

SKYLIGHTS

Newsletter of the Astronomical Society of Northern New England



JAN. 2010



Member of NASA's
Night Sky Network



Astronomical League
Member

ASNNE MISSION

ASNNE is an incorporated, non-profit, scientific and educational organization with three primary goals:

- 1) To have fun sharing our knowledge and interest with others.
- 2) To provide basic education in astronomy and related sciences to all who are interested.
- 3) To promote the science of Astronomy.



I want to give a **BIG THANK YOU** to all those who contributed to "Skylights" last year. Please keep the submissions coming.

What's Up In January

By Bernie Reim

This month is named after Janus, the Roman god of gates and doors, beginnings and endings. He is depicted as having two faces or heads, facing in opposite directions. The first month of this New Year has several interesting highlights which include another meteor shower, an annular solar eclipse, and Mars at its best and brightest in four years.

The Quadrantid meteor shower will peak on Sunday night the third of January into Monday morning the fourth. Unlike the last two meteor showers we just had, the Leonids in November and the Geminids in December, the moon will be only a few days past full, overpowering all but the brightest meteors.

Similar to the Geminids, the Quadrantids are caused by an extinct comet nucleus just recently discovered, named 2003EH1. You can usually expect up to 100 meteors per hour from this less famous shower, but not this year due to the bright moon. Named after a defunct constellation, Quadrans Muralis, these meteors will appear to originate from an area of the sky near Hercules, Draco, and the Big Dipper.

There is a way to catch these meteors even if it is cloudy or snowing and in spite of a bright moon. Because of their great speed as they enter our atmosphere around 70 miles high, these tiny particles create a luminous ionized trail in their path that will easily reflect a radio beam back to Earth. Their strong echoes can be heard with simple ham radio equipment. You can use a local TV or radio transmitter as the source of the beam or you can try to tune into their reflections from one of the most powerful radar beams on Earth, the Air Force Space Surveillance radar in Texas. Its primary function is to track satellites and space debris down to 10 cm across.

It continually tracks about 15,000 objects up to 10,000 miles high. Its beam now extends 42 light years into space, because it started tracking with our first satellite in 1958.

There are samples of these eerie sounds on spaceweatherradio.com. Their chirps and pings sound quite metallic, materializing out of a static background. Some of the more consistent meteor showers like the Perseids and Leonids are broadcast live on different web-sites.

Even more interesting than the occasional meteor shower is the remarkable symphony of strange natural noises always emanating from our planet. Our whole environment literally sings with radio waves at audio frequencies. Our ears can't detect these radio waves directly, but we can convert them to sound waves with a very low frequency receiver. Mostly created by distant lightning strikes (over 100 strikes occur on earth every second) these sounds take on many variations. The annular solar eclipse created by the new moon on the 15th will only be visible along a thin

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What's Up "Continued from page 1"

line from central Africa, over southern India, and into China. The moon will be a little too far away from Earth to completely cover the sun, so a brilliant and dangerous ring of sunlight remains. I experienced one of those eclipses over southern Maine on May 10, 1994. Though not as dramatic as total solar eclipses, annular solar eclipses are still quite spectacular and clearly reveal many wonderful aspects of the earth, moon, and sun in the process. During the five minutes that the perfect ring of sunlight was suspended in the cloudless sky, this part of the earth took on a darkened, silvery atmosphere that made it feel like I was suddenly transported to an alien world. Seeing the hundreds of images of the crescent sun dancing on the ground, projected through the young green leaves of early May, was also an unforgettable and other-worldly experience.

About half of all solar eclipses are annular, when the moon is closer to apogee, and half are total, when the moon is closer to perigee. There will also be a total solar eclipse later this year during the next eclipse season on July 11. The moon's shadow cone will pass right over Easter Island, one of the most remote inhabited locations on earth in the middle of the South Pacific, thousands of miles from any land.

