



March 2004 Newsletter of the Omaha Astronomical Society Issue 195

The McNeil Nebula is it new, or just been hiding?



General Meeting of the  
Omaha Astronomical Society  
Friday, March 5th at 7:30 PM  
Durham Science Center, Room 169  
UNO Campus

Program: See Page 3

## **Events**

**MARCH CLUB STAR PARTY**  
Saturday, March 20th

**PLATTE RIVER STATE PARK**

**MAHONEY PUBLIC STAR PARTIES**

May 14, 2004 is to be the first of the year

**PLANNING MEETING FOR 2004**  
**NEBRASKA STAR PARTY**

11 March, 7:30 pm

Mahoney State Park Lodge

Join us and do your part to help plan the next NSP

**NEALE WOODS NATURE CENTER PROGRAMS**

Phone number: (402) 453 - 5615

March 5, 2004, 7:30 - 9 PM Moon Magic

March 20, 2004, 7:30 - 9 PM Spring Star Tales

OAS members are encouraged to help out with these events.

STELLA is a publication of The Omaha Astronomical Society. Please send related correspondence to: STELLA, c/o Omaha Astronomical Society, P O Box 540424, Omaha, NE



## **BULLETINS**

### **March Meeting**

Dr. Dan Wilkins will give a talk on the  
"Optical effects of high speed."

### **Good March Dates to Observe at the OAS Club Site in Weeping Water Nebraska**

Friday 12 March, last quarter moon  
Saturday 13 March, last quarter moon

Friday 19 March, new moon  
Saturday 20 March, new moon

### **Upcoming Events**

Sat. 3 April 7 PM, Hitchcock Nature Center  
PLANET NIGHT

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## An Astronomy Quiz

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This Month Quiz - Answers next month.

1. What is the Astronomical League's newest Observing club, and how many items must you observe?
2. How many segments make up one mirror in the Keck Telescopes?
3. What and where is Pasiphae?
4. How far from Earth is the closest red dwarf star?
5. What is special about the mirror in the Laval 2.7M LMT?
6. What is estimated age of the oldest know galaxy, and where is it?
7. How big is Delambre, and what is it?
8. When is the peak activity of the Beta Leonids?
9. What is the latest on the composition of Europa?
10. What galaxy is this , what is happening to the gas in the outer region of this galaxy, and what may have caused it?



## February Quiz Answers

1. 12" Porthole Glass
2. Venus will transit the sun
3. It is not connected to any other mare
4. Christiaan Huygens, Moon of Saturn
5. Beta, Ursae Majoris
6. 4 Vesta
7. Buzz Aldrin
8. 37 Cluster
9. 83.3 minutes
10. Shumaker-Levy 9

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One of its discoveries is that Jupiter's ring system is continually replenished by dust kicked up as interplanetary meteoroids smash into the four inner moons.

If it weren't for the glare of Jupiter, the Galilean moons would be naked eye objects in a dark sky. At opposition the brightest, Ganymede, has a magnitude of 4.6, while the darkest, Callisto, shines at magnitude 5.7. Even Barnard's Amalthea, at magnitude 14.1, would be visible in large amateur scopes.

