

# Skylights

Newsletter of the Astronomical Society of Northern New England



Jun 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 June

By Bernie Reim

**T**he month of June is named for the Roman goddess Juno, who was also the wife of Jupiter. The Greek equivalent is the goddess Hera. The word June also has its origin in Latin meaning the "younger ones".

This month always marks the beginning of summer for us in the Northern Hemisphere. This year that will happen at exactly 12: 24 a.m. on Wednesday morning, June 21<sup>st</sup>. This marks the highest point that the sun will reach in our sky for the year. The sun is in Gemini in June, but you can't see the zodiac constellation when the sun is in it. Gemini the Twins is a winter constellation in the Winter Hexagon near Orion.

The summer solstice also marks the shortest night and the longest day for us in the northern hemisphere. If you would photograph the sun every few days at noon, or any consistent time of day with a fixed camera, the pattern for the whole year would trace out a figure 8, called the analemma. You can also create this shape by just tracing the length of the shadow of a fixed object for the whole year.

Even though the nights are getting shorter now, we still have plenty of night time to enjoy the sky above us from this latitude. Saturn will be the "star" of the month, since it will reach opposition on the 14<sup>th</sup>, which is also National Flag Day. That means the superior planet (all the planets from Mars through Neptune) is directly opposite the earth from the sun. The moon does this every month at full moon. On this day the planet will rise at sunset, reach its highest point in our sky at midnight, and not set until sunrise. However, for this opposition Saturn will be at its most southerly in the sky, which means it will not get as high in our sky as it usually does during its opposition, which happens every 13 months.

Jupiter will share the limelight with Saturn in the evening sky this month. The King of the Planets was at opposition back on April 7, so it is fading out a little more each evening, but it is

still closer and brighter than usual. It will end its retrograde or westward motion against the fixed background of stars on June 9. Notice that it will be working its way back eastward towards Spica, the brightest star in Virgo all month and throughout the summer. It will reach about 10 degrees directly above Spica on Sept. 11. Spica, which means ear of wheat, is at least a double star and is located about 262 light years away.

Jupiter now rises well before sunset, so it is already high in our southern sky by the time it gets dark. It will set by one in the morning by the end of June. As you watch Jupiter this month, remember that we have a very appropriately named little man-made satellite orbiting around this giant planet every 53 days. It is named Juno and it has already completed 6 of these orbits. They are highly elliptical, getting as close as 2200 miles above the poles and then traveling way out to 1.6 million miles. This way Juno spends much less time in Jupiter's very powerful and dangerous electrical fields which would fry all of its sensitive and sophisticated scientific instruments.

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

Juno was launched on August 5 of 2011 and after a gravity assist from Earth in October of 2013, it arrived at Jupiter exactly on schedule, July 4 of 2016. Juno recently took some incredible pictures of ever-changing patterns of thousands of colorful, swirling clouds around its South Pole. It looks much more like the sky in Van Gogh's *Starry Night* than what you would expect Jupiter to look like. Any individual can help to choose the pictures that Juno will take and they can even help to process them. Just go on their website, Junocam, for details. This is another great example of citizen science. This is one small aspect of our taxes put to great use and we can even materially participate in gathering and processing this important information so that we can all share the knowledge gained through this instrument.

Notice that Jupiter is exactly two magnitudes, or 6 and a quarter times brighter than Saturn now. A waxing gibbous moon will pass just 2 degrees above Jupiter on the evening of June 3<sup>rd</sup>, and will then catch up with the next planet along the ecliptic, which is Saturn. The moon continually moves eastward at the rate of about 12 degrees per day, or its own width of half a degree every hour. It will catch up with Saturn a week later and pass directly above the ringed planet on June 10<sup>th</sup>.

Venus is still the bright morning planet. It will fade rapidly in our sky this month as it pulls farther ahead of us in its faster orbit around the sun. It will be exactly half illuminated on June 3<sup>rd</sup>, when it reaches greatest western elongation from the sun at 46 degrees. Then it will get fuller, similar to a waxing gibbous moon, even while it is getting fainter in our sky.

We will finally lose Mars in our evening sky this month. It was with us as an evening planet all winter and spring long as it was setting about the same time each evening since it was moving along in our sky at about the same rate that we are orbiting the sun. Then the red planet will not show up again in the morning sky until August.

When summer starts Mars will be about as far away as it can get from us at about 250 million miles away, since it will be half way to its next opposition on July 27 of next year. Its last opposition was on May 22 of last year. Mars gets to opposition only once every 26 months, instead of every 13 months like the other superior planets.

The next opposition of Mars will be almost as good as the one back on August 27 of 2003. At 34 million miles, that was the closest that Mars got to earth since the Stone Age, 60,000 years ago. Even at opposition, Mars has a wide range of distances to Earth. They can range from about 33 million miles to 63 million miles away. When you catch Mars fading out early this month, remember that the largest rover we ever landed on Mars, named Curiosity, has been there almost 5 years now and

is still making interesting discoveries and taking great pictures.

