

# Gemini



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DECEMBER  
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DECEMBER 2000

## Month at a Glance

All times listed are CST, 2400 hour format

JANUARY 2001

- 4 Pluto is in conjunction with the Sun, passing into the morning sky.
- 9 The Moon closes to 1.7 deg. south of Saturn: evening sky.
- 10 The Moon closes to 3.0 deg. S. of Jupiter and 8.0 deg. from Pleiades: evening sky.
- 13 The Geminid Meteor Shower Peaks. Watch to the NE but a just-past-full moon will all but ruin the view.
- 14 The Moon appears 0.5 deg. N.E. of the Beehive cluster: evening sky.
- 20 The Moon appears 4.0 deg. N. of Mars: morning sky.
- 21 The Winter Solstice: 7:38 AM. Winter begins.
- 23 Venus appears 1.2 deg. S. of Uranus: evening sky. The Moon appears 0.9 deg. N. of Ceres: morning sky.
- 25 **Partial Solar Eclipse: 56% of the Sun eclipsed**  
Times in Local Standard Time for St. Paul.  
Begins: 0939 Maximum: 1107 Ends: 1241 Lasts 03h02m  
Mercury is at Superior Conjunction, behind the Sun.
- 28 The Moon appears 2.0 deg. S. of Neptune: evening sky.
- 29 The Moon appears 1.8 deg. N. of Venus and 2.2 deg SSE of Uranus: evening sky.

**Check out the eclipse on Christmas Day!** The last solar eclipse of the millenium, if you're counting correctly. **Remember to never look at the sun without proper eye protection!** For proper viewing use a #14 welders glass, or get some eclipse glasses. They are cheap and available at the Minneapolis Planetarium.

**Moon** First Quarter: **3rd** Full: **11th**  
Last Quarter: **17th** New: **25th**

**Mercury:** Libra/Sagittarius. Find it early in the month on the ENE horizon just before sunrise in the first week of the month, going around behind the Sun by month end.

**Venus:** Sagittarius/Capricornus. Incredibly bright! Low in the southwest after sunset all month.

**Mars:** Virgo. High in the east before dawn.

**Jupiter:** Taurus. High in the East at sunset, passing due South at midnight.

**Saturn:** Taurus. Just West of Jupiter, but not as bright.

**Uranus:** Capricornus. Low in the West-southwest after sunset.

**Neptune:** Capricornus. Low in the West-southwest after sunset, just West of Uranus, setting about an hour earlier.

**Pluto:** Ophiuchus. Lost behind the Sun this month.

- 3 Quadrantid meteor Shower peaks. Moon will be set during peak after midnight.
- 5 The Moon appears 2.0 deg. S. of Saturn in the evening sky.
- 6 The Moon appears 3.0 deg. S. of Jupiter in the morning sky.
- 9 Total Lunar Eclipse for Earth's Eastern Hemisphere. Partial phase will be just ending at moonrise for Minnesota. Should be indistinguishable.
- 17 Venus is at Greatest Eastern Elongation, 47 deg. from the Sun: evening sky.
- 22 Mercury passes 0.5 deg. S. of Uranus in the early evening sky.
- 25 The Moon passes 3.0 deg. S. of Uranus and 5.0 deg. S. of Mercury; early evening sky.
- 28 Mercury is at Greatest Eastern Elongation, 18 deg. from the Sun: early evening sky. The Moon appears 6.0 deg. S. of Venus in the evening sky.
- 29 The Moon appears 2.0 deg. N. of Venus in the evening sky.
- 30 The Moon passes 1.8 deg. S. of Neptune in the evening sky.

**Check out** the lovely Venus, living up to its namesake, bright and bold to the southwest. Brighter than anything in the sky except for the Sun and Moon, and occasional Iridium flare. Her cloud-choked atmosphere reflects over 75% of the sunlight that strikes the planet.

