

# Inside Orbit

A Publication of the  
Grand Rapids Amateur  
Astronomical Association

## In This Issue:

### March Meeting Information

*George Lessens from WZZM TV13 will speak to the GRAAA on Saturday, March 8. The title of his talk is "Weather Tools of the TV Meteorologist."*

### Calendar of Events & News Notes

*Happenings in the GRAAA and the astronomical community*

### NASA's Space Place - "Invisible Spiral Arms"

*The wonders of the world of science and technology, brought to you by NASA and the Jet Propulsion Laboratory*

### Chaffee Planetarium Sky Shows

**Note:** Any views and opinions expressed by the authors in this publication are not necessarily those of the GRAAA or its members.

#### Inside Orbit Staff

Editor-in-Chief	Kevin Jung
Editing, Layout & Graphics	Kevin Jung
Contributing Authors	
Contributing Authors <i>(this edition)</i>	
Production Staff	Kevin Jung

#### GRAAA Website

[www.graaa.org](http://www.graaa.org)

#### Mailing Address:

Inside Orbit  
3308 Kissing Rock Ave SE  
Lowell, MI 49331

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February lunar eclipse © 2008 Sharon Finkbeiner  
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**MARCH MEETING NOTICE**  
**Saturday, March 8, 2008**  
**7.30pm - Public Museum, Meijer Theater**

**"Weather Tools of the TV Meteorologist."**

**PRESENTED BY GEORGE LESSENS**  
Chief Meteorologist  
WZZM TV-13

Forecasting the weather can be interesting, especially in an area like West Michigan. With a big lake to the west affecting the weather all year, it makes interpreting and understanding the various scientific models a special challenge.

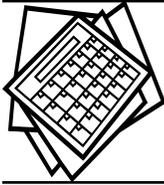
Chief Meteorologist George Lessens gives an insight into the science and technology behind the television weathercasts from WZZM 13, the station with "West Michigan's Most Accurate Forecast."



**About the Speaker:**

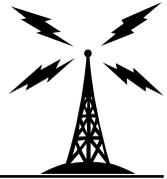
George Lessens is the Chief Meteorologist at WZZM TV13, and has been with the station since 1980. A graduate of Lowell High School, he received his degree in meteorology from Penn State University. He is a member of the American Meteorology Society (AMS) and holds its highest seal of approval as a Certified Broadcast Meteorologist (CBM.) He also serves on the National AMS Broadcast Board of Meteorology, the governing body that evaluates meteorologists seeking to obtain the AMS or CBM Seals of Approval. He is also a member of the National Weather Association. George is an Eagle Scout, having earned the Boy Scouts' highest honor from Troop 102, Lowell, MI.

*As usual, all members are invited. This meeting is open to the public. All are encouraged to attend.*



## News and Events

(Latest News and Events always online  
at [www.graaa.org](http://www.graaa.org))



**THE GENERAL MEETING OF THE GRAAA** will be held on Saturday, March 8th at the Public Museum Meijer Theater starting at 7.30pm. The program, beginning at 8.00pm, will feature local meteorologist George Lessens, who will speak on "**Weather Tools of the TV Meteorologist.**"

### *About the Topic:*

Forecasting the weather can be interesting, especially in an area like West Michigan. With a big lake to the west affecting the weather all year, it makes interpreting and understanding the various scientific models a special challenge. Chief Meteorologist George Lessens gives an insight into the science and technology behind the television weathercasts from WZZM 13, the station with "West Michigan's Most Accurate Forecast."

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**VISITORS' NIGHTS FOR 2008:** The new season of Visitors' Nights at the observatory will be starting at the end of April, which means it's probably about time to think about signups. The full schedule is up on the website (Member's Area), so check out the schedule, and if you can, put your name down for some nights (six would be nice) by dropping an email to the website.

**MEMBERSHIP RENEWALS:** May is the usual month for most memberships to expire (except those who joined at other times of the year). There will be a renewal notice sent out via regular (old-fashioned USPS "snail mail") this month, and emails reminders until everyone's paid up. If you want to "beat the rush" you can download a renewal form from the Member's Area of the website.

**APRIL MEETING ADVANCED NOTICE:** Make sure you put Wednesday, April 16 on your calendar. We're having the April meeting later (and during the week) for a special speaker, [NASA Astronaut David Leestma](#).

