

Skylights

Newsletter of the Astronomical Society of Northern New England



OCT 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 October

By Bernie Reim

The New England landscape will slowly transform over the course of this month from the lush greens of summer to the brilliant and varied hues of our flaming foliage that we are so well known for in this area of the country.

As this terrestrial transformation is taking place, our celestial views are also changing from the familiar summer constellations to slow rising of the winter hexagon out of the ocean in the east. This heralds the approach of winter as the nights will consistently be getting longer and cooler and crisper.

Every month has its share of interesting and exciting events taking place in our sky as we learn to look for them. There are no more eclipses this month, but there will not one but two meteor showers and a rare parade of 4 of the five brightest planets in the morning sky along with Comet 67P/Churyumov-Gerasimenko becoming visible in Leo with a telescope. There is also another comet, named Catalina, which is getting brighter in the southern hemisphere and will become visible for us in December. The second brightest asteroid, Vesta, will be visible in Cetus the whale with binoculars all month around midnight.

The Orionid meteor shower will peak during the night of Wednesday the 21st. The waxing gibbous moon will set about an hour and a half after midnight that morning, which still leaves four hours of dark skies to enjoy these meteors, which are actually tiny, sand grain-sized pieces of Halley's Comet burning up high in our atmosphere. We pass through the debris trail of this famous comet twice every year. The other shower this comet causes is the Eta Aquarids on May 4th. This is the only comet that causes two meteor showers every year for us on Earth.

This will be a great opportunity to focus on and learn the winter hexagon, which contains all the brightest stars in the late fall and winter sky. Orion the Hunter is in the middle of this hexagon. All the meteors will appear to

originate from the club that Orion is holding high over his head, as if he were throwing these meteors all over the sky just to dazzle us here on Earth with his great power.

This year this shower is only expected to produce about 15 meteors per hour, but some years that goes up to 70 per hour. The number is not as important as being able to appreciate that the earth is speeding through comet dust at 67,000 mph and getting a better sense of our precious and protective, thin and tenuous atmosphere at that time.

All of our brightest planets except Saturn will be making appearances in the morning sky. The two brightest planets, Venus and Jupiter, will not only be very close to each other, similar to their recent great conjunction on June 30th, but they will also be close to their highest in the sky one hour before sunrise in the east-southeastern sky in Leo all month.

This appearance will not be closer than the one in June, but this time Mars and even Mercury will join them in this fantastic early morning celestial dance of the planets. Not only do we get to watch and learn from these four bright planets this month, but the 21st brightest star in our sky, Regulus in Leo,

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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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will join the action along with a waning crescent moon on the 8th. Three of these planets will live within a narrow three and a half degree wide circle for a while and then they will take turns expanding this circle over the course of their spectacular dance gracing our morning skies for all of this month.

We will get a chance to see the comet that we landed on back in November of 2014. Comet 67P/Churyumov-Gerasimenko will be visible in Leo just above all the planetary action in the morning sky if you have a telescope. It may only reach 11th or 12th magnitude, so you would need a 6 or 8 inch telescope to see it. This comet reached perihelion or its closest approach to the sun last August, shooting out huge jets of material around that time. It is only 2.8 miles across and has a very strange two-lobed shape, as if two comets got smashed together. It belongs to the Jupiter family of comets and orbits the sun every 6.5 years.

This is the first time we ever landed a scientific instrument on a comet and then tracked it over time with another spacecraft. The Philae lander had a tough time since its harpoons didn't fire to anchor it to the comet, so it bounced a couple of times and couldn't get much data. The lander is named for the Philae obelisk which was used to decipher Egyptian hieroglyphs. The spacecraft is called Rosetta. We are trying to decipher in detail for the first time some of the great mysteries that this 4.5 billion year old chunk of primordial rock and ice is really telling us.

Saturn is getting lower in the sky in Scorpius. The ringed planet will get too low in our atmosphere to get a good view of it through telescopes by the end of this month. A waxing crescent moon will join Saturn on the evening of the 16th.

Be aware that the fainter planets of the outer solar system are all visible in the evening sky near Saturn with binoculars. Uranus will be at opposition in Pisces on the 11th and Neptune is just past its best for the year in Aquarius. Then keep traveling west to find Pluto in Sagittarius. At only 14.5 magnitude, you will need a very good telescope to see it for yourself, but it is good to know where it is in our sky as more exciting high resolution images filter in from the New Horizons spacecraft that passed right by it on July 14th.

