

SKYLIGHTS

Newsletter of the Astronomical Society of Northern New England



JAN. 2008



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.

What's Up In January

By Bernie Reim

Winter has been in full swing for many weeks already. The first month of this New Year offers several interesting celestial highlights that will make it well worth it to brave the winter elements to see and appreciate.

This month is named after the Roman god, Janus. He is depicted with two faces looking in opposite directions. Known as the god of gates, doorways, beginnings and endings, he symbolizes change and transitions. He also represents time, since he is looking into the past with one face and into the future with the other.

Brilliant orange Mars still rules the night sky, with Saturn rising by 9 pm to start this month and rising by 7 pm to finish January. The two brightest planets, Venus and Jupiter, are engaged in a dramatic celestial dance at dawn as Venus sinks a little lower each morning and Jupiter rises a little higher. There is a brief but intense meteor shower known as the Quadrantids on the morning of the 4th, and, as a bonus, there will even be another bright comet visible early this month, named Comet 8P/Tuttle.

The unmistakable orange hue of our neighboring planet begins the month in Gemini in the upper part of the winter hexagon, burning brightly at minus 1.5 magnitude, just brighter than the brightest star in the sky, Sirius. However, the red planet then begins to fade quickly as it drops farther and farther behind in our respective orbits around the sun. It will lose a whole magnitude in brightness, which will leave it two and a half times fainter and 3.3 arc seconds smaller by the end of the month. Since Mars is still in retrograde or westward motion, it actually backs up into Taurus later this month. It will end its retrograde loop on January 30th and then proceed eastward into Gemini again.

Saturn, shining with a steady golden light at magnitude 0.6, can be found in Leo, three zodiac constellations east of Mars. These 2 planets are ever so slowly approaching each

other, heading for a nice evening conjunction in early summer.

A much faster approach is unfolding in the morning sky this month as our two brightest planets are heading for a close conjunction on the 31st. Try to see how early this month you can spot the king of the planets low in the southeastern sky at dawn. It should be visible without binoculars by the end of the first week of the New Year.

Brilliant Venus begins the month shining at minus 4.1 magnitude, but is slowly fading even as it is getting more illuminated by the sun. It is shrinking in our sky as it plows farther ahead of Earth in its orbit around the sun. It begins the month in Scorpius, not far above and to the left of the orange supergiant star named Antares. At 700 times the diameter of our sun and nearly 20 times its mass, it is one of the largest stars in our whole galaxy of 200 billion stars. Venus is now located where Jupiter was for much of last summer. However, Venus moves quicker in our sky because it is much closer to the sun than Jupiter. By the time Jupiter catches up with it on the last day of the month, they will be one full constellation farther east along the ecliptic, in Sagittarius.

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What's Up "Continued from page 1"

The Quadrantid Meteor Shower peaks around 2 am on the morning of Friday the 4th this year. The moon will have set just one hour before that, so it will not interfere with the show as long as it is clear. This shower, named after an ancient constellation that no longer exists, Quadrans Muralis, can produce up to 100 meteors per hour for a couple of hours. They originate between Draco the Dragon and the Big Dipper. Most people never see this shower because its peak is so short and the weather is usually not very good this time of year. If it is clear that morning, bundle up and go for it. Remember that this is the coldest hour of the night in the coldest month of the year. It will be quite an adventure watching tiny pieces of comet dust from the extinct comet nucleus of near-earth asteroid 2003 EH1 tear into our upper atmosphere at 30 miles per second under such extreme conditions.

The bonus that could happen this month in addition to the other exciting events is the brightening of Comet 8P/Tuttle to naked eye visibility early this year. It will begin the month located just below and to the left of the Andromeda Galaxy, which is the closest large galaxy to our own Milky Way at only 2.5 million light years, which is just 25 times the diameter of our galaxy away. You can see this galaxy without binoculars and it is the farthest object anyone can see naked eye, because it is a combination of 400 billion stars, about twice the size of our own Milky Way Galaxy.

