

# Skylights

Newsletter of the Astronomical Society of Northern New England



APR 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 April

By Bernie Reim

**T**he month of April is named after aprilis, which means opening. That is exactly what the northern hemisphere is now doing during our first full month of spring, even though we had a very mild winter this year.

The celestial patterns are always changing, just as the terrestrial patterns are always changing, due to our seasons caused by our 23.5 degree tilt of the earth. Notice that Orion and the famous winter hexagon are now getting lower in the west just as the equally famous summer triangle is beginning to rise in the east. They consist of Lyra the harp, Cygnus the swan, and Aquila the eagle.

There are several interesting highlights this month. These include Mercury's best apparition of the year, Mars getting closer and brighter each day, a comet and an asteroid in Leo the Lion, and the Lyrid meteor shower.

I hope many of you saw that wonderful total solar eclipse over Indonesia early in March. I watched a live feed of the entire event and was thrilled by its continual unfoldment and its unexpected occurrences like seeing the shadow bands race across the earth at faster than the speed of sound and the solar prominences visible just before and during totality.

I learned a lot of interesting things about the power of our sun from the professional astronomers sharing their insights and commentary with the viewers. It was also educational to get a glimpse of life in these exotic locations half way around the earth. As you physically become the fourth body in a perfect three body alignment of the three most important bodies in all of humanities life on earth, it really shows you the enormous power of nature and the surprisingly great influence that any one individual can have as they align themselves with this power and understand more about it and how to use it for the good of mankind. Just one average solar flare releases

enough energy in one second to provide for all the power needs of this entire country for 100 years.

This was an especially important eclipse because it helped to prepare us for our own total solar eclipse next summer, on Monday, August 21. The narrow path of totality will cut right across our country from Oregon to South Carolina, the first time in nearly 100 years. It is not too early to start making reservations and doing some research on the best locations and methods of capturing and sharing this amazing and rare event. Then we will be very lucky and enjoy another total solar eclipse less than 7 years later, on April 8 of 2024, which will pass right over Maine.

Mercury makes its best showing for the year on April 18. Our first planet starts the month by rising around 7:30 pm, during evening twilight. By the middle of the month it will not set until 8:30 pm. It will be 20 degrees east of the sun and it will reach 10 degrees high, or one fist at arm's length. Watch the waxing crescent moon pass nearby on the 8<sup>th</sup>. One of the best events for the entire year of 2016 is coming up next month. That will be the transit of Mercury across the face of the sun on Monday, May 9.

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

Mars will more than double in brightness during this month as the earth is rapidly catching up with our neighboring planet. Then it will continue to get brighter and larger until we get closest to it on May 22. That point is called opposition and only happens every 26 months for Mars, but about every 13 months for the other superior planets. The red planet is already showing some nice detail on its surface in small telescopes and it will only get better over the next several months until we pull too far ahead of Mars by July in our faster orbit around the sun.

Jupiter is still close to its best for the year, now rising just before sunrise. Saturn is getting closer and brighter, rising around midnight and approaching its own opposition in early June.

A comet named Ikeya-Murakami is drifting right through Leo the Lion this month. Discovered in 2010, this comet will pass just half a degree below Regulus, the brightest star in Leo and the 21<sup>st</sup> brightest star in the whole sky, on the 24<sup>th</sup> and 25<sup>th</sup>. It will only shine at around 10<sup>th</sup> magnitude, so you will need a telescope to see it for yourself, but it is nice to know that it is there when you look at Leo this month.

There will also be an asteroid crossing through another part of Leo this month. It will glow at about the same magnitude as the comet, so you will also need at least a small telescope to see this interesting asteroid, named 6 Hebe. It has been proven that 6 Hebe is the source of 40 percent of all the meteorites that fall to Earth, which is quite amazing. It is about the 8<sup>th</sup> largest of all the millions of asteroids and its diameter is about 120 miles across. It is at its closest to Earth now and is visible just above Denebola, which marks the tail of Leo the Lion.

