

SKYLIGHTS

Newsletter of the Astronomical Society of Northern New England



Oct. 2006



Member of NASA's
Night Sky Network

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.



Important Notices:

1. Membership dues are due starting in October...more details on page 2.
2. October's keynote speaker is IAU member Dr. Jerry LaSala...more on page 6.

What's Up In October

by Bernie Reim

This is the month that nature finishes transforming the lush green leaves of summer into the vivid gold, orange, and red leaves of autumn. We will have cooler and less humid weather this month to watch the continually unfolding drama that appears as the night sky.

There are two particularly dramatic events happening this month. The moon will once again occult the Pleiades and the Orionid meteor shower peaks on October 21st.

A bright, 86% lit waning gibbous moon will drift in front of the Pleiades star cluster starting around midnight on Monday, October 9 and lasting until 3 am. Since the moon is just 2 days past full that night, it will rise about one hour after sunset. This is already the fourth such occultation this year, but I haven't been able to see any of the previous three, although I did see an excellent occultation of the Pleiades on the first day of spring about 12 years ago.

This time the moon's sunlit side will cover up the stars and then they will reappear from behind the dark side one hour later. Remember that the moon moves eastward against the fixed background of stars at the rate of one degree every two hours, even as it appears to set in the west along with the constellation that it is in at the time. The moon covers half a degree of the sky. You will need a telescope to see the exact second that the stars will be going out, because the moon is so bright. You can see the stars coming back out with just a pair of binoculars, but you will need to know exactly when they will show up again. For us at this latitude, the four bright lower stars in the Pleiades, Merope, Alcyone, Atlas, and Pleione will not be covered by the moon. Only the four higher stars, Electra, Maia, Taygeta, and Sterope will be covered.

The next dramatic event this month will be the annual Orionid Meteor Shower. There will be no moon to interfere with the show this month. The shower begins on Friday night, October 20th, and will last right through Monday night the 23rd, with its probable peak on Sunday morning the 22nd a couple of hours before sunrise. You can expect about 20 meteors per hour all emanating from a point in the constellation of Orion the Hunter that will be rising at 9 pm.

Although the Orionids are not one of the year's most prolific showers, they are caused by that most famous of all comets, Halley's. The Eta Aquarids every May 4th are also caused by this comet as the earth intersects a single, broad stream of meteoroids in two places in its orbit on opposite sides of the sun. Both of these showers produce faint and swift meteors as you are witnessing tiny, sand grain-sizes pieces of Halley's Comet smashing into our atmosphere at nearly 40 miles per second. Most of this comet dust disintegrates

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Sun-like Stars

By Joan Chamberlin

The sun is a star, so the stars we see in the night sky must be like our sun. This is a belief held by much of the public and probably many of our school children. But how true is this? Are many of the stars we can easily see on a clear dark night really like our sun? This is the topic of an amazing PowerPoint presentation that is part of our new NASA Night Sky Network toolkit called Shadows and Silhouettes, which has activities on moon phases, eclipses, transits, and the Kepler Mission to detect transits of earth-sized planets orbiting in the habitable zone of sun-like stars.

Stars which are on the main sequence, still primarily fusing hydrogen to helium, comprise about 90% of the stars in the Milky Way Galaxy. Our sun, a spectral type G2 star, is on this main sequence. Sun-like stars make up about 7% of the stars in the galaxy.

Also on the main sequence are cool red stars, which are much less massive than the sun. These red dwarfs comprise about 79% of the galaxy's stars. About 4% of the stars in the galaxy are hot blue massive stars, much more massive than the sun and many times brighter.

About 1% of the stars in the Milky Way are red giants. Although they are cooler than the sun, they have swelled up to enormous sizes and therefore are very bright. These stars have moved off the main sequence and are no longer fusing primarily hydrogen to helium. You might say they are in retirement. The remaining 9% of stars are white dwarfs, unable to fuse anything. They are the end point of some stars' lives.

What we learn from this PowerPoint is that although sun-like stars comprise 7% of the Milky Way's population, the hot massive blue stars and the red giants are what we mostly see in the night sky. Together the hot blue stars and red giants comprise only 5% of the Milky Way's stars.

So how many stars brighter than 4th magnitude can we see on a clear dark night that are like our sun? Only three in the entire night sky, including both Northern and Southern Hemispheres! Eta Cassiopeia is visible all year long at our latitude; Tau Ceti is visible only a few months of the year; and Alpha Centauri is not visible from our latitude in Maine.

