SKYLIGHTS

Newsletter of the Astronomical Society of Northern New England

Dec. 2006

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.

Important Notice:
Membership dues are due...more details on page 2 (see 2nd notice).

What's Up In December

by Bernie Reim

This year winter arrives at exactly 7:22 p.m. on Thursday, December 21. The winter solstice occurs when the sun reaches its lowest point in the sky, giving us the longest night and shortest day of the year in the Northern Hemisphere.

At this latitude the days will be less than 9 hours long and the sun will only climb 24 degrees into the sky on the winter solstice. By comparison, the days will be over 15 hours long and the sun will reach 70 degrees high at noontime on the summer solstice. At the equinoxes the sun reaches 48 degrees high at noon and the days and nights are each 12 hours long.

There are at least two interesting highlights this month. There will be a close conjunction of 3 planets and a star on December 10 and the annual Geminid Meteor Shower peaks on December 13.

Look for Mercury, Mars, and Jupiter very low in the southeastern morning sky about 40 minutes before sunrise starting on the first of the month. All three will fit into a circle less than 12 degrees across. As the month progresses, Mercury will sink a little lower each day and Mars and Jupiter will creep a little higher. They will be closest on the morning of Sunday, December 10, when they will form a tight knot just one degree across. As a bonus, a bright star in Scorpius will join them in this tight circle. You will need binoculars to see dim Mars and the star so low on the horizon in the brightening twilight sky. Mercury will drop out of view by the end of this month, but Jupiter and Mars will continue to climb higher. This will be the closest gathering of three planets since 1971 and the next conjunction of three planets this close will not happen until 2029.

The other major highlight this month will be the Geminid Meteor Shower, peaking on Wednesday night the 13th into Thursday morning the 14th. This is often the best meteor shower of the year, even better than the August 12 Perseids. You can expect at least 60 meteors per hour out of this reliable shower each year if the conditions are right. The moon will not interfere that much this year, since it will be in the waning crescent phase just past last quarter and will not rise until just after midnight.

This meteor shower was first seen in 1862, but they didn't discover its source until 1983, when an infrared satellite spotted an asteroid in the same orbit as the stream of dust and debris causing this shower. All other meteor showers are caused by comets, but the Geminids are an exception, since they seem to be caused by an asteroid.

It is easy for comets to form a coma and a tail of debris as it passes near the sun when its orbital speed increases and it gets heated

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Club Contacts

Officers:

President:
David Bianchi
dbianchi@verizon.net

Vice President:
Ron Burk
ron.burk@yahoo.com

Secretary:
Joan Chamberlain
starladyjoan@yahoo.com

Treasurer:
Wes Brann
wbrann@maine.rr.com

Board of Directors:

Tim Brown
zawijava@maine.rr.com

Ian Durham
idurham@anselm.edu

Scott Kearney
scottydog1@verizon.net

Star Party Co-ordinator:

Ron Burk
ron.burk@yahoo.com

Skylights Editor:

Paul Kursewicz
pkursewicz@ttlc.net

Website Manager:

Jim Hatch
nerdfulthing@earthlink.net

NASA Night Sky Network Co-ordinator:

Joan Chamberlin
starladyjoan@yahoo.com

BOLD ORION ON THE RISE

Leo Kretzner

Submitted by the Robin Family (Dale, Aaron, and Seth)

When the days are growing shorter and the nights are growing long And the North Wind puts a tear into your eye If you're out around 'bout midnight and you look off to the East There you may see Bold Orion on the rise!

You may know him by his stance or the starry shield he holds As he rises silent in a clear cold sky Young Jack Frost and Old Man Winter, they beckon to the call Of their master Bold Orion on the rise!

Bold Orion, mighty hunter Rising in a clear cold sky See the summer fall before him Bold Orion on the rise

Through seven starry ages he has ruled the winter sky With the fires of lost eons in his eyes He has seen the rise and fall of kings and continents and all Shining silent Bold Orion on the rise!

When he ascends no hesitation, when he moves no turning 'round Like a soul been called to glory, earthly born and heavenly bound Now the bird is on the wing, and it's southward that she flies Hastened on by Bold Orion on the rise!

Bold Orion, mighty hunter Rising in a clear cold sky See the summer fall before him Bold Orion on the rise

Summer comes on far too slowly and it passes all too fast And you wonder "Is there nothing that can last?" Here today and gone tomorrow, and the green leaves turn to red And the present quickly fades into the past

Chop your wood and stack it high, now, stoke the fires in your home Burning nightly sending smoke up to the sky Keep the winter at your door, but keep the summer in your heart Drink a toast to Bold Orion on the rise!

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 8.

☆ Additional Notice ☆

Dues have to be paid before the December meeting or the members cannot vote or run in the elections for officers for 2007. This is in the By-laws.