**Moon** First Quarter: **2<sup>nd</sup>** Full: **9<sup>th</sup>**  
Last Quarter: **16<sup>th</sup>** New: **24<sup>th</sup>**

**Mercury:** Sagittarius / Capricornus. Swinging around the Sun to peak in the evening on the 28<sup>th</sup>.

**Venus:** Aquarius/Pisces. Easy to spot after twilight in the Southwest.

**Mars:** Virgo/Libra. Rising at 0200 by month's end, high in the predawn sky.

**Jupiter:** Taurus. Found next to the Seven Sisters high to the South.

**Saturn:** Taurus. Leading brighter Saturn across the southern sky.

**Uranus:** Capricornus. Lost in the glow of twilight.

**Neptune:** Capricornus. Setting just before Uranus, lost in the glare of the Sun.

**Pluto:** Ophiuchus. Lost in dawn's glow, climbing higher into the predawn sky by month end.

**Editor**

Thor Olson

**Circulation**

John Treadwell

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thor.olson@mn.efi.com

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MAS Gemini

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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 10th of the month preceding the month of publication.

**Patron Members**

MAS offers a patron membership to anyone who wants to help support our activities by paying a slightly higher annual membership fee (\$40 instead of the regular \$16). We would like to thank the following patron members who helped support MAS during 1999:

James A. Bowditch

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**Now Showing!**

Compiled by Ron Schmit

**Minneapolis Planetarium: 612-630-6150****Showing now until January 11:**

“*Tis the Season*”: Saturday and Sunday at 1415. Thursdays: 1900.

Explore this season of light and possibilities for the Christmas Star.

“*Winter Wonders*”: Saturday and Sunday: 1300 & 1530.

Special **Holidazzle Showtimes**: Friday & Saturday: 1730.

Travel around the world discovering holiday traditions and celebrations!

**Starting January 12:**

“*Journey to the Stars*”: Saturday and Sunday at 1415. Thursdays: 1900.

Join us for a fantastic voyage from the Earth to the edge of the universe.

“*SuperStars*”: Saturday and Sunday: 1300 & 1530.

Meet the Super Heroes of the sky!

**Showing December and January:**

“*Romancing the Stars*” 2<sup>nd</sup> Saturday of each month: 19:00.

Sit back and enjoy an evening of love stories under the stars.

“*Minnesota Skies*”, 2<sup>nd</sup> Wednesday of each month: 1200 & 1900

A close look at the best sky sights of the month.

“*Starlight, Starbright...*” January 27th: 1100

A charming show designed for children ages 3-5.

Cost for most shows: \$4.50 for adults, \$3.00 for kids 12 and under.

**Eisenhower Observatory: 612-988-4077**

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.

**MAS Officers****President: Ben Huset**

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**Board Member: John Connery**

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**Announcements etc.****MAS Elections**

Elections for the positions of President, Secretary, and Board Member will be held at the December 5th general meeting. Read the biographies of the candidates in this issue of Gemini.

Should a member be unable to attend the December meeting, that member may request in writing a ballot from the Nominations Chairperson. Such ballots must be returned to the Nominations Chairperson by November 30.

Robert H. Schmidt,  
Nominations Chairperson  
6445 Emerson Ave. So.  
Richfield, MN 55423-1316

## Starhouse Observatory

Dave Olmstead  
photos by Ben Huset

Michael Koppelman had an open house for his observatory on Saturday evening (September 30) so I drove from Baylor out to his location which is kind of southwest of Shakopee.

What a cool personal observatory he has constructed! A multi-level building with a home dome over the telescope where he can pursue his astrophotography. Really a cool place to just hang out at, even on a cloudy evening.



*Michael's astrograph can be seen through the opening in the dome. Access is through the door at ground level, then up to the observing floor. The concrete pedestal goes down far enough to reach stable ground somewhere near the Earth's mantle.*



*Michael Koppelman in front of his new observatory.*

Michael supplied good eats and lit a gigantic bonfire that was mesmerizing and kept in check by a guy manning a water hose. It was a nice balmy evening with a few stars poking out here and there. Fellow MAS member Todd Giencke was there and we all talked astronomy, CCD, and equipment most of the evening. Just a great time. Thanks for the invite! Congratulations!