Mars will reach opposition on the 29th. That is when it rises at sunset and sets at sunrise and reaches its closest point to earth, so it will be biggest and brightest in our sky, revealing several of its features even through smaller telescopes. Its strong orange light will get almost as bright as our brightest star, Sirius in Canis Major, which will be to the right of Mars at the bottom of the Winter Hexagon. This will not be a very close opposition for Mars, since it will only get within 62 million miles of us, which is about twice as far away as it got in August of 2003, which was its closest opposition in nearly 60,000 years.

Jupiter is slowly sinking into the western sky and will be setting shortly after sunset by the end of the month. Saturn now rises before midnight and continues to rise about 4 minutes earlier each evening, approaching its own opposition in April.

Jan.1. On this day in 1801, Giuseppe Piazzi discovered the first and largest asteroid, Ceres, which is about 600 miles across and was once classified as a planet. Ceres alone

has one third of the mass of all the millions of asteroids orbiting in the asteroid belt between Mars and Jupiter.

Jan. 2. The nearly full moon will pass just to the right of Mars tonight.

Jan. 3. The earth is at perihelion, or closest to the sun today at 91.4 million miles or 1.7% less than its average distance of 93 million miles.

Jan. 7. Last quarter moon is at 5:39 a.m. EST.

Jan. 8. Stephen Hawking was born on this day in 1942.

Jan. 11. Antares, one of the largest stars in our whole galaxy of 200 billion stars, will be just to the right of the waning crescent moon 1 hour before sunrise in the southeast this morning.

Jan. 13. Look for the very thin crescent moon just to the right of Mercury very low on the southeastern horizon half an hour before sunrise this morning.

Jan. 15. New moon is at 2:11 a.m. An annular solar eclipse happens today that will be visible as a partial solar eclipse over much of Africa, Asia, and parts of Europe.

Jan. 17. The waxing crescent moon will be just below and to the right of Jupiter one hour after sunset this evening in the west-southwest.

Jan. 23. First quarter moon is at 5:53 a.m.

Jan. 25. The Mars rover Opportunity landed on the red planet on this day in 2004. Its twin rover, Spirit landed three weeks earlier on the other side of Mars. Designed to last just 3 months, both rovers are still working and transmitting useful data 6 years later. Opportunity has traveled about 12 miles and Spirit 5 miles and they have taken 250,000 images.

Jan. 29. Mars reaches opposition tonight, but it was closest to Earth two days earlier. Look for the nearly full moon just below and to the left of Mars.

Jan. 30 Full moon is at 1:18 a.m. This is also called the Old, Moon after Yule, or Wolf Moon. Just 3 hours later the moon will make its closest approach to Earth for 2010, at 221,600 miles, which is 7% less than its average distance. The tides will be several feet higher than normal and if a winter storm also occurs today, it could be really dramatic by the ocean.

Moon Phases

Jan 7

Last Quarter

Jan 15

New

Jan 23

First Quarter

Jan 30

Full

Moon Data

Jan 1

Moon at perigee

Jan 2

Moon Enters Leo

Jan 4

Moon Enters Virgo

Jan 6

Moon Enters Libra

Jan 8

Moon Enters Scorpio

Jan 13

Moon Enters
Capricorn

Jan 15

Moon Enters
Aquarius

Jan 17

Moon at apogee

Jan 18

Moon Enters Pices

Jan 20

Moon Enters Aries

Jan 23

Moon Enters Taurus

Jan 25

Moon Enters Gemini

Jan 27

Moon Enters Cancer

Jan 30

Moon at perigee

Astronomical Society

Of

Northern New England

Business Meeting

December 4, 2009

Present:

Richard Beaulieu (secretary), Dave Bianchi, Ron Burk (president), Joan Chamberlin, Bob Conley, Alan Goff, Bro. Albert Heinrich, Kevin Manley, Joyce Rowland.

Secretary's Report:

The secretary has learned of no new members.

Star Parties:

The Boy Scout party was cancelled and not rescheduled.

Club/public

December 18 new moon 12/16 January 15 new moon 1/15

February 12 new moon 2/14 April Kennebunk Land Trust rescheduled

Web sites:

We will put the club calendar on the Night Sky Network web site. There will be a link on asnne.org.