Comet Tuttle will also be just to the right and below Comet Holmes in Perseus, which is still visible in binoculars. Unlike Comet Holmes, Comet Tuttle will move much faster through the sky, heading south into Pisces and Cetus the Whale later this month as it fades out and recedes from Earth, only to return once again in 13.6 years.

Jan.1. On this day in 1801 Giuseppe Piazzi discovered the first and largest asteroid, Ceres. It was considered a planet for about 50 years. Now it is considered a dwarf planet, along with Pluto, because it hasn't cleared its neighborhood of similar objects. At 600 miles in diameter, which is nearly the size of Texas, Ceres is in hydrostatic equilibrium, which means it is large enough to have spun itself into a round shape, which is the second criteria for a planet. Ceres contains one third of the

mass of all the asteroids orbiting between Mars and Jupiter. NASA just launched a mission named DAWN last Sept. that will arrive at Vesta, another large asteroid in 2011 and at Ceres in 2015. Ceres is a very rare planetary embryo that, along with Pallas and Vesta, never evolved into a full fledged planet. Formed 4.6 billion years ago as leftover material when our sun ignited and began fusing hydrogen into helium, most of the rest of these objects either merged to form the terrestrial planets or they were kicked out of the solar system by Jupiter.

Jan.2. Earth is at perihelion, or closest to the sun today at 91 million miles or 3% closer than at aphelion in July.

Jan. 3. The Quadrantid Meteor Shower peaks tonight into the morning of the 4th.

Jan.7. On this day in 1610, Galileo discovered Callisto, Europa, and Io, 3 of the 4 largest moons of Jupiter that you can see in binoculars. He would discover Ganymede, which is the largest moon in our solar system at 3200 miles in diameter, larger than Pluto and Mercury, 6 days later.

Jan. 8. New moon is at 6:37 a.m. EST.

Jan. 15. First quarter moon is at 2:46 p.m.

Jan. 18. The waxing gibbous moon passes through the northern fringe of the Pleiades star cluster once again this morning starting at 1:30 a.m.

Jan. 19. The moon, at perigee passes just to the left of Mars this evening.

Jan. 20-26. Mercury makes a good appearance low in the western sky just after sunset.

Jan. 22. Full moon is at 8:35 a.m. This is also called the Winter, Cold, Ice, or Wolf Moon.

Jan.25. Saturn is just 3 degrees north of the waning gibbous moon this evening.

Jan.30 Last quarter moon is at 12:03 a.m. Mars ends its retrograde loop in Taurus and starts moving eastward back into Gemini again.

Jan.31. Venus is just one degree to the upper right of Jupiter this morning at dawn.

Moon Phases**Jan 8**

New

Jan 15

First Quarter

Jan 22

Full

Jan 30

Last Quarter

Moon Data**Jan 3**

Moon at apogee

Jan 5Venus 7° North
of MoonAntares 0.5° north
of Moon**Jan 10**Neptune 0.4° north
of Moon**Jan 12**Uranus 3° south
of Moon**Jan 19**

Moon at perigee

Mars 1.1° south
of Moon**Jan 24**Regulus 0.7° north
of Moon**Jan 25**Saturn 3° north
of Moon**THE DAILY ASTRONOMER**
November 26, 2007**The Astronomy of You**From the USM Southworth Planetarium
"Portland's Underground Universe"**Submitted by Joyce Brann**
Permission by Edward Gleason USM

There are those who derive strange pleasure from harping upon the sheer improbability of our individual existence. At one level the genealogists hasten to point out that you (and, yes, we're speaking about YOU personally) are the product of innumerable matches: some blessed, others regrettable, a few unfathomable ("she married HIM?") and a handful the result of the "devil's design or Heaven's sense of humour." A genealogist might say, "If a veteran of the Battle of Hastings hadn't happened upon a certain meadow at a certain hour to catch sight of a certain maid and been bold enough to invite her out for a discussion of the Magna Carta over drinks, he might have ended up marrying someone else...thus, you'd be a completely different person and you'd been wearing somebody else's shirt." (Mind you, we didn't say this genealogist was a historian, and yes, we know this doesn't apply to everybody.)

