

Skylights

Newsletter of the Astronomical Society of Northern New England



JULY 2016



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 July

By *Bernie Reim*

The month of July is named for Julius Caesar. On this first full month of summer, the days are still long and the nights are still short, but it is a great time to get outside under our warm skies to see and appreciate just a few of its myriad wonders.

All eight of the planets in our solar system will be visible at some time this month in our evening sky. We are standing on one of them. Our home planet will reach aphelion or its greatest distance from the sun on Monday July 4th. We will be 94,512,904 miles away, or only about 3% farther than we are at perihelion in early January. There will also be a new moon a few hours earlier on that same day. Last month we had the June full moon on the same day as the summer solstice. The last time this happened was 68 years ago in 1948, when Harry Truman was the president.

Jupiter is still in the eastern part of Leo the Lion, moving in its normal, eastward direction through our sky along the ecliptic. The king of the planets is slowly fading as we are pulling farther ahead of it in our faster orbit around the sun, but it is still brighter than anything in the sky except for Venus, the moon, and the sun. By the end of the month, Jupiter will set less than two hours after sunset. Back on March 8, when it was at opposition, Jupiter was rising just as the sun was setting. It has 67 total moons, more than any other planet in our solar system.

A spacecraft named Juno will arrive at Jupiter this July 4th. Launched back on August 5 of 2011 by a powerful Atlas 5 rocket, Juno is one of 10 missions that have studied Jupiter at close range. Juno is the first spacecraft sent to the outer solar system that is not powered by the radioactive decay of plutonium. Instead, Juno has 3 huge solar-cell panels, each of which is nearly 30 feet long. They only generate 400 watts of power since the sun is only 1/25 of its intensity on Earth, since Jupiter is about five times farther away at 500 million miles, or about 45 minutes at the speed of light.

The other nine spacecraft have taught us many important things about this great planet, but as with any true knowledge, we have literally only scratched the surface of what this planet can tell us. As is always the case, many theories will be proven, many will be disproven, and many more questions will be raised than we had even thought of asking before Juno arrived at Jupiter. Juno will drop into a sequence of 14-day-long orbits by October which will carry it to just 2600 miles above its cloud tops as it plunges in over the North Pole and exits again over the South Pole and then out to 1.6 million miles away. This avoids most of the trapped charged particles that could easily destroy this spacecraft. Juno will be racing along at 37 miles per second, or twice as fast as we are always orbiting the sun. Just picture this amazing little spacecraft with its triangle of giant solar panels and 9 incredible scientific instruments slowly rotating in a cartwheel every 30 seconds while it is gathering valuable data about our largest planet. Juno will be racing through incredibly strong magnetic fields and millions of amps of electric current.

"Continued on page 2"

Inside This Issue

Club Contact List	pg 2
Moon Data	pg 3
Sky Object Of The Month	
NASA's Space Place	pg 4
Club Items For Sale	
Meteor Showers in 2016	
Hubble's bubble lights up the interstellar rubble	pg 5,6
Sunset pictures	pg 7
Club Meeting & Star Party Dates	pg 8
Directions ASNNE Locations	
Become a Member	pg 9

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

Gary Asperschlager
gasperschlager@gmail.com

Larry Burkett
larrybu32@yahoo.com

Star Party Co-ordinator:

TBD

Skylights Editor:

Paul Kursewicz
pkursewicz@myfairpoint.net

Website Manager:

Nan Musgrave
mzgrvz@outlook.com

NASA Night Sky Network

Co-ordinator:

Joan Chamberlin
starladyjoan@yahoo.com

JPL Solar System Ambassador:

Joan Chamberlin
starladyjoan@yahoo.com

What's Up "Continued from page 1"

It is expected to make about 35 such dramatic and dangerous orbits, but it could last much longer, as some of our missions on Mars have. However, Mars was not nearly as hostile a place as Jupiter.

We don't even know if Jupiter has a solid core of metal, rock, and ice, or essentially no core at all beyond its metallic hydrogen. The pressures at the center of Jupiter are 50 million times greater than what we experience on the surface of the earth. When NASA dropped the Galileo probe down to 100 miles below Jupiter's cloud tops 21 years ago, they found the expected ammonia layers but they didn't find the water layer. So Jupiter may have far less water than expected, which would have major implications for how it was formed and for how most other Jupiter-sized planets in other solar systems formed.

Jupiter has very intense northern and southern lights around its poles, generated by its powerful dynamo of rapidly spinning metallic hydrogen. Jupiter is ten times larger than the earth and 318 times heavier, but it rotates one full turn every 10 hours. This huge magnetosphere extends about 3 million miles into space towards the sun, but this giant geomagnetic tail extends all the way past Saturn, half a billion miles away, on the other side of the sun. Our earth also has a magnetosphere around it, stretching roughly to the moon on the side away from the sun, but it is more than 1000 times smaller.

