

Skylights

Newsletter of the Astronomical Society of Northern New England



JAN 2017



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 January

By *Bernie Reim*

January is named for the Roman god Janus, who faces both forward and backward at the same time. He is the god of beginnings and transitions. As we enter this New Year and first full month of winter we can reflect on some of the great scientific discoveries in astronomy that happened last year and we can look forward to and be certain of many more great discoveries happening this year as we keep searching and expanding our knowledge.

The top five discoveries of last year are: 1) Two gravitational waves were confirmed using LIGO, the Laser Interferometer Gravitational-wave Observatory. This amazing phenomenon was first predicted by Einstein over 100 years ago, and has just now actually been found and proven. These are ripples in the fourth dimensional fabric of space-time itself in which we and the earth and all the stars and everything else is embedded. Those two particular waves were caused by mergers of 30 to 40 solar mass black holes just over 1 billion light years away. That detector can only hear such waves of higher frequency, but many gravitational waves of all frequencies are passing through the earth all the time. This opens a whole new window on astronomy itself, since it goes way beyond any of the wide range of electromagnetic telescopes from gamma ray to radio that we are now using to gain most of our knowledge.

2) An earth-like planet was discovered right next door, orbiting around the closest star, Proxima Centauri, only 4.2 light years away. We now have evidence that there may be about as many planets just in our own galaxy as there are stars, around 300 billion. About every tenth star may have 10 or so planets. We have found over 2000 new exoplanets over the past few years, but only a handful that could have the right conditions for liquid water, which is probably extremely rare elsewhere in the universe. Ironically, this amazing planet, simply named Proxima Centauri b, is right in our

celestial backyard. It is almost like searching for the holy grail all over the world and literally finding it hidden somewhere in plain sight right in your own backyard. Now we just need to confirm that it does have liquid water which we can do with better instruments and technology.

3) Rockets made by Space-X and Blue Origin have proven several times last year that they can reuse their main boosters, by executing perfect vertical landings under power. This will make space travel much less expensive so more of it will happen and more satellites will be launched.

4) More of Pluto and the Kuiper Belt are being revealed. New Horizons flew very close to Pluto on July 14 of 2015, but important new data is still coming in and it will now also fly very close by 20 to 25 more Kuiper Belt objects. The next one will happen on January 1 of 2019. They found that Pluto has been active within just the past several million years and they discovered a thicker atmosphere than expected on this cold, distant, lonely outpost of our solar system.

“Continued on page 2”

Inside This Issue

Club Contact List	pg 2
Moon Data	pg 3,4
Sky Object Of The Month	
NASA's Space Place Club Items For Sale Meteor Showers in 2016	pg 5
Big Science in Small Packages	pg 6,7
Astro Photos	pg 8
Christmas Party Photos	Pg 9
Club Meeting & Star Party Dates Directions ASNNE Locations	pg 10
Become a Member	pg 11

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What's Up "Continued from page 1"

5) Juno successfully arrived at Jupiter last year on July 4 and is now making extremely elongated 53-day orbits plunging in over the poles and quickly getting far away to avoid the dangerous high energy particles generated by Jupiter's strong magnetic fields. Juno's computer and sensitive instruments are shielded by sitting inside a 400-pound vault of titanium. This mission should relay important data back to us until February of 2018. Juno will reveal secrets hidden under Jupiter's dense clouds for billions of years.

Highlights for this first month include Venus climbing higher into the evening sky near its best and brightest for the year, a conjunction of Mars and Venus, Saturn returning to our morning sky, Mercury near its best for the year in the morning sky, a bright asteroid in Cancer and Gemini, a fairly bright comet in Capricorn, and a good meteor shower on the third of January.

Venus is now putting on its best evening apparition in five years. It will reach greatest eastern elongation from the sun on the 12th, but it will not reach its brightest until early next month. Venus will be half lit, similar to last quarter moon at this point. However, it takes Venus 225 days to make one orbit around the sun and it only takes the moon 29 days. Venus will reach 30 degrees above the western horizon an hour after sunset and it will not set until 9 pm.

Then we will travel about ten degrees east of Venus in Aquarius and we can see Mars. The red planet is now just over 100 times fainter than brilliant Venus, but it is still distinctly orange and it is brighter than any of the stars close to it. The red planet continues to get a little fainter each evening as the earth speeds farther ahead of it while Venus is getting closer to us and brighter even as it is getting less and less illuminated by the sun. Neptune is also nearby, but it is another 630 times fainter than Mars and you would need a telescope to spot this eighth and farthest planet at nearly 3 billion miles away. Pluto, an icy dwarf, is about 4.5 billion miles away from Earth.

