

Skylights

Newsletter of the Astronomical Society of Northern New England



FEB 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 February

By Bernie Reim

The month of February is named after Februa, which was the Roman festival of purification. We are now halfway through winter. That point is marked by Ground Hog Day on the second of this month. Legend has it that if the groundhog sees its shadow, it will retreat back into its burrow and there will be 6 more weeks of winter. For us in Maine, there will be 6 more weeks of winter regardless of this artificial outcome.

There will be several interesting highlights that will be well worth making the effort to observe this month that will give you a much better sense of the dynamic and ever-changing nature of our solar system. These include Jupiter at its best, a slowly fading bright comet arcing through Perseus and Andromeda, a large asteroid crawling through Cancer the Crab, a good chance at seeing a fireball or bolide, and a great triple conjunction of our closest planetary neighbors.

Carefully observing this quintet of very different events and applying it to similar scenarios in our solar system will give you a better appreciation of planetary orbits, the motions and nature of comets and asteroids, and the nature of tiny objects burning up high in our atmosphere.

Jupiter will reach opposition this month on Friday the 6th. That means it will rise at sunset, stay in the sky all night long and not set until sunrise. A superior planet is always at its best and brightest at this point, because it is closest to the earth in its elliptical orbits as it gets exactly opposite the earth from the sun on that day. That happens about every 13 months for all the superior planets except for Mars, which only reaches opposition once every 26 months because it is so much closer to us than the other superior planets.

Jupiter began its retrograde or westward motion in the sky on December 9th of last year and will end its retrograde motion on April 8 this year. The midpoint of this retrograde loop that superior planets appear to trace through the

TRIVIA: The entire surface area of Pluto is smaller than Russia.

sky is known as it opposition. Since Saturn is well behind Jupiter now, the opposition of Saturn will not happen until May 22 of this year, although it will start its retrograde loop in Libra on March 14th.

The King of the Planets shines brilliantly just above and to the right of Regulus, the brightest star in Leo the Lion. Notice that it is still about 4 times fainter than Venus. Jupiter rotates all the way around on its axis in just 10 hours, so you will be able to witness a complete rotation through a telescope and look for its famous red spot and many other nice cloud bands and turbulence features since the planet is visible for 12 hours straight near its opposition.

Another unusual phenomenon to look for this month through a telescope will be several mutual occultations and eclipses of Jupiter's four large Galilean moons. This is possible because the plane of its moons is edge on to the earth now for a few months. All four of its largest moons will be lined up in order to the east side of Jupiter on the night of its opposition. The order will be Io, Europa,

"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	pg 5
Meteor Showers in 2015	
Minor merges have major consequences for black holes	pg 6
Wheely Bar for a tripod mount	pg 7,8,9
Club Meeting & Star Party Dates	pg 10
Directions ASNNE Locations	
Become a Member	pg 11

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What's Up "Continued from page 1"

Ganymede (the largest moon in our whole solar system) and Callisto. On the night of the 26th, three of its moons will go through four mutual occultations and eclipses.

Just by watching Jupiter and its miniature solar system closely this month, you will see the results and applications of many interesting laws of physics and be better able to identify with Galileo as he first saw some of these events 406 years ago and used them to prove that the earth can't be the center of our solar system.

Saturn starts the month rising around 4 am and by the end of February will be rising around 2 am. It continues to rise a little earlier each night as it approaches its own opposition on May 22. Notice that the ringed planet is about 80 times fainter than Venus. Look for the contrast of the golden hue of the ringed planet with the orange-red, Mars-like color of nearby Antares, the brightest star in the constellation of Scorpius where Saturn now resides. Its rings are now tilted very open at 25 degrees to our line of site, which makes them quite prominent and allows you to easily discern the Cassini division in a small telescope.

Last month Venus and Mercury put on a great show and we learned about the contrasts and similarities of our first two planets since they were so prominent in our evening sky. This month we can extend that knowledge to our neighbor on the other side, Mars. Mercury has dropped out of our evening sky and Mars sinks lower as Venus climbs higher. Watch our two closest celestial neighbors catch up with each other for the first 20 days this month. They will be less than one degree apart on Friday the 20th when a slender waxing crescent moon will join the pair 1 hour after sunset in the western sky. View this trio with binoculars or a rich-field telescope. The next evening Mars and Venus will be even closer together, but the moon will be 14 degrees above the pair. Try to photograph this rare and stunning conjunction both for its beauty and its scientific value.

We just found evidence of the Beagle 2 lander that the British sent to Mars back on June 2, 2003. We have pictures of the partly opened lander, a parachute, a cover, and possibly an air bag. It would have been a great Christmas gift to the whole world on December 25 of 2003 when the Mars Express dropped this highly innovative probe that would have revealed many more mysteries about Mars including possible life on this alien world.