Where we meet:

It was stated again that we can't afford the new, higher rent at the Kennebunk lodge. The Kennebunk Unitarian Church looks attractive. The rent there would be \$25 a month. But we could not transfer all that we have in the closets there.

The directors need to get together to visit the site to look it over.

Meeting programs:

January 8 Bernie Reim February 5 Ian Durham March 5 George Whitney

April 9 Steve Innes? May 7 James Standerfer?

Observatory/Equipment:

The 80 mm Celestron has been mounted on the Mead as a viewfinder. A Losmondy ring was used. It works very well.

The Zeiss mount is not working. It will be looked at.

Elections:

Alan Goff said that he would be the secretary for next year. Adam Amara said that he would be a candidate for director.

Ron Burk will be president and also have the power to sign checks.

Waiver:

The directors and the members present decided that they would waive dues for Ron, since he contributed a lot from his pocket this summer to keep the lawn mower going.

Respectfully submitted,
Richard Beaulieu

Principal Meteor Showers in 2010

January 4
Quadrantids

April 22
Lyrids

May 6
Eta Aquarids

July 30
Delta Aquarids

August 12
Perseids

October 9
Draconid

October 21
Orionids

November 9
Taurids

November 18
Leonids

November 26
Andromedids

December 14
Geminids

December 22
Ursids

*Note: Dates are
for maximum*

Please share this holiday project with your club.

HOLIDAY NEBULA FILTER DEMONSTRATION PROJECT

What do you observe on a snowy holiday season? Observe colored holiday lights through any nebula filter. You will notice that certain color lights disappear, when they are observed through nebula filters. These types of filters only allow certain wavelengths of color light to pass through, blocking others. You can also observe the orange Hanukkah Menorah lights

Please share this demonstration project at your astronomy club meeting or club holiday party, using a string of colored holiday lights.

Hold a holographic diffraction grating in back of the nebula filter, And you will see the spectrum of the incandescent colored lights. You can also observe a sodium / mercury street light or fluorescent light. You will notice that certain spectrum emission lines disappear.

If you impress Santa, he may leave the TV 102i or NP 127 under your tree!

Barlow Bob

*Submitted by,
Glenn Chaple*

Club Items For Sale



Our club has merchandise for sale at:

www.cafepress.com/asne

ALL money raised goes to our operating fund.

Any design can be put on any item.
Just let our Director, David Bianchi, know.



People of the World, WE NEED YOUR EYES!

by Joan Chamberlin

Here is an opportunity for the entire world to work together to solve a 175 year old stellar mystery. Epsilon Aurigae is a bright star in the constellation Auriga, the Charioteer. This star is a variable star, which means that it changes in brightness over time. Epsilon Aurigae is an eclipsing variable, and the change in brightness that this star undergoes is caused by some type of object eclipsing the star, causing a fading and brightening. This process takes over 600 days.

Epsilon Aurigae is mysterious because its eclipse happens every 27.1 years and lasts for 2 years! Even more mysterious, in the middle of the main eclipse event there is a brightening and a fading. What could be causing these curious effects?

You can help find out just by observing this star, comparing it to nearby stars that have a constant brightness, and adding your observations to the data base at the Citizen Sky website. You can use only your eyes and a star map because this star is bright enough to see even in light polluted areas. If you have equipment to do photometry, you can also contribute this type of data. The eclipse has already begun, but you can still start now. As much data as possible is needed to solve this mystery. Your data will be important to science.

The Citizen Sky project is for EVERYONE, EVERYWHERE! It's a chance for ordinary people and professionals to work together and contribute to real science. Citizen Sky will give you the tools and support that you need to be a part of this effort. If you are interested in participating or in getting others in your country to participate, go to <http://www.citizensky.org> and read the information there. Answers to many questions you might have can be found on this site at FAQ or other sections that don't require you to log in. To access some of the information, you may need to register as a participant. Citizen Sky welcomes participants from all over the world and all levels of skill.

On the Citizen Sky site is a 10 Star Tutorial, which teaches you how to use comparison stars to determine what magnitude (brightness) you are seeing. This is good to practice with before you begin actually making observations of Epsilon Aurigae and putting your data into the Citizen Sky website.

