SKYLIGHTS

Newsletter of the Astronomical Society of Northern New England

Jan. 2007

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.

Congratulations go to Joan Chamberlin for being selected by JPL for: Solar System Ambassador!

What's Up In January

by Bernie Reim

This is the first full month of winter and should be colder than the warm December we just had. This month is named after the Roman god, Janus, the god of gates, doors, beginnings, and endings. Janus symbolizes change and transitions. He is usually depicted with two faces looking in opposite directions and was found on many ancient Roman coins. His major remnant in modern culture is being the origin of the word January.

The earth will be at perihelion, or closest to the sun, on January 4th. Our seasons are caused by the tilt of the earth, and not our distance from the sun. The earth will be at its closest perihelion in 10 years and it will not get this close again until the year 2020.

All the objects in the solar system orbit in ellipses and not circles, as Kepler proved about 400 years ago. Our orbit only varies a few percent, from 91.4 million miles to the sun on January 4th to 94.5 million miles on July 4th. The average distance is 93 million miles, which is also called one astronomical unit.

This distance was determined within 7% back in 1672 and was refined to within 0.2% of the correct distance in 1877, using a more accurate method than timing the transits of Venus across the sun, which last happened in 1874 and 1882, not counting the one we just had on June 8 of 2004. Modern satellites and radar ranging finally determined this distance, measuring from the sun's center to the center of the earth, to within just 100 feet in 1975.

You can actually determine this distance within less than one percent by just using an amateur telescope and a CCD camera. Simply pick an asteroid that is about one astronomical unit away, take a few dozen pictures of it at the right times over a one-day period, then use some simple trigonometry including the earth's baseline and the parallax angle to the asteroid, to determine the difference of its known distance, and voila, you have calculated one astronomical unit! It is amazing to see how easy it now is to calculate such a fundamental quantity, the scale of our solar system that many medieval astronomers simply could not achieve.

The five brightest planets have now balanced themselves out between the morning and evening sky. Venus and Saturn are the major evening sky objects this month, and Mars and Jupiter continue to ascend higher into the morning sky. Mercury makes a brief appearance in the evening sky below Venus during the last week of this month.

The brightest planet, Venus, can be seen low in the southwestern sky starting at 40 minutes after sunset. It is nearly full now and shines at magnitude minus 3.9, which is half a magnitude fainter than it usually is, but still about 10 times brighter than the brightest star

"Continued on page 3"

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STARGAZERS

Rex Fowler

Submitted by Dale Robin

Tinker tailors soldier sailors kings of orient far The Egyptians the Greeks and Romans all contemplated the stars Turn the pages through the ages to Copernicus From Galileo to here and now and oh here's their message for us

We've been a family of stargazers For a very long time Yes we're a family of stargazers And that's a very fine sign

Fireflies in mid-July and now the summer's half gone Me and my sisters were down to whispers camping out on the lawn We hitched a ride up for a slide up on the Milky Way Then without warning woke the morning to another fine day

Through the annals birds and mammals have gazed at Venus and Mars Frogs and fishes they been splashing wishes to the moon and the stars It's so amazing that we'll be gazing for millions of more years At the night sky where our eyes spy all those heavenly spheres

Two Total Lunar Eclipses in 2007

By Paul Kursewicz

The first of two total lunar eclipses in 2007 is unique in that it is partly visible from every continent around the world.

On Saturday, March 3, the eclipse will be visible throughout most of the Americas, Europe, Africa, and Asia.

From New England, the eclipse will already be well underway by the time the Moon begins to rise that evening. Totality will begin at 5:44 PM EST and will last until 6:57 PM EST.

Early on Tuesday morning, August 28, the second total lunar eclipse will take place. The eclipse will be visible throughout most of Eastern Asia, Australia, the Pacific Ocean, and the Americas.

Most of North America (except the far west) will see the eclipse interrupted by Moonset. Totality will begin at 5:52 AM EDT. And shortly thereafter, the Moon will set (totality ends at 7:22 AM EDT).

So, for the Eastern third of the United States and East-Central Canada, the Moon will set during totality. Very Interesting!

Interesting, because during the March eclipse, this same region saw the Moon rise during totality!

Moon Phases

January 3
Full

January 11
Last Quarter

January 18
New

January 25
First Quarter

Moon Data

January 6
Saturn 0.9° south of Moon

January 10
Moon at apogee

January 11
Spica 1.1° north of Moon

January 15
Jupiter 6° north of Moon

January 16
Mars 5° north of Moon

January 20
Neptune 2° north of Moon

Venus 0.8° north of Moon

January 22
Uranus 0.4° south of Moon

Moon at perigee

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

in the sky, Sirius in Canis Major, at magnitude minus 1.4. Venus will continue to climb higher in our evening sky throughout the winter and spring as it catches up with the earth in its orbit. Look for a nice conjunction of Mercury, the waxing crescent moon, and Venus on the evenings of Friday the 19th through Sunday the 21st.

