event | 7:00 PM | 10:00 PM |
| 8/2/2003 | Onan Public Event | 7:00 PM | 10:00 PM |
| 8/15/2003 | Onan Public Event | 7:00 PM | 10:00 PM |
| 8/16/2003 | Onan Public Event | 7:00 PM | 10:00 PM |
| 9/5/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 9/6/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 9/23/2003 | Onan Public Event: Autumnal Equinox | 6:00 PM | 10:00 PM |
| 9/26/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 9/27/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 10/3/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 10/4/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 10/24/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 10/25/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 10/31/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 11/1/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 11/21/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 11/22/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 11/28/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 11/29/2003 | Onan Public Event | 6:00 PM | 10:00 PM |
| 12/22/2003 | Onan Public Event: Winter Solstice | 6:00 PM | 10:00 PM |

2002 Star Parties

Star parties are held on Friday if weather permits, otherwise on Saturday. Call (952) 467-2426 after 6:00 p.m. on a star party date to hear whether it will be held.

| Date | Location | Sunset | Moonrise | Moonset | Moon Phase |
|-------------------|--------------|--------|----------|---------|----------------------|
| March/07/2003 | Cherry Grove | 18:06 | 8:47 | 22:54 | 21% Waxing Crescent |
| March/21/2003 | Baylor | 18:24 | | 8:04 | 18% Waning Gibbous |
| March /28/2003 | Cherry Grove | 18:33 | 4:48 | 2:18 | 15% Waning Crescent |
| April/04/2003 | Metcalf | 18:42 | 7:12 | 21:47 | 8% Waxing Crescent |
| April/25/2003 | Baylor | 19:09 | 3:21 | 13:17 | 28% Waning Crescent |
| May/02/2003 | Cherry Grove | 19:18 | 5:40 | 20:44 | 2% Waxing Crescent |
| May/09/2003 | Metcalf | 19:26 | 11:27 | 2:24 | >54% First Quarter |
| May/09/2003 | Baylor | 19:26 | 11:27 | 2:24 | >54% First Quarter |
| May/23/2003 | Baylor | 19:42 | 1:49 | 12:13 | 43% Waning Crescent |
| May /30/2003 | Cherry Grove | 19:48 | 4:10 | 19:40 | 0% New Moon |
| June/06/2003 | Metcalf | 19:54 | 10:29 | 0:53 | >40% Waxing Crescent |
| June/20/2003 | Baylor | 20:01 | 0:14 | 11:07 | 58% Waning Gibbous |
| June/27/2003 | Cherry Grove | 20:02 | 2:42 | 18:33 | 4% Waning Crescent |
| July/04/2003 | Metcalf | 20:01 | 9:33 | 11:21 | 26% Waxing Crescent |
| July/18/2003 | Baylor | 19:52 | | 9:57 | 74% Waning Gibbous |
| July/25/2003 | Cherry Grove | 19:46 | 1:15 | 17:24 | 12% Waning Crescent |
| August/01/2003 | Metcalf | 19:38 | 8:36 | 21:47 | 15% Waxing Crescent |
| August/22/2003 | Baylor | 19:06 | | 16:12 | 25% Waning Crescent |
| August/29/2003 | Cherry Grove | 18:54 | 7:37 | 20:14 | 6% Waxing Crescent |
| September/05/2003 | Metcalf | 18:41 | 16:20 | 0:36 | >76% Waxing Gibbous |
| September/19/2003 | Baylor | 18:15 | | 14:56 | 23% Waning Crescent |
| September/26/2003 | Cherry Grove | 18:01 | 6:32 | 18:38 | 1% Waxing Crescent |
| October/03/2003 | Metcalf | 17:49 | 15:10 | 23:36 | 62% Waxing Gibbous |
| October/17/2003 | Baylor | 17:23 | | 13:40 | 57% Waning Gibbous |
| October/24/2003 | Cherry Grove | 17:11 | 5:22 | 17:01 | 1% Waning Crescent |
| October/31/2003 | Metcalf | 17:01 | 13:52 | 22:38 | 47% First Quarter |
| November /14/2003 | Baylor | 16:44 | | 12:21 | 73% Waning Gibbous |
| November/21/2003 | Cherry Grove | 16:37 | 4:11 | 15:23 | 7% Waning Crescent |
| December/05/2003 | Metcalf | 16:30 | 14:54 | 5:26 | >12% Waxing Gibbous |
| December/13/2003 | Baylor | 16:29 | | 11:31 | 78% Waning Gibbous |
| December/19/2003 | Cherry Grove | 16:31 | 3:05 | 13:46 | 18% Waning Crescent |

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 \$18. 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.



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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.