At another level are those biologists who point out that every union resulting in reproduction might well have resulted in millions of possible progeny. So, you, as well as your great-great grandfather and everyone else could have been any of a few million choices...but you're you and you would have been different had matters worked out differently.

Then, we have the palaeontologists and others of similar ilk who look upon homo sapiens as the ultimate improbable product. A palaeontologist might say, "if a certain amphibian hadn't had a certain fin structure during a certain epoch and if he hadn't happened upon another certain amphibian and hadn't invited her out to discuss the land vs. water debate over a bowl of tasty and slow-moving invertebrates, then the human race would never have developed: thus depriving Earth of cities, poetry, calculus and Vogue magazine." (We didn't say this palaeontologist had sensible priorities.)

Beyond the ruminations of genealogy, biology and paleontology one finds the astronomical aspect...and matters become far more disquieting. We'll begin with the epoch of the early Universe: when the radiant energy born from the Big Bang had cooled sufficiently to produce the simplest matter - hydrogen sprinkled with helium. There was no possibility for life in this young Universe. One couldn't find the proper biochemical ingredients (carbon, oxygen, et cetera) within these vast primordial clouds to have made Earth life possible. These missing elements had to be created. The clever cosmos has a handy way of making heavy elements. It gathers the light element matter into massive spherical nuclear furnaces called stars. These high temperature plasma spheres fuse light elements into heavy elements within their super-hot cores. During these fusion reactions, some of the initial matter is converted into energy: releasing the energy potential inherent in all matter.

After a series of reactions, stars can form carbon, oxygen, silicon, and many other heavier elements, up to and including iron. Iron is the end point of stellar fusion reactions. Elements heavier than iron can only be created when stars explode from the inside out in an event called a "supernova." The supernova eruptions produce the gold, uranium, mercury, silver and other such truly heavy metals in relatively minute doses. The explosion also propels this metal-rich debris into space. Our solar system was formed when some of these supernova particles infiltrated a dark cloud of cool gas and dust. The introduction of these elements enriched the cloud and caused it to fall in on itself. The pressures and temperatures with the cloud increased as it formed a blob that eventually became a proto-star. This proto star ultimately became our Sun. It is fortunate that a supernova was close enough to the cool gas cloud to have caused this collapse and eventual star formation.

Around the forming Sun was residual matter which formed the planets. These newly-minted world were molten, fire-hot worlds, including the third one out...our Earth. The planet upon which we daily trod is a fertile world today, producing life forms in stunning abundance and diversity all around the globe. To become such a life-wealthy sphere, Earth had to fulfill quite a few requirements. First, it

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**The Astronomy Of You “Continued
from page 3”**

established an orbit at just the distance from the Sun. Were it closer, Earth might have been too hot to allow the first fragile life forms to develop and evolve. Regard Venus, the inferno world, as an example of a planet tortured instead of nurtured by solar energy. Move Earth much farther away and the third rock would be over-chilled: its surface a barren tundra. Here, one need only look to the desert world of Mars to see what happens to a planet that ventures too far from the Sun. Earth also had to have the right amount of matter. If Earth were less massive, its gravity field might not have been able to retain its envelope of life-sustaining gases. Mercury and Mars are both light worlds that lost most of their atmospheric gases to space. Conversely, if Earth were too massive, it might have retained too many gases. These thick gases would have enclosed Earth in a crushing, high pressure soup, similar to those surrounding Jupiter and Saturn. Life would not find a happy home in a maelstrom of hydrogen and methane.

