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## *President's Message*



As we enter the final two months of 2013, I am starting to think about the accomplishments that we have had as a team this year; both in terms of out-reach and in-reach.

We will celebrate these and recognize individuals for their outstanding contribution during our annual pot-luck celebration to be held on December 20<sup>th</sup>, 2013 at MSDC. I am asking members who wish to recognize others to please send me a private mail describing the person, their contribution, and reasons for recognition. The meeting portion will be very short and will cover only the minimal activities we need to conduct as an organization.

At the November meeting to be held on November 15<sup>th</sup> at St. Anselm College, John Blackwell will be our evening speaker and we are sure to be in for a treat. John is the Science Department Chair at Exeter Academy and an NHAS member. I am looking forward to hearing John's presentation. This meeting also begins the nomination process for club elections to be held at the December meeting. This is your chance to run for office or nominate someone who you believe can effectively serve, so please start thinking about this. Our secretary will send out details before the meeting about the nomination process and procedure.

I held the Q4 officer/board meeting on October 26<sup>th</sup> with a very healthy discussion and debate focused on

overload, burn-out, and member contribution. As mentioned during the October meeting, we discussed various activities, the level of effort, and the resources required to accomplish those goals. There were dozens of activities that NHAS performs on a weekly, monthly, and annual basis and we attempted to prioritize them.

We agreed that we have to get a handle on what we effectively can accomplish while maintaining balance in our membership. It is analogous to a company that grows too fast while not accounting for scalability. What we all agreed on unanimously is that our messaging to the membership is wrong when it comes to contribution, and we plan to take specific action to improve our messaging.

A key part of this is the perception that you have to be perceived as an expert to contribute. Nothing is further from the truth and it is ultimately my responsibility to eliminate that perception. Expect this to be my prime area of concentration for the remainder of this year and into 2014.

In summary, I am proud of the work we have done this year and I continue to be grateful to all in allowing me to lead this wonderful organization.

Clear Skies,

**Rich DeMidio**  
*NHAS President*

### *Winnacunnet High School, North Hampton NH, October 1*



The event took place under very clear skies with steady seeing. Paul Winalski gave the indoor presentation to about 30 members of the High School's Astronomy Club. Gardner Gerry and Ramaswamy set up scopes for the sky watch proper. We got to see Saturn and Venus at twilight, then the usual fall early evening suspects – I set up the 14" TScope and showed Mizar, 61 Cygni, Gamma Delphini, WZ Cassiopeiae, M57, M11, NGC 457, M13, the Coathanger, V Aquilae, and the Veil Nebula (!).

- *Paul Winalski*

After Venus and Saturn, I moved on to M13, Alberio, Mizar and the Dragonfly cluster -- one student promptly identified it as the Owl Cluster, NGC 457! Most of the talk was about stellar distances and surface temperatures. I capped off the evening by star-hopping to Neptune, via Enif and alpha Aquarii. 6 students and a teacher got a look.

- *Ramaswamy*

### *Goffstown High School, Goffstown NH, October 2, 2013*

The event took place under clear but somewhat damp and hazy skies. About 20 students and two teachers were present. NHAS members participating: Gardner Gerry, John Pappas, Ramaswamy, Steve Rand, Rich Schueller, Paul Winalski.

Among the objects observed in Mr. T: the 14" TScope: M17, M16, M13, M92, M15, M11, V Aquilae, T Lyrae, Epsilon Lyrae, 61 Cygni, Gamma Arietis, Gamma Delphini.

- *Paul Winalski*

With all the planets missing in action, I showed M22 and M13, and the usual cadre of double stars. With a GLP I traced the track of the NCP over the 25,800 year cycle of the Equinox precession to Reed Prior (a teacher) and others. The lights in the parking lot were turned off for the skywatch, but Mike Veilleux, the astronomy and science teacher for grades 9-12, suggested that darker but restricted views could be had from the back of the parking lot. Next time!