Oct.1. On this day in 1897 the Yerkes 40 inch refractor was dedicated. At that time it was the largest telescope in the world and now it is still the largest refractor in the world.

Oct.2. The waning gibbous moon passes half a degree north of Aldebaran in Taurus this morning.

Oct.4. Sputnik was launched on this day in 1957, essentially beginning the Space Age. Last quarter moon is at 5:06 p.m. EDT.

Oct. 8. The moon passes just south of Venus this morning.

Oct. 9. The waning crescent moon passes just south of Mars and Jupiter this morning. The Draconid Meteor shower peaks this morning. Caused by Comet Giacobini-Zinner, this shower only produces about 10 or 15 meteors per hour. They will all originate from Draco the Dragon near Polaris in Ursa Minor, which is also known as the Little Dipper.

Oct. 11. The moon passes near Mercury this morning. Uranus is at opposition.

Oct. 12. New moon is at 8:06 p.m. EDT.

Oct. 15. Mercury is at greatest western elongation at 18 degrees west of the sun.

Oct. 16. The moon passes just north of Saturn this evening.

Oct. 17. Mars passes less than half a degree north of Jupiter this morning.

Oct. 20. First quarter moon is at 4:31 p.m.

Oct. 21. The Orionid meteor shower peaks this morning.

Oct. 23. The moon passes just north of Neptune in Aquarius this evening.

Oct. 26. Venus passes just 1.1 degrees south of Jupiter this morning, just one hour after Venus reaches greatest western elongation from the sun. The moon is at perigee, or closest to the earth at 222,739 miles this morning.

Oct. 27. Full moon is at 8:05 a.m. This is also called the Hunter's Moon.

Oct. 31. On this day in 2005, the Hubble Space Telescope discovered 2 new moons of Pluto, named Nix and Hydra. It then discovered Kerberos in 2011 and Styx in 2012. All four of these moons are only about 20 to 30 miles across and tumble chaotically around Pluto and Charon.

Moon Phases

Oct 4
Last Quarter

Oct 12
New

Oct 20
First Quarter

Oct 27
Full

Moon Data

Oct 2
Aldebaran 0.5°
south of Moon

Oct 8
Venus 0.7° north
of Moon

Oct 9
Mars 3° north
of Moon

Jupiter 3° north
of Moon

Oct 11
Mercury 0.9° north
of Moon

Moon at apogee

Oct 16
Saturn 3° south
of Moon

Oct 23
Neptune 3° south
of Moon

Oct 26
Uranus 0.9° north
of Moon

Moon at perigee

Sky Object of the Month – October 2015 Messier 2 (NGC 7089) – Globular Cluster in Aquarius by Glenn Chaple

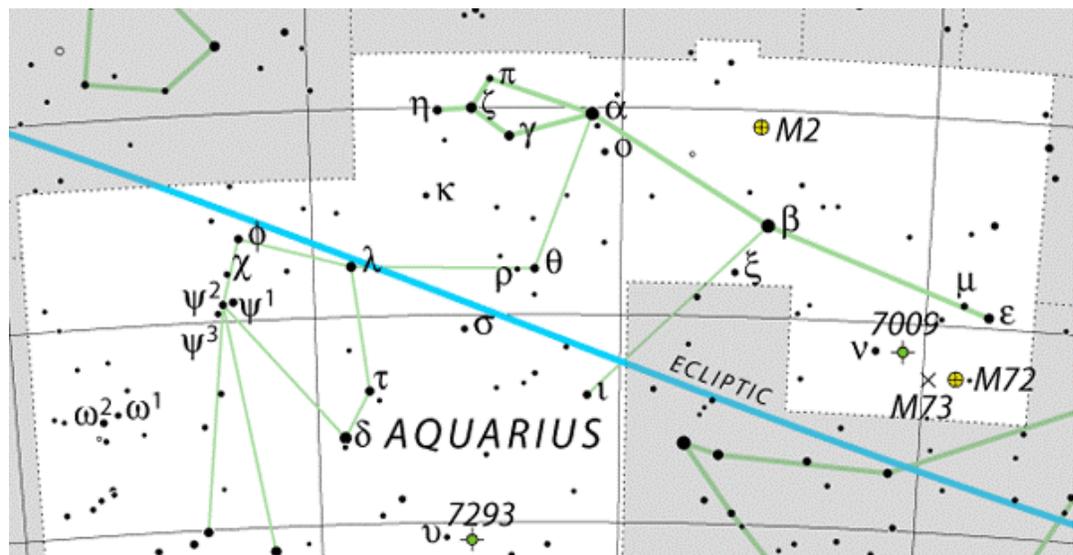
October can be a depressing month for the globular cluster aficionado. Sagittarius, Scorpius, and Ophiuchus and their treasure trove of globular clusters have ridden off to the west, leaving us with the barren-looking skies of autumn.

