

# Gemini

a publication of the Minnesota Astronomical Society



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## February 2008 Volume 33 Number 1 In the pages of Gemini

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SEPTEMBER/OCTOBER 2007**

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### A Trip to the Lowell Observatory

By Dave Brandt

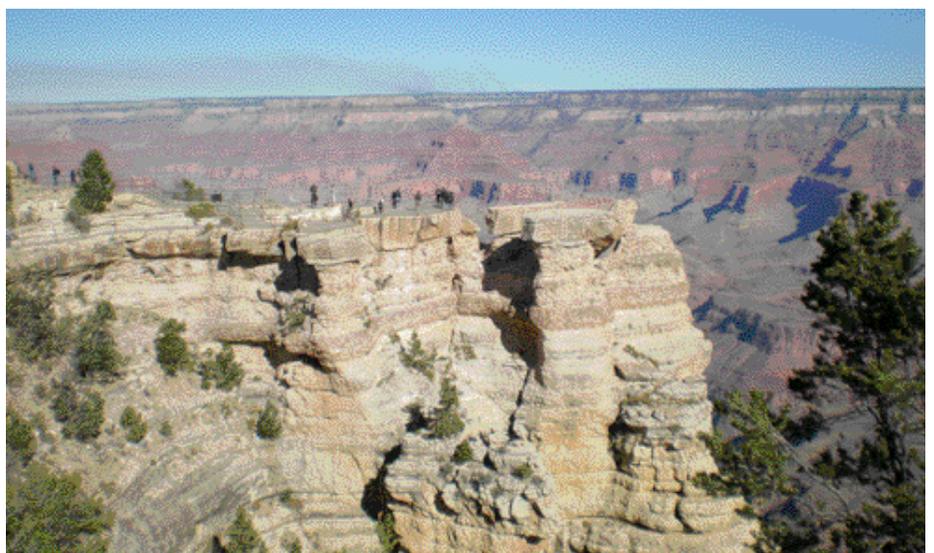
When I was about 20 I drove through Arizona a couple of times on my way to and from the naval base I was stationed at in San Diego. Back then it was just another state to get through. Then my dad and aunt and uncle moved there. Since then I try to get there at least once a year. I like the dry heat.

During the first few trips my wife and I didn't do any sight seeing beyond the Phoenix area. I did think about moving there, so I joined the East Valley Astronomy Club, and I timed two of my trips so I could go to their monthly meetings. It was on one of those trips that I met their guest speaker, Ted Bowell, of the Lowell Observatory. I am interested in asteroids and he is well known for his work with discovering asteroids. (<http://www.lowell.edu/users/elgb/>)

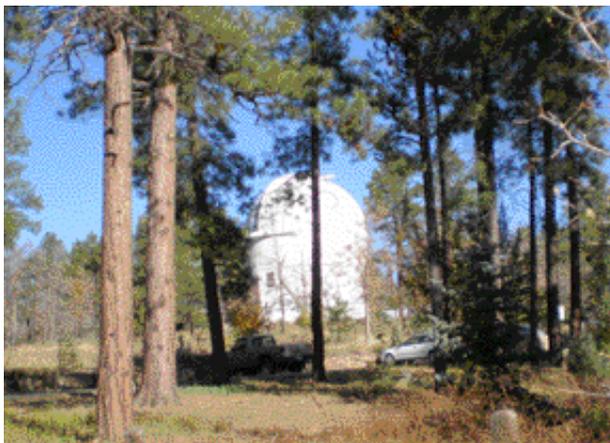
Eventually, my wife and I were looking for something new to do, so we signed up for a one-day tour of the Grand Canyon. It was February and no one warned us that it was going to be cold and snowy at the 6,000 foot altitude of the South Rim. Between warming up in the El Tovar Lodge and gazing down at the canyon, I knew I had to return someday. Some people think the Grand Canyon is a big hole in the ground, and others could spend hours gazing at it and exploring it. I am in the latter group. Since that first trip, I have been back three times and I'm planning to go again. This last trip I decided to add a trip to the Lowell Observatory to my plans.

