Skylights

Newsletter of the Astronomical Society of Northern New England

JUNE 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 June

By Bernie Reim

The month of June is named for the Roman god Juno, who was the wife of Jupiter. It also comes from a Latin word which means the "younger ones." So let's all feel younger this June as summer begins and our part of the planet has put on a warm, verdant hue to entice us outside. This year the summer solstice happens at 6:34 p.m. on Monday, June 20. Then start looking up to become more aware of the greater context in which the earth is always moving.

There was a great chance for most of the country to gain this greater context recently on May 9. You didn't even need to stay up late at night, but you did need a telescope and a solar filter to see and appreciate this fairly rare event. I watched the event for about 5 hours, even though passing clouds hid the sun for over half of that time. The two best moments, first contact and last contact were also clouded out, but it was still a joy to watch it and share it with a few dozen other interested people. I also looked at the sun through two different telescopes with built-in hydrogen alpha filters, which allowed us to see any prominences over the limb of the sun and any dark filaments and hotter and whiter regions called plage on its surface.

Only a small percentage of people in this country or the world have been fortunate enough to even glimpse the sun much less study it for any length of time through one of these hydrogen alpha filters. I had plenty of time that Monday to do just that. It gives you a much greater sense of how we really are in direct contact with the sun at all times through the dynamic solar wind that always rushes over and around us at nearly one million miles per hour and generates cascading cosmic rays, hundreds of which pass through us every second. The sun spins on its axis every 28 days and you can see the prominences rise and fall in real time as they follow the powerful magnetic field lines of our local star. It would take about 10 minutes of continual looking to notice any change, but that gives you a much better sense of the majestic power of the sun and its size at 109 earth diameters and our distance to the nearest star.

It was all unfolding right there in front of us, only 8 minutes away at the speed of light, but it was changing imperceptibly slowly unless you recorded it and played it back faster. Mercury was flying right along at 30 miles per second, traveling its full width of 3,000 miles every minute and 40 seconds. And still we couldn't notice anything, it was almost as if we were all frozen in time, knowing full well that something spectacular and rare was happening very close to us in space, but we could simply not grasp the full impact of this amazing phenomenon.

Mercury's sharp and dark, perfectly black little circle, about 150 times smaller than the sun's huge and luminous disk, contrasted nicely with a large group of much less sharp sunspots a little above our first planet. The sunspots had a grayer area around them called the penumbra and a darker and cooler region in their center called the umbra.

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Inside This Issue

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

Gary Asperschlager
gasperschlager@gmail.com

Larry Burkett
larrybu32@yahoo.com

Star Party Co-ordinator:

TBD

Skylights Editor:

Paul Kursewicz
pkursewicz@myfairpoint.net

Website Manager:

Nan Musgrave
mzgrvz@outlook.com

NASA Night Sky Network Co-ordinator:

Joan Chamberlin
starladyjoan@yahoo.com

JPL Solar System Ambassador:
Joan Chamberlin
starladyjoan@yahoo.com

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

They always occur in pairs with a North and South Pole since they are magnetic phenomenon wrapped up with the solar chromosphere.

Staring at the sun for that long also gave me a much better sense of its great power as it really does very generously provide for all life on earth. Every single second our very average sun is turning 700 million tons of hydrogen into helium, releasing 4 million tons of pure energy. We only receive one billionth of all that energy, or about 1 kW per square meter of our surface, but that is sufficient if we can capture and store it effectively.

Carefully watching Mercury's motion across the face of the sun for all that time also made me think about what gravity really is, the force that keeps not only Mercury but also the earth and all the thousands and probably billions of other planets in our galaxy in perfect orbits around their parent stars. As Einstein proved, gravity is simply the curvature of space-time. As John Wheeler stated, mass tells space how to curve and space tells mass how to move.

A perfect example of that is the precession of the orbit of Mercury. That was a mystery for over 200 years as the best minds on Earth could not figure it out, thinking it had to be some kind of object affecting its orbit that they could never find. That's because it didn't exist. The huge mass of our sun warps the actual space through which Mercury is always moving, which exactly explains the precession of its elliptical orbit. So we were seeing the effect of the very space-time curvature of the universe itself playing out right in front of all of us!

Three bright planets now dominate our evening sky. Mars was at its best in late May and is still much brighter and larger and redder than usual. Look for some surface features and the polar icecaps through a telescope. You could even spot one or both of the Martian moons now. We are already leaving Mars farther behind in or faster orbit around the sun.

