

Skylights

Newsletter of the Astronomical Society of Northern New England



AUG 2015



Member of NASA's



Astronomical League

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 August

By Bernie Reim

The month of August is named after Augustus Caesar and also has 31 days like July. Beginning this month we are now exactly half way into summer and there should be plenty of warm, clear nights that will be getting a little longer each night to give everyone more time to enjoy and learn about all the wonders that are always taking place above us.

There are some interesting conjunctions this month and this will be a great year to observe the Perseid Meteor Shower because it will peak just before the New Moon. One continuing highlight for the whole next year will be constant interesting and exciting data coming in from the New Horizons space craft that just had a close encounter with Pluto a couple of weeks ago on July 14.

We are learning many incredible new things about this very complex and unfamiliar miniature solar system guarding the outpost of our familiar solar system. Complex hydrocarbons have been discovered on Pluto, which is continually leaking nitrogen and methane gas onto Charon, fully half the size of Pluto and located only 12,000 miles away from it while locked in a 6 day orbit around a common center of gravity like a pair of figure skaters clasping hands.

It is amazing that Pluto has no craters. It is constantly resurfacing itself and exhibits living geology that will help us to better understand how the earth formed. Even Charon has colorful polar regions and giant craters and canyons deeper than our own Grand Canyon on Earth. Three of Pluto's 5 moons are locked in close rotation to keep them from colliding. Pluto has a similar orange-brown color as Mars, and we arrived at this icy dwarf exactly 50 years to the day of the close encounter of Mariner 4 with Mars in 1965. Any outer exploration that we are achieving in our galaxy and universe is only symbolic of the much deeper and more real inner exploration that each one of us is experiencing in this critical time of great change on Earth as we each open to the true New Horizons within.

Venus and Jupiter are getting closer again, but they will both sink below the western horizon well before they will get as close again as they were on the last day of June. Brilliant Venus will be getting very thin and large as it passes through inferior conjunction on the 15th of this month. After that it will reemerge into our morning sky and quickly rise higher. Look for its very thin crescent through binoculars or a telescope early this month before it gets too low to the western horizon.

Eleven years ago and again 3 years ago, we were privileged to see a very special case of what can happen to Venus at this moment of its inferior conjunction. That is called a transit of Venus and can only happen when the Earth-Venus-Sun plane are perfectly aligned. This happens in an unusual pattern of a pair of transits 8 years apart, followed by a long wait of 105 and a half years, then another pair of transits 8 years apart, and then an even longer gap of 121 and a half years. The entire cycle repeats every 243 years. We will have to wait until December of 2117 for the next Venus transit at inferior conjunction.

I was very fortunate to have been able to see both of these rare transits, especially because I almost missed both of them due to the

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Club Contacts

Officers:

President:
Ron Burk
 rdavidburk@yahoo.com

Vice President:
Joan Chamberlin
 starladyjoan@yahoo.com

Secretary:
Carl Gurtman
 carlgurt@msn.com

Treasurer:
Ian Durham
 idurham@anselm.edu

Board of Directors:

Nan Musgrave
 mzgrvz@outlook.com

Tim Brown
 cote54@icloud.com

Sara Carter
 scarterdin@hotmail.com

Star Party Co-ordinator:

TBD

Skylights Editor:

Paul Kursewicz
 pkursewicz@myfairpoint.net

Website Manager:

Jim Hatch
 nerdfulthings@earthlink.net

NASA Night Sky Network Co-ordinator:

Joan Chamberlin
 starladyjoan@yahoo.com

JPL Solar System Ambassador:

Joan Chamberlin
 starladyjoan@yahoo.com

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weather. The June 8, 2004 transit was partially obscured due to heavy early morning fog at our Starfield Observatory in Kennebunk. We enjoyed only tantalizing glimpses of this great event until the fog finally lifted completely just at the critical and most exciting moment as Venus finally emerged from its over 6 hour journey across the face of the sun. Through a good telescope and solar filter we then witnessed a completely unexpected sight. I saw the subtlety glowing silvery semi-circular arc of the dense and poisonous atmosphere of Venus starkly outlined against the blackness of deep space for two full minutes as the planet was rising above the sun. The next transit on June 5 of 2012 was not as dramatic but we were very lucky to see it at all since the skies cleared up literally seconds before the great event began after a solid week of rain with no clearing in the forecast.