In the future there may be translations of the 10 Star Tutorial in some languages other than English. If you are interested in helping translate this document into your native language so that it will be easier for people of your country to participate, please contact Joan Chamberlin at starladyjoan@yahoo.com. Please send any questions to the same address, and I will get back to you or find someone who can answer your question.

Sky Object of the Month - January 2010

omicron Ceti (Mira, the “Wonderful”)

By Glenn Chaple

Last month, we looked at the prototypical eclipsing binary beta Persei (Algol). This month, we turn to another prototype, the classic long-period variable (LPV) omicron Ceti. This star boasts a rich history, having been discovered by David Fabricius on August 13, 1596. Johann Bayer added it to his *Uranometria* star catalog as a 4th magnitude star. When it became apparent that this star would miraculously appear and disappear (a stellar behavior unheard of in those days), astronomers gave omicron Ceti the nick-name Mira “the Wonderful.” Mira’s periodicity was first described by Johann Holwarda, who determined a period of 11 months - a figure is close to today’s standard.

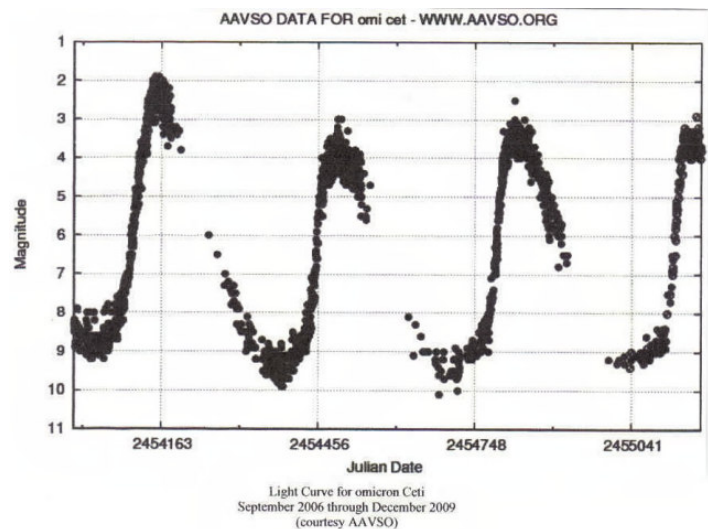
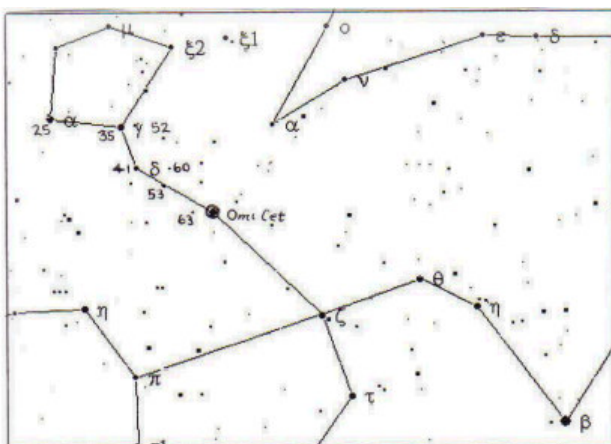
Mira is the prototype of a class of pulsating variable stars called “long-period variables (LPVs).” The typical “Mira-type” star is a red giant with a range of 5 or 6 magnitudes and a period of several months to one or two years. The brightest of LPVs, Mira typically varies from magnitude 3 to 9 in a 331 day cycle. At times Mira will rise to 2nd magnitude, and in 1779 was observed by William Herschel to rival the first magnitude star Aldebaran.

With modest means, you can follow Mira through a complete cycle. Naked eye observations will cover magnitude 5 and brighter, binoculars will work for magnitudes 5 through 8, while a small rich-field telescope can handle Mira at minimum. A small scope magnifying 50X will also uncover Mira’s 9th magnitude optical companion, situated 120 arc-seconds away.