Look for the softly glowing golden orb of Saturn as it now emerges right at sunset, reaching opposition on the third of June and remain in the sky all night long. If the shadow cone of the earth were long enough, it would hit Saturn that day. However, our shadow is only about a million miles long and Saturn is nearly one billion miles away, which is a thousand times farther than our shadow reaches into space. Both Mars and Saturn can be seen fairly close to each other now, with Mars in Libra and Saturn in Scorpius near Antares, an orange supergiant star fully 700 times larger than our sun. Watch the nearly full moon pass near Mars and then Saturn on June 17th and 18th. Notice that Mars is now 6 times brighter than Saturn, which is very unusual.

Jupiter is moving in its direct, eastward motion again in the eastern part of Leo the Lion. Mercury reappears in our eastern morning sky 30 minutes before sunrise. It will only get 7 degrees high so you may need binoculars to see it. Look for the very thin waning crescent moon right next to Mercury on June 3rd, the same day that Saturn reaches opposition.

June 3. The very thin crescent moon is just below Mercury this morning half an hour before sunrise.

June 4. On this day in 2000 the Compton Gamma Ray observatory re-entered our atmosphere. It discovered many amazing things about our high energy universe including about one very powerful gamma ray burst every day for its 10 years in orbit. New moon is at 11:00 p.m. EST.

June 5. On this day in 1989 Voyager 2 flew by Neptune, transmitting live pictures of this planet. On this day in 2012 the last transit of Venus across the sun took place that most of us will ever see. The next one is not until December of 2117.

June 9. The waxing crescent moon will be near Regulus in Leo tonight and near Jupiter the next night.

June 12. First quarter moon is at 4:10 a.m.

June 16. On this day in 1963 Valentina Tereshkova became the first woman in space.

June 17-18. The moon, Mars, and Saturn will create a wide, flat triangle in our sky.

June 20. Summer starts at 6:34 p.m. This marks the longest day for us in the northern hemisphere and the shortest day and the beginning of winter in the southern hemisphere. Full moon is at 7:02 a.m. This is also called the Strawberry or Rose Moon.

June 26. On this day in 1730 Charles Messier was born. He was a French comet hunter that developed a catalog of 110 objects that many amateur astronomers can find. He also discovered about a dozen comets.

June 27. Last quarter moon is at 2:19 p.m. EDT.

June 28. George Ellery Hale was born on this day in 1868. He successfully designed the 4 largest telescopes in the world from 1898 through the Mt. Palomar 200 inch in 1948.

June 30. On this day in 1908 a comet or asteroid exploded 5 miles above Tunguska, Siberia with the force of 20 megatons of TNT, or about 1,000 times the force of the first atomic bomb. About 80 million trees were leveled over an area of 1,000 square miles and no crater was ever found. A similar event just occurred 105 years later over Chelyabinsk, not far away. This one was a chunk of rock about 65 feet across that exploded about 15 miles up and no one was killed, but it could have been much worse. An event like this happens about every 50 years.

Moon Phases

June 4
New

June 12
First Quarter

June 20
Full

June 27
Last Quarter

Moon Data

June 1
Uranus 2° north of Moon

June 3
Mercury 0.7° north of Moon

Moon at perigee

June 11
Jupiter 1.5° north of Moon

June 15
Moon at apogee

June 17
Mars 7° south of Moon

June 18
Saturn 3° south of Moon

June 25
Neptune 1.2° south of Moon

Submitted by Glenn Chaple

Las Vegas Astronomical Society
www.lvastronomy.org

Sky Object of the Month – June 2016

(Courtesy LVAS Observer's Challenge*)

Messier 5 – Globular Cluster in Serpens Caput

(Magnitude – 6.2, Dimension – 17')

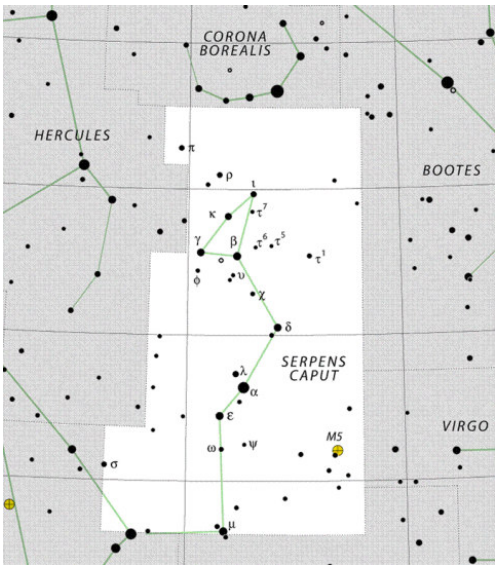
"Beautiful nebula discovered between Libra and Serpens, close to the sixth-magnitude star Flamsteed 5 Serpentis." Charles Messier (1764)