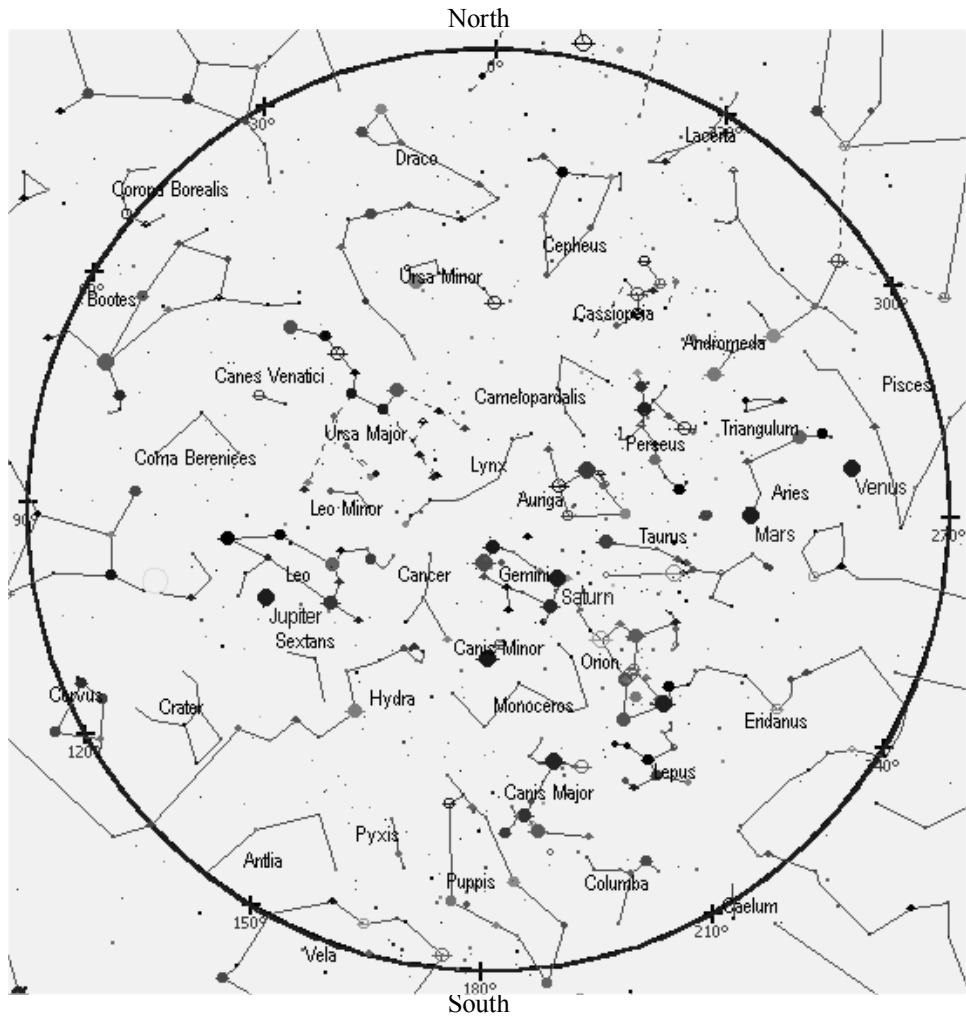
Jupiter will be at opposition about the time you read this (March 3). It will be well placed for observing until around late June.

## Special Note

We will again be taking orders for name tags at the March meeting:

Remember that they are 5 dollars each, please bring payment , Thanks in advance.

# The March Sky



This map reflects the Northern Hemisphere sky at the following times:

Early March, 2004	9 pm
Late March, 2004	8 pm
Early April, 2004	7 pm

## March Sky Calendar

6th Full moon  
13th Last quarter  
20th Spring Equinox (1:49 am EST)  
20th New Moon  
28th First Quarter Moon

### Recent Observing Awards

No new awards this month

Visit the club web site at: **[www.OmahaAstro.com](http://www.OmahaAstro.com)**

Save the club money... and get your newsletter in full color by signing up for the email edition of the Stella. Signing up is easy... just go to:

**[Http://www.omahaastro.com/DigitalStella](http://www.omahaastro.com/DigitalStella)**

### Welcome New Members...

Craig Seamands of Council Bluffs  
Richard Taubenberger of Bellevue

The Moons of Jupiter: Late Breaking News, Hill's Sphere, Satellite Synchronization, and Ring Replenishment

Harlan Seyfer

If you've been reading the March issues of *Astronomy* and *Sky and Telescope*, you are probably aware that March is the month of the planets of antiquity. Towards the end of the month all seven solar system bodies known to the ancients will be visible: Mercury, Venus, Mars, Jupiter, Saturn, and, of course, the Sun and Moon. I won't go into the details of their appearance. Those are covered in detail in both magazines. For thousands of years, that's where matters stood, albeit with occasional bickering over how all this stuff moved around the sky. Was the Sun or the Earth at the center of it all?

