

# starry nights



January, February, March 2004

Volume 24, Issue 1

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## PAINTING DONATED



The photo above is of our newly donated painting by Bruce Bond. The article in our last newsletter had mentioned the donation from his wife Kate Bond. Bruce, a long time member passed away about 4 years ago. We will have the painting displayed at the Nature Center at our Tuesday meetings.

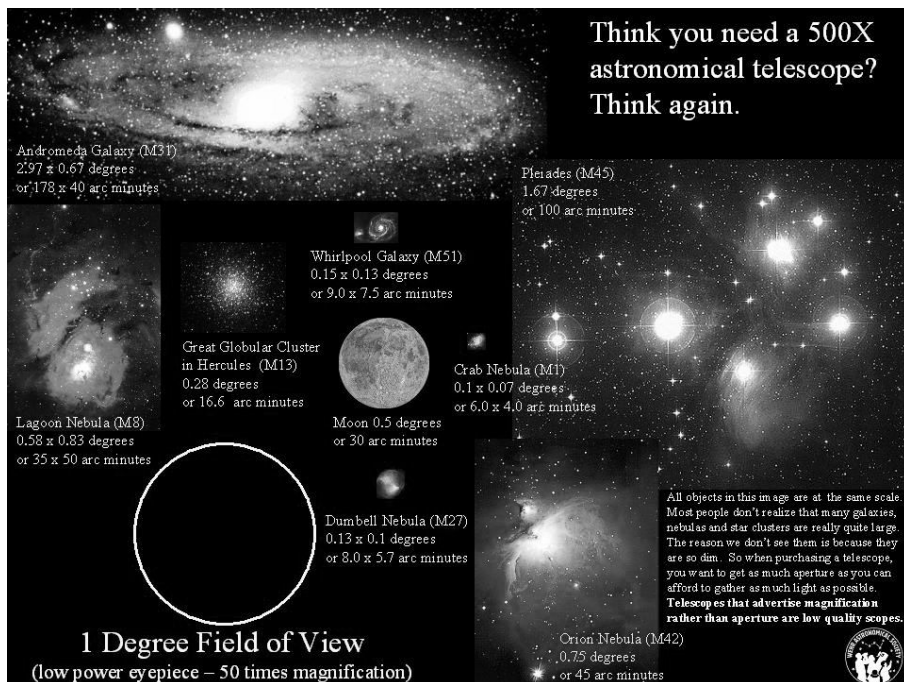
-Sandy Dombeck

Note: A special thanks goes to Sandy for putting together the framing and matting of this picture.



## How much magnification does that scope get?

This is one of the more common questions that we get at the observatory. People are just so used to the high magnification claims of the telescopes found in a department store. Typically these claims are around 500X (500 times) magnification.



The uninformed truly believe that you need such high powers to view astronomical objects. At first glance, this seems like common sense, since these objects are so far away from us. But if we also take into account that these objects are also quite large, then we realize that the objects are not really small.

Well, since a picture is worth a thousand words, I created a composite picture comparing the size of several deep sky objects (galaxies, nebulae and star clusters) to the moon, since most people are familiar with the moon. The average size of the moon as we see it in the sky extends about 1/2 a degree or 30 arc minutes (where 60 arc minutes equal a degree). In an average set of binoculars or a finderscope, the field of view is about 5 degrees. This means that you can fit 10 moon diameters in the full field. For a telescope, a low-

power of 50X will give you about a one-degree field of view. This translates to 2 moon diameters to fill the field of view.

The reason we don't see these objects is not because they are so small, but rather because they are so dim. So remember that the main specification for a telescope is its aperture or size of the main lens or mirror, not its magnification. The larger the aperture the more light the telescope can gather. Just look at what the professional observatories advertise, the aperture of their telescope. Manufacturers who advertise on magnification are trying to sucker you in to purchase their low quality scope. So try to find a telescope that advertises its aperture and you will get a much better telescope.