"This superb object is a noble mass, refreshing to the senses after searching for fainter objects" Admiral Smyth (1838)

"A beautiful assemblage of minute stars, 11-15 mag. Greatly compressed in the centre." T.W. Webb (c. 1859)

"Myriads of glistening points shimmering over a soft background of starry mist." Mary Proctor (1924)

These comments about Messier 5 say it all. This is one of the finest globular clusters in the northern sky, rivaling Messier 3 in Canes Venatici and M13 in Hercules. Discovered by the German astronomer Gottfried Kirch in 1702, Messier 5 is about 25,000 light years away.



www.constellation-guide.com

Mario Motta M.D.

***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) or Fred Rayworth (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 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



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!

NOAA's Joint Polar Satellite System (JPSS) to revolutionize Earth-watching

By Ethan Siegel

If you want to collect data with a variety of instruments over an entire planet as quickly as possible, there are two trade-offs you have to consider: how far away you are from the world in question, and what orientation and direction you choose to orbit it. For a single satellite, the best of all worlds comes from a low-Earth polar orbit, which does all of the following:

• orbits the Earth very quickly: once every 101 minutes,

• is close enough at 824 km high to take incredibly high-resolution imagery,

• has five separate instruments each probing various weather and climate phenomena,

• and is capable of obtaining full-planet coverage every 12 hours.

The type of data this new satellite – the Joint Polar Satellite System-1 (JPSS-1) -- will take will be essential to extreme weather prediction and in early warning systems, which could have severely mitigated the impact of natural disasters like Hurricane Katrina. Each of the five instruments on board are fundamentally different and complementary to one another. They are:

1. The Cross-track Infrared Sounder (CrIS), which will measure the 3D structure of the atmosphere, water vapor and temperature in over 1,000 infrared spectral channels. This instrument is vital for weather forecasting up to seven days in advance of major weather events.

2. The Advanced Technology Microwave Sounder (ATMS), which assists CrIS by adding 22 microwave channels to improve temperature and moisture readings down to 1 Kelvin accuracy for tropospheric layers.

3. The Visible Infrared Imaging Radiometer Suite (VIIRS) instrument, which takes visible and infrared pictures at a resolution of just 400 meters (1312 feet), enables us to track not just weather patterns but fires, sea temperatures, nighttime light pollution as well as ocean-color observations.

4. The Ozone Mapping and Profiler Suite (OMPS), which measures how the ozone concentration varies with altitude and in time over every location on Earth's surface. This instrument is a vital tool for understanding how effectively ultraviolet light penetrates the atmosphere.

5. Finally, the Clouds and the Earth's Radiant System (CERES) will help understand the effect of clouds on Earth's energy balance, presently one of the largest sources of uncertainty in climate modeling.