- *Ramaswamy*

### *Concord High School, Concord NH, October 8, 2013*

The event was held under clear skies and a bit of haze – pretty good conditions for being in a city. NHAS members participating: John Bishop, Herb Bubert, Rich DeMidio, Gardner Gerry, John Pappas, Ramaswamy, Steve Rand, Ed Ting and Bob Veilleux. I didn't have a good sense of the crowd size; lines seemed to be short. I did speak to several of the Concord High teachers, some of whom I'd met already at the daytime solar observing session last month. Objects I showed in the TScope: Polaris, Gamma Arietis, Gamma Delphini, WZ Cassiopeiae, 61 Cygni, V Aquilae, TX Piscium, M31/32, NGC 457, Perseus Double Cluster, M13, M92, and M57.

- *Paul Winalski*

There were 10 scopes lined up and Steve and I were at one end. John Bishop did an introductory talk on

the visible stars and constellations. I showed Alberio, Mizar and Almach (at 185x, it was really nice), also M31 (with Steve getting a larger view in his 10" Dob), and did some GLP tours. I located Uranus via star-hops starting at Algenib, which the remaining students and 3-4 teachers had a good look at. John Bishop then showed a larger disc of Uranus in his reflector (the platform tracking also helped). Everyone noted a kite formation, with the planet at the apex. Uranus is in retrograde motion at present, and in 2 weeks the kite will become a T in the sky. I also sketched the FOV for reference.

- *Ramaswamy*

### *Rundlett Middle School, Concord NH, October 10, 2013*



Ed Ting gave the indoor classroom presentations, but the sky watch had to be cancelled due to overcast skies. Ed has done this event each year for the past ten years and this year interest was so high that they put him in the gym, with the 120+ kids seated on the basketball court.

- *Paul Winalski, Ed Ting*

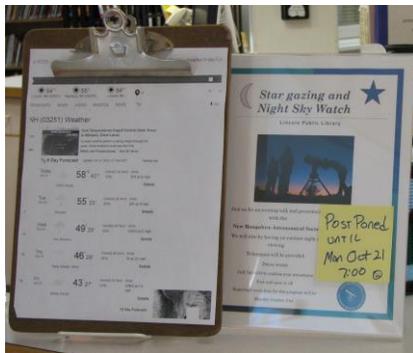
### *Reeds Ferry School, Merrimack NH, October 14, 2013*

The weather looked iffy for Monday evening, but even worse for Tuesday, so we held the event on Monday. Sky conditions started out partly cloudy, turning mostly cloudy and then overcast. The only objects

visible were the Moon and, earlier on, brilliant Venus. The crowd was very large, as usual -- close to 200 students, parents, and siblings, all of whom were delighted at the lunar views. All scopes were continuously busy and the NHAS participants included: John Bishop, Joe Derek, Rags Gilmore, Dennis Hobbs, John Pappas, Ramaswamy, Steve Rand and Rick Schueller (who enjoyed a ride down a slide when no one was watching, or so he thought!)

- Paul Winalski, Ramaswamy

### *Lincoln Public Library, Lincoln NH, October 21, 2013*



This event was held on the back-up date of October 21. The predicted weather was for partly cloudy skies, but since we'd postponed this one already, I decided to go for it. Unfortunately, the sky watch portion got completely clouded out (only Vega was visible for 5 minutes).

Instead I gave an extended indoor presentation, including the time-lapse movies from my "Fun with the Sun" presentation. Ramaswamy had earlier worked on their yet-to-be-circulated Library Telescope and I showed the assembled patrons how to use it. Thanks to Gardner Gerry for driving 90+ miles to attend.

- Paul Winalski

### *Epping Middle School, Epping NH, October 24, 2013*

This event took place under very clear and steady skies on the backup date. NHAS members participating: Paul Winalski, Ted Blank, Gardner Gerry, Ramaswamy, & Steve Rand. New member Elaine Grantham-Buckley was also present. There were 80+ students and parents. The only downside was that the parking lot lights were on. We set up in the darkest corner, but it still interfered with the viewing. They will try to turn the lights off for us next year.