As if that were not enough to convince us that we shouldn't be here at all, we then look at our parent star. Stars are not created equal. A star's life cycle is determined by its mass. During its formation, the Sun collected enough matter to become a "G-type" star. It is "yellowish," has an effective temperature of about 6,000 degrees and has a life span greater than 10 billion years. If it had gathered less matter, the Sun might have become a much cooler red dwarf star. If Earth were at its present distance from a red dwarf Sun, we'd be super cooled and devoid of life. Make the Sun more massive and perhaps it would become a white or blue-white giant. These stars are ultra-hot. We wouldn't have to worry about being super cooled if our planet were orbiting around one of these monster stars. Of course, were Earth at its present distance from a blue-white giant, we'd be a cinder or even inside the star itself. Translation: no life! And, even if Earth were far enough away from the giant star

to have temperatures similar to those it now enjoys, life would still not be possible. You see, these highly massive stars tear through their gaseous fuel rapidly and don't last too long: millions or tens of millions of years. Earth needed a couple billion years just to produce conditions conducive to the formation of life. Had our Sun been more massive, Earth might not have had nearly enough time to fashion its turbulent terrain into a life-rich broth...and there goes all the fin-endowed amphibians, earnest medieval soldiers and the rest of us with them.

Taking this topic back to its logical extreme, we regard the Universe itself and the four forces that govern its physical processes: gravity, electromagnetism, and the weak and strong nuclear forces. According to theoretical physics, any physical action, from falling rocks to radioactive rocks to melting rocks, occur because of these forces, either alone or in combination. These forces, like stars, are also not equal in either relative strength or characteristics. Gravity is the weakest, but was strong enough to have made the early matter clouds coalesce into stars and galaxies. Had gravity been slightly weaker, the matter would not have gathered in clumps, to make the stars that made the elements that formed the planet and all the life upon it. The Universe might have been a tenuous fog of light elements. Had gravity been slightly stronger, the Universe might well have collapsed back in on itself within a fraction of a second after its creation. It would have become one of those flicker Universes existing in the amount of time most people need to complete 1/1000th of a typical eye blink.

In fact, adjust the strengths of any of those fundamental forces by the tiniest ratio and the cosmos would NOT have had the proper conditions for the creation of galaxies, planets, or the essential biochemistry of life. This unnerving notion is the basis of two philosophical

views of the cosmos and its inhabitants: One is the "Strong Anthropic Principle," the idea that the Universe was tweaked and designed for the development and evolution of life. The parameters were set. The opposing view is the "Weak Anthropic Principle," the assertion that the Universe's capacity to create and sustain life is an incidental property that just happened to be a feature of this particular Universe. One axiom within the WAP is that billions of Universes might well exist, but only within an unknowable number is life possible. The other Universes might snap in and out like bubbles in a boiling soup, others might be quark soups, others might have 10 forces, and others might be stranger still. Here, of course, one delves headfirst into the realm of pure conjecture. We do know that life exists in this Universe...because we're all here to talk about it.

Thus, we can say, from the proper initial cosmic conditions, to the close proximity of an supernova to a cool gas dust cloud from which formed the right type of star orbited by just the right type of planet that is massive enough without being too massive...to all the innumerable encounters, accidents, evolutionary mis-fires and eventual modifications through the millions of years...to the serendipities of genealogy...we see how improbable our existence truly is.

Yet, here you are, in flesh, blood, bone and spirit...as much a part of reality as the Swiss Alps, Saturn's Rings and thunderstorms.

We must say, we're glad you're here...but if circumstances had contrived to have made you someone else, we'd probably say the same thing to him/her...but, we're saying it to you because you're the one who formed from the matrix of improbabilities.

Now, that's a thought perfectly tweaked and designed for a Monday morning.

**Principal
Meteor
Showers in
2008**

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*

Got any News? 
Skylights welcomes your Input.

Here are some suggestions:

*Book reviews -- Items for sale -- New equipment -- Ramblings --
Star parties -- Observing -- Photos.*

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 President, David Bianchi, know.

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Ultraviolet Surprise

by Patrick L. Barry and Tony Phillips

How would you like to visit a universe full of exotic stars and weird galaxies the likes of which astronomers on Earth have never seen before?

Now you can. Just point your web browser to galex.stsci.edu and start exploring.