Remember that NASA's Dawn spacecraft is still orbiting the largest of all asteroids, named Ceres, which is about 600 miles in diameter and was discovered back in 1801. Dawn just visited the second largest asteroid, Vesta, a few years ago, learning a lot from that encounter.

There is a Japanese spacecraft on its way right now to an earth-crossing asteroid named Ryugu. It was launched back in December of 2014 and should get there by 2018. It will gather several pounds of material from this asteroid and then return its precious cargo to

Earth by 2020. NASA will launch Osiris-Rex on its way to another dangerous, earth-crossing asteroid named Bennu in September of this year. It will also return samples to Earth. We will learn more about the origins of life on earth and how to protect ourselves from asteroids that may hit us by analyzing these samples in detail.

Remember that on February 15 of 2013 we knew that an asteroid named 367943 Duende would pass just 17,000 miles above the surface of Earth, which is closer than our many geosynchronous satellites orbit. What we didn't expect is a 65-foot diameter asteroid that came in from the direction of the sun and exploded just above the city of Chelyabinsk, Russia that morning, injuring 1500 people. Soon we will be better prepared with our new knowledge.

The Lyrid meteor shower will peak on April 22, but the full moon will wash out most of these meteors, caused by Comet Thatcher, which has a 415-year orbit.

April 1. On this day in 1997, Comet Hale-Bopp made its closest approach to the sun.

April 6. The moon passes less than one degree north of Venus this morning.

April 7. New moon is at 7:24 a.m. EDT. The Compton Gamma Ray observatory was launched on this day in 1991. It discovered about one major gamma ray burst every day for its life in orbit.

April 11. On this day in 1986, Halley's Comet was closest to the earth.

April 12. On this day in 1961, Yuri Gagarin became the first human in space.

April 13. First quarter moon is at 11:59 p.m. EDT.

April 16. Mars is stationary, beginning its retrograde or westward motion today.

April 18. The moon passes 2 degrees south of Jupiter this morning. Pluto is stationary.

April 22. Full moon is at 1:24 a.m. This is also called the Grass, Egg, Pink, or Fish Moon.

April 25. On this day in 1990, the Hubble Space Telescope was deployed. Look for the waning gibbous moon very close to Saturn, Mars, and the orange giant star named Antares in Scorpius this morning around 3 a.m. Antares is about 700 times larger than our own sun.

April 29. Last quarter moon is at 11:29 p.m. EDT.



Moon Phases

- Apr 7**  
New
- Apr 13**  
First Quarter
- Apr 22**  
Full
- Apr 29**  
Last Quarter

Moon Data

- Apr 4**  
Neptune 1.9° south  
of Moon
- Apr 6**  
Venus .7° south  
of Moon
- Apr 7**  
Moon at perigee
- Apr 8**  
Mercury 5° north  
of Moon
- Apr 10**  
Aldebaran 0.3°  
south of Moon
- Apr 18**  
Jupiter 2° north  
of Moon
- Apr 21**  
Moon at apogee
- Apr 24**  
Mars 5° south  
of Moon
- Apr 25**  
Saturn 3° south  
of Moon

Submitted by Glenn Chaple



## Sky Object of the Month – April 2016

(Courtesy LVAS Observer's Challenge\*)

NGC 3077– Peculiar Irregular Galaxy in Ursa Major  
(Magnitude – 9.9, Dimensions – 5.5' X 4.0')

NGC 3077 is a small member of the [M81 Group](#), visible in the same low power field as M81 and M82. It was discovered by William Herschel on November 8, 1801. To the casual observer, NGC 3077 looks like an [elliptical galaxy](#). However, it is classified as a [peculiar](#) irregular galaxy due to its wispy edges, scattered dust clouds, and active nucleus. Studies suggest a distance for NGC 3077 of 13 million light years.

Russeli Croman ([www.rc-astro.com](http://www.rc-astro.com))

Astronomy Magazine

\*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).