Steve Rand did the presentation. I showed: M31/M32, T Lyrae, V Aquilae, M57, M13, 61 Cygni, and Gamma Delphini. Ramaswamy showed Alberio, Mizar, NGC 457, M13 and the Pleiades. Ted Blank showed the double cluster, M57, M31 and Mizar. Gardner began with Alberio, and then moved on to M31, NGC 457, double cluster and the Pleiades.

- Paul Winalski (and others)

*Thank you SOOOOO much for a wonderful sky watch! The kids wrote about it in their science journals today and expressed that they really enjoyed both the presentation and the telescope use. They all described what they saw and most remembered the names. It was a wonderful experience for them. Also, many of the teachers and parents who attended had never looked through a telescope and also expressed their gratitude and sense of wonder. I'll tally up the proceeds from our refreshment stand and have the office cut a check to the NHAS. Thank you!*

- Lindsey Hansen and the Epping Middle School

### *Daniel Webster College, Nashua NH, October 29, 2013*

Due to ambiguity in directions to the scopes setup location, NHAS folks ended up in 2 separate areas of the sports field, screened from each other by trees. The 2 groups, in effect, held a Double Sky watch.

Steve Rand began the evening with an indoor presentation for about 15 students. Then a couple of students followed him to the baseball field, where Ted Blank, Joe Derek, Gardner Gerry, Elaine Grantham-Buckley and Paul Winalski had setup (and where the event had been held last year). The rest apparently went to the soccer field, where John Bishop, Larry LaForge and John Pappas showed them the skies for about an hour. Everyone agreed later on that it had been a strange night, and also a very cold one.

- Ted Blank, J. Bishop, S. Rand

### *Salem High School, Salem NH, October 30, 2013*

The skywatch at Salem High came off well in spite of some high clouds and fog for the first hour or so. The indoor talk was given by Salem HS teacher and NHAS member Gary Duranko. During his talk the scopes were set up by John Pappas, Paul Winalski and Ted Blank.

About 80 students cycled back and forth between the scopes and a pair of binoculars Ted set up on a tripod and left pointed at Andromeda. The students were very interested and attentive at the scopes, which were set up in the courtyard behind the school library. They sent us home with cookies and other goodies.

- Ted Blank

### Who is teaching whom at Reeds Ferry School

With less than perfect skies at the Reeds Ferry Sky Watch, there was a lot of conversation among club members after the kids had gone. I heard a fellow astronomer say that “there are more statistics in astronomy than in baseball.” I suppose that’s very true; and I’m glad, because with that thought, I have no problem in accepting that it is possible for one to be right up to date with smallest details in one area of our subject and yet be completely unaware of a basic development in another area.

I found this principle staring me in the face half-way through the Sky Watch. I overheard that each student had done an astronomy project and the Sky Watch was the culminating activity. So I asked the next student that came by if she had done a project.

“Yes,” she said, “on Jupiter.”

“Great,” I said, “What did you learn?”

“Four of its moons were discovered by Galileo and it has a lot of storms going on,” she said.

“Do you know about the Great Red Spot?” I asked.

“Yes,” she said.

It was at this point that I decided I would give her a little information I thought she might not know.

“Did you know that over the years the Red Spot has been getting lighter? It is more of a Great Pink Spot now.” “I know,” she said, and then told me something I didn’t know. “And it’s getting smaller too!” “Are you sure?” I asked, “How do you know that?” “I read it on the NASA website,” she said.

Now, I can remember when in Junior High (I think), my father told me it was important to let my teachers know I was interested in their subject.

“How do I do that?” I asked, “other than paying attention in class?”

He said, “Tell them something about their subject they didn’t know you knew. Even better, you’ll impress them more if you can tell them something about their subject that they didn’t even know!”

So I guess I would like to say to the little blonde fourth or fifth grader who came to look through my telescope, and who did her project on Jupiter: “Good job, I’m impressed!”

- Steve Rand

### The Best Question at Rundlett Middle School

I did my annual talk for Rundlett Middle School in Concord. I’ve done this each year for the past ten years - how time flies! This year interest was so



high they put me in the gym. 120+ kids sat on the basketball court. Unfortunately, forecast clouds and rain postponed the evening event.