Comet Lovejoy is nicely visible in a pair of binoculars above and to the right of the Winter Hexagon. It will pass to the right of a galaxy called NGC 891 in Perseus on the first of the month and then just to the right of M76, also known as the

Little Dumbbell Nebula on the 20th. It should fade to 8th magnitude this month.

Our fourth largest asteroid, Juno, a potato-shaped rock 170 miles in diameter, can be seen crawling through Cancer the Crab, not far from Jupiter this month. It is about 8th magnitude, so you will need at least a pair of binoculars to see this minor planet orbiting the sun in our sky. Juno will pass close to M44, an open cluster known as the Beehive, and M67, another open star cluster. You will notice that it moved if you look at it every three to four hours.

There are no major meteor showers until April, but you have a good chance of catching 5 or 6 sporadic meteors not associated with any particular comet each hour on clear, moonless nights. They are known as a fireball if they are brighter than Venus and it is called a bolide if it explodes at the end of its path, which is very dramatic and can light up the whole night sky for a split second as if a giant flash bulb went off to photograph the terrestrial night and all of its earthly surroundings for that instant.

Feb. 1. Neptune passes less than one degree north of Venus tonight.

Feb.3. Full moon is at 6:09 p.m. EST. This is also called the Snow Moon or Hunger Moon.

Feb.4. Clyde Tombaugh was born on this day in 1906. He would discover Pluto on the 18th of this month in 1930. The moon passes 5 degrees south of Jupiter tonight.

Feb. 6. Jupiter is at opposition tonight. Alan Shepard hit some golf balls on the moon on this day in 1971.

Feb. 7. The Stardust comet probe was launched on this day in 1999.

Feb.8. On this day in 1974, the last Skylab mission ended.

Feb. 11. Mercury is stationary. Last quarter moon is at 10:50 p.m. The first Japanese satellite was launched on this day in 1970.

Feb.12. The moon passes two degrees north of Saturn tonight.

Feb.15. Galileo Galilei was born on this day in 1564.

Feb.18. New moon is at 6:47 p.m.

Feb.19. Nicholas Copernicus was born on this day in 1473.

Feb.20. The moon, Mars and Venus pass very close tonight.

Feb.23. Supernova 1987 a in the Large Magellanic Cloud, a satellite galaxy of our own, exploded today in 1987.

Feb.25. First quarter moon is at 12:14 p.m.

Moon Phases

Feb 3
Full

Feb 11
Last Quarter

Feb 18
New

Feb 25
First Quarter

Moon Data

Feb 4
Jupiter 5° north
of Moon

Feb 6
Moon at apogee

Feb 12
Saturn 2° south
of Moon

Feb 17
Mercury 3° south
of Moon

Feb 19
Moon at perigee

Feb 20
Venus 2° south
of Moon

Mars 1.5° south
of Moon

Feb 21
Uranus 0.3° south
of Moon

Feb 25
Aldebaran 1° south
of Moon

Sky Object of the Month – February 2015 NGC 1501 – Planetary Nebula in Camelopardalis by Glenn Chaple

While Go-to technology has gained popularity with backyard astronomers who like to key their telescopes on a sky object with the push of a button, I prefer the no-frills star-hop mode of cosmic travel. Star-hopping lets me see enjoy celestial scenery I'd miss by traveling Go-to. I'll demonstrate my point with a star-hop to the planetary nebula NGC 1501 in Camelopardalis.

Camelopardalis isn't very kind to star-hoppers. This sprawling north circumpolar constellation contains just four stars brighter than 5th magnitude. A star-hop to any sky destination in Camelopardalis usually begins with a bright star in an adjacent constellation. To find NGC 1501, we begin at gamma (γ) Persei and trace a 12° path between a pair of 4th magnitude stars to Kemble's Cascade (refer to the finder charts below).

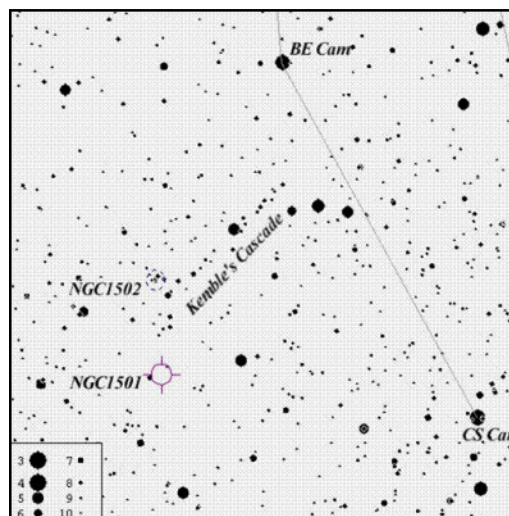
Kemble's Cascade is a stunning 2 ½° chain comprised of some 20 magnitude 7 to 9 stars. At its southwest end is the pretty open cluster NGC 1502, punctuated at the center with the eye-pleasing 7th magnitude twins that make up the double star Struve 485. A 1 ½° push south of NGC 1502 brings us to NGC 1501. Think of it – if we'd traveled to NGC 1501 via Go-to technology, we'd have missed *three* delightful celestial showpieces!