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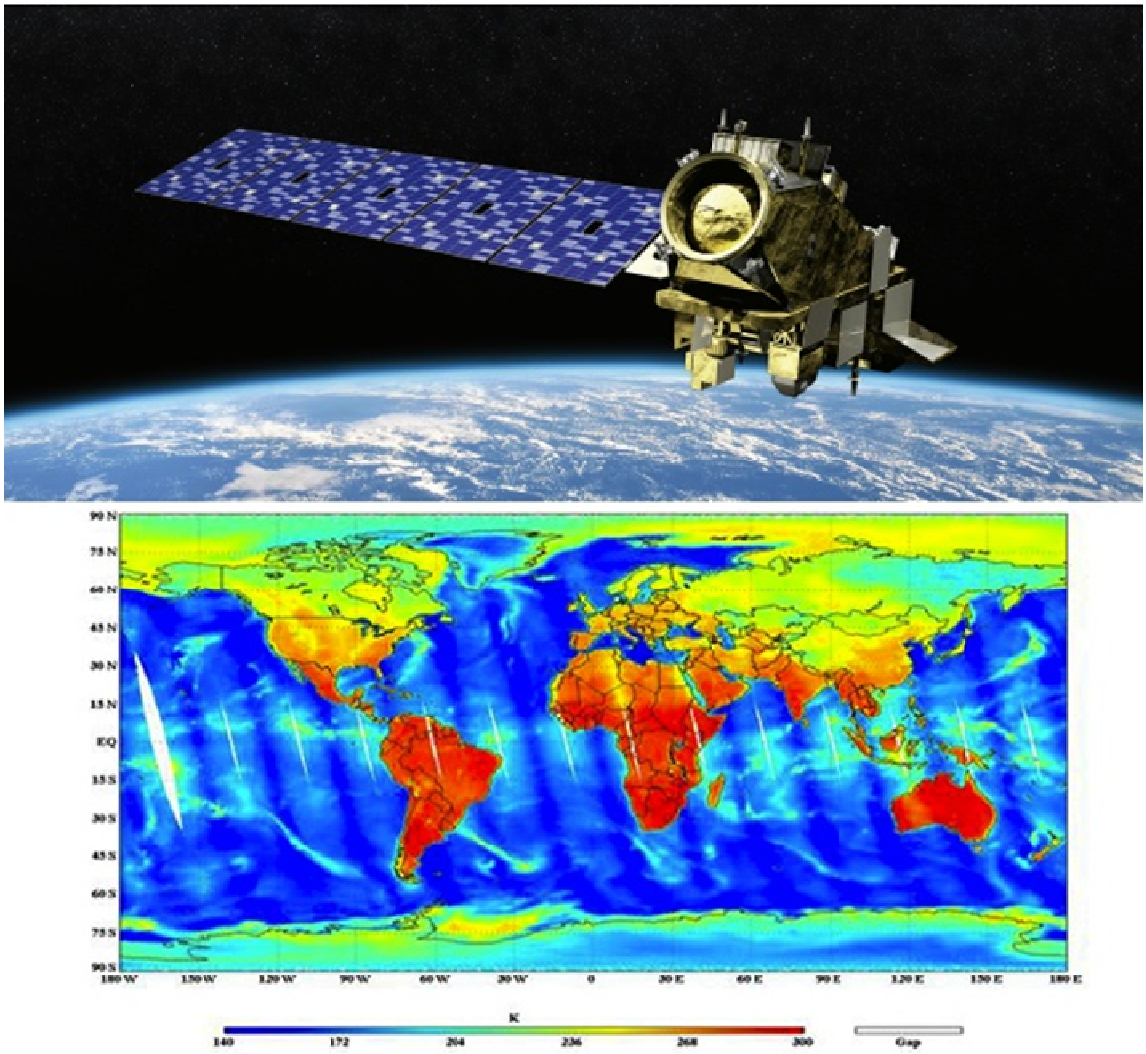
The JPSS-1 satellite is a sophisticated weather monitoring tool, and paves the way for its' sister satellites JPSS-2, 3 and 4. It promises to not only provide early and detailed warnings for disasters like hurricanes, volcanoes and storms, but for longer-term effects like droughts and climate changes. Emergency responders, airline pilots, cargo ships, farmers and coastal residents all rely on NOAA and the National Weather Service for informative short-and-long-term data. The JPSS constellation of satellites will extend and enhance our monitoring capabilities far into the future.



Images credit: an artist's concept of the JPSS-2 Satellite for NOAA and NASA by Orbital ATK (top); complete temperature map of the world from NOAA's National Weather Service (bottom).

Making a solar filter adapter for the Canon PowerShot SX50 HS

Submitted by Paul Kursewicz

Solar adapter attached to camera.

Had all materials at home so it did not cost me anything.

Construction

1. Took the lid off the “Sunsweet Ones” container and cut the plastic back 2 inches from the top. 2. Took the lid off the “Maxwell House” container and cut the plastic back 3 1/2 inches from the top. 3. Inserted the top of the “Maxwell House” container into the top part of the “Sunsweet Ones” container, which made a good tight press-fit. Then used black spray paint for the insides and on the outside of the “ Sunsweet Ones” container. 4. Took painters tape and put several layers around the outer edge of the “Maxwell House” container. Did the same to the inner edge of the “ Sunsweet Ones” container. This provided a snug fit onto my camera housing and a snug fit for my solar filter (see fig. A). 5. Had some left over door weather stripping. Cut the width and length to suit and inserted it into my glass solar filter (see fig. B). Figure C shows the finished product.