The best question from a student (looking at a photo of the Orion Nebula): “Is that a cupcake?”

- Ed Ting (M42 image from 1985, the lucky 13th)

### No Flash Photography at a Sky Watch, PLEASE!



Oh... never mind!

(Photo: Steve Rand)

This was to have been a Society Activities write-up about a liaison story, held over from last month. Then Dwight Lanpher posted an account on NHAS Chat, including a snapshot that spoke a thousand words. Well, perhaps not that many, but I contacted Larry Lopez and Joe Derek to get more words. And that settled the matter. Matt Marulla's Milky Way image has already been published last month, so here's the rest of the story. It is not a case of *Rashomon* since the three accounts do not differ, and comparing it to the *Rosetta Stone* is a bit of a stretch. Still, *The Last Take* is a treasure; it would have been a crime not to present it. So without further ado, here's **Acadia Night Party, 2013**.  
-Editor



The 40-Telescope Panorama: A view of the 70+ volunteers getting orientation from a Park Ranger (center), who might consider himself the conductor of this concert, but Larry is the concert-master, with Linda standing next to him (follow the NHAS blue). Joe and Bonnie Derek are a bit behind the white Toyota to the left. Joe's trademark telescope is pointing away from the assembly in the background to the far left. Trying to spot Matt Marulla would be futile; he gave this a miss. (Photo: Dwight Lanpher)

### ***New England Astronomy Clubs support Acadia Night Sky Festival***

**Mt. Desert Island** – Starting with an extraordinary presentation by Dr. Alex Filippenko and ending with the Monday morning sunrise, the fifth annual Acadia Night Sky Festival has officially closed. Blessed with three days of perfect weather, all three night sky and both solar observing events were held with enthusiastic attendance of visitors over the three days of viewing. But the behind the scenes story is the overwhelming support of amateur astronomers from all over New England.

The Cadillac Mountain Star Party, the centerpiece of the festival, had a record 40 telescopes and three binocular stations showing a myriad of star clusters, nebulae and galaxies to the approximately 1000 visitors to the mountain. These telescopes were manned by astronomers from 9 New England clubs including the Acadia Astronomical Society, Astronomical Society of Northern New England, Central Maine Astronomical Society, Downeast Amateur Astronomers, Gloucester (MA) Area Astronomy Club, *New Hampshire Astronomical Society*, Penobscot Valley Star Gazers, Southern Maine Astronomers and the Westport (CT) Astronomical Society.

This was the largest gathering in Maine of amateur astronomers with their telescopes, who were easily convinced to attend because of very dark skies of Acadia. While Cadillac Mountain may have been the largest site, nearly twenty telescopes and two to three hundred observers gathered at Seawall for the opening Friday Night Star Party viewing under some of the darkest skies of the event.

The solar viewing at Sieur de Monts Saturday morning attracted a record 10 solar telescopes, including exotic Calcium-K, and Hydrogen-Alpha as well as white-light filtered scopes and a spectroscope for observing the elements in the sun. Budd Miller, of the Astronomical Society of Northern New England, called the festival "extraordinary and magical."

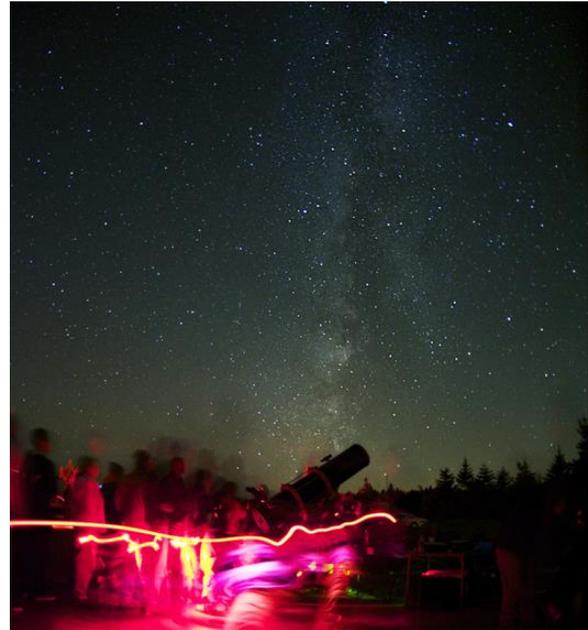
We'll not get better weather than we had this year, but one hopes that even more amateur astronomers and observers will visit the starlit skies of Acadia in 2014.