Saturn is now beginning to rule the evening sky, which it will do by next month, when it reaches opposition on February 10th. Saturn starts the year by rising around 8 pm, about 2 hours after Venus set. The ringed planet will rise by 6 p.m. by the end of this month. Look for its subtle golden light shining steadily just to the west of Regulus, the brightest star in Leo. It will brighten another two tenths of a magnitude, to zero magnitude, by the end of the month even as it continues to move westward, or retrograde, away from Regulus and the sickle in Leo, which also looks like a backwards question mark.

Jupiter, the King of the Planets, is the first one to rise in the morning. It is now 6 times brighter than Saturn and about 20 times brighter than Mars, which rises about one hour after Jupiter. Notice that a bright orange star is near these two planets. That is Antares, whose name means "rival of Mars", since the Greek word for Mars is Ares. This is a red super giant star in Scorpius which is nearly 1000 times larger than our sun and one of the largest stars in our whole Milky Way galaxy of about 300 billion stars. Fortunately Antares is located 400 light years away, but if it were placed where our humble sun is located in the sky, just 8.3 light minutes away, the orbits of Earth and Mars and even some of the asteroid belt between Mars and Jupiter would be engulfed inside the surface of this massive star.

Jan.1. The first and largest asteroid, Ceres, was discovered on this day in 1801. Now newly designated as a "dwarf planet", Ceres was considered a regular planet for about 50 years after its discovery. At 600 miles in diameter, or about the size of Texas, Ceres contains about 25% of the mass of the entire asteroid belt consisting of billions of asteroids. Ceres may actually have more fresh water than Earth, since its interior is loaded with frozen water. Only the gravitational disturbances from nearby Jupiter prevented Ceres from becoming a full-fledged planet.

Jan.3. Full moon is at 8:57 a.m. EST. This is also called the Old, Wolf, Ice, or Moon after Yule.

Jan.4. The Quadrantid meteor shower peaks tonight, but will be washed out by the moon.

Jan.6. The waning gibbous moon passes very close to Regulus tonight around 10pm.

Jan. 11. Last quarter moon is at 7:45 a.m.

Jan.12. The Deep Impact spacecraft was launched on this day in 2005. It smashed into Comet Tempel 1 on July 4 and discovered many new things about the nature of comets.

Jan.14.The Cassini spacecraft dropped the Huygens probe onto the surface of Titan, the largest moon of Saturn and the second largest moon in the solar system after Jupiter's Ganymede, on this day in 2005.

Jan.15. The slender waning crescent moon will pass just below Antares this morning. The next morning it will be near Mars and below Jupiter.

Jan. 18. New moon is at 11:01 p.m.

Jan.20. The slender waxing crescent moon will be just to the left and above Venus this evening.

Jan. 22. On this day in 2003, Pioneer 10 sent its last radio signal to Earth. Launched in March of 1972, this is the most remote man-made object and it was the first spacecraft to cross the asteroid belt and to leave our solar system. It is now over 8 billion miles away.

Jan. 25. First quarter moon is at 6:01 p.m. On this day in 2004, the Mars Opportunity Rover landed on the Martian surface. Now, 3 years later, it is still working well along with the Spirit Rover, which were both expected to work for only 3 months.

Jan. 31. Venus and Mercury are less than 10 degrees, or one fist at arm's length apart this evening about 40 minutes after sunset low in the west southwestern sky.

Principal Meteor Showers in 2007

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

Got any News?
Skylights welcomes your Input.

*I want to give a **BIG Thank You** to all those who contributed to Skylights last year. You made the Newsletter interesting, and made my life as Editor, allot easier. I would like to encourage all of you to submit something to our club Newsletter this year. Here are some suggestions: Book reviews -- items for sale -- new equipment -- ramblings -- star parties -- observing -- photos.*

Thanks again...
Paul Kursewicz

Space Rocks Hit the Moon

By Paul Kursewicz

Dots denote meteoroid impacts observed since Nov. 2005 by members of the NASA Meteoroid Environment Office.

Bill Cooke, head of NASA's Meteoroid Environment Office says, meteoroids are smashing into the Moon a lot more often than anyone expected.

This could influence future planning missions to the Moon...e.g., if it's safe for astronauts to go moonwalking during a meteor shower; and to calculate the necessary thickness of shielding for lunar spacecraft and habitats. A collision with a spacesuit or a habitation module, even from a small object, could be fatal.

Most meteoroids that enter Earth's atmosphere burn up harmlessly. The bulk of shooting stars are caused by things no bigger than sand grains and a few pea-sized objects. But even something as big as a beach ball will usually burn up, in a spectacular fireball, before hitting Earth's surface. The moon, with no atmosphere, sees it all rain down.

Cooke and colleagues documented two impacts during November's 2006 Leonid meteor shower. "The flashes we saw were caused by Leonid meteoroids 2 to 3 inches in diameter," Cooke said in a NASA statement. They hit with energies equal to 150 to 300 pounds of TNT.

Leonid meteors, leftover chunks from comet Tempel-Tuttle, are particularly dangerous because they move against the path of our own orbit around the Sun, so we hit them head-on at greater speeds than most other debris. This results in a greater release of energy at impact.