June 1. First quarter moon is at 8:43 a.m. EDT.

June 3. Hale's 200-inch telescope was dedicated on this day in 1948 on Mt. Palomar. The moon passes just two degrees above Jupiter tonight.

June 4. On this day in 2000, the Compton Gamma Ray Observatory was allowed to reenter our atmosphere after nearly 10 years of observing our high-energy universe in gamma ray wavelengths. It discovered about one new gamma ray burst per day over that time period.

June 5. On this day in 1989, Voyager 2 made its closest approach to Neptune. They were showing live, unprocessed images as they came in that night in a great program called Neptune all Night. The last transit of Venus occurred on this day in 2012. The next one will be in 2117.

June 9. Full moon is at 9:11 a.m. This is also called the Strawberry or Rose Moon. The full moon will be just 3 degrees above and to the left of Saturn tonight.

June 13. Pioneer 10 left our solar system on this day in 1983 and started traveling in interstellar space. The Hayabusa spacecraft returned the first asteroid samples to Earth on this day in 2010.

June 14. Saturn is at opposition tonight.

June 16. On this day in 1963, Valentina Tereshkova became the first woman in space and is still the only solo space flight by a woman.

June 17. Last quarter moon is at 7:34 a.m.

June 20. Venus is near the waning crescent moon this morning.

June 21. Summer starts at 12:24 a.m. this Wednesday morning.

June 23. New moon is at 10:32 p.m.

June 26. Charles Messier was born on this day in 1730. He developed a catalog of 110 celestial objects while hunting for comets. He also discovered about a dozen comets in the process.

June 29. George Ellery Hale was born on this day in 1868.

June 30. On this day in 1908 in Tunguska, Siberia, a comet or asteroid exploded a few miles above the ground creating a brilliant day-time fireball brighter than the sun. The force was equivalent to 20 megatons of TNT or about one thousand times the energy of the first atomic bomb. The impact leveled 80 million trees over 1,000 square miles, but no crater was ever found. Just 105 years later, On Feb 15 of 2013, a much smaller chunk of rock, 65 feet across, exploded over the nearby Russian city of Chelyabinsk with much less damage.

## Moon Phases

**June 1**  
First Quarter

**June 9**  
Full

**June 17**  
Last Quarter

**June 23**  
New

**June 30**  
First Quarter

## Moon Data

**June 3**  
Jupiter 2° south  
of Moon

**June 8**  
Moon at apogee

**June 9**  
Saturn 3° south  
of Moon

**June 16**  
Neptune 0.7° north  
of Moon

**June 19**  
Uranus 4° north  
of Moon

**June 20**  
Venus 2° north  
of Moon

**June 22**  
Aldebaran 0.5°  
south of Moon

**June 23**  
Moon at perigee

**June 27**  
Regulus 0.03°  
north of Moon

Submitted by Glenn Chaple



## Sky Object of the Month – June 2017

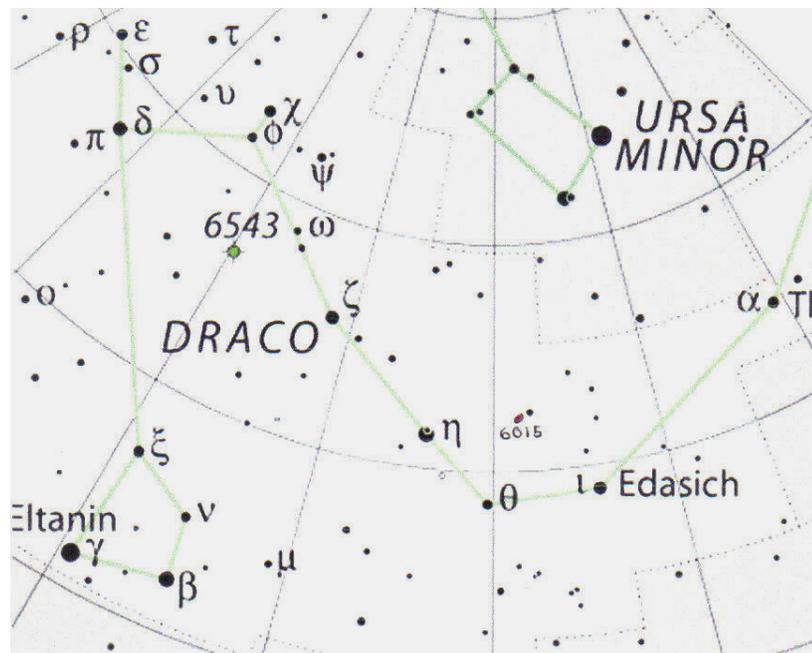
(Courtesy LVAS Observer's Challenge\*)

**NGC 6015 – Draco (Mag. 11.1; Size 5.4' X 2.3')**

This month's LVAS Observer's Challenge, the spiral galaxy NGC 6015 in Draco, was discovered by William Herschel on the evening of June 2, 1788. Herschel catalogued each of his finds into eight categories. This one was designated H.III 739 - the 739<sup>th</sup> object in Herschel's Category III (Very faint nebulae).