-Tim Grunewald



**Thank You!**

The club would like to thank Christine Enders, the manager of American Science & Surplus Store for donating to our club the light holder posts and the flashing red lights for the signs directing the way to the observatory from the parking lot at Froemming Park. Also, for handing out WAS observing schedules to her customers.

### W.A.S Board of Directors and Officers

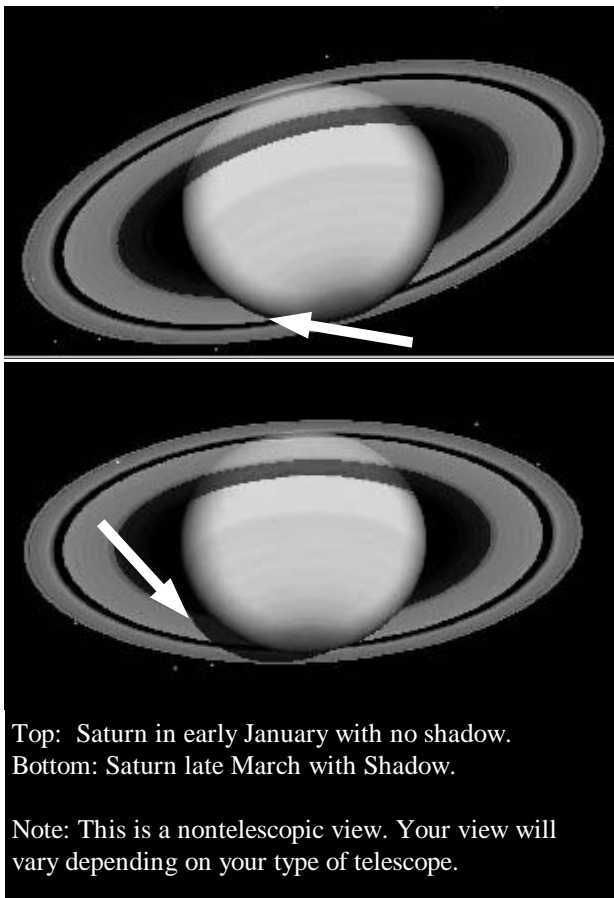
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\* Signifies the position is available and the name represents the acting volunteer. Contact a board member if you are interested in the position.

## Observing Challenge: Saturn

With the approach of the Cassini probe on Saturn, the ringed planet will take center stage this year. While we await the images and data from the probe, take a step outside and brave the cold with your own telescope. The Earth will be at its closest approach to Saturn in January, so it will be magnificently large. Rather than just trying to just see Titan or the Cassini division like usual, look for the planets shadow on the rings to come out of hiding throughout this quarter.

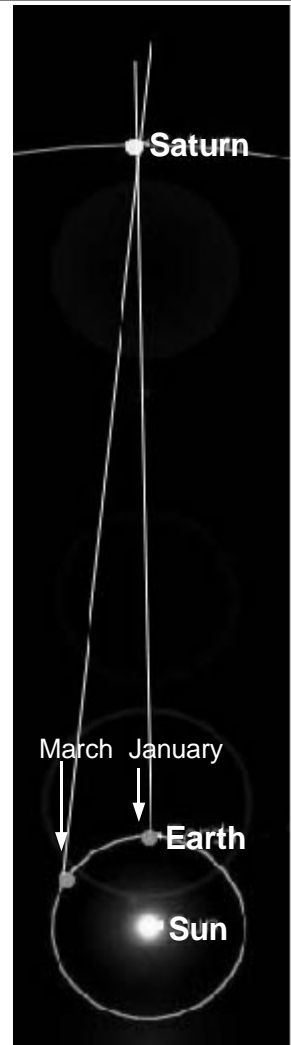


Top: Saturn in early January with no shadow.  
Bottom: Saturn late March with Shadow.

Note: This is a nontelescopic view. Your view will vary depending on your type of telescope.