Eta Cassiopeia is only 19 light years in distance, and Tau Ceti is 12 light years away. A sun-like star must be pretty close (in astronomical terms) for us to see it because it's so much dimmer than the hot blue stars and the red giants. So, when you're explaining to kids that the stars up there are like our sun, make sure you qualify it. Show them Eta Cassiopeia and tell them that one is a lot like our sun. Most of the stars they see up there aren't really like our sun! Some are much more massive and some are in different stages of their life cycles.



MEMBERSHIP DUES

Membership fees are for the calendar year beginning in January and ending in December. Dues are payable to the treasurer during the last quarter of each year (October-December) for the upcoming year. Checks should be made payable to the Astronomical Society of Northern New England (A.S.N.N.E). If you would like to mail in your dues, use the form on page 7.

**Got any News?
Skylights welcomes
your input.**

Moon Phases

October 6
Full

October 13
Last Quarter

October 22
New

October 29
First Quarter

Moon Data

October 3
Neptune 3° north
of Moon

October 4
Uranus 0.5° north
of Moon

October 6
Moon at perigee

October 16
Saturn 2° south
of Moon

October 19
Moon at apogee

October 24
Mercury 1.4° north
of Moon

Jupiter 5° north of
Moon

October 25
Antares 0.4° north
of Moon

What's Up "Continued from page 1"

between 50 and 100 miles high and will never hit the ground. The meteoroid would have to be considerably larger to survive its traumatic journey through our protective atmosphere and become a meteorite. The actual flash of light, called a meteor, usually lasts much less than one second.

All the meteor showers that we experience are caused by the earth passing through debris from comets. For example, Halley's Comet, whose nucleus is just 9 miles by 5 miles, loses a layer of dirty ice about 20 feet thick every time it goes around the sun, which is every 76 years. This has been happening for many thousands of years, so obviously there is a lot of debris in this path now.

There will not be much going on this month as far as any good views of the planets are concerned. We will lose Jupiter in the evening sky and Venus in the morning sky later this month. Mercury makes a short appearance in the evening sky between the 17th and the 28th of this month, but it will be even lower than Jupiter and will require binoculars to see. Look for a nice conjunction of the slender waxing crescent moon, Mercury, and Jupiter half an hour after sunset on Tuesday, October 24. Mars already disappeared from our sky last month and it will be in conjunction with the sun on the 23rd of this month.

That leaves only Saturn. The ringed planet now rises around 3 a.m. in the northeast in the constellation of Leo. It will be rising around midnight by the end of this month. Look for a waning crescent moon to pass near Saturn one hour before sunrise on Monday the 16th and watch it pass near Regulus, the brightest star in Leo, the next morning.

Oct. 5. The asteroid Ceres, which is our largest asteroid at 600 miles in diameter and contains nearly one third of the mass of all the millions of asteroids in our solar system combined, is stationary today. Remember that Ceres would have been reclassified as a planet if the first new definition would have been approved last summer.

Oct.6. Full moon is at 11:13 p.m. EDT. This is usually called the Hunter's Moon, but this month it is actually the Harvest Moon, because it is slightly closer to the equinox than the full moon was last month. This is 14 days

after the fall equinox, which is almost the latest that a Harvest Moon can ever occur. The moon is also at perigee today, which means that the tides will be higher, especially if there is a storm on this date.

Oct. 9. The waning gibbous moon occults the Pleiades tonight.

Oct. 13. Last quarter moon is at 8:26 p.m. The tides exhibit the least difference at first and last quarter and the greatest difference at full moon and new moon.

Oct. 19. The moon is at apogee, or farthest from the earth today at 406,074 km.

Oct. 21. The Orionid Meteor shower peaks tonight and tomorrow.

Oct. 22. New moon is at 1:14 a.m. The first record of a solar eclipse was on this day in 2136 BC.

Oct. 24. Mercury, Jupiter, Antares, and the waxing crescent moon form a nice conjunction this evening and the next.

Oct. 27. Venus is in superior conjunction with the sun. That means it is behind the sun on the far side from Earth. Venus could potentially pass directly between the sun and the earth only during inferior conjunction, (also called a transit in that case) which is what it did on June 8, 2004 and will do again on June 6, 2012. When I witnessed that amazing transit on June 8, I was aware that no person alive on Earth at that time had ever seen a transit of Venus. The last one occurred on Dec.6, 1882! As an unexpected bonus, through the solar filters and telescopes at our observatory in Kennebunk early that foggy morning, I also saw the thin, silvery, ephemeral semicircular arc of the atmosphere of Venus outlined against the blackness of space for a minute or two just after it cleared the surface of the sun! Be prepared for a transit of Mercury across the sun on November 8 next month, which also happens to be Edmund Halley's birthday. Mercury transits are far more common than Venus transits, but they are still fairly rare, only 13 occur each century.

