



Inside Orbit

Volume XXXXIII - Number 1

July 2007

Volume XXXIII - Number VII

A Publication of the Grand Rapids Amateur Astronomical Association

"In spite of the opinions of certain narrow-minded people, who would shut up the human race upon this globe, as within some magic circle which it must never outstep, we shall one day travel to the moon, the planets, and the stars, with the same facility, rapidity, and certainty as we now make the voyage from Liverpool to New York."

Jules Verne

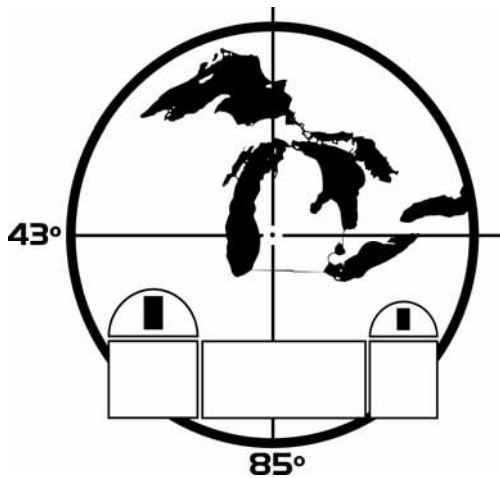
From the Earth to the Moon, 1865



This Issue:

- ☆ July's "Star-B-Que"
- ☆ Calendar of Events & News Notes
- ☆ The Solar System - July 2007
- ☆ NASA's Space Place
- ☆ Roger B. Chaffee Planetarium





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Grand Rapids Amateur
Astronomical Association

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Happenings in the GRAAA and the astronomical community

The Solar System - July 2007by Jeff Kozarski

What's that bring object in the evening sky? Can you only see the Summer Triangle for one week?

This is the article for you

NASA's Space Place - "Chew On This"

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

Roger B. Chaffee Planetarium

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, Jeff Kozarski
Contributing Authors	Jeff Kozarski
Contributing Authors (this edition)	
Production Staff	Kevin Jung

GRAAA Website

www.graaa.org

Images Credit:

Mailing Address:

Inside Orbit
3308 Kissing Rock Ave SE
Lowell, MI 49331

JULY MEETING NOTICE

Saturday, July 21, 2007
7.00pm - James C. Veen Observatory

“STAR-B-QUE 2007”

The Annual Potluck/Cookout/Star Party
for the members of the GRAAA

Since before the dawn of the current millennium, members of the Grand Rapids Amateur Astronomical Association have gathered at their observatory in the summer months, and one month in particular, to celebrate astronomy with a good old fashioned cookout/potluck/star party. This has gone down in history as the legendary “**Star-B-Que.**”

This year the **Star-B-Que** will be held on Saturday, July 21 at the Veen observatory. The start time has moved, and now the grill(s) being lilt at 7.00pm. Here are the particulars:

The club will provide the grills and the drinks, but individuals must provide the following:

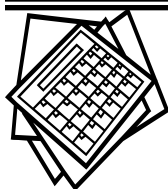
- ☆A dish to pass
- ☆Whatever you would like to put on the grill for yourself
- ☆Table settings (plates, napkins, utensils, condiments, etc)
- ☆Furniture (most people sit outside) -- bring your own lawn chairs, folding tables, etc.

This is a family event, so members are encouraged to bring their families out for the fun.

If it is clear, members are encouraged to stay and observe. The moon rises early (it's at first quarter, so there won't be dark skies - just the moon and Jupiter.

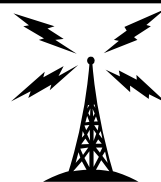
If you have any questions, or would like to help out in any way, please direct them to the web-site's email, and it will get to the people in charge of the event. Hope to see you all there!

This year there will also be the much-beloved song-stylings of “Banjo Jim” Foerch, local educator and musician and member of the band **Blue Water Ramblers**. If you have been to previous “SBQ's” you will be well aware of what a great time Jim and his banjo brings to the festivities. In the past, he has also had friends come and jam with him.



News and Events

(Latest News and Events always online
at www.graaa.org)



MONTHLY MEETING NEWS!: WE ARE COMBINING the monthly Star Party with a meeting this month. July is historically the month (except the first two years) when we had the annual **Star-B-Que**, and this year is no exception.

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If it is clear, members are encouraged to stay and observe. The moon rises early, night, so there won't be dark skies, just the moon and Jupiter.