Due to Earth's relatively fast motion through its orbit compared to Saturn's, we see a quick change in perspective. In the beginning of January, the Sun, Earth, and Saturn will be in alignment, offering a small, if any, visible shadow on the rings. But as time passes this quarter, the shadow will slowly reveal itself, and by the end of March it will be plainly visible giving an incredible three dimensional look. I would suggest trying to make a sketch of the planet during this sequence. Not only does drawing allow more detail to be noticed, it will also make an interesting sequence of drawings that you can compare.

Saturn's rings are also at a steep angle, revealing an excellent view of this beautiful, and favorite of any observer. This is an excellent opportunity to test your equipment, and your eye. Also, since this will



take  
place  
over  
the  
entire

quarter, there is no need to worry about cloudiness or atmospheric distortion. If conditions are not favorable, try again another night, there is plenty of time. Good luck, stay warm, and have fun.

-Adam Machajewski



**S**olar  
System  
News Roundup



### PLUTO (and KBOs)

As preparations for the Kuiper-Express probe to Pluto-Charon in 2006 move ahead, astronomers are trying to acquire Hubble time to search the close-in vicinity to find suspected additional moons of the far-distant planetary pair. They are convinced there are more moonlets out there in

orbit around Pluto, since being so far away from the Sun, it hasn't had to fight Sol to retain any satellites the way the inner planets have. With additional moons being found nearly every month around Neptune and Uranus (see below) the way is hopefully being pointed to discovering the same KBO-types around Pluto.

Kuiper-Express Mission planners are certain there are no medium-to-large moons still to be found, (in the range of 60 miles and up in diameter) since the Very Large Telescope (VLT) arrays already turned on to the Pluto-Charon pair would have revealed them by now. What they want to search diligently for are the smaller moonlets and KBO chunks; these would have both an attraction for and a hazard to orbit-programmers, so they want the neighborhood thoroughly researched before the final touches are put to the K-E probe's instruments.

#### NEPTUNE

Another unique new moon has been confirmed orbiting Neptune. First detected in 2001 by the U. of Hawaii's Mauna Kea 320-inch VLT telescope, this new moonlet, about 24 miles wide, has now been confirmed to be a Neptune satellite, and determined to be farther from its planet than any moon yet discovered. Its orbit around Neptune takes an astounding 26 Earth-years to complete. (By comparison, the previous longest-month holder, Jupiter's recently discovered and farthest-out S/2003/J2, takes only 2½ Earth-years.) The new Neptunian moon orbits an average 50 million miles away from its primary, or roughly half the distance from Earth to the Sun, and is probably a KBO just barely captured by the gas giant. Coupled with the confirmation of another long-suspected Neptunian moon first noticed in 1999, this now brings the Neptune satellite total to 22.

#### URANUS

Additional moons have also been found circling Uranus, this time courtesy of Hubble, which discovered three more in September, bringing the Uranian total now to 24. Two of the new moonlets are only 10 miles wide, while the third is about 25 miles. They all are part of an inner cluster including 10 others which are found between Puck, a bigger satellite found by the Voyager spacecraft, and Miranda, the innermost of the five largest Uranian satellites. This inner swarm of 13 satellites is unlike any other system of planetary moons, astronomers say, and they speculate that the moonlets are fragments from larger outer

moons that have been blasted off from their parent bodies by collisions with comets or KBOs.

Further study will also reveal whether these newly-found moonlets have any special role in creating or shepherding Uranus' 11 narrow rings.

#### SATURN

Only eight months remain till the Cassini spacecraft completes its seven-year journey and enters the Saturnian system in July. A course-correction burn on October 1 was completed successfully and the spacecraft is still in excellent health--including weathering the solar flare storms in October.