Fig. A

Fig. B

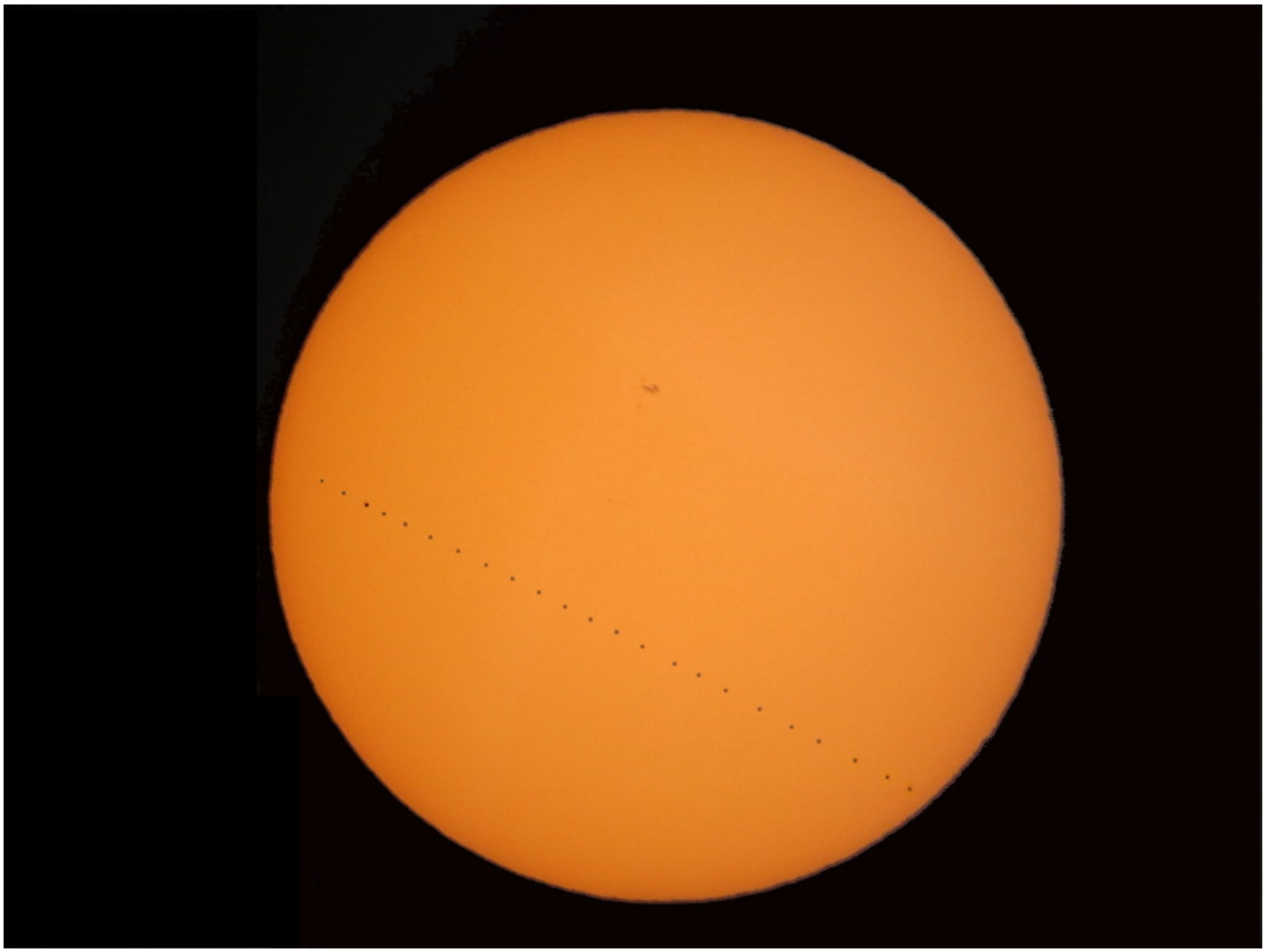
Fig. C

Mercury's Rare Transit at Starfield Observatory

Submitted by Paul Kursewicz



My set-up. A 10-inch Meade with a solar filter attached to the objective for viewing the Transit. Also viewed through the finder scope. Piggy backed my camera with its homemade solar filter adapter to the telescope. Stayed for the entire Transit. Took a total of 423 photos, and video recorded the last 6 minutes. I also took images (approximately) every 15 minutes and then brought them into Photoshop and made a composite showing Mercury's Transit across the disk of the Sun (see image below).



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Other attendees at Starfield Observatory










Club Meeting & Star Party Dates		
Date	Subject	Location
June 3	**ASNNE Club Meeting:** **7:30-9:30PM:** Club Meeting **Meeting Agenda** **Guest Speaker / Topic: TBD** Bernie Reim - What's UP Astro Shorts: (news, stories, jokes, reports, questions, observations etc.) Where's Pluto - Update on the New Horizons Mission status and later post-encounter (April-December 2016)	The New School, Kennebunk, Me.
June 10	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 Kennebunck [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 [Alewive 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_____