Jupiter is setting a little earlier each evening. By the sixth of August, the King of the planets will be setting just 45 minutes after sunset and Mercury will be less than one degree to the upper right of Jupiter. Also look for Regulus, the brightest star in Leo, very close to the pair. You may need binoculars to see them because of the bright twilight.

Now the stage is set for Saturn, the lone bright planet that is visible this month outside of twilight. The ringed planet will end its westward or retrograde motion towards Libra on the second of this month and resume its normal eastward motion back towards the head of Scorpius. Its rings remain fairly open at 24 degrees and it will reach eastern quadrature when it will be 90 degrees east of the sun on the 21st. That is when the shadow of the globe on the rings it at its greatest, which gives the planet an even more three-dimensional view through a telescope.

Mars has returned to the morning sky and now rises about an hour before the sun at the beginning of the month and it will rise two hours before the sun by the end of the month. Watch as Venus tries to catch up with the red planet towards the end of August. It will not appear to catch Mars until November 3rd.

This will be a great year for the Perseids not only because the moon will be just before new, but also because the earth should be passing right through the debris trail that Comet Swift-Tuttle shed back in 1862, 130 years before its last return in 1992. You

should see at least one meteor per minute at its peak.

Aug. 3. On this day in 2004 the Messenger spacecraft was launched to Mercury.

Aug.4. On this day in 2007 the Phoenix Mars lander was launched.

Aug.6. Last quarter moon is at 10:03 p.m. EDT. The Curiosity Rover landed on Mars on this day in 2012.

Aug. 8. Mars is just below Castor and Pollux in Gemini is a nearly straight line looking east-northeast 45 minutes before sunrise.

Aug.12. On this day in 1877 Asaph Hall discovered Deimos, at 8 miles across, the smaller of the two moons of Mars. He would discover Phobos just 6 days later. It is 14 miles across, about the length of Manhattan. The Perseid meteor shower peaks today into tomorrow. This shower usually lasts for several weeks, but it will be at its peak for a couple of days.

Aug. 14. New moon is at 10:53 am.

Aug.16. Look for Mercury in binoculars about 6 degrees to the right of a thin waxing crescent moon.

Aug.17. On this day in 2006, Voyager 1 reached 100 AU from the earth, just over twice the distance to Pluto. It would determine the heliopause at 123 au in 2013.

Aug. 20. Voyager 2 was launched on this day in 1977.

Aug.22. First quarter moon is at 3:31 p.m. The moon will be near Saturn tonight one hour after sunset in the south-southwestern sky. On this day in 1963 the X-15 set a world record altitude record for a winged craft of 354,000 feet, which is 67 miles high, or about where most of the meteors burn up and where the northern lights are the most intense. On this day in 1976, the unmanned Soviet Luna 24 mission returned soil samples from the moon that were 0.1 % water by mass.

Aug.25. The Spitzer Space Telescope was launched on this day in 2003. This was the last of a family of 4 great space telescopes to study the universe in 4 different wavelengths of light. The Hubble Space Telescope was the first. Then the Compton Gamma Ray Observatory was launched in April of 1991 and then Chandra in July of 1999, looking at the universe in x rays and then Spitzer for infrared. The Gamma Ray Observatory was allowed to re-enter our atmosphere back in June of 2000. Voyager 2 flies by Neptune on this day in 1989, which was the last flyby before Pluto.

Aug. 28. On this day in 1789 William Herschel discovered Enceladus, a moon of Saturn. This turned out to be a very dramatic moon that is sending out huge ice plumes into space which reform into a giant icy ring well beyond the visible rings of Saturn.

Aug. 29. Full moon is at 2:35 pm. This is also called the Green corn, grain, or sturgeon moon.

Moon Phases

Aug 6
Last Quarter

Aug 14
New

Aug 22
First Quarter

Aug 29
Full

Moon Data

Aug 2
Moon at perigee

Aug 5
Uranus 1.0° north
of Moon

Aug 8
Aldebaran 0.7°
south of Moon

Aug 13
Mars 6° north
of Moon

Aug 16
Mercury 2° north
of Moon

Aug 17
Moon at apogee

Neptune 3° south
of Moon

Aug 22
Saturn 3° south
of Moon

Sky Object of the Month – August 2015

SS Cygni – Dwarf Nova in Cygnus

by Glenn Chaple

Having been a member of the American Association of Variable Star Observers (AAVSO) for the past 35 years, I was recently asked to name my favorite variable star. I answered without hesitation, “SS Cygni.” I’m not alone. It’s a favorite among many variable stars, and here’s why.