Moon Phases

December 4
Full

December 12
Last Quarter

December 20
New

December 27
First Quarter

Moon Data

December 1
Moon at perigee

December 10
Saturn 1.2° south of Moon

December 13
Moon at apogee

December 15
Spica 0.8° north of Moon

December 18
Jupiter 6° north of Moon

Mars 5° north of Moon

December 23
Neptune 3° north of Moon

December 25
Uranus 0.08° south of Moon

December 27
Moon at perigee

What's Up "*Continued from page 1*"

up by its proximity to the powerful solar wind constantly traveling at about one million miles per hour. Tiny bits of ice and dust from these comets are thrown into space as jets erupt all over its spinning surface, eventually creating the coma and the tail. However, rocky asteroids are tougher and about ten times denser than comets and they don't form tails as they get closer to the sun.

Named 3200 Phaethon, this asteroid could be a hybrid. It might be an extinct core of a comet that has accumulated a thick crust of interplanetary dust that creates the Geminids. It has a highly elliptical, inclined orbit to the plane of the ecliptic and takes 1.4 years to orbit the sun, diving inside of Mercury at one point and venturing out just past Mars into part of the asteroid belt at its farthest point.

So you will be witnessing an enigma with each streak of fire that you will see during this shower. Geminids tear into our atmosphere at much slower speeds than other meteors. They average around 22 miles per second (Earth is continually orbiting the sun at 18.6 miles per second), compared to 40 to 44 miles per second for the Perseids, Orionids, and Leonids. They tend to leave brighter, longer, and more graceful streaks than the quick blips of other meteor showers.

Dress warmly for this celestial event, since it is likely to be much colder than it was for last month's Leonids. All the meteors will emanate from Gemini, which rises by 8 pm in the east, but will not reach its zenith until 2 am. Look wherever your sky is the darkest, since the meteors can be seen everywhere in the sky, although they will all originate from one point in the direction of the constellation of Gemini.

Venus finally returns to our evening sky early this month, as it sets just half an hour after the sun, but it will set over an hour after sunset by the end of the month.

Saturn, at just fainter than zero magnitude, starts the month rising at 10 pm and finishes the year rising by 8 pm. The ringed planet is just 5 degrees above Regulus in Leo and will start its retrograde or westward motion on December 6.

Dec.1. The moon is at perigee, or closest to Earth today at 365,923 km.

Dec.3. The nearly full, waxing gibbous moon will skim the northern edge of the Pleiades star cluster in Taurus this evening.

Dec.4. Full moon is at 7:25 p.m. EST. The December full moon is also known as the Cold, Moon Before Yule, and the Long Night Moon.

Dec. 7. The earliest sunset happens at our latitude today, at 4:04 p.m. The shortest day is still 2 weeks away and the latest sunrise another two weeks beyond that, at 7:14 a.m. on January 4, when the earth is also at perihelion, or closest to the sun. The reason for this apparent inconsistency is that the earth's orbit is an ellipse and not a perfect circle. Kepler discovered this in 1609.

Dec.9. The waning gibbous moon will be just above Saturn in Leo this evening.

Dec.10. Mercury, Mars, and Jupiter will be one degree apart in the morning sky 40 minutes before sunrise.

Dec.12. Last quarter moon is at 9:32 A.M.

Dec. 13. The moon is at apogee today. The Geminid Meteor Shower peaks tonight.

Dec.14. Tycho Brahe, the greatest observational astronomer of his time, was born on this day in 1546. He worked with Kepler to help him discover the three laws of planetary motion. On this day in 1972, Gene Cernan in Apollo 17 became the twelfth and last human to ever walk on the moon.

Dec. 17. The first powered flight was accomplished on this day in 1903 by Orville Wright. It took us only 66 more years to get all the way to the moon.

Dec.20. New moon is at 9:01 a.m.

Dec. 21. The winter solstice is at 7:22 p.m.

Dec. 25. Isaac Newton was born on this day in 1642.

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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

Club Items For Sale

Our club has merchandise for sale at:
www.cafepress.com/asnne

All money raised goes to our operating fund.

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

SHOP CATEGORIES

Postage · Apparel · Housewares
Hats & Bags · Stickers, Buttons & Magnets

What's Up "*Continued from page 3*"

Dec. 27. First quarter moon is at 9:48 a.m. The moon is at perigee. Johannes Kepler was born on this day in 1571. The meteorite ALH84001 was found on this day in 1984 in Antarctica. It was proven that it came from Mars based on the composition of trace amounts of gas trapped in it. What remains controversial is whether or not organic material was found in this rock, which was blasted off the Martian surface by a comet or asteroid about 16 million years ago and first formed about 4 billion years ago. It hit Earth about 13,000 years ago. This little rock tells a fascinating and mysterious story, as most things in astronomy do, once we learn to interpret and read them correctly.

Got any News? Skylights welcomes your input.

Prisons of Light: Black Holes

by Kitty Ferguson
1996

Review by Richard Beaulieu

The author lives in England where her husband is a professor at Cambridge University. She was a professional musician but later decided to return to her first love, science and cosmology. She now writes books to explain these subjects to a wide audience.