## Subject: 12.5" homemade reflector 60-70% completed for sale

Hello,

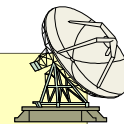
About 10 years ago, I was working on putting together a 12.5" truss tube reflector based off Dave Kriege's book. I have the box made of baltic birch, the mirror, 6061 aluminum truss tubes, mirror mount (custom made), secondary. I lost steam on it after some life changing events and never got back at it. I was an active member of ASNNE in the mid-late 90's, but the only name I recognize on your newsletter roster now is Paul K's.

Anyway, I retired in December and we're preparing to sell our house in May and move full time into a 41' diesel coach and tour North America for a few years. That being said, I'm considering selling this works in the making if I could get a fair price for the materials. I don't have a price in mind, but can get some pictures together, but if there were someone interested, the best thing might just be for them to email me and we could setup a time they could swing by and see what I have and make an offer. If it doesn't work out, I'll store things with a few other things we'll leave behind and perhaps resume it once we settle down. We are, however trying to minimize what we store.

If there's any interest in from a club member, they can contact me at mainuh858@yahoo.com Of course, being retired, I'm fairly flexible on time with a little advance notice.

Thanks in advance.

Don Lockhart  
Cumberland, Maine



Got any News?  
Skylights welcomes your Input.

*Here are some suggestions:*

*Book reviews -- Items for sale -- New equipment --  
Ramblings -- Star parties -- Observing -- Photos.*



**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](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.**

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## Gravitational Wave Astronomy Will Be The Next Great Scientific Frontier

By Ethan Siegel

Imagine a world very different from our own: permanently shrouded in clouds, where the sky was never seen. Never had anyone see the Sun, the Moon, the stars or planets, until one night, a single bright object shone through. Imagine that you saw not only a bright point of light against a dark backdrop of sky, but that you could see a banded structure, a ringed system around it and perhaps even a bright satellite: a moon. That's the magnitude of what LIGO (the Laser Interferometer Gravitational-wave Observatory) saw, when it directly detected gravitational waves for the first time.

An unavoidable prediction of Einstein's General Relativity, gravitational waves emerge whenever a mass gets accelerated. For most systems -- like Earth orbiting the Sun -- the waves are so weak that it would take many times the age of the Universe to notice. But when very massive objects orbit at very short distances, the orbits decay noticeably and rapidly, producing potentially observable gravitational waves. Systems such as the binary pulsar PSR B1913+16 [the subtlety here is that binary pulsars may contain a single neutron star, so it's best to be specific], where two neutron stars orbit one another at very short distances, had previously shown this phenomenon of orbital decay, but gravitational waves had never been directly detected until now.

When a gravitational wave passes through an objects, it simultaneously stretches and compresses space along mutually perpendicular directions: first horizontally, then vertically, in an oscillating fashion. The LIGO detectors work by splitting a laser beam into perpendicular "arms," letting the beams reflect back and forth in each arm hundreds of times (for an effective path lengths of hundreds of km), and then recombining them at a photodetector. The interference pattern seen there will shift, predictably, if gravitational waves pass through and change the effective path lengths of the arms. Over a span of 20 milliseconds on September 14, 2015, both LIGO detectors (in Louisiana and Washington) saw identical stretching-and-compressing patterns. From that tiny amount of data, scientists were able to conclude that two black holes, of 36 and 29 solar masses apiece, merged together, emitting 5% of their total mass into gravitational wave energy, via Einstein's  $E = mc^2$ .

During that event, more energy was emitted in gravitational waves than by all the stars in the observable Universe combined. The entire Earth was compressed by less than the width of a proton during this event, yet thanks to LIGO's incredible precision, we were able to detect it. At least a handful of these events are expected every year. In the future, different observatories, such as NANOGrav (which uses radiotelescopes to the delay caused by gravitational waves on pulsar radiation) and the space mission LISA will detect gravitational waves from supermassive black holes and many other sources. We've just seen our first event using a new type of astronomy, and can now test black holes and gravity like never before.