Dave O.



*A home for his Takahashi 6" Epsilon, on a mount that won't need nightly alignment!*

*Editor's note: This project is probably not the only personal observatory built by an MAS member. If you have similar experiences, please share them, either by submitting a description here in Gemini, or perhaps making a short presentation at an MAS meeting (see the subsequent article on meeting topics).*

*A story and an editorial, from your editor.*

I had the opportunity to travel to Arizona recently on business, and I arranged my schedule so that I could spend the weekend in the desert, enjoying and photographing the famous dark skies of the state. Alas, Arizona, and all the surrounding states were covered by clouds, the result of an "anomalous jetstream pattern" that had settled over the region.

There are plenty of things to do in Arizona, right? I revised my plans. I had encountered a website for TAAA, the Tucson Amateur Astronomy Association. It announced that their monthly meeting would be held on Friday, 3 November, the day I would be arriving. I followed the instructions to an auditorium on the University of Arizona campus, and attended a meeting that was much like an MAS general meeting... only more so, read on.

The TAAA meetings are actually segmented into three or four submeetings. The first, called the "beginners lecture", started at 6:30 and ran until 7:15. The topic was meteors, and a local meteor scientist presented slides and samples of meteors and explained how they are clues to the composition of planets. In fact, geologists *don't actually know, and can't measure*, the composition of the Earth! Their current model, with its mantle and iron core has been *inferred* by the composition of meteorites. Questions, answers, and a short break, brought us to 7:30, the beginning of the main meeting.

The main topic was a presentation by a retired physics professor who was also an avid amateur observer. He described his experiences with the Collins 13 image intensifier in combination with various nebula filters on his 10" Dobsonian. I was expecting a lecture on the physics of diffuse emission nebulas, but instead it was an "observers view" including the nuts and bolts of fitting components together and a description of what the views were like. Questions were answered until about 8:30 when the president made some announcements about upcoming events, an Astronomical League (AL)

award for the Herschel 400 was given, and then... a raffle! Or rather, *this month's* raffle.

Every month about a dozen items ranging from chemical handwarmers, posters, books, gift certificates, to planetarium software is raffled to the winning tickets of attendees. The items are contributed by local stores and individuals.

The meeting took a break for snacks and socializing. The librarian had brought a selection of books that were on display and available for signout. Like us, they are looking for a permanent home for the library. Also like us, they are building an observatory and had signup sheets for various construction activities.

I met several members and asked about the club's dark sky sites (I still hadn't given up completely on the weather). They have two, but one member told me that he had never been to either: his back yard was plenty dark, and one of the sites (Empire Ranch) was "way out there, it must be nearly a FOURTY-FIVE MINUTE DRIVE"!

At 9:30 the third segment of the meeting began. This is where members could give little presentations on any topic of interest-their latest projects, recent experiences, show-and-tell. This month there was only one: a description of the month's highlights for planetary observing (presented by the Herschel 400 award recipient) including notes on observing the transit plus shadow(both moon and shadow are visible) across Jupiter, an event that happens rarely, and only at opposition.

The official meeting concluded at about 10:00, but I noticed that there was yet another meeting segment that followed- a contingent of members continued on at a local restaurant. I was unable to note at what time that session ended!

Begin editorial...

All of this felt right at home for me-similar folks with similar interests. The meeting was well attended, about 100

people. This is considerably better than our own turnout (typically 30-40), since our clubs both have about the same total membership (300-400). This suggests that we might be able to engage more of our members if we can discern what makes for this success at TAAA.

Certainly it's not the degree of passion for astronomy. To be an amateur astronomer in Minnesota requires a resolve to overcome hardships that would wither any Tucson resident. Dew is an unheard-of phenomenon there, dark skies are over a hundred miles away for some of us, and the temperatures we routinely observe in would send a TAAA member shivering to their carport. No, it's not for lack of energetic willpower or enthusiasm for astronomy that differentiates our club participation.