SS Cygni is a prime example of a dwarf nova. Most of the time, it shines at a magnitude of around 12. Suddenly and without warning, it brightens to 8th magnitude – the four-magnitude jump taking a day or less. Such an outburst lasts for several days to a week before SS Cygni returns to quiescence. The outbursts occur at approximately 50-day intervals (see accompanying light curve). If you were to start observing SS Cygni now and each clear night to follow (you never know when the next outburst might occur), you might catch 2 or 3 before Cygnus drops low in the northwest sky in December.

The accompanying finder charts show the way to SS Cygni. Begin by centering your finder on the 5th magnitude star 75 Cygni, found by tracing a line from delta Cygni through Deneb and extending it an equal distance beyond and slight northward (Chart A). Using a low-power eyepiece, you should encounter a V-shaped group of stars headlined by 75 Cygni (labeled by its magnitude [5.1 with decimal omitted] in Chart B). The opening of the V leads to a triangle of 8th and 9th magnitude stars. Chart C is a close-up of the triangle, showing the magnitudes of nearby stars (again, decimals omitted) and the location of SS Cygni itself. A star hop to SS Cygni might take 10-15 minutes on your first attempt – perhaps 5-10 on the next. After a few evenings, you should be able to lock onto SS Cygni in a minute or less. Then the fun begins. SS Cygni might even be at outburst that first night. If not, keep a nightly vigil. That first night an 8th magnitude star greets your eye where a 12th magnitude one had been the night before should have you hooked!

About 372 light-years away, SS Cygni was discovered in 1896 by Louisa D. Wells of the Harvard College Observatory, and has been observed nonstop ever since. Like its kindred dwarf novae, of which over 375 are known, SS Cygni is a tight binary comprising a red dwarf and white dwarf orbiting each other – in this case every 6 ½ hours. Material from the red dwarf is gravitationally pulled towards the white dwarf, spiraling inward to form an accretion disk. Instabilities in the accretion disk lead to the outbursts.

For reasons I’ve already mentioned, SS Cygni is one of the most-observed variable stars in the night sky. It’s bright enough, even at quiescence, to be glimpsed in a 4-inch scope. I encourage you to join the crowd and discover for yourself the allure of this fascinating variable star.

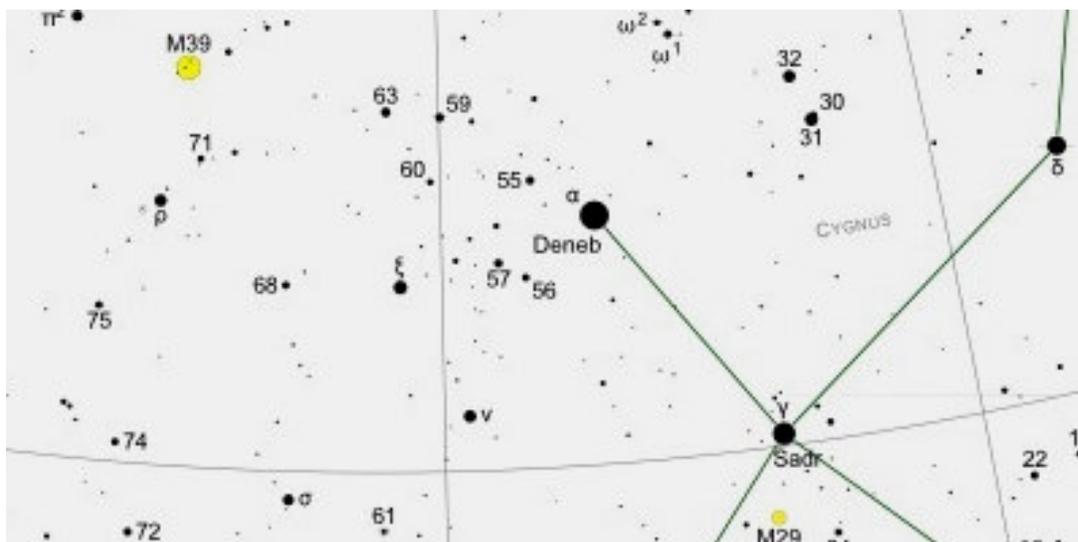


Chart A (freestarcharts.com)