Saturn returns to our morning sky this month. The ringed planet can be seen just above and to the right of Mercury low in the southeastern morning sky about half an hour before sunrise for most of the month.

This year's brightest asteroid, Vesta, can be seen with binoculars moving westward from Cancer into Gemini this month, rising around sunset. It will shine at 6.2 magnitude, which is just below the limit visible to the naked eye, which is 6th magnitude.

Comet 45P/Honda-Mrkos-Pajdusakova should reach 7th magnitude in the evening sky this month. Watch as it traces a nice loop through the constellation of Capricorn. It returns every 5 years and this will be one of its best appearances since it was discovered in 1948. There should be 4 more comets that will reach 7th magnitude or brighter in the next half year.

The Quadrantid Meteor Shower peaks on Tuesday morning the third. There will be ideal conditions this year since the waxing crescent moon will have set by 10pm that night. We can expect up to 120 meteors per hour if it is clear, all originating from a point in the sky near the Big Dipper.

Jan.1. On this day in 1801, Giuseppe Piazzi discovered the first and largest asteroid, Ceres. At 600 miles in diameter, it is the largest of all of the millions of asteroids that orbit in a belt between Mars and Jupiter. Vesta is the second largest at about 300 miles across, or about the width of Arizona.

Jan.2. A slender waxing crescent moon passes within 2 degrees of Venus and Mars this evening. Look for the ghostly glow of earthshine reflecting off the darker part of the moon.

Jan.3. The Quadrantid Meteor Shower peaks this morning. One of only two major meteor showers caused by asteroids and not comets, this shower is caused as we pass through debris from an asteroid named 2003EH1, which could be an extinct comet nucleus.

Jan.4. Earth is perihelion, or closest to the sun at 91.4 million miles away this morning.

Jan. 5. First quarter moon is at 2:47 p.m. EST.

Jan.7. On this day in 1610 Galileo discovered Callisto, Europa, and Io, 3 large moons of Jupiter. He would discover Ganymede, the biggest moon in our solar system just 6 days later.

Jan.8. Stephen Hawking was born on this day in 1942.

Jan.12. Full moon is at 6:34 a.m. This is also known as the Wolf Moon or Old Moon.

Jan.14. On this day in 2005 the Huygens probe landed on Titan, the largest moon of Saturn.

Jan.17. The asteroid Vesta is at opposition tonight. That means it rises at sunset and doesn't set until sunrise and is at its best and closest for the year.

Jan.19. Mercury reaches greatest eastern elongation from the sun. Last quarter moon is at 5:13 p.m. The New Horizons mission to Pluto was launched on this day in 2006. It got there on July 14 of 2015.

Jan.24. The moon passes near Saturn this morning and Mercury the next morning.

Jan. 27. New moon is at 7:07 p.m.

Moon Phases

Jan 5
First Quarter

Jan 12
Full

Jan 19
Last Quarter

Jan 27
New

Moon Data

Jan 2
Venus 1.9° south
of Moon

Neptune 0.4° south
of Moon

Jan 3
Mars 0.2° south
of Moon

Jan 5
Uranus 3° north
of Moon

Jan 10
Moon at perigee

Jan 18
Jupiter 3° south
of Moon

Jan 21
Moon at apogee

Jan 24
Saturn 4° south
of Moon

Jan 25
Mercury 4° south
of Moon

Submitted by Glenn Chaple



Sky Object of the Month – January 2017 (Courtesy LVAS Observer's Challenge*)

NGC 1545 – Open Cluster in Perseus (Mag. 6.2; Size 12')

In the northeast corner of Perseus is the beautiful open cluster NGC 1528. This is not the January, 2017, Observer's Challenge object, but it's worth starting here before moving 1.5 degrees southeastward to our real target, the open cluster NGC 1545. Both clusters shine at magnitude 6.2, with NGC 1528 being larger and richer.