The 6th annual Acadia Night Sky Festival dates have already been set for September 25 to 29, 2014. We hope to see even more amateurs and telescopes next year.

I would like to thank NHAS members Joe and Bonnie Derek, Mathew Marulla, and Linda and Larry Lopez for their assistance supporting this year's Acadia Night Sky Festival.

I made a head count from my panoramic photo of the observing field on Cadillac – a record 70 people in attendance for the astronomer volunteer briefing. The park officially had a count of over 900 people on buses and nearly 100 more with limited mobility that were allowed to come up in their cars. The buses were still the limiting factor and needs to be expanded next year.

- *Dwight Lanpher*



*Acadia Night Sky*

*(Photo: John Stetson, SMA)*



*An Object of Considerable Attention* *(Photo: Bonnie Derek)*

### *Take 2 On Acadia Night Party*

Decisions, decisions... which telescope to bring? I finally decided on the 12-1/2" equatorial mount because it is motorized and I wouldn't have to keep making major adjustments when viewing a single object in the night sky, with people waiting for a peek.

Bonnie and I arrived in Bar Harbor mid-afternoon on the Friday of the festival (9/27). The organizing committee had found us a room at Aysgarth Station in downtown Bar Harbor. The accommodations were comfortable and the innkeepers pleasant. We grabbed a bite to eat and headed to Seawall in Southwest Harbor where we met up with Matt Marulla and Melissa who were already

setting up. There were 10 to 15 volunteer telescopes already set up. The sun set and we showed off a clear night sky to 200 to 300 people.

Saturday arrived and we all met up again at Sieur de Monts Spring Nature Center for a solar viewing event. Larry and Linda Lopez, Matt Marulla and Melissa were among the many other volunteers there. Since I wasn't set up for solar viewing, I set up my binocular stand to do a little daytime lunar observing.

After an early supper we headed up Cadillac Mountain where the Saturday night main (Maine) event was to be held. Matt and Melissa had headed home but NHAS was represented by the other four. By the time the road was closed off to the public, 40 telescopes were set up for viewing.

As the sky turned dark, the buses from the visitor center below the mountain began showing up. There were twelve buses running continually throughout the evening bringing spectators up the mountain to look through our scopes at the spectacular night sky. The stars stood out like diamonds. The Milky Way poured out of Sagittarius. Light pollution was minimal. The organizers estimated over 1000 guests showed up for a view of the heavens.

The Dereks and the Lopezes decided to spend Sunday sightseeing around Bar Harbor on the Park Loop Road before heading home. It was a worthwhile venture and we were happy to have been part of it.

- *Joe Derek*

### *The Last Take*

We drove the Lincoln Town car directly from work on Friday, September 27, and arrived late at a typical Maine Cottage. It was wonderful.

We packed 3 telescopes, a Lunt H alpha (NEAF special), Vernonscope 80mm F/6 triplet APO (astromart) with solar filter, and a TV102 (né Todd Gross, Chase McNiss, Ed Ting, and Gardner).

We did solar viewing on Saturday with the Lunt & Vernonscope. We noticed we kept having a fresh supply of people -- those clever rangers put us at a bus stop. That worked well.

Things went swimmingly. The Lunt worked wonderfully. Matt Marulla had his FJ Cruiser. Drool. We were burned. From the sun. And Dehydrated. Time for Lunch.

For the evening observing (3 hours) we were asked to select objects beforehand. Later pairs of people were assigned the same object and asked to co-locate. Buses were going to drop people off. I thought this was crazy but it all worked out spectacularly. Those rangers knew a thing or three.

The buses were on an outer crescent of the road and their lights always pointed out. It also gave us fresh sets of people.