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Sky Object of the Month "Continued from page 3"



Chart B (AAVSO)

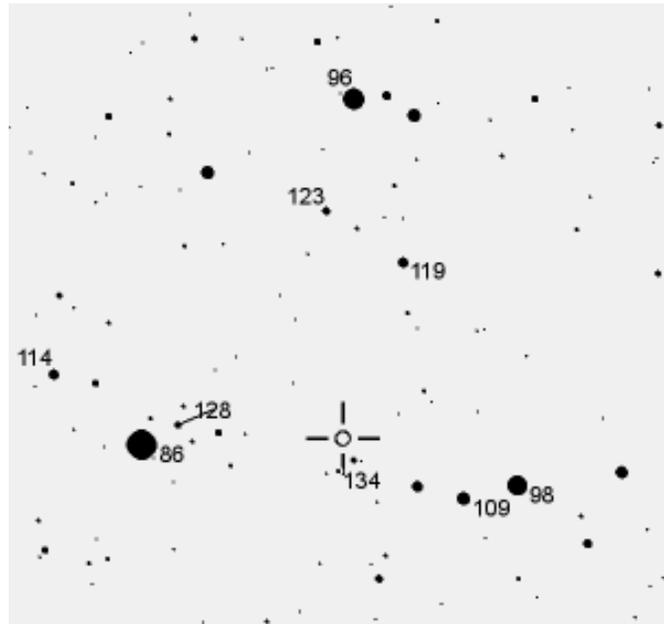
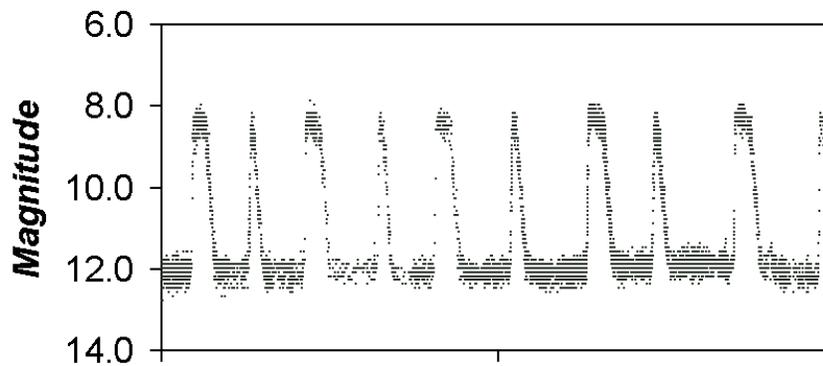


Chart C (AAVSO)



Light curve for SS Cygni over 500 day period (AAVSO)

Principal Meteor Showers in 2015

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

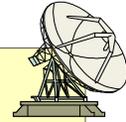
November 26
Andromedids

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.*



The latest issue of the Space Place Newsletter: News and Notes for Formal and Informal Educators can be found at:

<http://spaceplace.nasa.gov/educator-newsletter>

Check out our great sites for kids:



The Space Place website (<http://spaceplace.nasa.gov>)



The SciJinks Weather Laboratory at <http://scijinks.gov>



NASA Climate Kids at <http://climate.nasa.gov/kids>

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.*



On The Brightness Of Venus

By Dr. Ethan Siegel

Throughout the past few months, Venus and Jupiter have been consistently the brightest two objects visible in the night sky (besides the moon) appearing in the west shortly after sunset. Jupiter is the largest and most massive planet in the solar system, yet Venus is the planet that comes closest to our world. On June 30th, Venus and Jupiter made their closest approach to one another as seen from Earth—a conjunction—coming within just 0.4° of one another, making this the closest conjunction of these two worlds in over 2,000 years.

And yet throughout all this time, and especially notable near its closest approach, Venus far outshines Jupiter by 2.7 astronomical magnitudes, or a factor of 12 in apparent brightness. You might initially think that Venus's proximity to Earth would explain this, as a cursory check would seem to show. On June 30th Venus was 0.5 astronomical units (AU) away from Earth, while Jupiter was six AU away. This appears to be exactly the factor of 12 that you need.