**INSIDE ORBIT AUTHOR RETIREMENT:** After ten whole years, Jeff Kozarski has retired his (cyber) pen and will no longer be doing the monthly "Solar System" article. Anyone interested? Email for details.

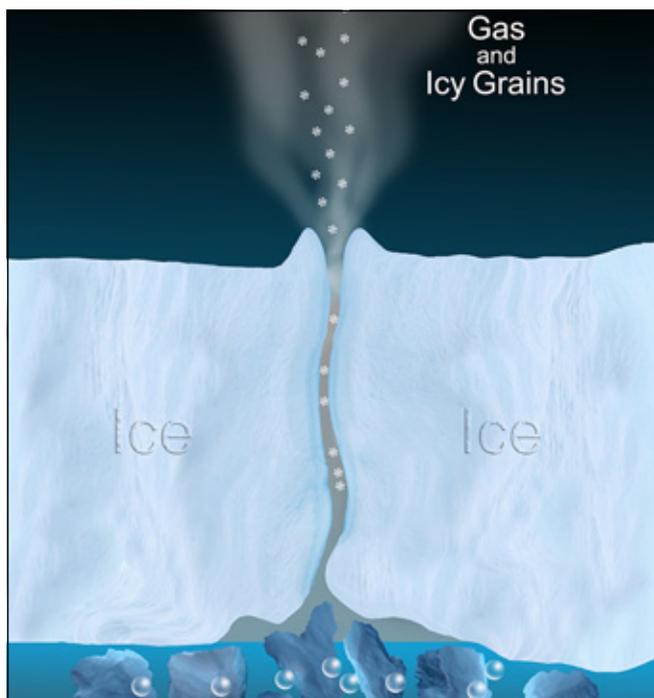
**GRAAA ONLINE FORUM:** Just a reminder of the forum for club members. It's a great place to get the latest scoop on club (and general astronomy) news, observing tips & tricks, and a whole bunch of other fun and informative things for all members to share in. You can find a link to the Forum in the Members' Section of the website. It hasn't been used much - c'mon people!!

**APRIL INSIDE ORBIT:** The deadline for submissions to the April 2008 *Inside Orbit* is March 22nd. If you'd like to write anything, please feel free to do so. The editorial staff is very relaxed concerning submissions, and take anything

that's remotely interesting. In fact, they will almost guarantee that it will be published.

**HARLOW SHAPELY LECTURE IN KALAMAZOO:** The Kalamazoo Astronomical Society and Western Michigan University are presenting a speaker from the Harlow Shapely Visiting Lecture Program on March 25th. Dr. Christine Jones of the Center for Astro-Physics, Harvard University. Dr Jones will speak on *Reflections from Outbursts of Supermassive Black Holes at the Centers of Galaxies*.

**SCIENTISTS STUDY 'PLUMBING' IN PLUMES OF ENCELADUS:** Scientists on the *Cassini* mission have become out-of-this world "plumbers" as they try to piece together what's happening inside the "pipes" feeding the plumes of Saturn's moon Enceladus.



Enceladus is jetting out giant geysers three times the size of the moon, and now scientists are beginning to understand how the ice grains are created and how they might have formed. Knowing the process of how the plume forms and the path the water-ice particles have to travel is giving them an insight into what may be a liquid reservoir or lake lying just beneath the surface.

**NASA'S DEEP IMPACT BEGINS HUNT FOR ALIEN WORLDS:** NASA's *Deep Impact* spacecraft is aiming its largest telescope at five stars in a search for alien (exosolar) planets as it enters its extended mission, called *Epopi*.

*Deep Impact* made history when the mission team directed an impactor from the spacecraft into comet Tempel 1 on July 4, 2005. NASA recently extended the mission, redirecting the spacecraft for a flyby of comet Hartley 2 in 2010.

**ARECIBO OBSERVATORY ASTRONOMERS DISCOVER FIRST NEAR-EARTH TRIPLE ASTEROID JUST 7 MILLION MILES AWAY:** Once considered just your average single asteroid, 2001 SN263 has now been revealed as the first near-Earth triple asteroid ever found. The asteroid -- with three bodies orbiting each other -- was discovered this week by astronomers using the radar telescope at the National Science Foundation's (NSF) Arecibo Observatory in Puerto Rico.