I arrived at the Flagstaff site about 20 minutes before the 9:00 A.M. opening time. It was a near-perfect day for me at this 7,000 foot location at about 70 degrees F with a clear blue sky. I had been at the Grand Canyon the previous day and had taken a picture of some mountains to the south. I had planned to see how far away those mountains were. As I drove south from the canyon I realized that one of those mountains was next to Flagstaff--about 60 miles south of the canyon. No wonder 18 major observatories are located in Arizona.

I wanted to explore the observatory on my own, but the parking lot was surrounded by a fence with signs warning visitors to stay with the guided tours. There were a couple of buildings that looked like dormitories. I guessed that the astronomers slept there during the day. Also, I could see the unmis-



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takable shape of a dome through the trees farther up the mountain.

I was the only one waiting when the visitor center opened, so I examined the merchandise at the souvenir store. There was also a small children's museum there that had several exhibits meant to demonstrate some of the principles of astronomy.

More people began to trickle in and there was an announcement about the start time of a guided tour.

The tour started with a short movie. After the movie the tour

guide, Drew, asked if there were any questions. I wanted to know his background and where the other people on the tour were from. He was a mathematics major and didn't plan on being an astronomer. The other people in our group were from various places in the U.S.A., but one couple was from Australia. I was the only amateur astronomer.

We walked to the Clark Telescope and Drew told us the story of how Percival Lowell had moved to Arizona and had the Clark Co. build the telescope so he could observe Mars. (His wife had a mausoleum built for his remains. It is about 50 feet from the telescope.)

Drew asked for a volunteer to approach the telescope and push on the tube. A child who looked like she was about 12 was selected. She easily moved the huge telescope. Drew also told us about the astronauts who had used the telescope to look for places to make the first landing on the moon.

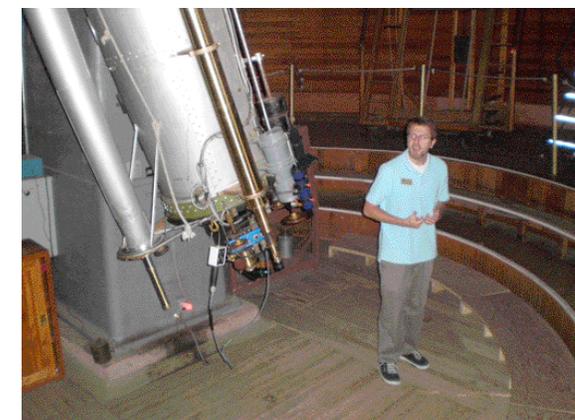
We next walked farther up the mountain toward the observatory that houses the astrograph that Clyde



Tombaugh used to discover Pluto. The path to the building was marked with signs with the name of a planet on each one. Drew explained that the distances between the signs were a scaled-down version of the actual solar system distances. Naturally, someone asked if Pluto is still considered a planet.

Some of the people on the tour were not used to thin air, so they waited at the bottom of the path while the rest of us went into the observatory.

I had read a biography about Clyde Tombaugh when I was a kid, so I felt a connection with him and his story. He built his first telescope when he was 20 and sent drawings of the planets to the Lowell Observatory. They were so impressed that they offered him a job. It was probably a job that no one else wanted. He was to sit by the astrograph for the entire 1-1/2 hour exposure time and make corrections as needed. There are about 300 good observing nights in Arizona, so he was busy most of the nights. Eventually they gave him the job of using the blink microscope. Clyde worked for about a year before he discovered Pluto. The search was started because of unexplained motions in the orbits of the



outer planets. It was later learned that the unexplained motions were caused by an error in the calculations and not by Pluto.

There was a contest to name the ninth planet, and it was won by an eleven-year-old named Venetia Burney. The name Pluto was selected partly because the first two letters were Percival Lowell's initials.

After Clyde discovered Pluto, he was sent to college to become a professional astronomer.

## GEMINI INFO

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Send all MAS membership dues, change of address cards, subscriptions and renewals to the current MAS Membership Coordinator. See "How to pay your dues" on the last page of this newsletter.

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As we were leaving the observatory I felt compelled to touch the astrograph. I explained to Drew that "I just had to touch it." He didn't say anything.