Each of Jupiter's four large Galilean moons, visible with only a good pair of binoculars, leaves a bright knot of light as a footprint in these polar auroras. The one left by Io, the most volcanic place in our whole solar system, is especially interesting because about one ton of sulfur dioxide escapes from its thin atmosphere every second, forming a huge doughnut-shaped torus of plasma that interacts with Jupiter's magnetic fields generating three different and distinctly audible radio sounds that I have heard on two separate occasions.

Look for a slender waxing crescent moon passing just below Regulus in Leo and then Jupiter about one hour after sunset on the evenings of the 7th and 8th; just a few days after Juno will get to Jupiter.

Then keep watching as the moon gets about 7 percent larger and travels 12 degrees farther east each night. The waxing gibbous

moon will be right above Mars on the 14th, then right above Saturn the next evening. Both brilliant orange Mars and golden Saturn are now slowly fading like giant cooling embers, but they are still brighter and closer than usual. Also look for the orange giant star named Antares in Scorpius below this ever-changing trio of bright celestial objects. At 700 times the size of our sun, Antares is one of the largest stars in our whole Milky Way galaxy of over 300 billion stars.

Both Venus and Mercury are reappearing in our evening during the final week of July, about 5 degrees apart and very low in the western sky, setting about 45 minutes after sunset. Look for them near Regulus in Leo, not far from Jupiter. Neptune is now in Aquarius and Uranus is in the next constellation to the east, Pisces, rising in the late evening.

Pluto is at opposition on July 7th and will spend the whole season in the Teaspoon asterism, part of Sagittarius which also has an asterism called the Teapot. The dwarf planet Pluto takes 248 years to orbit the sun one time, so it will not appear to move much in our sky.

Several meteor showers will happen later this month after a long lull in activity. These include the Delta Aquarids, the Piscis Austrinids, and the Alpha Capricornids. You will also see some early Perseids meteors, which will peak by the 12th of August.

July 4. Earth is at aphelion or farthest from the sun today. Juno will arrive at Jupiter. The Crab nebula in Taurus was first seen on this day in the year 1054 by many cultures around the earth. This supernova is about 6500 light years away, which means that this giant star actually exploded about 7500 years ago, but its light just reached us about 1000 years ago. New moon is at 7:01 a.m. EDT.

July 5. On this day in 1687 Isaac Newton published his Principia, explaining his Laws of Universal Gravitation and many other principles of math and physics.

July 8. The moon is near Jupiter this evening.

July 11. First quarter moon is at 8:52 p.m.

July 15. The waxing gibbous moon, Saturn, and Antares form a nearly vertical line in the south about one hour after sunset.

July 16. On this day in 1994 the first of 21 fragments of Comet Shoemaker-Levy 9 hit Jupiter. Another piece hit the planet about every 6 hours. I saw up to five of these giant black marks.

July 19. Full moon is at 6:56 p.m. This is also called the Hay or Thunder Moon.

July 20. On this day in 1969, the first two humans set foot on the moon. They were Neil Armstrong and Buzz Aldrin. Only 10 more humans would ever walk on the moon, ending in December of 1972.

July 26. Last quarter moon is at 7:00 p.m.

July 29. The moon will occult Aldebaran in Taurus in the morning just after sunrise.

Moon Phases

- July 4**
New
- July 11**
First Quarter
- July 19**
Full
- July 26**
Last Quarter

Moon Data

- July 1**
Moon at perigee
- Aldebaran 0.4°
south of Moon
- July 9**
Jupiter 0.9° north
of Moon
- July 13**
Moon at apogee
- July 14**
Mars 8° south
of Moon
- July 16**
Saturn 3° south
of Moon
- July 23**
Neptune 1.1° south
of Moon
- July 25**
Uranus 3° north
of Moon

Submitted by Glenn Chaple



Sky Object of the Month – July 2016

(Courtesy LVAS Observer's Challenge*)

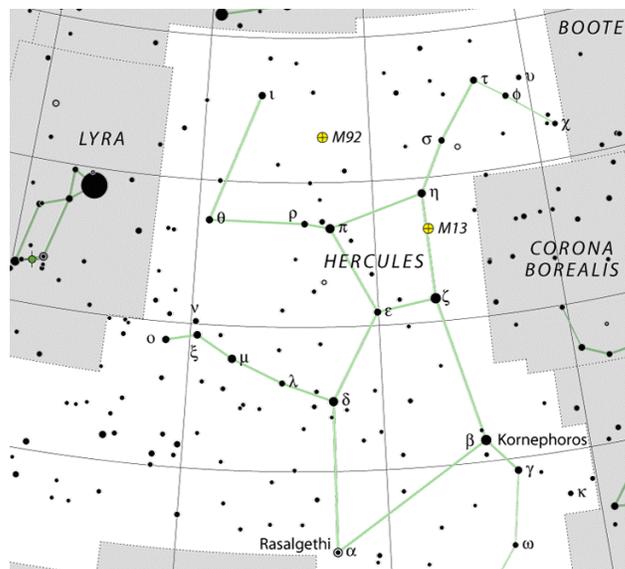
M92–Globular Cluster in Hercules (Magnitude 6.5, Size 14')