That's the address of the Galaxy Evolution Explorer image archive, a survey of the whole sky at ultraviolet wavelengths that can't be seen from the ground. Earth's atmosphere blocks far-ultraviolet light, so the only way to see the ultraviolet sky is by using a space telescope such as NASA's Galaxy Evolution Explorer.

About 65% of the images from the all-sky survey haven't been closely examined by astronomers yet, so there are plenty of surprises waiting to be uncovered.

"The Galaxy Evolution Explorer produces so much data that, beyond basic quality control, we just don't have time to look at it all," says Mark Seibert, an astronomy postdoc at the Observatories of the Carnegie Institution of Washington in Pasadena, California.

This fresh view of the sky has already revealed striking and unexpected features of familiar celestial objects. Mira is a good example. Occasionally visible to the naked eye, Mira is a pulsating star monitored carefully by astronomers for more than 400 years. Yet until Galaxy Evolution Explorer recently examined Mira, no one would have guessed its secret: Mira possesses a comet-like tail 13 light-years long.

"Mira shows us that even well-observed stars can surprise us if we look at them in a different way and at different frequencies," Seibert says.

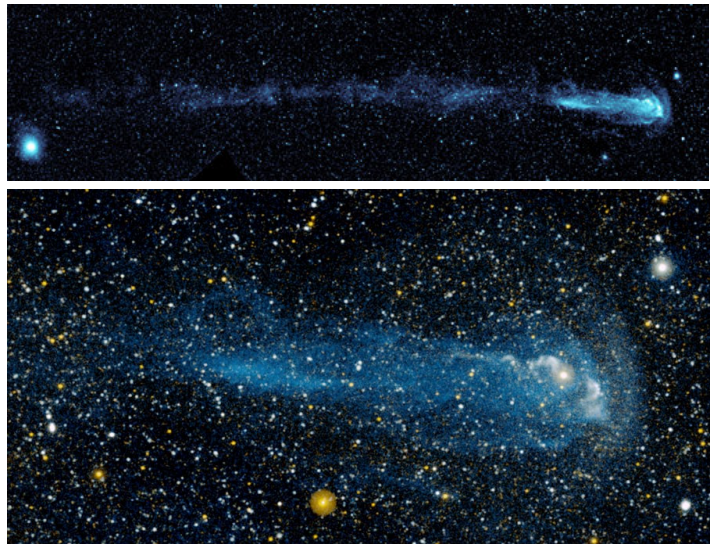
Another example: In April, scientists announced that galaxies such as NGC 1512 have giant ultraviolet spiral arms extending three times farther out into space than the arms that can be seen by visible-light telescopes. It would be like looking at your pet dog through an ultraviolet telescope and discovering his ears are really three times longer than you thought!

The images from the ultraviolet space telescope are ideal for hunting new phenomena. The telescope's small, 20-inch primary mirror (not much bigger than a typical backyard telescope) offers a wide field of view. Each image covers 1.2 degrees of sky—lots of territory for the unexpected.

If someone combing the archives does find something of interest, Seibert advises that she or he should first search astronomy journals to see whether the phenomenon has been observed before. If it hasn't, email a member of the Galaxy Evolution Explorer science team and let them know, Seibert says.

So what are you waiting for? Fire up your web browser and let the discoveries begin!

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



Caption:

Astronomers looking at new ultraviolet images from the Galaxy Evolution Explorer spacecraft were surprised to discover a 13-light-year long tail on Mira, a star that has been extensively studied for 400 years.

Club Meeting & Star Party Dates

Date	Subject	Location
January 4	5:30PM to 6:30 PM Business Meeting. 6:30PM to 7:15PM Beginner Classes. 7:30PM Club Meeting Begins: Topic: Club members will talk on various subjects. Already slated: Ian Durham , Ian will talk about variable stars, and do a book review. Joan Chamberlin , Joan will do a presentation on supernovae. (Possible observing after the meeting).	Masonic Hall West Kennebunk, Me.
January 11, Dusk	Open Observing Session with rain/cloud date of Jan. 12. New Moon 1/8	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

2008 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 _____