In November, Mira reached a peak brightness of about magnitude 3.5. The star has begun to fade, but should still be visible to the naked eye throughout December and the early part of January. The accompanying chart should help you make rough estimates of Mira’s brightness. If you want to follow it into the domain of binoculars and small telescopes, log on to www.aavso.org. First, click on “Make a Chart.” In the box labeled “NAME,” type on “omi Cet.” Next to the “Plot a Chart of this Scale” prompt, scroll to “B” (the scale used for relatively bright variable stars). Click on “Plot Chart” and – voila! – you have a “B” chart for Mira.

Last month, I noted that observing and recording an eclipse of Algol should be on every backyard astronomer’s “to-do” list. Add Mira the Wonderful to that list.

Your comments on this column are welcome. E-mail me at gchaple@hotmail.com.





Sunglasses for a Solar Observatory

by Patrick Barry

In December 2006, an enormous solar flare erupted on the Sun's surface. The blast hurled a billion-ton cloud of gas (a coronal mass ejection, or CME) toward Earth and sparked days of intense geomagnetic activity with Northern Lights appearing across much of the United States.

While sky watchers enjoyed the show from Earth's surface, something ironic was happening in Earth orbit.

At the onset of the storm, the solar flare unleashed an intense pulse of X-rays. The flash blinded the Solar X-Ray Imager (SXI) on NOAA's GOES-13 satellite, damaging several rows of pixels. SXI was designed to monitor solar flares, but it must also be able to protect itself in extreme cases.

That's why NASA engineers gave the newest Geostationary Operational Environmental Satellite a new set of sophisticated "sunglasses." The new GOES-14 launched June 27 and reached geosynchronous orbit July 8.

Its "sunglasses" are a new flight-software package that will enable the SXI sensor to observe even intense solar flares safely. Radiation from these largest flares can endanger military and civilian communications satellites, threaten astronauts in orbit, and even knock out cities' power grids. SXI serves as an early warning system for these flares and helps scientists better understand what causes them. "We wanted to protect the sensor from overexposure, but we didn't want to shield it so much that it couldn't gather data when a flare is occurring," says Cynthia Tanner, SXI instrument systems manager for the GOES-NOP series at NASA's Goddard Space Flight Center in Greenbelt, Maryland. (GOES-14 was called GOES-O before achieving orbit).

Shielding the sensor from X-rays also reduces the amount of data it can gather about the flare. It's like stargazing with dark sunglasses on. So NASA engineers must strike a balance between protecting the sensor and gathering useful data.

When a dangerous flare occurs, the new SXI sensor can protect itself with five levels of gradually "darker" sunglasses. Each level is a combination of filters and exposure times carefully calibrated to control the sensor's exposure to harmful high-energy X-rays.

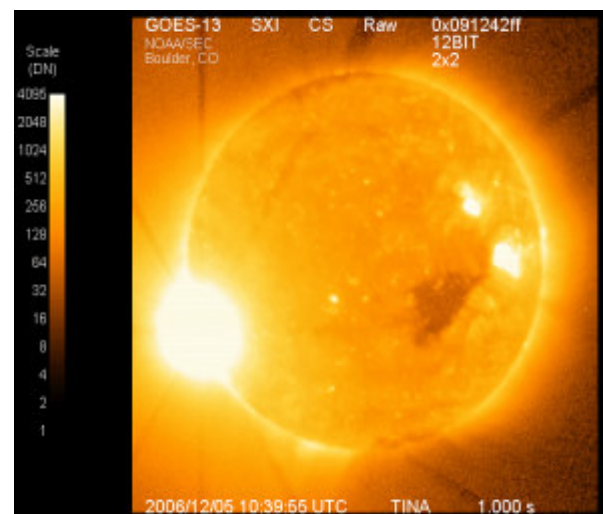
As the blast of X-rays from a major solar flare swells, GOES-14 can step up the protection for SXI through these five levels. The damaged sensor on GOES-13 had only two levels of protection—low and high. Rather than gradually increasing the amount of protection, the older sensor would remain at the low level of protection, switching to the high level only when the X-ray dose was very high.

"You can collect more science while you're going up through the levels of protection," Tanner says. "We've really fine-tuned it."