But all is not lost! Pegasus is home to the wonderful globular M15, and Aquarius sports a pair of globs, M2 and M72. The former is our “Object of the Month” and a worthy rival to M15.

M2 was discovered by French astronomer Jean-Dominique Miraldi in 1746, and catalogued by Messier 14 years later. At magnitude 6.5, M2 is barely visible to the unaided eye from dark-sky locations. You can find it with binoculars or finderscopes by searching the area 5 degrees north of beta (β) Aquarii and looking for what appears to be an out-of-focus star. Viewed with small-aperture scopes and magnifications between 60-120X, M2 is an unresolved, condensed circular haze some 5 or 6 arcminutes in diameter. Larger scopes and magnifications in excess of 150X expand the overall dimensions to 8-12 arcminutes and reveal stars in the outer regions.

Recently, I compared M2 and M15 with my 13.1-inch Dob and an 18-inch Dob owned by fellow ATMoB member Steve Clougherty. Both globulars appeared similar in size; their outer regions nicely resolved by the two scopes. M15 seemed more concentrated toward the middle – a surprise to me, as some observing guides describe M2 as having an almost stellar-looking center. I didn’t see it; neither did Clougherty. What’s your opinion?

M2 lies about 37,000 light years away. It’s one of the richer and larger globular clusters - an estimated 100,000 stars fill an area 175 light years across. At a calculated age of 13 billion years, M2 is also one of the oldest globular clusters in the Milky Way.



www.constellation-guide.com



image by Mario Motta M.D.

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

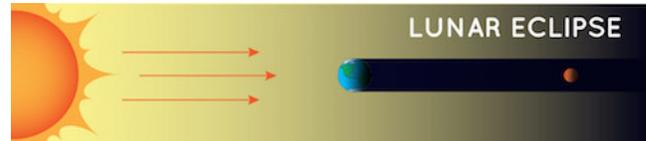
Don't Miss the Lunar Eclipse!

This weekend on September 27 there will be a total lunar eclipse. And not only that—it's a supermoon! That means it's a total eclipse that happens when the moon is closest to Earth in its orbit. This is a rare event. It hasn't happened in over 30 years, so you definitely don't want to miss it.

The total eclipse will last one hour and 12 minutes, and will be visible to North and South America, Europe, Africa, and parts of West Asia and the eastern Pacific. Earth's shadow will begin to dim the supermoon slightly beginning at 8:11 p.m. EDT. A noticeable shadow will begin to fall on the moon at 9:07 p.m. EDT, and the total eclipse will start at 10:11 p.m. EDT.

[Wait, what's a lunar eclipse again?](#)
[And how is it different from a solar eclipse?](#)

<http://spaceplace.nasa.gov/eclipses>



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>

MEMBERSHIP DUES

Membership fees are for the calendar year beginning in January and ending in December. Dues (see page 10 for prices) 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 10.

Additional Notice

Dues have to be paid before the December meeting or the members cannot vote or run in the elections for officers for 2016. This is in the By-laws.



Measure the moon's size and distance during the next lunar eclipse

By Dr. Ethan Siegel

The moon represents perhaps the first great paradox of the night sky in all of human history. While its angular size is easy to measure with the unaided eye from any location on Earth, ranging from 29.38 arc-minutes (0.4897°) to 33.53 arc-minutes (0.5588°) as it orbits our world in an ellipse, that doesn't tell us its physical size. From its angular size alone, the moon could just as easily be close and small as it could be distant and enormous.

But we know a few other things, even relying only on naked-eye observations. We know its phases are caused by its geometric configuration with the sun and Earth. We know that the sun must be farther away (and hence, larger) than the moon from the phenomenon of solar eclipses, where the moon passes in front of the sun, blocking its disk as seen from Earth. And we know it undergoes lunar eclipses, where the sun's light is blocked from the moon by Earth.