And there's the challenge. What is the smallest scope that can capture this 11<sup>th</sup> magnitude galaxy, and how much detail can be picked up with large-aperture instruments? You'll find NGC 6015 by concentrating on an area about one-half degree ESE of a 5<sup>th</sup> magnitude star that forms a parallelogram with eta ( $\eta$ ), theta ( $\theta$ ), and iota ( $\iota$ ) Draconis.

Estimates of the distance to NGC 6015 vary from 38 million to 50 million light years. If we accept a median distance, the galaxy is approximately  $\frac{3}{4}$  the diameter of our Milky Way.



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*“Continued from page 3”*



[www.astrophotos.net](http://www.astrophotos.net)

**\*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](http://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*

## RED ALERT – Downward Pointing Lasers

NASA is planning to use (or is already using) downward pointing lasers which are mounted on their spacecrafts. For those of us who look at the night sky through a telescope, or a pair of binoculars, this is a potential hazard. If a laser beam enters our instrument at the very time we are viewing, eye injury or blindness could occur. Contact physicist, Dr. Jennifer Inman, [jennifer.a.inman@nasa.gov](mailto:jennifer.a.inman@nasa.gov) and tell her your concerns about this perilous issue. Why should we have to live in fear each time we look into a telescope or a pair of binoculars? This is unacceptable!



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](http://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](http://spaceplace.nasa.gov) to explore space and Earth science!



## The Fizzy Seas of Titan

By Marcus Woo

With clouds, rain, seas, lakes and a nitrogen-filled atmosphere, Saturn's moon Titan appears to be one of the worlds most similar to Earth in the solar system. But it's still alien; its seas and lakes are full not of water but liquid methane and ethane.

At the temperatures and pressures found on Titan's surface, methane can evaporate and fall back down as rain, just like water on Earth. The methane rain flows into rivers and channels, filling lakes and seas.

Nitrogen makes up a larger portion of the atmosphere on Titan than on Earth. The gas also dissolves in methane, just like carbon dioxide in soda. And similar to when you shake an open soda bottle, disturbing a Titan lake can make the nitrogen bubble out.

But now it turns out the seas and lakes might be fizzier than previously thought. Researchers at NASA's Jet Propulsion Laboratory recently experimented with dissolved nitrogen in mixtures of liquid methane and ethane under a variety of temperatures and pressures that would exist on Titan. They measured how different conditions would trigger nitrogen bubbles. A fizzy lake, they found, would be a common sight.

On Titan, the liquid methane always contains dissolved nitrogen. So when it rains, a methane-nitrogen solution pours into the seas and lakes, either directly from rain or via stream runoff. But if the lake also contains some ethane—which doesn't dissolve nitrogen as well as methane does—mixing the liquids will force some of the nitrogen out of solution, and the lake will effervesce.

"It will be a big frothy mess," says Michael Malaska of JPL. "It's neat because it makes Earth look really boring by comparison."

Bubbles could also arise from a lake that contains more ethane than methane. The two will normally mix, but a less-dense layer of methane with dissolved nitrogen—from a gentle rain, for example—could settle on top of an ethane layer.

In this case, any disturbance—even a breeze—could mix the methane with dissolved nitrogen and the ethane below. The nitrogen would become less soluble and bubbles of gas would fizz out.

Heat, the researchers found, can also cause nitrogen to bubble out of solution while cold will coax more nitrogen to dissolve. As the seasons and climate change on Titan, the seas and lakes will inhale and exhale nitrogen.