I don't profess to know the exact answer, but I suspect that there may be some organizational aspect that is involved. Like many such organizations, the TAAA is led by a modest number of very active members (including well known amateur David Levy). While the leadership is made of an active core, I noticed from their newsletter that the various month-to-month operational tasks are spread among a wider group. In addition to the usual list of officers (president, secretary, treasurer, board members), there are additional "positions" that are listed including: chief observer, AL correspondent, astrophotography SIG, computers SIG, and star party coordinators. Not listed in the newsletter, but apparent from the meeting were other positions, where some individually managable part of keeping the club humming had been delegated.

It may also be the case that the TAAA monthly meetings are more compelling to its membership. A recent thread on our own MAS email list proposed varying our usual fare of science topics to include more of the observational and hobby aspects of amateur astronomy. The response was predictably mixed, but as a consequence of the topic being broached, a number of MAS members volunteered to give presentations about various projects and topics they had gained experience with.

My own opinion lies with encouraging

## ELECTION OF OFFICERS, December 5, 2000

and including more of our own members in the meetings, without foregoing entirely our exposure to challenging science topics. Our membership ranges from extreme beginners to advanced experts, and I think it is the large ranks of beginners who stand to benefit most from a more balanced program. In this regard I think the TAAA has it right.

Specifically, the partitioned meeting held in a state-of-the-art auditorium with plenty of time scheduled (and managed) for the topics, contributions from members, and an opportunity to extend it past closing time at a nearby cafe' are all positive aspects of a successful meeting.

If some of the ideas presented here seem on the right track, you may want to share this opinion with our board members. As you encourage them to spread and delegate more of the load, optimize our meeting structure, and organize ourselves for more member participation, you can also help them out by identifying your own skill set, perhaps offering to do some small, manageable, even insignificant item. It may be inconsequential for you, but it could become part of a large collection of member-driven efforts, contributing to a thriving organization, the Minnesota Astronomical Society.

Thor Olson,  
Gemini Editor.



*Spectacular red and green aurora were recorded by Ben Huset over the Onan Observatory at Baylor.*

Election to the offices of President, Secretary, and Board Member At Large will take place at the December 5, 2000 meeting of the Minnesota Astronomical Society.

### Candidates for office of President

**Ben Huset (incumbent):** Ben has stressed increasing club outreach events and opening the Onan Observatory. He has served the last two years as MAS President and seeks re-election to expand these and other activities. He has been a member since the mid 1980's and was a Board Member in the mid 1990's.

**Michael Koppleman:** Mike is a North Dakota native who went to Berklee College of Music in Boston. He worked as a recording engineer and record producer for Prince and others. Mike is currently Chief Technical officer at Bitstream Underground, a Minneapolis Internet technology company. Mike has been a member of Minnesota Astronomical Society since 1998 and has recently completed a small observatory near Chaska. Mike said that as president he would have the following priorities: 1) Keep the club focused on enhancing our enjoyment of astronomy. We are interested in astronomy, not clubs. 2) Try to make meetings more interactive. 3) Work toward more light pollution awareness and elimination. 4) Promote the MAS through fun items, such as T-shirts, coffee mugs, and mouse pads, primarily as public relations rather than money making. 5) Resource utilization, noting that all facilities should be available and used on a regular basis.

### Candidates for Secretary

**Sam Hunt:** Hooked on astronomy at the age of 13 in 1958 while looking through a friend's 8" scope, Sam has owned and used passionately, mostly small refractors and medium sized Newts. Started making Newts in 1971, and made several six to 10-inch scopes. Sam was President of the Des Moines Astronomical Society in the early 1970's and was also President of the Central Iowa Amateur Astronomers (CIAA) in the late 1970's. Sam has interests in 35mm photography; computer aided optical design, and archeology Sam is employed by Kforce Consulting as a Windows database analyst and programmer.