Meanwhile, attention is focusing on what will happen to the Huygens probe when it impacts on the moon Titan. Will it settle down on an icy plain, or splash into and bob around on a Titanic ocean of methane or ethane? The probe is equipped to handle both contingencies. It has an impact sensor to record the density of any solid terrain, plus a sonar device to probe the depths of an ocean. An ocean landing has one clear advantage: the probe would bob up into an upright position--important for getting data up to the orbiting Cassini mother craft.

The 700-pound probe will then report on Titan's surface conditions for as brief a time as three minutes or as long as a half-hour, depending on what kind of surface it lands on. In either event, images made by the Huygens camera a few miles above the surface and a few minutes before landing will indicate whether it is coming down on land or sea. What NASA managers also hope for is a landing on the Saturn-facing side of Titan, so that the lander can photograph the view of the ringed mother planet rising above the horizon, seen through the misty Titan atmosphere.

#### JUPITER

The Galileo probe plunged into the clouds of Jupiter on September 21, thus bringing to an end its "Space Odyssey." Data was collected right up to the time of immersion of the probe in the upper reaches of the Jovian atmosphere, at which time the rotation of the planet also blanked off signals.

NASA hopes that Galileo's successor will be the "Icy Moons" probe, which could be launched by the end of this decade, to do closer investigation of the three outer Galilean moons--Europa, Ganymede, Callisto--to help determine if there truly are liquid oceans under their ice caps.

## ASTEROIDS

A major rediscovery was made in October of a long-missing Near-Earth asteroid. First found in 1937 by a German astronomer who named it Hermes, the discovery at the time of the first Near Earth asteroid was a sensation to the pre-WWII world populace. (The New York World's Fair in 1939 had a model of Hermes poised above a diorama of Central Park to educate visitors on the new-found threat of Near Earth Astroids.)

After 1937, Hermes disappeared from astronomers' telescopes, and since so little data had been collected on it, its orbit was never calculated, although it was assumed it came back to cross Earth's orbit as many as a dozen times in the following 66 years.

Now the elusive Hermes has once again been found, this time by Arecibo Observatory's radar observations with its 250-foot Radio telescope in Puerto Rico. The radar images reveal a "strongly bifurcated appearance," says A.O., strongly suggesting that Hermes is actually a set of twins. (If known in 1937, maybe a better name should have been Gemini?) Each body is just over a quarter-mile in diameter; in 1937 it was estimated that Hermes was about a mile in diameter. What is more interesting is that the two bodies are of equal size--the first true identical twin asteroids yet found--where in all the other pairs of asteroids found so far the secondary is just a fraction the size of the primary.

Hermes will pass the Earth by the end of this year at a distance nine Moon-orbits, then go on to swing around Venus before beginning its three-year trek back to its apogee in the Asteroid Belt. Another tiny asteroid was only detected in late September after just passing its closest point of approach to Earth of 55,000 miles--less than one-quarter of the Moon's distance from our planet. Given the scale of the Solar System, this was a cosmic-whisker miss.

## MARS

A total of four spacecraft are heading towards Mars in an almost cosmic traffic jam: the ESA's Beagle lander probe, the Japanese Space Agency's Nozomi ("Hope") orbiter, and the two U.S. Rover landers aboard probes Spirit and Opportunity. The first two will arrive at Mars in December, with the Beagle targeted to impact on the Isidris Planum. The two U.S. Rover probes will come on in January to land, one to the

Meridiani Planum (Meridian Plain) and the other to the inside of the Gusev Crater, where both will hunt for signs of ice and water.

In addition to their primary task of looking for subsurface water, one of the other tasks of the Rovers will be to investigate the Martian sand-dune-ripple widths and heights, the dunes found mostly in valleys and crater floors. Due to the lower gravity, much-less-dense atmosphere, and much greater wind speeds, larger particles are borne along to the drifts. Instead of just sand grains as on Earth, pebbles and even small rocks can be whisked along and up the dune slopes, and when hit by other particles and jumped into the air, they would travel even further and higher before falling. This effect has produced huge dunes on Mars that the cameras on Mars Global Surveyor have photographed and hopefully the Rovers will video close up.