Finally, we went down the path to the Slipher Building. The front of the building had a dome roof. I thought it might be a planetarium, but it wasn't. It houses a small museum that, among many other artifacts, contains the blink microscope that Clyde used. There is also a visitor's log book with the signatures of Neil Armstrong and Frank Borman from their trip here to use the Clark Telescope. After about 10 minutes we were told it was time to go. I could have spent a couple of hours there, and I emailed them explaining that the time was too short. I didn't take a single picture there. I regret that. Next time... It was about noon so there was still time to go to Meteor Crater! 🐾

## **MAS Board Report September/October 2007**

**Bill Kocken, secretary**

### **Board News**

Elections are in December. Ben Mullin is the election coordinator this year. The openings are VP, treasurer, and one board member at large.

### **Treasurer's News**

Bob presented a third quarter treasurer's report. All in all, the club's finances are in good shape. Dues will actually be at or above budget for 2007. Gemini printing expenses are up, so we will likely be over budget on Gemini this year. Other expenses are just a bit over budget. Our insurance costs are up this year because of the increased value of club-owned equipment. That's a good problem to have! The Onan path project cost \$16,530. The Onan foundation has already reimbursed us with a special grant of \$7,200.

### **LLCC**

An 18'x24' concrete slab has been poured at LLCC for shared use between MAS and LLCC. We agreed to share 50% of the slab's cost with the LLCC. The club's share is \$430. Next year we plan to build a garage on the slab for storage of the 30" Obsession telescope. We will have a 12'x12' space for our use. This will greatly enhance our use of that awesome scope. We will be able to store the assembled scope in the

## **MAS Board Report November/December 2007**

It has been an exciting and fun year for MAS. There is way too much to talk about here for the entire year, so I'll just summarize what's gone on since the last report.

### **Board News**

The December election of officers was completed. Steve Emert replaces Ben Mullin as VP. Merle Hiltner replaces Jon Hickman as board member at large and Bob Benson was re-elected as treasurer. Steve and Ben handed off the loaner scope program. The VP is in charge of the digital projector, and it is also the VP's responsibility to bring treats to the monthly membership meeting. We will also need a new meeting location. Steve has proposed that we meet at his workplace at Hwy 100 and 494. MAS members are welcome to attend the board meetings, which are held on the third Tuesday of the month at 7:00 P.M.

### **LLCC**

We've paid the club's share of the cost for the concrete slab

garage and simply wheel it out to the observing area. This will cut the setup and take down effort immensely.

The Dark Sky Site committee recommended that Ken Hugil fill the opening on the committee. Current committee membership is: Greg Haubrich (chairman), Bill Kocken, Ron Bubany, Loren Hoen, John Marchetti, Mike Burr, Doug Brown and Ken Hugil. Nathan Neske and Cort Sylvester have stepped aside due to family obligations and work pressures. We'd like to thank them for their contributions.

### **Outreach**

Outreach activities, especially at Onan, have reached new highs. The public night attendance this year has been amazing. Other outreach activities are straining our capabilities. We need to get more club members involved. Some people may not feel adequately prepared or knowledgeable enough. We discussed some ideas to improve the situation. Ideas included a want ad in the forums and featuring outreach at a future MAS meeting.

### **January Meeting**

We have the opportunity for a presentation from someone at JPL in January. Rather than move the regular meeting to an alternate date, we discussed hosting a second meeting, possibly in conjunction with the Minnesota Planetarium. Stay tuned for further details. 🐾

at LLCC, which came to \$430. This slab will be the base for a garage to be built which will allow us to store the 30" Obsession telescope fully assembled. In 2007 we had only one outreach activity at LLCC. A second outreach opportunity was cancelled by LLCC due to low expected attendance at their dinner event. Our star party cost for LLCC for 2007 was \$400 for the use of some of the darkest skies in Minnesota along with bunkhouse lodging with showers and flush toilet facilities.

### **Calendar Orders**

We organized group orders of the 2008 RASC Observers Guide and the 2008 Ottewell Calendar on behalf of club members. We made about \$60 profit for the club.

### **Budget**

We will review the 2007 expenditures and 2008 annual budget at the February membership meeting. The biggest expenditure in '07 was for Gemini. We spent approximately \$3,668 and were about \$500 over budget. This was mostly due to increased printing costs. Another budget variance is for

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insurance. With the increased value of MAS equipment, our annual insurance bill is now approximately \$1,000.