**Paul Baude:** Paul has been a member of the Minnesota Astronomical Society for three short years during which his interest in amateur astronomy has slowly evolved. He works at 3M Company as an engineer and calls Maplewood home. Paul manages to get out a few times a month to scan the skies from his backyard with a pair of reliable binoculars and a less reliable 6" dobsonian scope.

### Board Member at Large

**Gale A. Jallen:** Gale grew up in South Dakota where his father was a watchmaker. Gale used his father's jeweler's lathe to grind and polish strong negative lenses to make telescopes using old reading glasses as objectives. Gale has a BS in Electrical Engineering from ND State. He has worked for CDC and Seagate. He has eight patents covering a variety of subjects.

Gale now has a Meade LX200 that he says beats the reading glass telescope of his youth. His dream is to build or acquire a CCD camera for the Meade. Gale is an active Ham operator, a member of IEE and other radio-related societies, and of course, MAS.

**John Treadwell (incumbent):** John has been a member of the Minnesota Astronomical Society for about ten years and has served as an officer for the last four years. He has been a member of the OTC, a planning and organizing group of MAS members along with the architect, which has worked to see that the Onan Observatory came to be. John's special interest for MAS is outreach and education in astronomy. His personal interest is deep sky astronomy.

## MAS Member Wins National NASA Competition

Emma Schmidgall, MAS member and Robbinsdale Cooper High School student, was awarded first place in the NASA Student Involvement Program. She is part of a student team being honored for work on Long-Term Martian Climatic Studies, a proposed space mission to Mars for the long-term study of Martian weather. Schmidgall and two partners

conducted their research in an accelerated math class through the University of Minnesota Talented Youth Mathematics Program. More than 1200 entries were judged for the NASA competition by scientists, engineers and educators. Schmidgall won a trip to Washington, D.C. in May, where her team attended an awards ceremony and presented their research project.

## For Sale

For Sale: 4-1/2" OTA, \$90.00

For Sale: 15" f/4.5 primary mirror, \$600

For Sale: 16" f/5 Dob, Tectron Tubes and connectors, 2" focuser, 16" Zerodur primary mirror, 2.6" secondary, \$1700, will discount price for a 10" f/6 Dob or OTA trade-in.

Contact Kelly Vickerman,  
763-413-2980.

## MAS Board Meeting Minutes

**Robert Schmidt**

Minutes of the October 17, 2000 meeting of the Board of the Minnesota Astronomical Society.

Board members in attendance: Ben Huset, President; Dave Olmstead, Vice President; Chuck Jorgensen, Treasurer; John Connery, Board Members at Large; Bob Schmidt Secretary. Also present was Jim Fox, NCRAL 2002 Chairman for MAS.

Meeting was called to order by President Ben Huset at 7:05 PM.

The Minutes of the September Board Meeting were approved as read.

The Treasurer's report: There was an increase in insurance coverage. Chuck Jorgensen moved and John Treadwell seconded a motion: Change the signatories on the Minnesota Astronomical Society Bank Account to reflect current officers of the Society. Motion was discussed briefly and was passed unanimously. Also by unanimous consent the Treasurer was directed to convert the Certificates of Deposit into Money Market Funds as they became due as that would increase earned interest and also makes the funds accessible on demand without interest penalties. The Treasurer also distributed copies of the current Quarterly Report.

No Web report.

Library report: The books of the library are in Ben Huset's car. The need for a new Librarian was noted.

Meeting report: November, Ron Schmit; December, Mike Duvernois; January, Todd Giencke; February, Annual Business Meeting.

Meeting place was discussed with suggestion that we continue at The Science Museum of Minnesota but that we start meetings at 7:00 PM rather than 7:30 PM.

Outreach report: A flyer from Star Quest was distributed. Star Quest occurred October 14, 2000 at Radio City in Mounds View. See <http://www.FreeMars.org/mnfan/starquest00/>

Metcalf report: Warming house timer is in and operational. Thanks to Jim Fox there is now 115-volt AC power to the piers on either side of the driveway to drive telescopes or computers. A motion was made to install a new lock on the warming house as the security of the present lock had been compromised. Motion was seconded and passed. Jim Fox offered to get a new lock.