Lunar eclipses provided the first evidence that Earth was round; the shape of the portion of the shadow that falls on the moon during its partial phase is an arc of a circle. In fact, once we measured the radius of Earth (first accomplished in the 3rd

century B.C.E.), now known to be 6,371 km, all it takes is one assumption—that the physical size of Earth's shadow as it falls on the moon is approximately the physical size of Earth—and we can use lunar eclipses to measure both the size of and the distance to the moon!

Simply by knowing Earth's physical size and measuring the ratios of the angular size of its shadow and the angular size of the moon, we can determine the moon's physical size relative to Earth. During a lunar eclipse, Earth's shadow is about 3.5 times larger than the moon, with some slight variations dependent on the moon's point in its orbit. Simply divide Earth's radius by your measurement to figure out the moon's radius!

Even with this primitive method, it's straightforward to get a measurement for the moon's radius that's accurate to within 15% of the actual value: 1,738 km. Now that you've determined its physical size and its angular size, geometry alone enables you to determine how far away it is from Earth. A lunar eclipse is coming up on September 28th, and this supermoon eclipse will last for hours. Use the partial phases to measure the size of and distance to the moon, and see how close you can get!

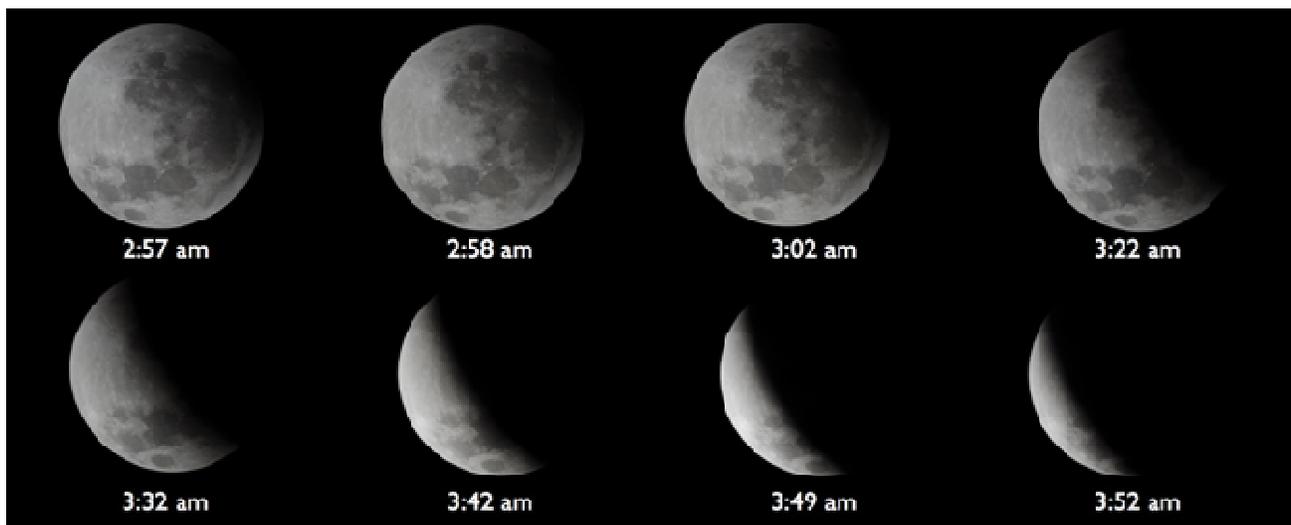


Image credit: Daniel Munizaga (NOAO South/CTIO EPO), using the Cerro Tololo Inter-American Observatory, of an eight-image sequence of the partial phase of a total lunar eclipse.

Starfest 2015



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Peter Gillette gave a talk about his Canon Powershot SX50 HS digital camera and it's use for astroimaging.



Dr. Nicole Gugliucci gave a talk about Citizen Science—Making Research Accessible.



Riwaj Pokhrel (Joan's friend from Nepal) gave a talk about Dust And Gas To Stars.



Fireside Chat

Club Meeting & Star Party Dates

Date	Subject	Location
Oct 2	ASNNE Club Meeting: 6:45-7:30PM: Beginner Astronomy Class (Public walk-ins welcome). 7:30-9:30PM: Club Meeting <u>Meeting Agenda</u> Guest Speaker/Topic: TBD Bernie Reim - What's UP Astro Shorts: (news, stories, jokes, reports, questions, observations etc.)	The New School, Kennebunk, Me.
Oct 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

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 _____