She has collaborated before with Stephen Hawking. This time, she decided to write an easy to understand book on black holes. The level of the book can be grasped by an eighth grader yet she explains theories from general relativity and quantum mechanics.

Photographs and drawings abound that help understand this subject.

I have to admit that Kitty Ferguson has taught me a lot. As an example, I did not know that a black hole does not fill the sphere up to the event horizon. The physics that we know for sure tells us that the mass is concentrated at a point at the center, and the event horizon is at some appropriate distance from there.

The point at the center is called a singularity and is of nearly infinite density. It may weigh several billion solar masses.

I did what I could within my means to test the reliability of Kitty Ferguson's work. She states that 18.5 times the number of solar masses that the black hole has will give its circumference in kilometers.

I have verified that this is so, using the formula for the escape velocity for a body.

For example, if a black hole has 100 solar masses, the circumference is 1850 km.

There is an interesting chapter on what evidence we have for the existence of black holes somewhere in the sky. There are quite a few.

This book has the easiest to understand explanation of virtual particles in empty space that I have ever found.

Newton invented calculus while trying to prove that for a body like the earth, all the weight appears to be concentrated at the center. Similarly, theoretical physicists who work on black holes might just invent something great, maybe even reconcile quantum mechanics and relativity. So working on black holes is very useful and pratical, and not frivolous.

Anyone who wants something easy to read and informative, this is it!

NASA's Space Place

A New View of the Andromeda Galaxy

By Dr. Tony Phillips and Patrick L. Barry

This is a good time of year to see the Andromeda galaxy. When the sun sets and the sky fades to black, Andromeda materializes high in the eastern sky. You can find it with your unaided eye. At first glance, it looks like a very dim, fuzzy comet, wider than the full moon. Upon closer inspection through a backyard telescope—wow! It's a beautiful spiral galaxy.

At a distance of "only" 2 million light-years, Andromeda is the nearest big galaxy to the Milky Way, and astronomers know it better than any other. The swirling shape of Andromeda is utterly familiar.

Not anymore. A space telescope named GALEX has captured a new and different view of Andromeda. According to GALEX, Andromeda is not a spiral but a ring.

GALEX is the "Galaxy Evolution Explorer," an ultraviolet telescope launched by NASA in 2003. Its mission is to learn how galaxies are born and how they change with age. GALEX's ability to see ultraviolet (UV) light is crucial; UV radiation comes from newborn stars, so UV images of galaxies reveal star birth—the central process of galaxy evolution.

GALEX's sensitivity to UV is why Andromeda looks different. To the human eye (or to an ordinary visible-light telescope), Andromeda remains its usual self: a vast whirlpool of stars, all ages and all sizes. To GALEX, Andromeda is defined by its youngest, hottest stars. They are concentrated in the galaxy's core and scattered around a vast ring some 150,000 light years in diameter. It's utterly unfamiliar.

"Looking at familiar galaxies with a new wavelength, UV, allows us to get a better understanding of the processes affecting their evolution," says Samuel Boissier, a member of the GALEX team at the Observatories of the Carnegie Institution of Washington.

Beyond Andromeda lies a whole universe of galaxies—spirals, ellipticals and irregulars, giants and dwarfs, each with its own surprising patterns of star formation. To discover those patterns, GALEX has imaged hundreds of nearby galaxies. Only a few, such as Andromeda, have been analyzed in complete detail. "We still have a lot of work to do," says Boissier, enthusiastically.

GALEX has photographed an even greater number of distant galaxies—"some as far away as 10 billion light-years," Boissier adds—to measure how the rate of new star formation has changed over the universe's long history. Contained in those terabytes of data is our universe's "life story." Unraveling it will keep scientists busy for years to come.

For more about GALEX, visit www.galex.caltech.edu. Kids can see how to make a galactic art project at spaceplace.nasa.gov/en/kids/galex/art.shtml.

Caption:
The GALEX telescope took this UV image of the Andromeda galaxy (M31), revealing a surprising shape not apparent in visible light.

Club Meeting & Star Party Dates		
Date	Subject	Location
Dec. 01, 7:30 PM	The *regular club* meeting will be held at 7:30pm. Topic: **Night Sky Network Broadcast** with a question session to follow.	Masonic Hall West Kennebunk, Me. **NOTE: Beginner classes will be held from 6:30 PM to 7:15 PM.**
Dec. 22, Dusk	Open Observing Session with rain/cloud date of Dec. 23. New Moon 12/20	Starfield Observatory, West Kennebunk, Me.
Jan. 05, 7:30 PM	The monthly Club Meeting. Topic TBD.	Masonic Hall West Kennebunk, Me.
Jan. 19, Dusk	Open Observing Session with rain/cloud date of Jan. 20. New Moon 1/18	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

2007 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_____