Antiquity and the bickering (more or less) ended during a cold January in Padua in 1610, when Galileo noticed four "stars" accompanying Jupiter. Over several weeks he came to realize that they were indeed revolving around Jupiter. The Galilean satellites, as they are now known, were the first solar system objects discovered since antiquity.

By the way, there is strong circumstantial — but controversial — evidence that Simon Marius (Mayr), a German astronomer, discovered the moons of Jupiter independently of Galileo and possibly a month or two earlier. Regardless of this claim, he gave these moons the names they are known by today — Io, Europa, Ganymede, and Callisto — named after the lovers of Jupiter.

The detection of the Galilean moons started a process of discovery that continues to this day. The Central Bureau for Astronomical Telegrams (CBAT) of the International Astronomical Union (IAU) announced on January 25, 2004, that "the discovery of a new satellite of Jupiter has been reported on CCD images taken with the 3.6-m Canada-France-Hawaii Telescope and the 2.2-m University of Hawaii reflector by teams led by S. S. Sheppard and by B. Gladman." This announcement was followed on 4 February 2004 by another, "The discovery of a new satellite of Jupiter has been reported on CCD images taken with three telescopes at Mauna Kea by a team led by S. S. Sheppard. Astrometry, preliminary orbital elements by B. G. Marsden, and an ephemeris appear on MPEC 2004-B81 ( $e = 0.31$ ,  $i = 149$  deg,  $P = 759$  days,  $H = 16.7$ )."

The IAU has designated these S/2003 J 22 and S/2003 J 23. "S/2003" indicates that they are satellites discovered in 2003. While they were captured on photographs taken in 2003, they were not confirmed as orbiting Jupiter until the dates of the announcements. Incidentally CBAT only rarely sends out telegrams any more. Every announcement is via email now. The Minor Planet Electronic Circulars (MPEC) can be found at <http://cfa-www.harvard.edu/iau/services/MPEC.html>. The purpose of CBAT and MPEC is to quickly get time sensitive information to professional astronomers and interested amateurs.

The data given is preliminary:  $e$  indicates the new moon's orbital mean eccentricity,  $i$  is the inclination of the satellite's orbit from Jupiter's around the Sun,  $P$  as you might guess is the orbital period in days, and  $H$  is the absolute magnitude of the satellite. In both cases the visual magnitude is about 24 when Jupiter is at opposition, its closest point to Earth.

Scott Sheppard's web site, where I found much of this information, is an authoritative location for data on our solar system's natural satellites: <http://www.ifa.hawaii.edu/~sheppard/satellites/>. S/2003 J 1 through S/2003 J 23 were all discovered by teams led or co-led by Sheppard. As of mid-February, when I'm writing this, Jupiter has 63 known satellites compared to Saturn's 31, which were discussed last month.

Satellites can only orbit a planet within an area called the Hill sphere. Outside the Hill sphere, the planet's gravity is too weak to hold the satellite. The Sun's gravity dominates and pulls the satellite-wannabe away from the planet. At opposition Jupiter's Hill sphere is a circle with a radius of about 4.7 degrees centered around Jupiter. That's a pretty large hunk of celestial real estate. The diameter of that circle is equivalent to about 19 of our full Moons. You might also recall that the width of your fist when held out at arms length is about ten degrees. It is at the edges of Jupiter's Hill sphere that astronomers are searching for Jovian moons.

The latest Jovian satellites discovered have diameters of about a mile and are near the magnitude limit of the equipment used by Sheppard and his team. These are the world's two largest digital cameras mounted on the Subaru (8.3 meter diameter) and Canada-France-Hawaii (3.6 meter diameter) telescopes atop Mauna Kea in Hawaii.

Io revolves around Jupiter in 1.77 days; Europa, in 3.55 days; Ganymede in 7.16. About the time of the French Revolution, the Marquis de Laplace pointed out that this is a ratio of about 1:2:4. That is, Europa takes about twice as long as Io to orbit their parent planet and Ganymede takes about four times as long. The Marquis demonstrated that these satellites are permanently locked into this relationship. A consequence of this is that all three satellites can never show the same phenomena at the same time. For example, you can never see all three crossing the face of Jupiter at once. If Europa and Ganymede are transiting, Io will be hidden behind Jupiter. Callisto orbits Jupiter in 16.3 days and is speeding up. In a few hundred million years, it too will join this dance, orbiting at eight times the period of Io.