Cherry Grove: No report.

Onan report: Dave Olmstead reported that there is work to do Saturday on the arches for the seal between the rolling roof and the next unit of the observatory and also landscape work on the perimeter path around the observatory. Also a public event is planned for Friday evening and Saturday evening.

Chuck Jorgensen moved and Dave Olmstead seconded a motion to make \$3200.00 available to Ralph Nelson to purchase cabinets and benches for the Onan Observatory. Motion carried.

Jim Fox reported on NCRAL 2002, distributing a planning sheet and then discussing items on the sheet.

The Marion Warling scope power supply has to be reworked as it trips GFCI breakers. Also lockscrews are needed on the finder. Also safety when using the scope must be addressed.

Ben Huset displayed a Meade 10" LX6 scope, a gift from Patron member Jon Geiss to the MAS, a fine tool for outreach events. Also the Library books were moved from Ben's car to Dave Olmstead's garage.

A motion was made, seconded and passed to authorize \$100.00 to buy plastic boxes to store the library books.

The next Board Meeting will be November 21, 2000 at the home of Bob Schmidt.

Adjournment at 10:17 PM.

Robert H. Schmidt, Secretary

## Science Museum of Minnesota Astronomy Classes: 651-221-4511

The Science Museum offers classes in “entry level” astronomy for both families and adults. Classes may be taken individually or all together. Call for details!

### Adult Programs

*The Night Sky*: Friday, December 1, 1900-2100.

A look at what’s out there, what it looks like, and how you can find it.

*The Planets*: Friday, December 8, 1900-2100.

A visit with our neighbors the planets. So alike but so different...

*Passport to the Sky*: Friday, December 15, 1900-2100.

The tools of the trade – what equipment do you need to do astronomy?

## 2000 Star Parties

**Star parties are held on Friday if weather permits, otherwise on Saturday. Call (651) 649-4861 after 6:00 PM 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 Waconia, 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.

### 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	Site	Sunset	Moon
1-Sep	METCALF	19:55	sets 19:54
22-Sep	ONAN/BAYLOR	19:10	rises 0:03
29-Sep	CHERRY GROVE	18:57	sets 20:20
6-Oct	METCALF	18:44	sets 1:06
20-Oct	ONAN/BAYLOR	18:19	rises 0:43
27-Oct	CHERRY GROVE	18:08	rises 7:51
3-Nov	METCALF	16:58	sets 22:51
17-Nov	ONAN/BAYLOR	16:42	rises 22:46
24-Nov	CHERRY GROVE	16:37	rises 5:45
1-Dec	METCALF	16:33	sets 21:38
15-Dec	ONAN/BAYLOR	16:33	rises 20:31

### Parking at Onan Observatory

We are requested by Marty Walsh, of Baylor Regional Park, our host for the Onan Observatory, that MAS members 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 when you attend your next outing at Baylor, PLEASE PARK in the PARKING AREA.

## 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 Rd. Minneapolis, MN 55414-3627. Make checks payable to MAS. The current annual membership dues and subscription fees are:

<b>Regular membership</b>	<b>\$ 16.00</b>
<b>Patron membership</b>	<b>\$ 40.00</b>
<b>Student membership</b>	<b>\$ 10.00</b>
<b>Subscription to Gemini for members of other astronomy clubs</b>	<b>\$ 4.50</b>
<b>Subscription to Gemini for other persons</b>	<b>\$ 9.00</b>

### 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). 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.

**GEMINI**

**MNASTRONOMICAL SOCIETY**

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**Minneapolis, MN 55458-3011**

ADDRESS SERVICE REQUESTED

To subscribe to the MAS e-mail list send e-mail to:

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with the single line

**subscribe**

in the body (not subject) of the message.

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

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