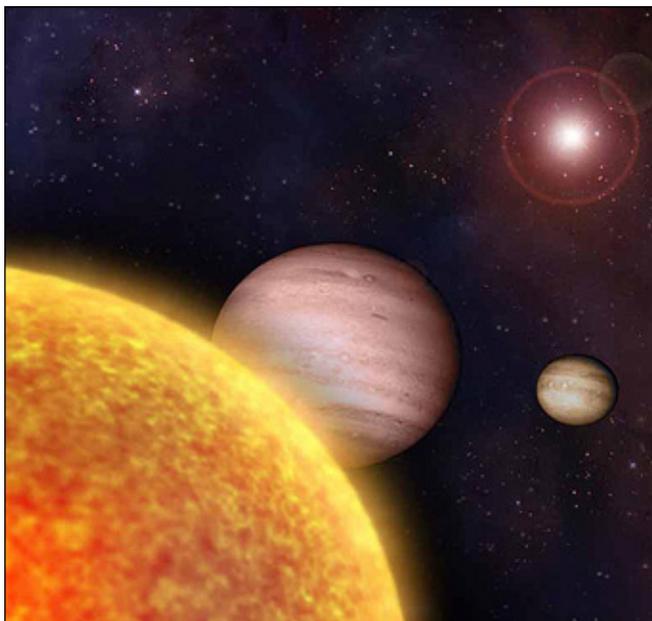
**POSSIBLE PROGENITOR OF SPECIAL SUPERNOVA TYPE DETECTED:** Using data from NASA's *Chandra X-ray Observatory*, scientists have reported the possible detection of a binary star system that was later destroyed in a supernova explosion. The new method they used provides great future promise for finding the detailed origin of these important cosmic events.

In an article appearing in the February 14th issue of the journal *Nature*, Rasmus Voss of the Max Planck Institute for Extraterrestrial Physics in Germany and Gijs Nelemans of Radboud University in the Netherlands searched *Chandra* images for evidence of a much sought after, but as yet unobserved binary system - one that was about to go supernova. Near the position of a recently detected supernova, they discovered an object in *Chandra* images taken more than four years before the explosion.

**PROPOSED CARL SAGAN COMMEMORATIVE STAMPS UNVEILED AT ITHACA SCIENCENTER:** A movement to immortalize famed Cornell astronomer Carl Sagan with a U.S. postage stamp was launched Feb. 11 for local media at the Ithaca Sciencenter. Patrick Fish, founder of the Utica-based grassroots Sagan Appreciation Society, and Charles Trautmann, executive director of the Sciencenter, unveiled four renderings by three artists or

artist teams of proposed Sagan memorial stamps that the society plans to submit to the U.S. Postal Service for commissioning.

**ASTRONOMERS DISCOVER SCALED-DOWN JUPITER AND SATURN IN A FARAWAY SOLAR SYSTEM LIKE OUR OWN:** An international team of astronomers has discovered two planets that resemble smaller versions of Jupiter and Saturn in a solar system nearly 5,000 light years away.



The two planets were revealed when the star they orbit crossed in front of a more distant star as seen from Earth. For a two-week period from late March through early April of 2006, the nearer star magnified the light shining from the farther star.

**MARS ROVERS SHARPEN QUESTIONS ABOUT LIVABLE CONDITIONS:** Like salt used as a preservative, high concentrations of dissolved minerals in the wet, early-Mars environment known from discoveries by NASA's *Opportunity* rover may have thwarted any microbes from developing or surviving.

"Not all water is fit to drink," said Andrew Knoll, a member of the rover science team who is a biologist at Harvard University, Cambridge, Mass.

**A LIGHTWEIGHT DISK AROUND A LIGHTWEIGHT STAR MAY HARBOR EARTH-LIKE PLANET:** A team of Japanese astronomers resolved a circumstellar disk around the young lightweight star FN