If you have any questions, or would like to help out in any way, please direct them to the website's email, and it will get to the people in charge of the event. Hope to see you all there!

MEMBERSHIP DUES: Although many members have paid their yearly dues (which were up in May), there are some who still have not. For those of you who have not, please do so. July is the last month for the "grace period."

VISITORS' NIGHTS FOR JULY: The Observatory will be open - *clear skies only* - on Saturday, July 14th and Saturday, July 28th. Times are 9.30pm-12.00am. Come out and help if you can. As usual, emails will be sent out the week of the particular night as a reminder to all.

OBSERVATORY PROJECTS: There are two projects being worked on at the observatory right now, and help is needed from the membership. The first project is wiring up the road lights and dob shed lights to the main building. Most of the work is done, but we need the help of an experienced electrician. The second project is the recarpeting of the west dome and stairs. We are in need of a experienced carpet installer. Of course, we will have people there to help with any work to be done, but we need experts. If you are an electrician or carpet installer, or know someone who is who would like to do the club a service, please contact David DeBruyn. His phone numbers are: Home - 957.0769; Work - 456-3525.

ROVING MARS: Congratulations to former GRAAA President James Ashley, who has been working since January as Payload Uplink Lead/Payload Downlink Lead for the Miniature Thermal Emission Spectrometer (Mini-TES) for the Mars Rover Opportunity at Meridiani Planum. James' boss Steve Squyres could be heard describing the mission's latest findings on **National Public Radio's Science Friday** on June 22nd.: http://www.sciencefriday.com/pages/2007/Jun/hour2_062207.html.

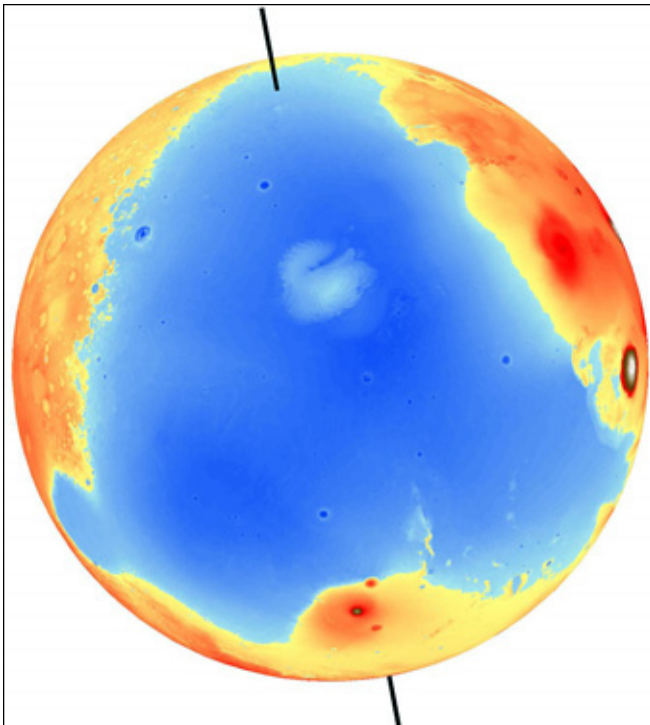
One of the PUL's jobs is to build command sequences for rock and soil targets and then deliver them to the spacecraft via JPL conduits. The job description for the PDL is to monitor the health of the instrument and verify data products that are downlinked to Earth by way of the Odyssey orbiter relay.

PROJECTS AT THE OBSERVATORY: There are several projects that are going on at the observatory this year, including some electrical work and other maintenance issues (like some new carpeting). If you would like to help, please contact the Observatory Committee via the website, or call Ron Vander Werff.

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!!

AUGUST INSIDE ORBIT: The deadline for submissions to the August *Inside Orbit* is July 21st. 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.

STRONG EVIDENCE THAT MARS ONCE HAD AN OCEAN: A paper in this week's issue of *Nature* by University of California, Berkeley, geophysicists demolishes one of the key arguments against the past presence of large oceans on Mars.



Mars as it might have appeared more than 2 billion years ago, tipped 50 degrees from its orientation today and with an ocean filling the lowland basin that today occupies the north polar region.

Even from Earth, a large plain surrounding the planet's north pole looks like a sediment-filled ocean basin. In the 1980s, Viking spacecraft im-

ages revealed two possible ancient shorelines near the pole, each thousands of kilometers long with features like those found in Earth's coastal regions. The shorelines - Arabia and the younger Deuteronilus - date from between 2 and 4 billion years ago.