The NASA and ESA probes will leave their parent craft orbiting as relay stations (making a total of five craft in orbit around Mars) and the landers can also relay through the already-positioned NASA Mars Global Surveyor (MGS) orbiter. For data sent by the landers, all three can also communicate directly back to Earth when in line of sight. Japan's Nozomi's instruments have been damaged by a solar flare last year, so it remains to be seen how much, if any, data will be able to be sent back. (In fact the JSA is worried about having any control over Nozumi as it approaches Mars, which might result in its joining other crashed probes on the Red Planet's surface.) In the same vein, the recent October solar flares blinded the ESA's Beagle orbiter's two star trackers for up to 15 hours, but mission controllers said both instruments--the trackers are crucial to keeping Mars Express oriented properly--are now working properly and there appears to be no long-term damage.

Meanwhile, the orbiting MGS spacecraft has produced a historic photo. While Mars was at its closest to Earth this summer, the MGS camera was turned back towards Earth to take a picture of what Earth and its surface would look like to any Mars observer trying to discern our continental markings, much as Schapparelli and Lowell tried to do with the Red Planet. The photo shows a half-crescent Earth (much like Venus viewed from our planet) with the North and South American continents visible in a hazy way, plus darker splotches (oceans) and lighter ones (major cloud formations.) The resulting mix is just tantalizing

enough to have puzzled any Martians seeing this in a telescope just as the dusty Red-Planet view did to our earlier astronomers.

### LUNA/EARTH

SMART-1, the ESA probe to the Moon, was finally launched from Kourou, French Guiana in September after months of delay. Due to the low thrust of the final-stage ion engine on the probe itself, it will take three-months to reach the Moon's orbit (as opposed to three days with high-impulse chemical rockets). However, once there it will still take SMART-1 another 12 more months of maneuvering to achieve a permanent orbit around the Moon--including passing through and using the zero-gravity pinpoint of Earth-Moon's Lagrange Point-1--and then several more weeks after that to stabilize into the programmed orbit. Then it will commence a two-year mission to look for water believed to be hidden deep in craters on the lunar surface.

### VENUS

Undaunted by the proven fragility of JSA's instruments to Solar flares in its troubled Nozumi Mars probe, Japan still plans to launch its first-ever unmanned space probe Sunward to Venus in 2007, with the spacecraft expected to start orbiting the planet in 2009.

### MERCURY

NASA's orbiting probe to the innermost planet, called Messenger, is still on track to be launched a few months from now in the spring of 2004, to arrive at Mercury in January of 2008, after conducting two flybys of neighboring Venus in 2006 and 2007, then two more flybys of Mercury in 2008, before settling into orbit in 2009.

### ALPHA CENTAURI

(Well, a great deal beyond our Solar System, but since it is our nearest star neighbor at just 4.3 light-years distance--or 52 light-months--some interesting news of recent discoveries about the Alpha-Centauri system is in order.)

A-C is actually three stars, Alpha, Beta, and Proxima. The first two are G-types similar to Sol, orbiting each other in 80 years time at a distance apart the equivalent of Uranus from our Sun.

However, tiny Proxima is immensely farther away from the other two, actually a whole two light-months away. By comparison, Pluto is only 0.008 a light-month away from Sol. Proxima is so far

away from the other two that it takes millions of years to orbit them, total orbit time still undetermined. Proxima is actually the nearest star to us, being those two light-months closer than the other pair in its current orbital position.

Recent measurements now reveal that Alpha is 1.23 times Sol's diameter, and Beta is 0.87 times. Proxima is a tiny red dwarf, so small that it is only one-and-a-half times the diameter of Jupiter, but with 150 times its mass. As such, it is just above the threshold of being a brown dwarf, meaning that it was barely massive enough to initiate a feeble nuclear fusion.