Oct. 29. First quarter moon is at 4:25 pm. EST. Daylight Savings Time ends at 2:00 am.

Principal Meteor Showers in 2006

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*

The Sun Does a Flip!

by Paul Koursewicz

On July 31st 2006, a tiny sunspot was born. Ordinarily, it wouldn't be worth mentioning but this sunspot was special: *It was backward*. Solar physicists have been waiting for this. A backward sunspot is a sign that the *next solar cycle* is beginning.

The Sun has magnetic poles, but unlike Earth they are not constant. They change every 11 years or so from magnetic north to magnetic south and back. Sunspots are planet-sized magnets created by the Sun's inner magnetic dynamo. Like all magnets, sunspots have north (N) and south (S) magnetic poles.

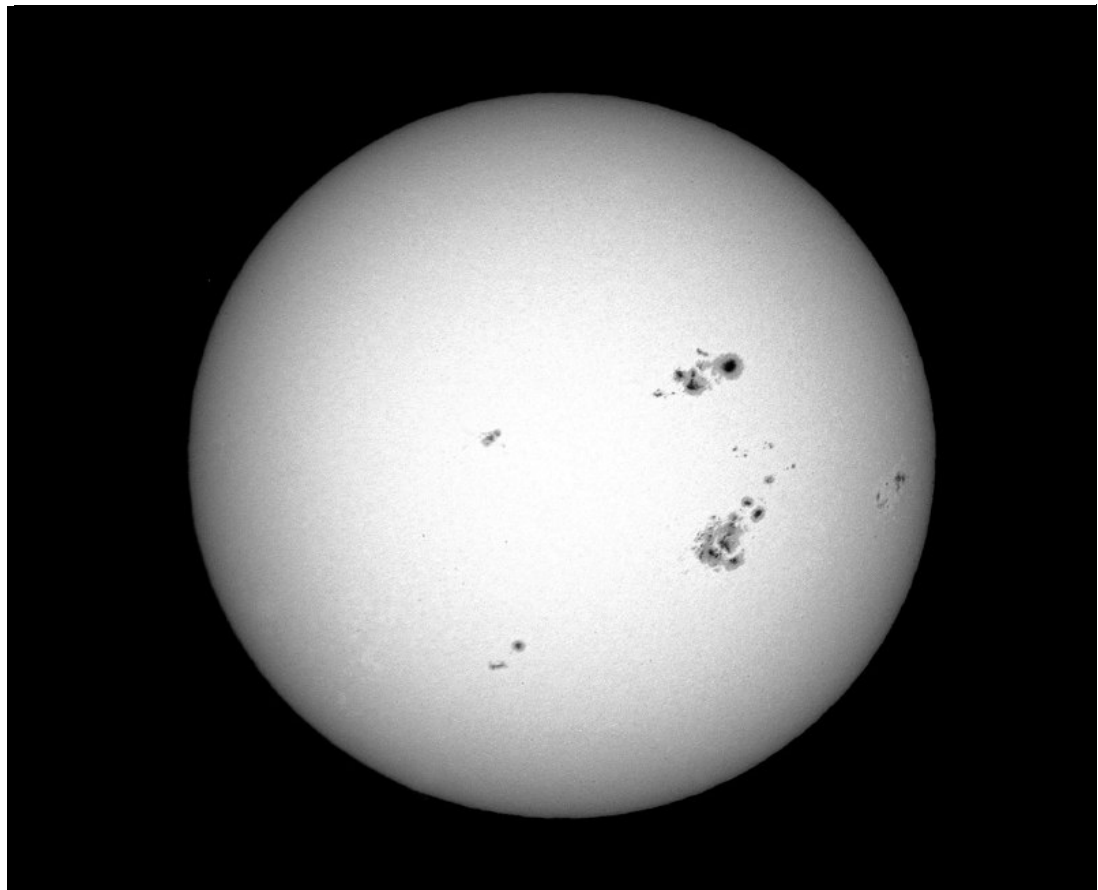
The sunspot of July 31st popped up at solar longitude 65 degrees W, latitude 13 degrees S. Sunspots in that area are normally oriented N-S. The newcomer, was S-N, opposite the norm.

As a new cycle begins, the number of sun-

spots with the reverse orientation will increase and the ones with the orientation of the old cycle will decrease in number. In the transition period they can both occur on the Sun, as the two cycles have no sharp boundary and overlap.