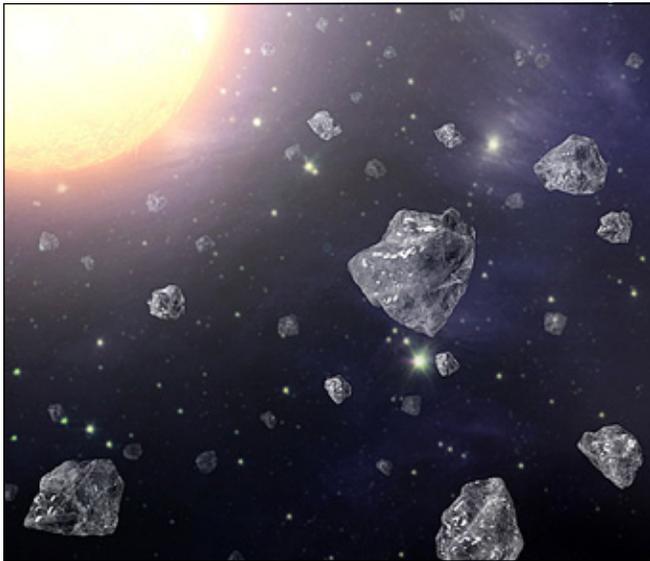
Tau. The diminutive star is located in a star-forming region toward the Constellation Taurus at a distance 460 light years from Earth. This research group used the Coronagraphic Imager with Adaptive Optics (CIAO) at the Subaru Telescope to directly image FN Tau and the lightweight disk of planet-forming material surrounding it. This star is merely 100 thousand years old and weighs only one tenth of the Sun.

**MANY, PERHAPS MOST, NEARBY SUN-LIKE STARS MAY FORM ROCKY PLANETS:** Astronomers have discovered that terrestrial planets might form around many, if not most, of the nearby sun-like stars in our galaxy. These new results suggest that worlds with potential for life might be more common than we thought.



University of Arizona, Tucson, astronomer Michael Meyer and his colleagues used NASA's *Spitzer Space Telescope* to determine whether planetary systems like ours are common or rare in our Milky Way galaxy. They found that at least 20 percent, and possibly as many as 60 percent, of stars similar to the sun are candidates for forming rocky planets.

**SPITZER'S EYES PERFECT FOR SPOTTING DIAMONDS IN THE SKY:** Diamonds may be rare on Earth, but surprisingly common in space -- and the super-sensitive infrared eyes of NASA's *Spitzer Space Telescope* are perfect for scouting them, say scientists at the NASA Ames Research Center in Moffett Field, Calif.



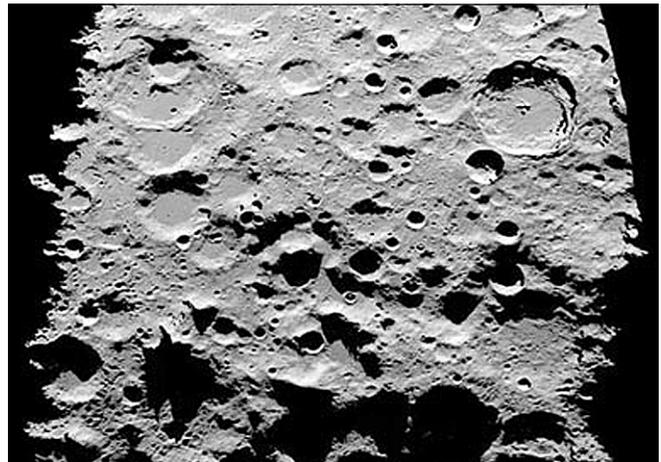
Using computer simulations, researchers have developed a strategy for finding diamonds in space that are only a nanometer (a billionth of a meter) in size. These gems are about 25,000 times smaller than a grain of sand, much too small for an engagement ring. But astronomers believe that these tiny particles could provide valuable insights into how carbon-rich molecules, the basis of life on Earth, develop in the cosmos.

**SPACECRAFT AT MARS PREPARE TO WELCOME NEW KID ON THE BLOCK:** Three Mars spacecraft are adjusting their orbits to be over the right place at the right time to listen to NASA's *Phoenix Mars Lander* as it enters the Martian atmosphere on May 25.



Every landing on Mars is difficult. Having three orbiters track *Phoenix* as it streaks through Mars' atmosphere will set a new standard for coverage of critical events during a robotic landing. The data stream from *Phoenix* will be relayed to Earth throughout the spacecraft's entry, descent and landing events. If all goes well, the flow of information will continue for one minute after touchdown.