THE DWARF PLANET KNOWN AS ERIS IS MORE MASSIVE THAN PLUTO, NEW DATA SHOWS: Die-hard Pluto fans still seeking redemption for their demoted planet have cause for despair this week. New data shows that the dwarf planet Eris is 27 percent more massive than Pluto, thereby strengthening the decree last year that there are eight planets in the solar system and a growing list of dwarf planets.

According to Mike Brown, the discoverer of Eris, and his graduate student Emily Schaller, the data confirms that Eris weighs 16.6 billion trillion kilograms. They know this because of the time it takes Eris's moon, Dysnomia, to complete an orbit.

SPITZER SEARCHES FOR THE ORIGINS OF LIFE OF EARTH: Astronomers suspect the early Earth was a very harsh place. Temperatures were extreme, and the planet was constantly bombarded by cosmic debris. Many scientists believe that life's starting materials, or building blocks, must have been very resilient to have survived this tumultuous environment.



Now, NASA's Spitzer Space Telescope has learned, for the first time, that organic molecules believed to be among life's building blocks, called polycyclic aromatic hydrocarbons (PAHs), can survive another type of harsh setting, an explosion called a supernova. Supernovae are the violent deaths of the most massive stars. In death, these volatile objects blast tons of energetic waves into the cosmos, destroying much of the dust surrounding them.

EXTREME PLANET TAKES ITS TOLL: Like Sun Belt retirees who complain about cold weather, NASA's Mars rovers are becoming less tolerant of temperature changes with age.

Near the Martian equator, where the rovers are exploring opposite sides of the red planet, highs and lows make Earth temperatures look downright tropical. Temperatures often differ by more than 100 degrees Celsius. That's a change of 180 degrees Fahrenheit -- the equivalent of having the temperature drop from a high of 70 degrees F. at midday to minus 110 degrees F. the same night. That would be like going from a beach in Hawaii to the South Pole in mid-winter ... every day!

HOBBY-EBERLY TELESCOPE HELPS ASTRONOMERS LEARN SECRETS OF ONE OF UNIVERSE'S MOST DISTANT OBJECTS: Astronomers have used the 9.2-meter Hobby-Eberly Telescope (HET) at McDonald Observatory to confirm one of the most distant known objects in the universe. The object is a quasar — an extremely bright galaxy nucleus powered by matter falling into a super-massive black hole at its heart — that is 12.7 billion light-years away. Because light travels at a finite speed, we are seeing this quasar as it appeared 12.7 billion years ago, when the universe was just 7 percent of its present age.

NASA SCIENTIST FINDS A NEW WAY TO THE CENTER OF THE EARTH: Humans have yet to see Earth's center, as did the characters in Jules Verne's science fiction classic, "Journey to the Center of the Earth." But a new NASA study proposes a novel technique to pinpoint more precisely the location of Earth's center of mass and how it moves through space.



This spectacular "blue marble" image is the most detailed true-color image of the entire Earth to date. Image credit: NASA/GSFC

Knowing the location of the center of mass, determined using measurements from sites on Earth's surface, is important because it provides the reference frame through which scientists determine the relative motions of positions on Earth's surface, in its atmosphere and in space. This information is vital to the study of global sea level change, earthquakes, volcanoes and Earth's response to the retreat of ice sheets after the last ice age.

CRATER COULD SOLVE 1908 TUNGUSKA METEOR MYSTERY: In late June of 1908, a fireball exploded above the remote Russian forests of Tunguska, Siberia, flattening more than 800 square miles of trees. Researchers think a meteor was responsible for the devastation, but neither its fragments nor any impact craters have been discovered.

INFORMATION SPOT: Retrograde Motion is the temporary apparent backward motion of a planet in the sky, from east to west, caused by the geometry between the Earth and planet. Due to this geometry, only planets that orbit outside the orbit of the Earth are observed to have retrograde motion.