There is a possibility that the A-C system harbors even more stars such as Proxima, or brown dwarfs. It is also a probable candidate for containing planets, and Hubble will soon be programmed to look for all three types. However, any planets orbiting the two larger stars would be poor prospects for harboring any Earth-type characteristics. With the companion star only the distance of Uranus away from any rocky inner planets of the other, the tremendous mass of the opposing star would be constantly bombarding the other's planets with a blizzard of space debris and asteroidal chunks from the equivalent of their two Asteroidal Belts. When we consider how Jupiter's (in comparison) feeble gravity is continually flinging asteroids and comets at Mars and even Earth one can imagine what would be going on in exchange between Alpha and Beta. Moreover, the closeness of the two stars could cause the planet(s) of one to be snatched away regularly by the other in a cosmic game of juggling that could send one's planets soaring far away into a multi-century elliptical orbit (somewhat like that newly discovered moon of Neptune, described above).

As for any planets circling Proxima, although they would be much safer from the gravity effects of Alpha and Beta, they would still get, over eons of time, an accumulated onslaught of Alpha's and Beta's space debris from their star wars, and the feeble dim glow from the tiny red dwarf would do little to encourage any evolution of life--even if that could survive the bombardments.

-Jay Wichmann



# Skywatch

## Observers Corner: NGC 2362



<http://home.att.net/~hermperez1/ngc2362.htm>

This quarter we are going to be looking at NGC 2362 in Canis Major. This is a small open cluster of 60 stars that includes the 4.4 magnitude star  $\tau$  Canis Majoris. NGC 2362 is fairly easy to find and is an easy object for small telescopes. It looks like some sparkles have been put around  $\tau$  Canis Majoris. The cluster is about 5,000 light years away with a diameter

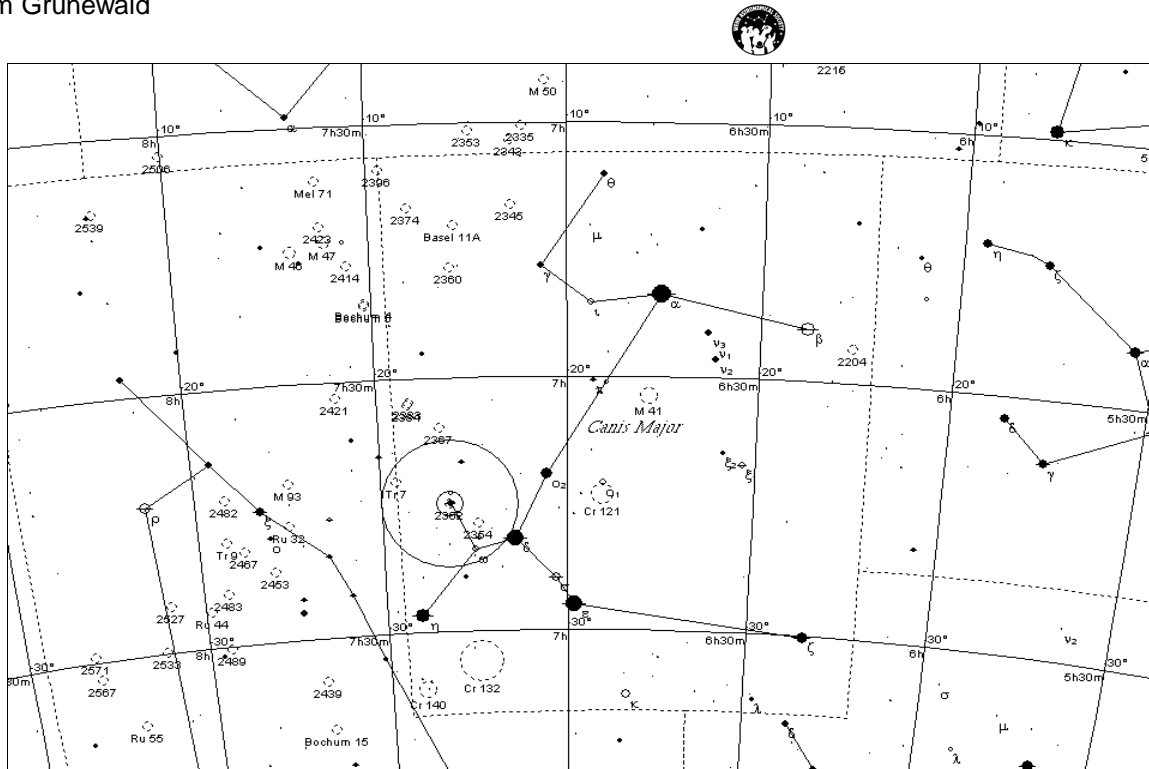
of about 8 light years.