**NASA VIEWS LANDING SITE THROUGH EYES OF FUTURE MOON CREW:** NASA has obtained the highest resolution terrain mapping to date of the moon's rugged south polar region, with a resolution to 20 meters (66 feet) per pixel. Scientists at NASA's Jet Propulsion Laboratory, Pasadena, Calif., collected the data using the Deep Space Network's Goldstone Solar System Radar located in California's Mojave Desert. The imagery generated by the data has been incorporated into animation depicting the descent to the lunar surface of a future human lunar lander and a fly-over of Shackleton Crater.



**INFORMATION SPOT: Mare** is Latin for "sea," it is an area of basalt rock on the surface of the Moon created relatively recently by oozing lava. The plural form of mare is maria. It is thought that most maria formed as a result of impacts on the Moon; lava bled from cracks made in the Moon's surface and filled craters to form the dark "seas" visible from Earth. Maria are the youngest and most crater-free regions on the Moon's surface.

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 ...news to be continued next month

*Note: These articles are courtesy NASA Space Place Program at the Jet Propulsion Laboratory.*

## Invisible Spiral Arms

by Patrick Barry

At one time or another, we've all stared at beautiful images of spiral galaxies, daydreaming about the billions of stars and countless worlds they contain. What mysteries—and even life forms—must lurk within those vast disks?

Now consider this: many of the galaxies you've seen are actually much larger than they appear. NASA's Galaxy Evolution Explorer, a space telescope that "sees" invisible, ultraviolet light, has revealed that roughly 20 percent of nearby galaxies have spiral arms that extend far beyond the galaxies' apparent edges. Some of these galaxies are more than three times larger than they appear in images taken by ordinary visible-light telescopes.

"Astronomers have been observing some of these galaxies for many, many years, and all that time, there was a whole side to these galaxies that they simply couldn't see," says Patrick Morrissey, an astronomer at Caltech in Pasadena, California, who collaborates at JPL.

The extended arms of these galaxies are too dim in visible light for most telescopes to detect, but they emit a greater amount of UV light. Also, the cosmic background is much darker at UV wavelengths than it is for visible light. "Because the sky is essentially black in the UV, far-UV enables you to see these very faint arms around the outsides of galaxies," Morrissey explains.

These "invisible arms" are made of mostly young stars shining brightly at UV wavelengths. Why UV? Because the stars are so hot. Young stars burn their nuclear fuel with impetuous speed, making them hotter and bluer than older, cooler stars such as the sun. (Think of a candle: blue flames are hotter than red ones.) Ultraviolet is a sort of "ultra-blue" that reveals the youngest, hottest stars of all.

"That's the basic idea behind the Galaxy Evolution Explorer in the first place. By observ-

ing the UV glow of young stars, we can see where star formation is active," Morrissey says.

The discovery of these extended arms provides fresh clues for scientists about how some galaxies form and evolve, a hot question right now in astronomy. For example, a burst of star formation so far from the galaxies' denser centers may have started because of the gravity of neighboring galaxies that passed too close. But in many cases, the neighboring galaxies have not themselves sprouted extended arms, an observation that remains to be explained. The Galaxy Evolution Explorer reveals one mystery after another!

"How much else is out there that we don't know about?" Morrissey asks. "It makes you wonder."

Spread the wonder by seeing for yourself some of these UV images at [www.galex.caltech.edu](http://www.galex.caltech.edu). Also, Chris Martin, principle scientist for Galaxy Evolution Explorer—or rather his cartoon alter-ego—gives kids a great introduction to ultraviolet astronomy at [spaceplace.nasa.gov/en/kids/live#martin](http://spaceplace.nasa.gov/en/kids/live#martin).



In this image of galaxy NGC 1512, red represents its visible light appearance, the glow coming from older stars, while the bluish-white ring and the long, blue spiral arms show the galaxy as the Galaxy Evolution Explorer sees it in ultraviolet, tracing primarily younger stars. (Credit: NASA/JPL-Caltech/DSS/GALEX).



# ROGER B. CHAFFEE PLANETARIUM

Public Museum, Grand Rapids

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## Show Schedule March 2008

### For General Audiences and Families:

**TO BOLDLY GO** – Famous explorers from across history tell the story of their voyages and discoveries in their own words. From China, to America, Antarctica and even a future voyage to Mars, visitors will hear the personal hardships and triumphs of exploration. **45 minutes**

SHOWTIMES: Daily at 2:00 p.m.