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...news to be continued next month



The Solar System: July 2007

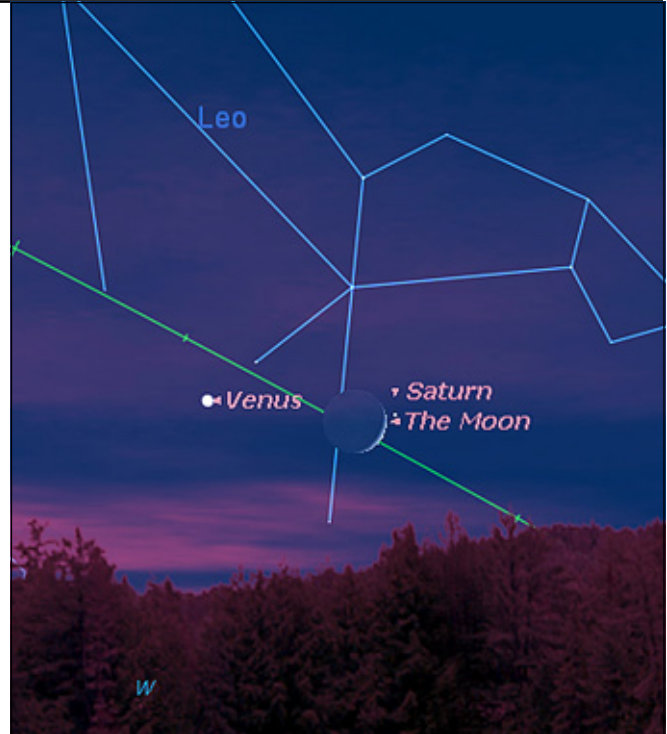
by Jeff Kozarski

July skies highlight Venus & Saturn's last hurrah in the evening sky as they sink lower towards the Sun's glare. Jupiter is the prime time planet for telescopes this month low in the south at dusk. Uranus & Neptune are prominent telescopic morning objects. Mars is finally brightening & is well up in the eastern sky before sunrise.

Mercury returns to the morning sky this month reaching greatest elongation on the 20th. On that morning you can find Mercury around 7° up in the NE sky, 45 minutes before sunrise. It will glow steadily at +0.3 magnitude. Mercury shouldn't be too hard to spot provided you have a clear horizon & use binoculars to aid. It will gradually drop lower each morning though it will slowly brighten as it moves closer to the Sun. By early next month Mercury will be too close to the Sun to be seen reaching superior conjunction a few weeks later.

Venus was at greatest elongation from the Sun (45°) for this evening apparition on June 9th. This month is the last good opportunity to easily view Venus before it reaches inferior conjunction in mid August. Venus also attains its greatest brilliance this month at -4.5 magnitude Venus begins the month near Saturn in Leo. Venus & Regulus are close to each other on the evening of the 13th. The period of July 16-17 will be interesting to watch as a young crescent moon glides by above Venus.

And the end of the article are some ephemerides for Venus this month. Be sure to watch Venus through a telescope, as this is the most exciting time to view its changing phases. Notice that Venus is moving south of the ecliptic by month's end into Sextans. This combined with the shallow angle of the ecliptic at sunset contributes to poor viewing of Venus well before inferior conjunction. Next month Venus & the Sun set nearly parallel of each other in the western sky.



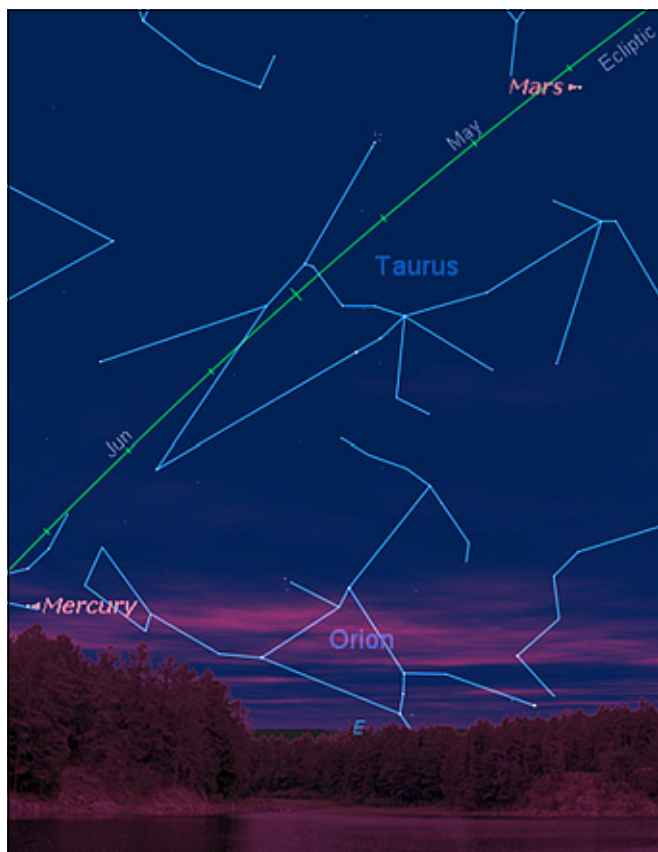
On the evening of the 16th a half-hour after sunset, the crescent moon is located in between Venus & Saturn.