NGC 1501 is a magnitude 11.5 planetary nebula located about 5000 light-years away. Its slightly oval disk, just under an arc-minute across, can be glimpsed (barely) in a 3-inch scope, but twice that aperture will be needed for a definite sighting. With a 12-inch scope and dark-sky conditions, you should be able to make out the nebula's bluish hue and magnitude 14.5 central star.



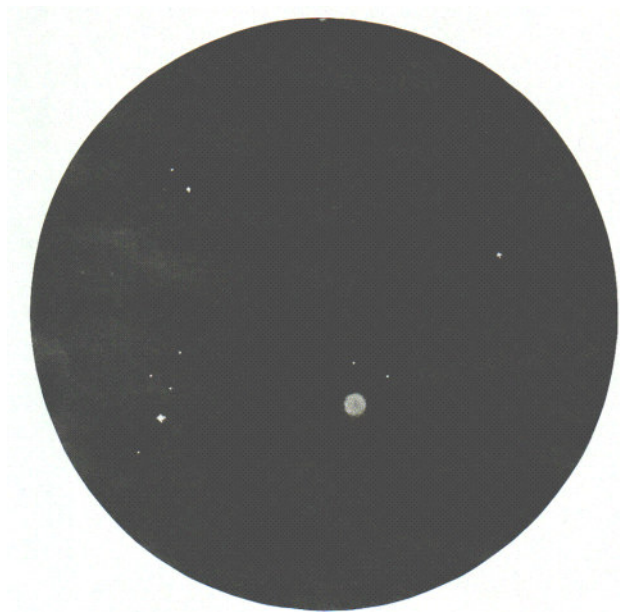
www.constellation-guide.com
(IAU and Sky and Telescope)

www.astrosurf.com

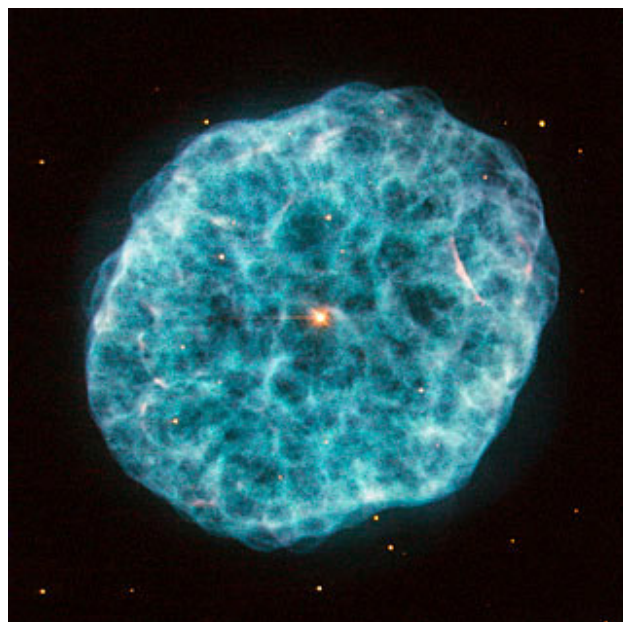


“Continued on page 4”

Sky Object of the Month “*Continued from page 3*”



**NGC 1502 (13.1-inch f/4.5 reflector at 166X)
Sketch by author**



ESA/Hubble and NASA

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

Got any News?
Skylights welcomes your Input.



Here are some suggestions:

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



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>.

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.*



Minor mergers have massive consequences for black holes

By Dr. Ethan Siegel

When you think of our sun, the nearest star to our world, you think of an isolated entity, with more than four light years separating it from its next nearest neighbor. But it wasn't always so: billions of years ago, when our sun was first created, it very likely formed in concert with thousands of other stars, when a giant molecular cloud containing perhaps a million times the mass of our solar system collapsed. While the vast majority of stars that the universe forms—some ninety-five percent—are the mass of our sun or smaller, a rare but significant fraction are ultra-massive, containing tens or even hundreds of times the mass our star contains. When these stars run out of fuel in their cores, they explode in a fantastic Type II supernova, where the star's core collapses. In the most massive cases, this forms a black hole.