*Larry under the dome, Linda dealing with incredulity (Photos: D. Lanpher)*

Linda got M15 and the TV102, and I got Albireo & the Vernonscope. This was absolutely dandy. I learned a lot about Albireo.

My partner had an AP 130mm Gran Turismo but as he was an avid astro-photographer he had no 2" star diagonal, so I loaned him one of the three I had brought. What luck.

After a while Albireo stopped splitting. This was embarrassing. My partner's occasional laser flashes assured me I was at the correct place. Finally the air became stable and Albireo got quite a bit better. That companion is a faintest fluorescent blue you can imagine. I've never seen it so clear. The conditions were spectacular.

In the morning I was ready to leave but I was told that I had to walk around a lake to get breakfast. My 13 pound French poodle dragged and pushed me for 4 miles. Okay, Linda's French poodle. It was a good hike.

Bonnie and Joe were leading the way. Then we went to the shore where Joe tempted fate on the rocks. Bonnie assisted Linda (thanks Bonnie) and I reminisced about climbing up and down the extension runway at La Guardia Airport (big boulders) 50 years ago as I was getting farther and farther out on the rocks.

Almost up to Joe. I think I might have been a bit lighter and quicker on my feet back then. But I'm not sure.

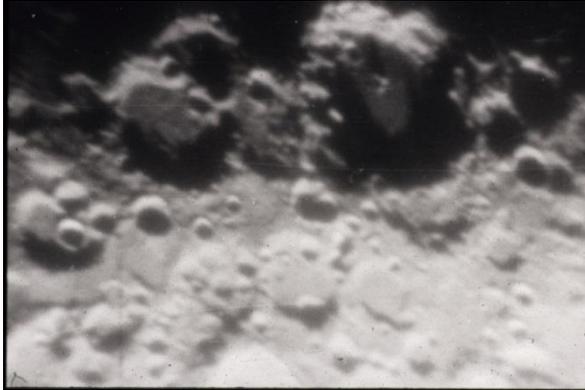
Needless to say we were walking slowly on Monday. For some reason, Joe was wondering if we had over-extended us. We assured him. Yes we had. We had had a great time.

Those rangers at Acadia Park were a treasure.

- *Larry and Linda Lopez*

## A Lunar Look Back

Ed Ting's presentation at the October Business meeting ("Kepler's Kafeteria") included a lunar photograph he had taken years ago, a photograph whose craters he had never been able to identify.



"Well," I thought, "here's a challenge!" After all, how hard could it be? I have a National Geographic (NG) lunar map from the 60's at home, I'll ask Ed to send me the photo, and we'll have the answer in no time. I spent about an hour bouncing back and forth between the NG map, maps on line, and the MoonMapPro app on my phone.

I started with the three equilateral craters (to the extreme left) that looked like a pair of eyes and a nose, with a slightly larger one nearby that could be a mouth. I came up with a few candidates, but could make nothing work. As I sat back in frustration, I picked up a pamphlet I'd snagged at the first NEFAF event. It was a supplement to *Astronomy* magazine called Your Guide to the Moon by Bob Burnham. There, on the next to the last page, I thought I spotted the triplet and the mouth crater.

Concern set in however, when I couldn't make the surrounding craters fit Ed's photo ... until it dawned on me that it was probably a reverse image of what I was seeing in my references. Getting back to my MoonMapPro, I clicked on "mirror" and there it was ... just as Ed had imaged it so many years ago.



Left: The original image, rotated and flipped, with the crater pattern at the top. Above: Lunar map of the region, with the marker craters near the center, and the 'mouth' to the left of the 'S' of the Surveyor 7 landing.

As it turns out, the eyes (Heinsius A&B), nose (Heinsius C), and mouth (Wilhelm D) craters sit in the southwest quadrant of the moon, between Wilhelm and Tycho.

Thanks Ed, it was fun!

- Steve Rand, Photo Interpreter, CIA (Crater Identification Agency)

## *Eclipses and Other Events*

As the Full Moon rose on the evening of Oct. 18<sup>th</sup>, a 4 hour long Penumbral Lunar eclipse got underway.