**UNDER STARLIT SKIES** – The planetarium operator takes the audience on a live tour of the night sky, finding the prominent stars, constellations, and planets visible tonight. Current astronomical events are also presented. **30-40 minutes**

SHOWTIMES: Saturday and Sunday at 3:00 p.m.

**Added Value:** This show is free with paid Museum admission; or arrive after 2:30 p.m. for the planetarium show only and pay only \$3.00/ person.

### For Families and Children:

**MAPPING THE SKY** – See how ancient and modern people used the sky to navigate. Learn how the stars can be used to find directions and location on the Earth. **30 minutes**

SHOWTIMES: Saturday and Sunday at 1:00 pm

NOTE: The Chaffee staff may integrate celestial maps into Under Starlit Skies. In this event, *the Friendly Stars* will instead be run as the 1:00 show.

### Laser Light Show Programming:

**RUSH** – In this all new show, a new lineup of Rush's greatest hits comes to the Chaffee Planetarium. **50 minutes.**

SHOWTIMES: Saturdays, 9:00 p.m.

**WISH YOU WERE HERE** – Welcome to the machine! The Pink Floyd's tribute to their former band member, the now deceased Syd Barrett, joins the Chaffee line-up with an array of breathtaking effects. Shine on you crazy diamond! **45 minutes.**

SHOWTIMES: Saturdays, 10:00 p.m.

### **ONE NIGHT ONLY! VERNAL EQUINOX FESTIVAL, FRIDAY, MARCH 21st!**

One night only! See three of the Chaffee's best laser-light shows back-to-back.

8:00 p.m. **LED ZEPPELIN** – The greatest hits of Led Zeppelin crash into the Chaffee. Rock out to all your favorite Zeppelin songs and, of course, climb the Stairway to Heaven. **45 minutes.**

9:00 p.m. **BRAIN SALAD SURGERY** – Welcome back my friends to the show that never ends! The most famous album by rockers Emerson, Lake and Palmer, takes you on a journey through the history of humanity to the corrupt future of Karn Evil 9. You've gotta see the show, it's rock-and-roll! **45 minutes.**

10:00 p.m. **OK COMPUTER** – Hey, man, slow down! The most popular album by Radiohead is finally back at the Chaffee. The band laments the corruption of the world today, while their unique music is accompanied by an intense barrage of effects in one of the Chaffee's most elaborate productions. **55 minutes.**

**Grand Rapids Amateur Astronomical Association  
Membership Application or Renewal Form**

DATE: \_\_\_\_\_

- New Membership**       **Renewal**

Please fill out the information below as completely as possible.  
For Family memberships, please include all persons for whom membership is desired.

**Please Print**

Name: \_\_\_\_\_ Birthdate: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Home Phone: \_\_\_\_\_ Cell Phone: \_\_\_\_\_

E-Mail: \_\_\_\_\_

(Note: For Family members, if more than one e-mail address, please list others on back of application)

**Adult** (18 or older, a Minimum of \$40.00) . . . . . \$ \_\_\_\_\_

**Student** (through 17 yrs old, a Minimum of \$25.00) . . . . . \$ \_\_\_\_\_

**Family** (all members of one family, a Minimum of \$50.00) . . . . . \$ \_\_\_\_\_

*(Note: Contributions greater than the minimum dues are considered a donation and are tax-deductible)*

**Observatory Endowment Fund** . . . . . \$ \_\_\_\_\_

**Miscellaneous Donations** . . . . . \$ \_\_\_\_\_

*(Note: Contributions to these funds are tax-deductible. Indicate amount of donation)*

**OBSERVATORY USER FEE:** (a Minimum of \$25.00 per user) . . . . . \$ \_\_\_\_\_

*(Contributions of more than \$25 will help meet repairs and upgrade of equipment costs.)*

If you are a qualified user of the Vein Observatory, and wish to remain so,  
check the box for **"User Fee."**

**TOTAL ENCLOSED** (From all categories above) . . . . . \$ \_\_\_\_\_

Make Check or Money Order to:  
**GRAND RAPIDS AMATEUR ASTRONOMICAL ASSOCIATION (or GRAAA)**

Mail to: Jerry Persha, GRAAA Treasurer  
199 Smith St.  
Lowell, MI 49331

**Grand Rapids Amateur Astronomical Association  
3308 Kissing Rock Ave. SE  
Lowell, MI 49331-8918**