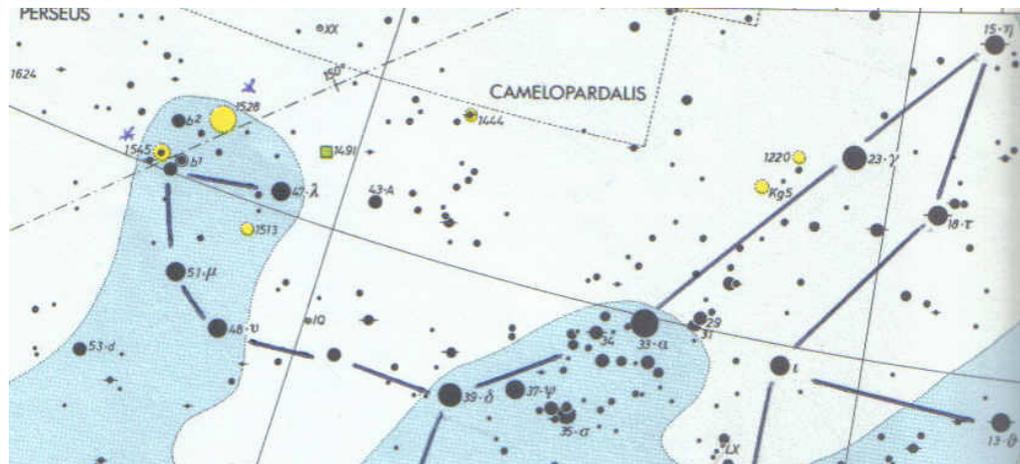
NGC 1545 lies a few arcminutes east of the 5th magnitude star β Persei, and is dominated by the wide triple star South 445 (observed and catalogued by the British astronomer Sir James South in 1825). Its three members, of magnitudes 7.1, 8.1, and 9.3, form an isosceles triangle. The brightest is a yellow-orange K5 giant. About 7.5' north of S445 is the double star Struve 519 (magnitudes 7.9 and 9.4, separation 18.3") whose primary is also yellow-orange.

On March 18, 1979, I observed and sketched S445 and Struve 519 using a 3-inch f/10 reflector at 60X. I failed to notice the fainter stars that comprise the bulk of NGC 1545. My Observer's Challenge will be to re-observe the area with the 3-inch and see if I can pick out some of the dozen or so 10th to 11th magnitude members. Steven O'Meara, author of the *Herschel 400 Observing Guide*, reports adding 3 dozen more stars with a 4-inch scope at 101X.

Discovered by William Herschel in late December, 1790, NGC 1545 also bears the Herschel designation HVIII85 (H85⁸) – the 85th entry in his 8th category of deep-space objects (coarsely scattered clusters of stars). It lies an estimated 2500 light years away.

Glenn Chaple for the LVAS

Finder Chart for NGC 1545



Sky Atlas 2000.0

“Continued on page 4”

“Continued from page 3”

NGC 1528 (top right) and NGC 1545 (bottom left)



www.alsonwongastro.com

NGC 1545 (S445 in center, STF 519 at top center)



Digitized Sky Survey image

*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 2017

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!



Big Science in Small Packages

By Marcus Woo

About 250 miles overhead, a satellite the size of a loaf of bread flies in orbit. It's one of hundreds of so-called CubeSats—spacecraft that come in relatively inexpensive and compact packages—that have launched over the years. So far, most CubeSats have been commercial satellites, student projects, or technology demonstrations. But this one, dubbed MinXSS ("minks") is NASA's first CubeSat with a bona fide science mission.

Launched in December 2015, MinXSS has been observing the sun in X-rays with unprecedented detail. Its goal is to better understand the physics behind phenomena like solar flares – eruptions on the sun that produce dramatic bursts of energy and radiation.

Much of the newly-released radiation from solar flares is concentrated in X-rays, and, in particular, the lower energy range called soft X-rays. But other spacecraft don't have the capability to measure this part of the sun's spectrum at high resolution—which is where MinXSS, short for Miniature Solar X-ray Spectrometer, comes in.

Using MinXSS to monitor how the soft X-ray spectrum changes over time, scientists can track changes in the composition in the sun's corona, the hot outermost layer of the sun. While the sun's visible surface, the photosphere, is about 6000 Kelvin (10,000 degrees Fahrenheit), areas of the corona reach tens of millions of degrees during a solar flare. But even without a flare, the corona smolders at a million degrees—and no one knows why.