Over time, many generations of stars—and hence, many black holes—form, with the majority eventually migrating towards the centers of their host galaxies and merging together. Our own galaxy, the Milky Way, houses a supermassive black hole that weighs in at about four million solar masses, while our big sister, Andromeda, has one nearly twenty times as massive. But even relatively isolated galaxies didn't simply form from the monolithic collapse of an isolated clump of matter, but by hierarchical mergers of smaller galaxies over tremendous timescales. If galaxies with large amounts of stars all have black holes at their centers, then we should be able to see some fraction of Milky Way-sized galaxies with not just one, but *multiple* supermassive black holes at their center!

It was only in the early 2000s that NASA's Chandra X-ray Observatory was able to find the first binary supermassive black hole in a galaxy, and that was in an ultra-luminous galaxy with a double core. Many other examples were discovered since, but for a decade they were all in ultra-massive, active galaxies. That all changed in 2011, with the discovery of two active, massive black holes at the center of the regular spiral

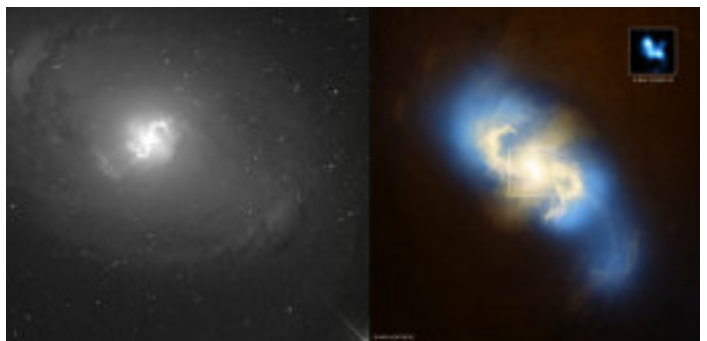
galaxy NGC 3393, a galaxy that must have undergone only minor mergers no less than a billion years ago, where the black hole pair is separated by only 490 light years! It's only in the cores of active, X-ray emitting galaxies that we can detect binary black holes like this. Examples like NGC 3393 and IC 4970 are not only confirming our picture of galaxy growth and formation, but are teaching us that supermassive relics from ancient, minor mergers might persist as standalone entities for longer than we ever thought!

Check out some cool images and artist reconstructions of black holes from Chandra:

<http://chandra.harvard.edu/photo/category/blackholes.html>

Kids can learn all about Black Holes from this cool animation at NASA's Space Place:

<http://spaceplace.nasa.gov/black-holes>.



Caption:

Images credit: NGC 3393 in the optical (L) by M. Malkan (UCLA), HST, NASA (L); NGC 3393 in the X-ray and optical (R), composite by NASA / CXC / SAO / G. Fabbiano et al. (X-ray) and NASA/STScI (optical).

Medium Universal Wheeley Bar



All parts accounted for, and the installation instructions were simple.



Each leg is adjustable in length (33 inches - 43 inches) to line up with the feet of the tripod. I opted for 5-inch diameter wheels instead of the standard 2 3/8-inch.

“Continued on page 8”



Tripod shown on Wheeley Bar with leveling bolts and knobs. The legs of the tripod are fully retracted to keep the center of gravity low.



Each tripod foot sits inside of a circular opening of the Wheeley Bar leg with the outer edge of the opening against the foot. Wheels can be locked to prevent rolling. Leveling bolts level the mount (as shown here). The large Fender Washer acts as a stop in soft ground.

“Continued on page 9”



My 10-inch LX-6 (f/6.3) Meade Schmidt-Cassegrain in its case. I forgot the weight of this unit, it's pretty heavy. The Wheeley Bar that I purchased will accept a maximum weight of 100 lbs (with tripod it's close).



The telescope very easily rolled out and then back into my garage (even while going over a 3/8-inch lip at the beginning of my garage floor). Very sturdy and a smooth roll. With the upgraded 5-inch polyurethane wheels I should have no problem rolling this onto the grass .

Club Meeting & Star Party Dates

Date	Subject	Location
Feb 6th	<p>ASNNE Club Meeting:</p> <p>6:45-7:30PM: Joan's Beginner Astronomy Class (Public walk-ins welcome).</p> <p>7:30-9:30PM: Club Meeting</p> <p><u>Meeting Agenda</u></p> <p>Guest Speaker: TBD</p> <p>Bernie Reim - What's UP Astro Shorts: (news, stories, jokes, reports, questions, observations etc.) Where's Pluto - Update on the New Horizons Mission and "Planet" status.</p>	The New School, Kennebunk, Me.
Feb 13th	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
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2015 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 _____