July 2007 Lunar Data:

- ☆ Last Quarter on the 7th at 12.53pm EDT
- ☆ New Moon on the 14th at 8.04am EDT
- ☆ First Quarter on the 22nd at 2.29am EDT
- ☆ Full Moon on the 29th at 8.48pm EDT

The Earth is at aphelion on July 7, 1.017 AU from the sun. At this point we are the farthest away in our orbit, and slowly travel inward toward perihelion in January.

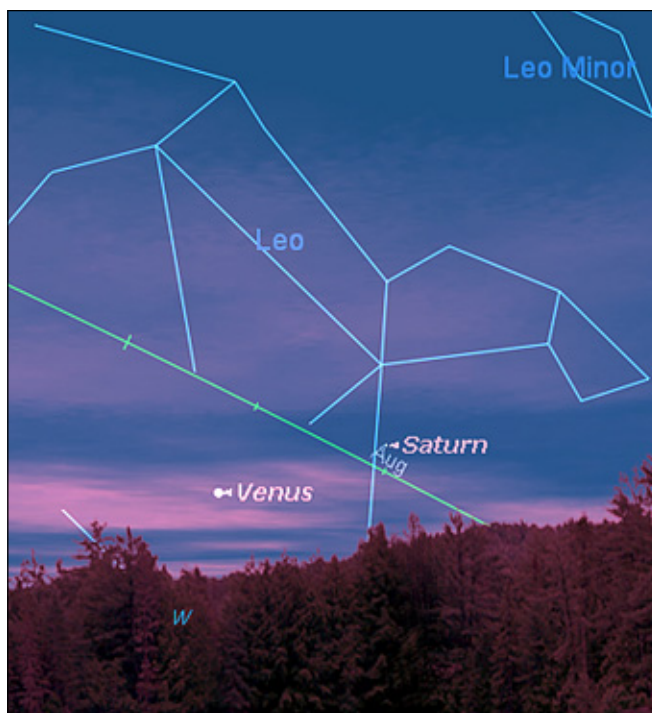
Mars is in Aries this month. At mid month Mars is rising about 4 hours before sunrise placing it prominently in the east. Mars is at +0.6 magnitude on the morning of the 15th and still appears small through a telescope only 6.7" wide. By the 28th Mars moves into Taurus and is now rising around 1:30 a.m. EDT.



Mars & Mercury on the morning of the 20th looking east around 45 minutes before sunrise.

Jupiter was at opposition on June 7th in Ophiuchus and is still in retrograde motion until early August. This is a great time to view Jupiter during the evening hours as it is transiting the meridian around 10:45 p.m. EDT. on the 15th. Note that from July 20-21 that Jupiter & Venus will each be 43" of arc wide.

Saturn will slowly sink towards the solar glare this month. It is near Venus around the 1st but will gradually drop lower each evening. Watch for the crescent moon nearby on the 16th. At month's end Saturn is setting less than an hour after the Sun. Conjunction with the Sun is in mid August.



Saturn & Venus at sunset on the 31st. Note Venus will be only 7° high with the aid of binoculars at first then spot it with the naked eye. Saturn however will probably be next to impossible to see.

Uranus won't be at opposition until early September. It is in Aquarius rising just before midnight at mid-month. It should be an easy target for telescopes to spot the +5.7 magnitude point of light. Uranus is transiting the meridian just before the start of civil twilight on the 15th.

Neptune is about a month away from opposition in Capricornus. It is rising around 10:30 p.m. EDT. at mid-month and is high enough to view with telescopes after midnight.

Ephemeris for Venus

Date/Time	Const.	Set	Mag	Distance	Size	Illumination
7/01 - 9.40pm	Leo	11.42pm	-4.43	0.5256	32"	35%
7/11 - 9.40pm	Leo	11.10pm	-4.47	0.4510	37"	27%
7/21 - 9.40pm	Leo	10.30pm	-4.45	0.3841	43"	18%
7/31 - 9.40pm	Sextans	9.40pm	-4.33	0.3299	51"	9%

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

Chew on This

By Diane K. Fisher

The Mars robotic rovers, Spirit and Opportunity, are equipped with RATs, or Rock Abrasion Tools. Their purpose is to abrade the surface patina off the Mars rocks so that the alpha x-ray spectrometer can analyze the minerals inside the rocks, rather than just on the surface.