In 1979 the Voyager I and II spacecraft discovered that Jupiter had a ring. They also spotted three small moons circling Jupiter closer than Io. Previously only Amalthea, discovered by E.E. Barnard in 1892, was known to be closer to Jupiter than Io. Because of Jupiter's atmospheric and magnetic drag, the particles in the Jovian ring probably don't stay there for long. The Galileo spacecraft orbited Jupiter for over eight years, until it plunged into the giant planet last September. \*\*\* Continued on page 5 \*\*\*

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# Bits of Information

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## NEW OBSERVING CLUB

The Astronomical League has a new Observing club, and it is the Constellation Hunter Observing Club. It has two different certifications and pins: The Northern Skies and the Southern Skies. The northern one has a list of 38 constellations while the southern one has 56 in its list.

## THE PLANETS

March is a time to see all five of the naked eye planets. After sunset Venus is easy to see even during the hours of twilight. You will find it in the western sky shining brightly, it is impossible to miss shining at magnitude -4.3. On the night of March 24th look for it next to a thin crescent moon. By the end of the month Venus will be at its greatest evening elongation, just 2 degrees below Pleiades, and around the same time it will be half illuminated.

Mars has faded away to little more than a dot. Mars will end the month near the star Aldebaran, the red eye of the Taurus the Bull.

Next in line comes Saturn, high in the sky above Orion. Saturn is high in the west for several hours after sunset. On March 7<sup>th</sup> Saturn will halt its westward motion, and resume its normal easterly motion. The rings are still tilted close to their maximum. Since 3 months have passed since opposition the shadow of the rings on the planet should be visible. The rings and Saturn's moons make it a joy to observe.

At sunset Jupiter is low in the eastern sky, however it comes to opposition on the night of the 3-4 March. At -2.5 magnitude Jupiter is easy to spot. This month there will be a rare event with Jupiter's moons, on the 27/28 three moons will cast (28<sup>th</sup> @ 3:10 AM EST)

shadows simultaneously on Jupiter's surface. They are Callisto, Io, and Ganymede. Also at that time Europa will be hidden as it slide behind the planet at 1:32 AM.

Lastly Mercury will make an appearance during the month. It will become visible around the 17<sup>th</sup> when it will be 6 degrees above the horizon thirty minutes after sunset. It reaches its greatest elongation the same day as Venus on the 29<sup>th</sup>, however it will only be 19 degrees above the horizon due to its smaller orbit.

#### **COMETS & ASTEROIDS**

Comet C/2002 T7 (LINEAR) should be visible in the west after sunset with binoculars, it is below the only bright star in the area, Gamma Pegasi. It will soon move behind the sun, and it will reappear before dawn in mid-April.

Comet C/2001 Q4 should make an appearance in the northern sky in May, hopefully it will put on a good show time will tell.

Look for asteroid 1 Ceres in Gemini during March, early in the month will be difficult as the moon will be close by.

#### **DEEP SKY**

Orion still draws your attention in the southern sky after the sun sets. As always there is much to look at here:

- The Trapezium
- The Great Orion Nebula (M42)
- M78 a reflection nebula
- Collinder 70 an open cluster
- McNeil Nebula
- Plus there are numerous double and/or triple stars

So may your sky's be clear, and the temperature warm.



## Club Officers .....

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### BENEFITS OF MEMBERSHIP

- ◆ Members receive the STELLA, our monthly newsletter.
- ◆ Each member is automatically a member of the Astronomical League, the only nation-wide organization for amateur astronomers.
- ◆ Use of the observing site at Weeping Water, NE
- ◆ The opportunity to borrow one of several club-owned telescopes.
- ◆ Organized trips to local observatories, planetariums and museums.
- ◆ Significant savings on subscriptions to **Sky & Telescope** and **Astronomy** magazines.
- ◆ Savings on astronomy books and printed materials.

### ANNUAL MEMBERSHIP DUES

Regular/Family  
\$25.00

Junior/Student  
\$10.00

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\$10.00

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