Only this doesn't explain things at all! Brightness falls off as the inverse square of the distance, meaning that if all things were equal, Venus ought to seem not 12 but 144 times brighter than Jupiter. There are three factors in play that set things back on the right path: size, albedo, and illumination. Jupiter is 11.6 times the diameter of Venus, meaning that despite the great difference in distance, the two worlds spanned almost exactly the same angular diameter in the sky on the date of the conjunction. Moreover, while Venus is covered in thick, sulfuric acid clouds, Jupiter is a reflective, cloudy world, too. All told, Venus possesses only a somewhat greater visual geometric albedo (or amount of reflected visible light) than Jupiter: 67

percent and 52 percent, respectively. Finally, while Venus and Jupiter both reflect sunlight toward Earth, Jupiter is always in the full (or almost full) phase, while Venus (on June 30th) appeared as a thick crescent.

All told, it's a combination of these four factors—distance, size, albedo, and the phase-determined illuminated area—that determine how bright a planet appears to us, and all four need to be taken into account to explain our observations.

Don't fret if you missed the Venus-Jupiter conjunction; three more big, bright, close ones are coming up later this year in the eastern pre-dawn sky: Mars-Jupiter on October 17, Venus-Jupiter on October 26, and Venus-Mars on November 3.

Keep watching the skies, and enjoy the spectacular dance of the planets!



Caption:

Image credit: E. Siegel, using the free software Stellarium (L); Wikimedia Commons user TimothyBoocock, under a c.c.-share alike 3.0 license (R). The June 30th conjunction (L) saw Venus and Jupiter pass within 0.4° of one another, yet Venus always appears much brighter (R), as it did in this image from an earlier conjunction.

July Club Picnic, Meeting, & Observing



An excellent day for a picnic



Flower pictures taken in the field

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Two Patriotic (red, wht & blu) Plutocrates



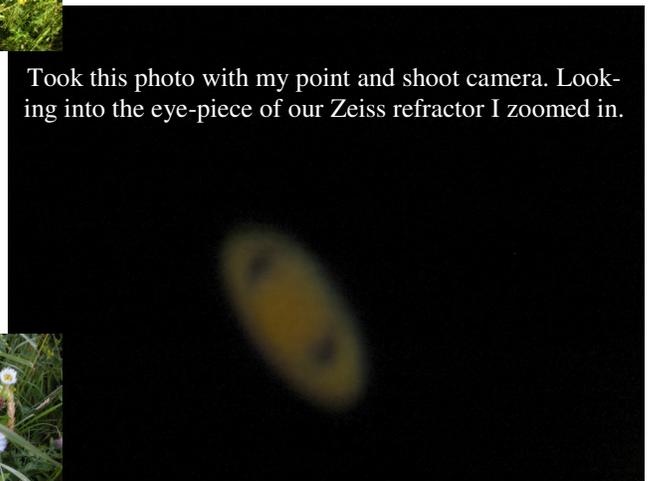
Brent and his Bug Zapper



Worked well zapping the mosquitoes.
Lights up at night.

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Daytime objects observed included the Sun, Venus, and Jupiter.
Nighttime objects focused mainly on Saturn. Around 10:30 we watched an Iridium Flare pass us by.
Then, very low on the Eastern horizon between an opening in the tree line, a beautiful large Red Moon (almost full) appeared majestically in the silence of the night.



Club Meeting & Star Party Dates

Date	Subject	Location
August 7	<p>ASNNE Club Meeting:</p> <p>6:45-7:30PM: Beginner Astronomy Class (Public walk-ins welcome).</p> <p>7:30-9:30PM: Club Meeting</p> <p><u>Meeting Agenda</u></p> <p>Guest Speaker/Topic: John Nowacki aka W3NA will do a talk on radio wave propagation. It's very tightly bound up with solar and meteor activity.</p> <p>Bernie Reim - What's UP</p> <p>Astro Shorts: (news, stories, jokes, reports, questions, observations etc.)</p>	The New School, Kennebunk, Me.
TBD	Club/Public Star Party (<i>Visit website for updates and or cancellations</i>)	Starfield Observatory, West Kennebunk, Me.

Directions to ASNNE event locations

Directions to The New School in Kennebunk [38 York Street (Rt1) Kennebunk, ME]

For directions to The New School you can use this link to the ASNNE NSN page and then click on "get directions" from the meeting location. Enter your starting location to generate a road map with complete directions. It works great. http://nightsky.jpl.nasa.gov/club-view.cfm?Club_ID=137

Directions to Starfield Observatory [Alewife Road, Kennebunk, ME]

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

2015 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 _____

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 _____