But future robotic missions to Mars will be asked to go even further below the surface. Scrapers and corers will gather rock samples of substantial size, that, in order to be analyzed by a spectrometer, will need to be crushed into a fine powder.

Crushing rocks on Mars? Now there's a problem that brings to mind a multitude of possible approaches: Whack them with a large hammer? Squeeze them until they explode? How about just chewing them up? It was with this latter metaphor that the planetary instrument engineers struck pay dirt—so to speak.

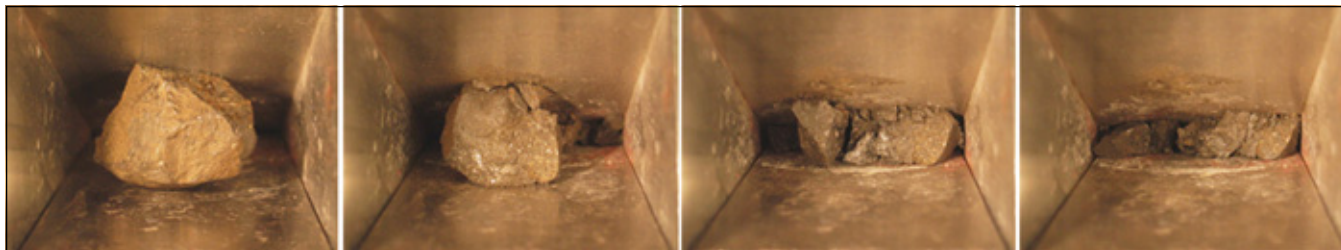
Thanks to NASA's Planetary Instrument Definition and Development Program, a small group of NASA engineers came up with the Mars Rock Crusher. Only six inches tall, it can chew the hardest rocks into a powder.

The Mars Rock Crusher has two metal

plates that work sort of like our jaws. One plate stays still, while the other plate moves. Rocks are dropped into the jaw between the two plates. As one plate moves in and out (like a lower jaw), rocks are crushed between the two plates. The jaw opening is larger toward the top and smaller towards the bottom. So when larger rocks are crushed near the top, the pieces fall down into the narrower part of the jaw, where they are crushed again. This process repeats until the rock particles are small enough to fall through a slit where the two plates are closest.

Engineers have tested the Mars Rock Crusher with Earth rocks similar to those expected to be found on Mars. One kind of rock is hematite. The rusted iron in hematite and other rocks help give Mars its nickname "The Red Planet." Another kind of rock is magnetite, so-called because it is magnetic. Rocks made by volcanoes are called basalts. Some of the volcanoes on Mars may have produced basalts with a lot of a mineral called olivine. We call those olivine basalts, and the Rock Crusher chews them up nicely too.

Visit www.jpl.nasa.gov/technology to read the latest about other NASA technologies for exploring other planets and improving life on this one.



Looking down on the jaws of the Mars Rock Crusher, we see a magnetite rock get crushed into smaller and smaller particles.



ROGER B. CHAFFEE PLANETARIUM

Public Museum, Grand Rapids

July 2007 Show Schedule

For general and family audiences

SOLAR SYSTEM SAFARI - In this all new sky show, a jungle adventurer uses his magical camera to take visitors on an imaginary safari to the major bodies in the Solar System. Each comes alive, taking on a unique personality while describing its characteristics and oddities. **35 minutes**

SHOWTIMES: Daily at 2:00 pm
(Also Monday at 11.30am)

For general audiences

UNDER SUMMER SKIES - This is a continuation of the regular series of sky shows illustrating prominent stars, constellations, and planets currently visible, as well as special celestial events..

The planet Jupiter, the annual Perseid meteor shower and a late August total eclipse of the moon are featured. **40 minutes**

SHOWTIMES: Saturday and Sunday at 3:00 pm

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.

THE GREAT SPACE CHASE - Education/ Entertainment Feature with Laser Light. The planetarium's multiple audio-visual capabilities, including colorful laser graphics, illustrate an amusing tale in which a detective chases a crafty fugitive across the universe. The story is interspersed with musical interludes accompanied by dazzling special effects. . **40 minutes**

SHOWTIMES: Saturday and Sunday at 1:00 pm
(Weekdays at 3.00pm)

**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: _____

Name: _____ Birthdate: _____

Name: _____ Birthdate: _____

Name: _____ Birthdate: _____

Name: _____ Birthdate: _____

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 Veen 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