To find this cluster, start on Sirius ( $\alpha$  Canis Majoris), the brightest star in the sky, which is to the lower left of the constellation Orion (the lower left of Orion's body is in the upper right corner of our map). With your eye, look below Sirius about one fist at arms length. You will see three stars that form a right triangle with the two stars being brighter than the third. These stars are  $\delta$  Canis Majoris,  $\epsilon$  Canis Majoris and  $\eta$  Canis Majoris. Put your finderscope on the star at the top of the triangle,  $\delta$  Canis Majoris. To the left (right in a finderscope) of  $\delta$  Canis Majoris you will see two fairly bright stars. Center your finderscope on these stars. You should see another similar set of two bright stars in the finderscope enter the field of view near the bottom when you center the other stars. Center those stars in the finderscope and you should see a yellow star below them. Center the finderscope on the bright star that is farthest from the yellow star. That star is  $\tau$  Canis Majoris.

-Tim Grunewald

## Lunar Phases

○	January 7	Full
◐	January 14	Last Quarter
●	January 21	New
◑	January 29	First Quarter
↔		
○	February 6	Full
◐	February 13	Last Quarter
●	February 20	New
◑	February 27	First Quarter
↔		
○	March 6	Full
◐	March 13	Last Quarter
●	March 20	New
◑	March 28	First Quarter



# SCHEDULED ACTIVITIES

FOR

The Wehr Astronomical Society

<http://www.wehrastro.org>

## Regular Meetings

(Free and Open to the Public)



**Tuesday, January 13, 2004 7:00 p.m.**

**Wehr Nature Center**

**Pluto, Kuiper-Belt Objects and Beyond** Jay Wichmann will give the next installment of his series of talks



**Tuesday, February 10, 2004 7:00 p.m.**

**Wehr Nature Center**

**More than just the Kocken Observatory:** Gerry Kocken



**Tuesday, March 9, 2004 7:00 p.m.**

**Wehr Nature Center**

**Current NASA developments and programs:** Patrick Huth from the NASA Glen Space Center in Ohio will discuss current NASA events.

## Observatory Activities

(Free and Open to the Public)

January 16	7:00	Deep Sky Observing, locate Auriga, the Charioteer. See Mars and Saturn
January 30	7:00	Observing the Moon and Deep Sky objects. See a 1st quarter moon and the brighter deep sky objects. See Mars and Saturn.
February 13	7:00	Deep sky observing. Locate Orion the Hunter and the Great Nebula. See Mars and Saturn.
February 27	7:00	Observing the Moon and deep sky objects. See a 1st quarter moon and the brighter deep sky objects. See Mars and Saturn.
March 12	7:00	Deep sky observing. Locate Gemini, the Twins. See Mars, Saturn, and Jupiter. Closest to Earth on March 4th, GRS transit 10:22 pm.
March 26	7:00	Observing the Moon and deep sky objects. See a crescent moon and the brighter deep sky objects. See Mercury, Venus, Mars, Saturn, and Jupiter (GRS transit 11:53 pm)

Note: All observatory dates fall on a Friday, and are held at Froemming Park.  
GRS transit: When Jupiters Great Red Spot is in the middle of the planet. The GRS is visible 1 hour before and after this time.