**Outreach**

Jon was contacted by the Astro Society of the Pacific about a study they are planning to do about astronomy outreach. They will be working with clubs to learn about best approaches to outreach. Jon will be their contact for now, although it will probably be transferred to a board member or to Bob Young later on,

**2007 Treasurer's Report**

This year we've seen a great deal of activity in our society with a few major projects getting underway. Cherry Grove has seen much activity and plans to continue improvements in 2008. Onan Observatory has added a much-needed driveway and parking for handicapped. The new site at the Long Lake Conservation Center will see more activity this summer after a good first year. As a result I've been busy keeping track of it all. Our fourth-quarter and year-end numbers look good. We have managed to finish the year with a small surplus. Unfortunately a few items will need a closer look for 2008. We had overruns with Gemini and special projects this year. I can assure you that the board approved all expenses not in the budget, we had no surprises (with the exception of insurance), and we will have a budget ready for the membership to vote on at our February general membership meeting on the 7th.

**Third Quarter Treasurer's Report**

We ended third quarter with total cash/cash equivalents at \$29,710.68.

We started the year at \$29,981.00

Membership income for the third quarter was \$2,438.00, just \$234.00 short of our budget. (Good news!)

Our money market dividend income was \$265.80, which puts us \$427.65 ahead of our budget for the year.

On the expense side, we've spent \$1,331.88 from the general fund and are \$216.00 over budget in expenses at the end of the quarter.

**Year-End Report**

		31-Dec-07	1-Jan-07	
<b>Cash and Cash Equivalents</b>		\$29,051	\$33,411	
		Actual through	YTD	Variance
		12/31/07	Budget	Positive/(Negative)
<b>Income:</b>	Dues	8,036	8,688	-652.00
	Donations	4,183	2,880	1,303.00
	Interest	1,310	755	555.00
	Other	1,178	120	1,057.85
		\$14,707	\$12,443	2,263.85
<b>Expense:</b>	Astronomical League	1,815	1,960	145.00
	Observatory Operations (Metcalf & Cherry Grove)	464	878	413.75
	LLCC Operations	0	600	600.00
	Monthly meetings	351	540	188.83
	Public Outreach and PR	55	300	245.00
	Special Projects	3,584	2,880	-704.00
	Gemini	3,827	3,180	-647.00
	Insurance	1,203	800	-403.00
	Other	2,192	2,413	221.20
		13,491	\$13,551	59.78

**September 2008 Meeting**

The Science Museum will be closed to the public during the time of our September meeting because of the Republican National Convention. We thought that having a meeting at Onan would be fun. The September 2008 meeting will be held on Friday, September 6, at Onan.

**Conclusion**

We would like to thank Ben and Jon for their service as VP and board member at large and welcome Steve and Merle as their replacements. Also many thanks to Bob for volunteering for a second term as treasurer. █

The table shows our cash and cash equivalents from the beginning of the year until the end of December. The categories compare our actual income/expenses to our budget, and you can see the problems we will need to address for the 2008 budget. A few items that are not shown but are worth mentioning on the positive side are the society's ways to generate income. We made a small profit on the calendar and book sales as well as generous donations collected at the Onan Observatory which would not be possible without the generous volunteers who work the public nights. And once again our members came through with personal donations and patron member support; without that the society could not afford to do the many projects we all benefit from.

Please feel free to contact me by phone or email if you have any questions or concerns about the society's finances or budget. █

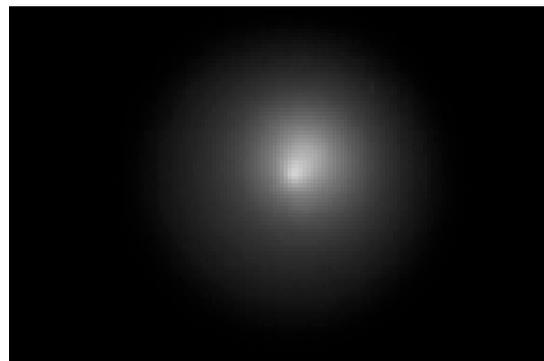
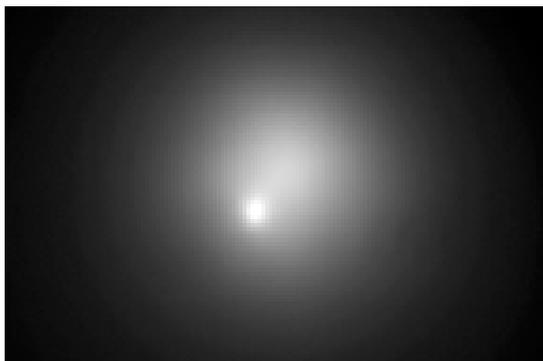
The budget for Gemini this year was \$3,100.00 and as of our 4th issue we have spent \$2,454.76 for printing and postage. That only leaves us with \$645.24 in the budget for the remaining two issues. The printing costs have gone up substantially, and we will need to adjust next year's budget to reflect that change.