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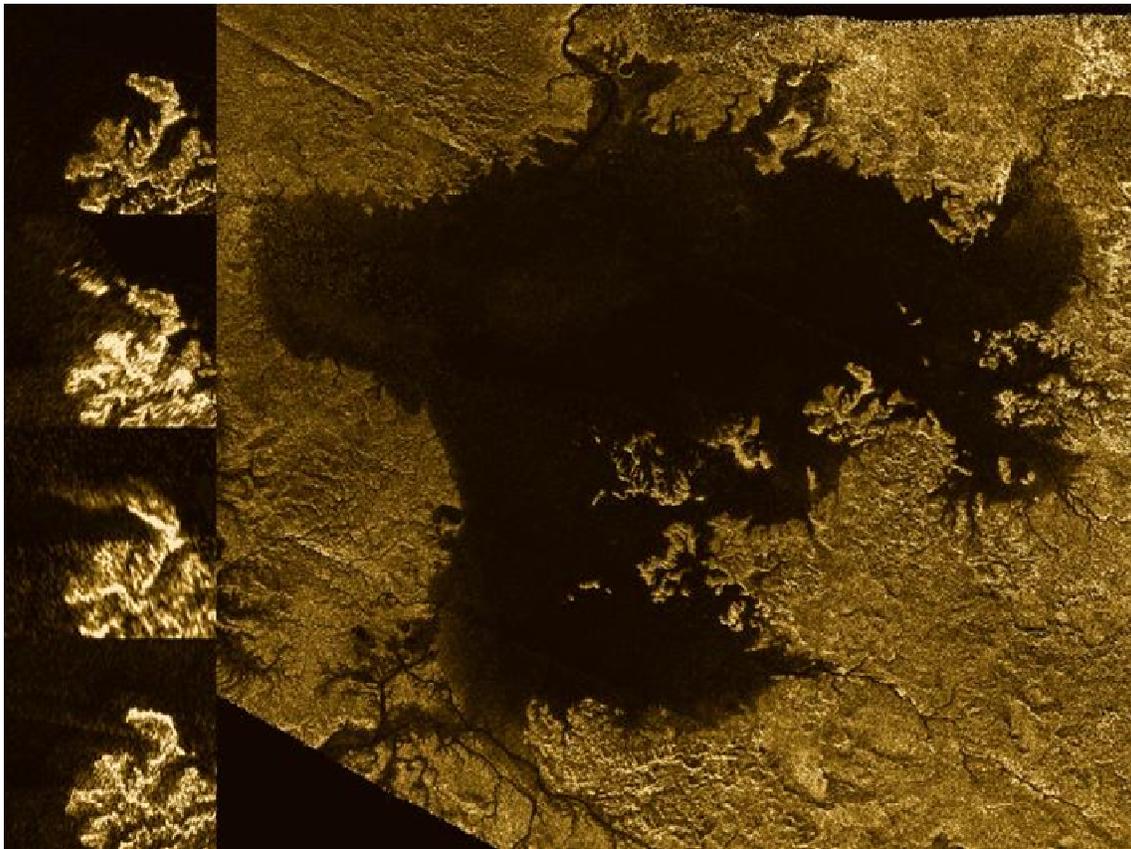
*“Continued from page 6”*

But such warmth-induced bubbles could pose a challenge for future sea-faring spacecraft, which will have an energy source, and thus heat. "You may have this spacecraft sitting there, and it's just going to be fizzing the whole time," Malaska says. "That may actually be a problem for stability control or sampling."

Bubbles might also explain the so-called magic islands discovered by NASA's Cassini spacecraft in the last few years. Radar images revealed island-like features that appear and disappear over time. Scientists still aren't sure what the islands are, but nitrogen bubbles seem increasingly likely.

To know for sure, though, there will have to be a new mission. Cassini is entering its final phase, having finished its last flyby of Titan on April 21. Scientists are already sketching out potential spacecraft—maybe a buoy or even a submarine—to explore Titan's seas, bubbles and all.

To teach kids about the extreme conditions on Titan and other planets and moons, visit the NASA Space Place: <https://spaceplace.nasa.gov/planet-weather/>



*Caption: Radar images from Cassini showed a strange island-like feature in one of Titan's hydrocarbon seas that appeared to change over time. One possible explanation for this "magic island" is bubbles. Image credits: NASA/JPL-Caltech/ASI/Cornell.*

Astro Photos  
**Canon Powershot SX50 HS**  
*Photos Submitted by Editor*

**Pinwheel Galaxy (M101) 5-21-17**

**Top image:** Single JPEG image, 4 min exposure, ISO 1600. M101 is at the lower right corner. An unknown flyby object crosses the field of view.



**Bottom image Pinwheel:** Four 4min exposures stacked and imaged at 75x digital zoom. Then edited and processed in Photoshop.



## Club Meeting & Star Party Dates

Date	Subject	Location
June 2nd	<p style="text-align: center;"><b>ASNNE Club Meeting</b></p> <p><b><u>Beginner Class: 6:30PM - 7:15PM</u></b> Sara Carter will conduct the class.</p> <p><b><u>Meeting 7:30PM - 9:30PM</u></b></p> <p><b>Guest Speaker: Paul Kursewicz</b></p> <p><b>Topic:</b> Preparing for the August 21, 2017 Total Solar Eclipse. Paul is planning on traveling out west to capture images of the Eclipse. This eclipse will be visible everywhere in the US (at least partially).</p> <p>Bernie Reim - What's UP Astro Shorts - (news, stories, jokes, reports, questions, photos, observations etc.)</p>	The New School, Kennebunk, Me.
TBD	Club/Public Star Party ( <i>Check List-serve / website for updates 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](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 \_\_\_\_\_