Overview: Lunar Impact Monitoring:
http://www.nasa.gov/centers/marshall/news/lunar/program_overview.html

Photo Gallery of the Observatory:
http://www.nasa.gov/lb/centers/marshall/news/lunar/photos.html

NASA's Space Place

The Planet in the Machine

By Diane K. Fisher and Tony Phillips

The story goes that a butterfly flapping its wings in Brazil can, over time, cause a tornado in Kansas. The "butterfly effect" is a common term to evoke the complexity of interdependent variables affecting weather around the globe. It alludes to the notion that small changes in initial conditions can cause wildly varying outcomes.

Now imagine millions of butterflies flapping their wings. And flies and crickets and birds. Now you understand why weather is so complex.

All kidding aside, insects are not in control. The real "butterfly effect" is driven by, for example, global winds and ocean currents, polar ice (melting and freezing), clouds and rain, and blowing desert dust. All these things interact with one another in bewilderingly complicated ways.

And then there's the human race. If a butterfly can cause a tornado, what can humans cause with their boundlessly reckless disturbances of initial conditions?

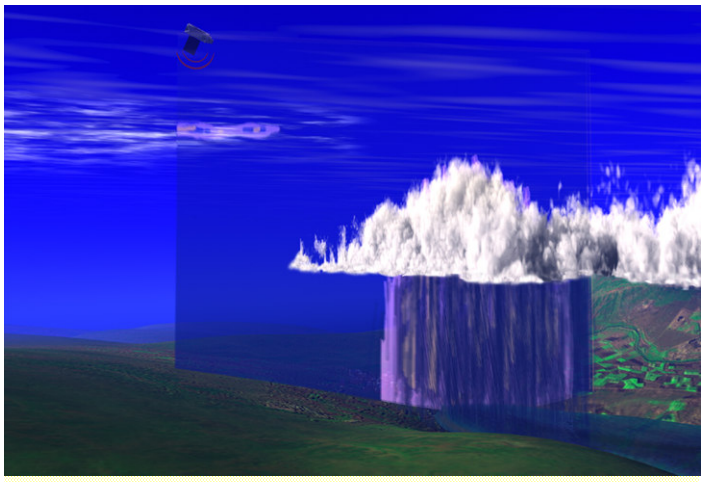
Understanding how it all fits together is a relatively new field called Earth system science. Earth system scientists work on building and fine-tuning mathematical models (computer programs) that describe the complex inter-relationships of Earth's carbon, water, energy, and trace gases as they are exchanged between the terrestrial biosphere and the atmosphere. Ultimately, they hope to understand Earth as an integrated system, and model changes in climate over the next 50-100 years. The better the models, the more accurate and detailed will be the image in the crystal ball.

NASA's Earth System Science program provides real-world data for these models via a swarm of Earth-observing satellites. The satellites, which go by names like Terra and Aqua, keep an eye on Earth's land, biosphere, atmosphere, clouds, ice, and oceans. The data they collect are crucial to the modeling efforts.

Some models aim to predict short-term effects—in other words, weather. They may become part of severe weather warning systems and actually save lives. Other models aim to predict long-term effects—or climate. But, long-term predictions are much more difficult and much less likely to be believed by the general population, since only time can actually prove or disprove their validity. After all, small errors become large errors as the model is left to run into the future. However, as the models are further validated with near- and longer-term data, and as different models converge on a common scenario, they become more and more trustworthy to show us the future while we can still do something about it—we hope.

For a listing and more information on each of NASA's (and their partners') Earth data-gathering missions, visit **science.hq.nasa.gov/missions/earth.html** . Kids can get an easy introduction to Earth system science and play Earthy word games at **spaceplace.nasa.gov/en/kids/earth/wordfind** .

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



Caption:
CloudSat is one of the Earth observing satellites collecting data that will help develop and refine atmospheric circulation models and other types of weather and climate models. CloudSat's unique radar system reads the vertical structure of clouds, including liquid water and ice content, and how clouds affect the distribution of the Sun's energy in the atmosphere. See animation of this data simulation at **www.nasa.gov/mission_pages/calipso/multimedia/cloud_calip_mm.html** .

Club Meeting & Star Party Dates

Date	Subject	Location
Jan. 05, 7:30 PM	The *regular club* meeting will be held at 7:30pm. Topic: Powerpoint presentation from the Nightsky Network: **When Worlds Align 2006 Transit of Mercury**. Originally transmitted on 11/26/06 by Fred Espenak, Nasa's Goddard Space Center.	Masonic Hall West Kennebunk, Me. **NOTE: Beginner classes will be held from 6:30 PM to 7:15 PM.**
Jan. 19, Dusk	Open Observing Session with rain/cloud date of Jan. 20. New Moon 1/18	Starfield Observatory, West Kennebunk, Me.
Feb. 02, 7:30 PM	The monthly Club Meeting. Topic TBD.	Masonic Hall West Kennebunk, Me.
Feb. 16, Dusk	Open Observing Session with rain/cloud date of Feb. 17. New Moon 2/17	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_____