Solar activity rises and falls during its 11-year cycles, swinging back and forth between times of quiet called *solar minimum* (when the number of sunspots all but disappear) and storminess called *solar maximum* (when the number of sunspots are at their peak). Right now the Sun is quiet (near the end of the last solar cycle, which peaked back in 2001). The next cycle, should begin "any time now," returning the Sun to a stormy state.

The SOHO satellite will continue to observe the evolution of the sunspots and the solar activity during the new solar cycle, which will culminate in the solar maximum in about 5.5 years time. Solar scientists predict that the upcoming solar maximum will be very active and could even be the most fierce in decades.



Inside the regions of sunspots, the surface is some 2000 degrees cooler than normal and therefore the spots appear dark. Back in October 2003, I took this photo using my 10" telescope, a Badder solar filter, and a Nikon D100 digital camera. Astronomers said they can't remember the last time two Jupitetr-sized sunspots crossed the face of the Sun at the same time.



From Thunderstorms to Solar Storms...

by *Patrick L. Barry*

When severe weather occurs, there's a world of difference for people on the ground between a storm that's overhead and one that's several kilometers away. Yet current geostationary weather satellites can be as much as 3 km off in pinpointing the true locations of storms.

A new generation of weather satellites will boost this accuracy by 2 to 4 times. The first in this new installment of NOAA's Geostationary Operational Environmental Satellites series, called GOES-N, was launched May 24 by NASA and Boeing for NOAA (National Oceanic and Atmospheric Administration). (A new polar-orbiting weather satellite, NOAA-18, was launched May 2005.)

Along with better accuracy at pinpointing storms, GOES-N sports a raft of improvements that will enhance our ability to monitor the weather—both normal, atmospheric weather and “space weather.”

“Satellites eventually wear out or get low on fuel, so we've got to launch new weather satellites every few years if we want to keep up the continuous eye on weather that NOAA has maintained for more than 30 years now,” says Thomas Wrublewski, liaison officer for NOAA at NASA's Goddard Space Flight Center.

Currently, GOES-N is in a “parking” orbit at 90° west longitude over the equator. For the next 6 months it will remain there while NASA thoroughly tests all its systems. If all goes well, it will someday replace one of the two active GOES satellites—either the eastern satellite (75°W) or the western one (135°W), depending on the condition of those satellites at the time.

Unlike all previous GOES satellites, GOES-N carries star trackers aboard to precisely determine its orientation in space. Also for the first time, the storm-tracking instruments have been mounted to an “optical bench,” which is a very stable platform that resists thermal warping. These two improvements will let scientists say with 2 to 4 times greater accuracy exactly where storms are located.

Also, X-ray images of the Sun taken by GOES-N will be about twice as sharp as before. The new Solar X-ray Imager (SXI) will also automatically identify solar flares as they happen, instead of waiting for a scientist on the ground to

analyze the images. Flares affect space weather, triggering geomagnetic storms that can damage communications satellites and even knock out city power grids. The improved imaging and detection of solar flares by GOES-N will allow for earlier warnings. So for thunderstorms and solar storms alike, GOES-N will be an even sharper eye in the sky.

Find out more about GOES-N at goespoes.gsfc.nasa.gov/goes. Also, for young people, the SciJinks Weather Laboratory at scijinks.nasa.gov now includes a printable booklet titled “How Do You Make a Weather Satellite?” Just click on Technology.

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



Caption:
New GOES-N satellite launches, carrying an imaging radiometer, an atmospheric sounder, and a collection of other space environment monitoring instruments.

Club Meeting & Star Party Dates

Date	Subject	Location
Oct. 06, 7:30 PM Bring a friend Pluto is a hot topic	The <i>regular club</i> meeting will be held at 7:30pm. Keynote speaker: Dr. Jerry LaSala . Dr. LaSala is Chair of the Physics Dept. at USM and Director of Southworth Planetarium. He is also a member of the IAU and attended the Prague proceedings regarding the definition of a planet.	Masonic Hall West Kennebunk, Me. NOTE: Beginner classes will be held from 6:30 PM to 7:15 PM.
Oct. 20, Dusk	Open Observing Session with rain/cloud date of Oct. 21. New Moon 10/22	Starfield Observatory, West Kennebunk, Me.
Nov. 03, 7:30 PM	The monthly Club Meeting. Topic TBD.	Masonic Hall West Kennebunk, Me.
Nov. 17, Dusk	Open Observing Session with rain/cloud date of Nov. 18. New Moon 11/20	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

2006 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 _____