This month's LVAS Observer's Challenge takes us to the "other" Messier globular in Hercules. Overlooked in favor of the brighter and easier to find M13, M92 is a noble object in its own right. Discovered by Johan Bode in 1777, it was independently found and catalogued by Messier four years later. Its distance of 26,000 light years is similar to that of M13.

Locating M92 isn't all that difficult. It's bright enough to be picked up with binoculars and finderscopes. Just scan the region about two-thirds of the way from eta (η) to iota (ι) Herculis and look for a hazy round patch about half the size of M13. The challenge isn't in observing M92, but in determining the smallest aperture that will resolve this cluster.



Image by Mario Motta MD



IAU and Sky and Telescope

*The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in our monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either [Roger Ivester \(rogerivester@me.com\)](mailto:rogerivester@me.com) or [Fred Rayworth \(fred@fredrayworth.com\)](mailto:fred@fredrayworth.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to lvastronomy.com/observing-challenge.

Principal Meteor Showers in 2016

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 latest issue of the Space Place Newsletter: News and Notes for Formal and Informal Educators can be found at: <http://spaceplace.nasa.gov/en/educators> .

Space Place is a NASA website for elementary school-aged kids, their teachers, and their parents.

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.
Just let our club member, David Bianchi, know.***

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!



Hubble's bubble lights up the interstellar rubble

By Ethan Siegel

When isolated stars like our Sun reach the end of their lives, they're expected to blow off their outer layers in a roughly spherical configuration: a planetary nebula. But the most spectacular bubbles don't come from gas-and-plasma getting expelled into otherwise empty space, but from young, hot stars whose radiation pushes against the gaseous nebulae in which they were born. While most of our Sun's energy is found in the visible part of the spectrum, more massive stars burn at hotter temperatures, producing more ionizing, ultraviolet light, and also at higher luminosities. A star some 40-45 times the mass of the Sun, for example, might emit energy at a rate hundreds of thousands of times as great as our own star.

The Bubble Nebula, discovered in 1787 by William Herschel, is perhaps the classic example of this phenomenon. At a distance of 7,100 light years away in the constellation of Cassiopeia, a molecular gas cloud is actively forming stars, including the massive O-class star BD+60 2522, which itself is a magnitude +8.7 star despite its great distance and its presence in a dusty region of space. Shining with a temperature of 37,500 K and a luminosity nearly 400,000 times that of our Sun,

it ionizes and evaporates off all the molecular material within a sphere 7 light years in diameter. The bubble structure itself, when viewed from a dark sky location, can be seen through an amateur telescope with an aperture as small as 8" (20 cm).

As viewed by Hubble, the thickness of the bubble wall is both apparent and spectacular. A star as massive as the one creating this bubble emits stellar winds at approximately 1700 km/s, or 0.6% the speed of light. As those winds slam into the material in the interstellar medium, they push it outwards. The bubble itself appears off-center from the star due to the asymmetry of the surrounding interstellar medium with a greater density of cold gas on the "short" side than on the longer one. The blue color is due to the emission from partially ionized oxygen atoms, while the cooler yellow color highlights the dual presence of hydrogen (red) and nitrogen (green).

The star itself at the core of the nebula is currently fusing helium at its center. It is expected to live only another 10 million years or so before dying in a spectacular Type II supernova explosion.

“Continued on page 6”

“Continued from page 5”



Image credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA), of the Bubble Nebula as imaged 229 years after its discovery by William Herschel.

Sunset

Submitted by Paul Kursewicz
Canon PowerShot SX50 HS



Club Meeting & Star Party Dates

Date	Subject	Location
July 1	<p>ASNNE Club Meeting:</p> <p>Meeting Agenda</p> <p>Picnic and observing session (weather permitting) at Starfield Observatory. Start time 6:30 PM.</p> <p>Bring your own food and beverage. Gas grills will be HOT. All dessert donations will be appreciatively eaten!</p> <p>If rained out, just a regular July meeting at The New School (TNS).</p> <p>Guest speaker/topic - TBD. Regular agenda: Bernie Reim - What's Up. Members Astro shorts - ie, news, events, questions. Where's Pluto - Update on the New Horizons Mission and "Planet" status. Days to close approach.</p>	Starfield Observatory, West Kennebunk, Me.
July TBD	Club/Public Star Party (Check List-serve / website for updates or cancellations)	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

2016 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 _____