One possibility is that many small nanoflares constantly heat the corona. Or, the heat may come from certain kinds of waves that propagate through the solar plasma. By looking at how the corona's composition changes, researchers can determine which mechanism is more important, says Tom Woods, a solar scientist at the University of Colorado at Boulder and principal investigator of MinXSS: "It's helping address this very long-term problem that's been around for 50 years: how is the corona heated to be so hot."

“Continued on page 7”

“Continued from page 6”

The \$1 million original mission has been gathering observations since June.

The satellite will likely burn up in Earth's atmosphere in March. But the researchers have built a second one slated for launch in 2017. MinXSS-2 will watch long-term solar activity—related to the sun's 11-year sunspot cycle—and how variability in the soft X-ray spectrum affects space weather, which can be a hazard for satellites. So the little-mission-that-could will continue—this time, flying at a higher, polar orbit for about five years.

If you'd like to teach kids about where the sun's energy comes from, please visit the NASA Space Place: <http://spaceplace.nasa.gov/sun-heat/>



Astronaut Tim Peake on board the International Space Station captured this image of a CubeSat deployment on May 16, 2016. The bottom-most CubeSat is the NASA-funded MinXSS CubeSat, which observes soft X-rays from the sun—such X-rays can disturb the ionosphere and thereby hamper radio and GPS signals. (The second CubeSat is CADRE — short for CubeSat investigating Atmospheric Density Response to Extreme driving - built by the University of Michigan and funded by the National Science Foundation.) Credit: ESA/NASA

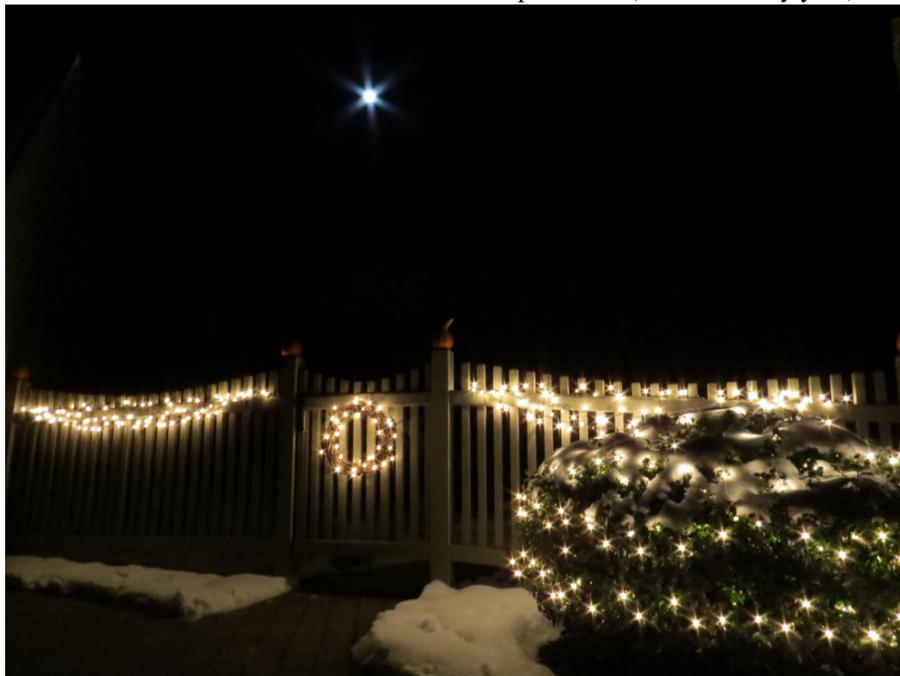
[Astro Photos - Canon Powershot SX50 HS](#)

Photos Submitted by Editor

Horsehead & Christmas Tree Nebula. Taken 12-04-16. Camera lens was zoomed in to 1200mm and shot in RAW mode. ISO was set at 1600. Took 6 hand guided exposures of 4min each. Then stacked and edited in Photoshop.



Star of Bethlehem? The December 14th Super Moon (taken from my yard).



Christmas Party 2016



Club Meeting & Star Party Dates

Date	Subject	Location
Jan 6th	<p>ASNNE Club Meeting:</p> <p>7:30-9:30PM: Club Meeting</p> <p><u>Meeting Agenda</u></p> <p>Guest Speaker: Ian Durham - Review of the year in Physics, The Top Five.</p> <p>Bernie Reim - What's UP</p> <p>Astro Shorts: (news, stories, jokes, reports, questions, photos, observations etc.)</p>	The New School, Kennebunk, Me.
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

2017 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 _____