Forecasters anticipate a new solar maximum in 2012-2013, with plenty of sunspots and even more solar flares. "GOES-14 is ready," says Tanner.

For a great kid-level explanation of solar "indigestion" and space weather, check out spaceplace.nasa.gov/en/kids/goes/spaceweather.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Caption:
X-9 class solar flare December 6, 2006, as seen by GOES-13's Solar X-ray Imager. It was one of the strongest flares in the past 30 years.

Club Meeting & Star Party Dates

Date	Subject	Location
January 8	ASNNE Club Meeting 5:30-6:30 PM: Business Meeting 6:40-7:30PM: Social Hour and Joan's Beginner Astronomy Class (Public walk-ins welcome). 7:30-9:30PM: Club Meeting: *Bernie Reim's "What's Up." *Astro Shorts & Astro News. *NASA Night Sky Network Activity. Guest Speaker: Bernie Reim Bernie is writing a children's book about the Hubble Space Telescope and he would like your help with some ideas (i.e. more adventures for Eddie and picture ideas).	Masonic Hall West Kennebunk, Me.
January 15	Club/Public Star Party. Rain date 1-16-10 (<i>Visit website for updates and or cancellations</i>).	Starfield Observatory, West Kennebunk, Me.

Directions to ASNNE event locations

Directions to Masonic Hall

From I-95:

If coming southbound, take Exit 25 off of I-95. Come out to Rte. 35. Turn left at stop sign and turn right at next stop sign. Proceed straight ahead and you will see a variety store on the left and the Masonic Hall will be on the right.

If coming northbound, take Exit 25 off of I-95. Turn right at the stop sign and cross over I-95. Proceed straight for about 1/2 mile. There will be a variety store on the left and the Masonic Hall will be on the right.

Directions to Starfield Observatory

From North:

Get off turnpike at exit 32, (Biddeford) turn right on Rt 111. Go 5 miles and turn left on Rt 35. Go 2 miles on Rt 35 over Kennebunk River to very sharp 90 degree left turn. The entrance to the Starfield Observatory site is at the telephone pole at the beginning of the large field on the left. Look for the ASNNE sign on the pole.

From South:

Get off the turnpike at exit 25 in Kennebunk. After toll both turn right on Rt 35. Go up over the turnpike and immediately turn right on Rt 35. About 4 miles along you will crest a hill and see a large field on your right. Continue until you reach the end of the field. Turn right into the Starfield Observatory site at the last telephone pole along the field. Look for the ASNNE sign on the pole. If you come to a very sharp 90 degree right turn you have just passed the field.

To join **ASNNE**, please fill out the below membership form. *Checks should be made payable to: Astronomical Society of Northern New England (A.S.N.N.E).* For more details, please visit our website:
<http://www.asnne.org>



Astronomical Society of Northern New England
 P.O. Box 1338
 Kennebunk, ME 04043-1338

2010 Membership Registration Form

(Print, fill out and mail to address above)

Name(s for family): _____

Address: _____

City/State: _____ Zip code: _____

Telephone # _____

E-mail: _____

Membership (check one):

Individual \$35 _____ Family \$ 40 _____ Student under 21 years of age \$10 _____ Donation _____

Sky & Telescope (\$32.95) _____ Astronomy (\$34) _____

Total Enclosed _____

Tell us about yourself:

1. Experience level: Beginner _____ Some Experience _____ Advanced _____

2. Do you own any equipment? (Y/N) And if so, what types?

3. Do you have any special interests in Astronomy?

4. What do you hope to gain by joining ASNNE?

5. How could ASNNE best help you pursue your interest in Astronomy?

6. ASNNE's principal mission is public education. We hold many star parties for schools and the general public for which we need volunteers for a variety of tasks, from operating telescopes to registering guests to parking cars. Would you be interested in helping?

Yes _____ No _____

7. ASNNE maintains a members-only section of its web site for names, addresses and interests of members as a way for members to contact each other. Your information will not be used for any other purpose. Can we add your information to that portion of our web site?

Yes _____ No _____