The Onan Fund is normally not part of the quarterly report, but since we had a very large expense at Onan this year the numbers are as follows: Total cost for the path project was \$16,530.00. The entire amount came out of the Onan Fund, an independently financed fund. The Onan Family Foundation has made up for most of it with a \$7,200.00 special grant on top of our \$5,000.00 yearly grant for 2007. █

## Photos of Comet P/17 Holmes

by Greg Haubrich

by Kurt Casby



### 30 Years Ago In Gemini

From the minutes of the regular meeting of Feb. 7, 1978

The program for the evening was a slide presentation of an eclipse expedition taken by Bruce Lundegard and Herber Kuehl. Both went on the Fairview/Fairsea expedition of last October, which stalked the total eclipse of the sun off Peru in the Pacific. The two returned with slides of adventures both on and off the boat.

Their ship, the Fairview, left Port Everglades, Florida, and sailed to Cartagena, Columbia. From there it sailed to the Panama Canal; transiting the isthmus was one of the high-lights of the trip. (Was the eclipse one of the low lights?) From there they rendezvoused with the Fairsea for a short view of the eclipse. After a lot of shuttering, the Fairview set course for Puerto Vallarta, Mexico, where our two adventurers tried kiting behind a speedboat. Then it was back to the U.S.A. via Los Angeles. 🐦

### Messier Marathon 2008

By Bill Kocken

Can you believe it? MAS will be holding its 10th annual Messier Marathon this year. Every year, in early spring, when the nights are long and the sun isn't near any of the Messier objects, amateur astronomers have an opportunity to see all 110 of the most beautiful deep sky objects in a single night. Here in Minnesota, M30 is too low to be visible before sunrise, so we're limited to 109 objects. We've been doing this for nine years and 2008 will make it ten!

OK, but maybe your inner voices are saying, "Oh, but it'll be cold, or I'll get hungry, or I can't stay up all night, or I don't know how to find some of those pesky Ms, or I'll be lonely." Don't worry, MAS has answers to all these little voices. We have a very nice warming hut at Cherry Grove, and coffee and other warm beverages and snacks will be available to keep you fueled up. There is even time in a Messier Marathon for a nap, and most of all you'll be surrounded by the friendliest, most helpful astronomers around. As a bonus, we have prizes. We will award the grand prize for the most objects found by star-hopping, a prize for the best performance by a beginner, and a door prize just for showing up.

**Details: What/Where:** 10th annual Messier Marathon at Cherry Grove.

**When:** March 7, with March 8 as primary backup. A new moon later, April 4 or April 5, are also available as

backup dates. Call the MAS message line, 952-467-2426, or check the MAS bulletin board for go/no-go announcements.

**Who:**

**You. The event is open to all observers of any skill or stamina and any type of equipment. Bring just your naked eyes or binoculars or any telescope you wish to use. All are welcome!**

**Why:**

**It is a wonderful chance to get together, to compete a little if you wish, and jump-start the 2008 observing season.**

Messier Marathon Hints:

- A few days before, check out your scope to make sure it will be ready for the big night. At this time of the year, frost can often be a problem. Successful marathoning requires that you be able to keep your optics clear. We will have a 12-volt hair dryer available, but in severe conditions this may not be adequate.
- Gather your finder charts. This is a must for a successful marathon. There are many great resources, but I highly recommend The Year-Round Messier Marathon Guide by H.C. Pennington. We will provide logging sheets from SEDs ([www.seds.org](http://www.seds.org)) for you to record your finds. These sheets list the Messier objects in a suggested viewing order.