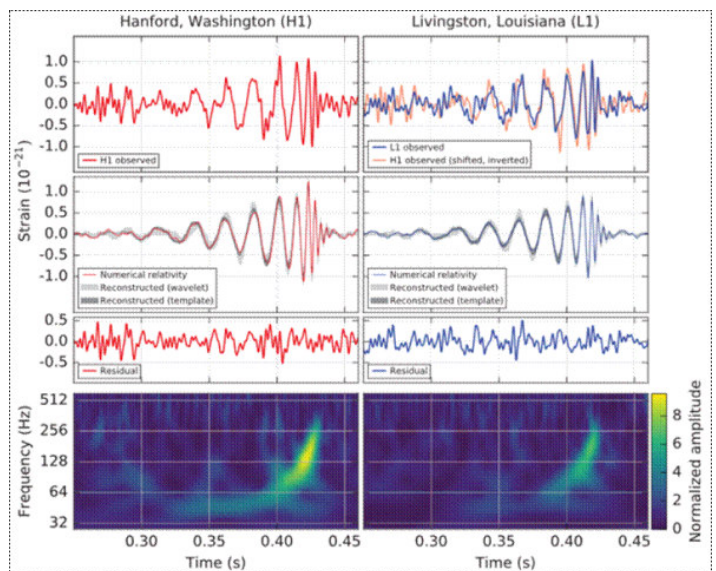


Image credit: Observation of Gravitational Waves from a Binary Black Hole Merger B. P. Abbott et al., (LIGO Scientific Collaboration and Virgo Collaboration), *Physical Review Letters* 116, 061102 (2016). This figure shows the data (top panels) at the Washington and Louisiana LIGO stations, the predicted signal from Einstein's theory (middle panels), and the inferred signals (bottom panels). The signals matched perfectly in both detectors.

## Submitted by Peter Gillette

Subject: Canon PowerShot SX50 HS

Hi guys!

I've just come in from my observatory. Its 9 degrees, but I've been too excited to get cold. First decent night in quite a while, and I decided to break out "the camera", and just see what I could do.

Well, WOW!

I started off just getting the camera lined up on the back of my LX-200, shooting 2 1/2 minutes at ISO 800, and got this shot of Taurus, which ain't too bad.



What I was doing was centering Aldebaran in the scope, then centering it in the camera, then zooming in and refining the centering, ultimately to have the camera be "go-to", and try for a shot of M 1...



*“Continued on page 8”*

*“Continued from page 7”*

Keep in mind that I've not done any processing on any of these shots! I did boost up the ISO to 2000, or something like that. It was the next stop up after 1600, and still just a 2 1/2 minute exposure. I was so pleased with that, that I decided, foolishly, to try for B33, the Horsehead. Keep in mind that I have never been able to get a photo of it before, and had little hope. Silly me, especially after I saw the first exposure, thru the little viewer. I started blathering!



This is just thru the camera, no extra optics, no processing. I did bump up the exp. time to 4 1/2 minutes, but that's it! And I think the lens was set around 50X.

I then decided that I'd just about had enough, but then saw that NGC 2903 was very well placed, so I said, "What the heck!", and gave it a try, at 3 1/2 min., and maybe 75X.



Notice the other galaxy I caught, without even knowing it, at the left edge of the frame. Amazing!

If this doesn't get you guys inspired to get yer gear out and try some of this CHDK stuff, I give up!

-P-



## Club Meeting & Star Party Dates

Date	Subject	Location
April 1	<p><b>ASNNE Club Meeting:</b></p> <p><b>7:30-9:30PM:</b> Club Meeting</p> <p><b><u>Meeting Agenda</u></b></p> <p><b>Guest Speaker: Kirk Rogers.</b>  <b>Topic: Constellation Mythology</b>            Renown Astro and Birding photographer Kirk Rogers is also known for his story telling about the Mythology of the Constellations. Join us to hear how the ancients put the stars in the sky.</p> <p>Bernie Reim - What's UP</p> <p>Astro Shorts: (news, stories, jokes, reports, questions, observations etc.)</p> <p>Where's Pluto - Update on the New Horizons Mission status and later post-encounter (April-December 2016)</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](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 \_\_\_\_\_