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*Some of the people and scopes at the 2007 Messier Marathon*

*Continued from Page 5*

- Dress warmly, very warmly. This time of the year it can be downright cold. Warm boots, hats, gloves and layers of everything else are the key. I also recommend that you pick up a few chemical hand- and foot-warmers. If the weather is dangerously cold, we will postpone the event.
- In the afternoon of the big night, take a nap, but don't blame us if your boss gets upset.

- On the big night, try to arrive early. The sun sets at 6:11 on March 7, and I suggest you try to arrive 30 minutes before that. This will give you time to sign in, set up your equipment, move your vehicle out of everyone's way and socialize a bit as we nervously wait for it to get dark enough to begin. We know that not everyone can get there that early, so don't worry if you have to arrive late.
- When your observing has ended, please turn in your log sheet. Pack up your gear and go home, or take a nap before hitting the road. If you've pulled a really late night, try not to plan too much for the next day.
- Have fun! I saved the most important hint for last. This is the year's best opportunity to see as many of the Messiers as possible in one night. But the key thing is to get out there and reintroduce yourself to the wonderful night sky and your fellow astronomers.

### **Bonus Event - Virgo Venture**

On May 2 (or 3) we will hold our annual Virgo Venture. For those of us who didn't get enough time to find, observe or enjoy the Virgo Cluster of Galaxies at the Messier Marathon, we provide a chance to circle back and do so. Stay tuned for more details as the event approaches. ■

## **Directions to the Star Party Locations**

For maps and further details about the sites, please go to our website at [www.mnastro.org/facilities](http://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		
2/1/08				7:01 PM	3:40 AM	11:54 AM	31%	2 days past 3rd qtr.
2/8/08		2/9/08		7:10 PM	8:08 AM	7:34 PM	1%	2 days past new
2/15/08			Lunar Eclipse on 2/20	7:19 PM	11:29 AM	4:24 AM	63%	2 days past 1st qtr
2/22/08		2/23/08		7:28 PM	7:53 PM	7:52 AM	99%	2 days past full
2/29/08	Baylor & LLCC(*)			7:37 PM	2:27 AM	10:31 AM	49%	1 day past 3rd qtr
3/7/08	Cherry Grove & LLCC		Messier Marathon	7:47 PM	6:31 AM	6:29 PM	0%	New !
3/14/08	Metcalfe	3/15/08		8:57 PM	11:25 AM	4:15 AM	48%	1st qtr
3/21/08				9:07 PM	7:45 PM	7:14 AM	100%	Full
3/28/08	Baylor & LLCC	3/29/08		9:17 PM	2:13 AM	10:13 AM	66%	3rd qtr
4/4/08	Cherry Grove & LLCC		Messier Marathon alt.	9:29 PM	5:53 AM	6:20 PM	5%	New !
4/11/08	Metcalfe	4/12/08		9:40 PM	10:24 AM	2:59 AM	33%	1st qtr
4/18/08				9:53 PM	6:41 PM	5:39 AM	95%	1 day before full
4/25/08	Baylor	4/26/08		10:06 PM	After midnight	10:01 AM	80%	5 days past full
5/2/08	Cherry Grove & LLCC		Virgo Venture	10:19 PM	4:14 AM	5:10 PM	15%	3 days before new
5/9/08	Metcalfe & LLCC	5/9 & 5/10	Astronomy Day	10:34 PM	9:24 AM	After midnight	20%	4 days after new
5/16/08				10:48 PM	5:39 PM	4:04 AM	87%	3 days before full
5/23/08	Metcalfe	5/24/08		11:02 PM	After midnight	8:58 AM	91%	4 days after full
5/30/08	Cherry Grove & LLCC			11:14 PM	2:36 AM	4:04 PM	28%	4 days before new
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%	2 days after full
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	Chery 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](http://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.



## MN ASTRONOMICAL SOCIETY

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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. Send your payments to the MAS Membership Coordinator at: Minnesota Astronomical Society, Attn: Membership Coordinator, P.O. Box 14931, Minneapolis, MN 55414. Make checks payable to MAS or you can pay by PayPal on the MAS web page. The current annual membership dues and subscription fees are: \$24 for regular memberships (\$56.95 including a Sky and Telescope subscription discounted to the annual member subscription rate of \$32.95), \$60 for patron memberships (\$92.95 including Sky and Telescope subscription) and \$12 for student memberships (\$44.95 including Sky and Telescope subscription).

#### 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.