But as Penumbral Lunar eclipses go, it was perhaps visually distinctive for about half an hour (midway), and easy to miss. Two weeks later at the next New Moon, an Annular Solar eclipse began over the mid-Atlantic ocean, became Total and swept across equatorial Africa. But until Tom Cocchiario's post on the subject, I did not realize that portion of a Partial eclipse would be visible from New England. Starting with about half the Sun's disk obscured by the Moon at sunrise, the eclipse was visible for half an hour.

Surprises are often just around the corner in Astronomy!

### *Eclipses*

Lunar and Solar eclipses *always* occur in pairs, at adjoining Full and New Moons. Which one happens first is determined by orbital circumstances, and places on Earth from which the two events are visible can vary widely, as does the type (one or both can end up as a Partial eclipse, most of the time).

There are 3 or 4 instances each decade when eclipses happen as a trio. Two Lunar eclipses will book-end a Solar eclipse, or 2 Solar eclipses will occur on either side of a Lunar eclipse. In such cases, the middle one is always "complete" – it is either an Annular or Total Solar eclipse, or it is a Total Lunar eclipse.

The last such sequence occurred this year, when the Annular Solar eclipse of May 10<sup>th</sup> followed an Umbral Lunar eclipse on April 25<sup>th</sup>, and was itself followed by a Penumbral Lunar eclipse on May 25<sup>th</sup>. I managed to observe the first one from Sydney the day I landed in Australia, and then the Annular eclipse 2 weeks later from the Red Centre ([read a report in the member forum](#)). The 2<sup>nd</sup> Lunar eclipse was so shallow (0.0156 mag.) that it was best ignored. The next triplet will occur in July-August 2018.

Incidentally, the next four Lunar eclipses will all be Total, occurring about 6 months apart, on April 15, 2014 (early morning), October 8, 2014 (moonset), April 4, 2015 and September 27, 2015 (late evening on a Sunday). The first one is followed by an Annular Solar eclipse on April 29, 2014, but you'll have to travel to Antarctica to observe it! We can't see the 3<sup>rd</sup> one from here, but it follows the Total Solar eclipse of March 20, 2015 (more than 2 minutes long, visible from the north Atlantic above 55° latitude).

The term "Solar Eclipse" is a misnomer (*see box*), but Lunar eclipse and eclipses of the Galilean moons are correctly termed. A complete set of the latter could be observed during the first week of November, with Io eclipsed by Jupiter the night of November 2-3, Europa and Ganymede taking their turn the next night, and finally Callisto blinking off and then on (170 minutes later) during the night of November 5-6.

The next Total Solar eclipse (of about 2½ minutes) visible from the US will be on August 21, 2017, with the track running from Oregon to South Carolina. The 3½ -minute Total eclipse of April 8, 2024 can be viewed from north Vermont and the top-end of New Hampshire, and will have a distinct sub-plot: the other 7 planets will be arrayed along a 70° arc of the ecliptic on either side of the Sun and the Moon.

Every Total or Annular Solar eclipse is a Partial one outside the center track, as was the case on Nov 3<sup>rd</sup>. But in about 600 million years, there will be no Total Solar eclipses seen from Earth. The Moon will have moved too far away, and its smaller apparent size will be capable of generating only Annular eclipses.

## Transits

The pair of transits of Venus across the Sun for the 21<sup>st</sup> century is history now, with both events incomplete for observers in New England. But the next planetary transit will be different – the transit of Mercury on May 9, 2016, will be seen in its entirety from this area starting just after 7am, weather permitting of course!



*Transit of Venus, June 6, 2012, from Narrandera, NSW*

Depending on how one marks the start of a cycle, the current pattern of four Transits of Venus in a 243-year cycle has been in effect since 1518 or 1631 (the transit Kepler predicted, along with a near-miss in 1639; Horrocks corrected the latter prediction and observed that transit, a first observation!), and will end in the year 2846. Before the 17<sup>th</sup> century there were three transits per cycle. There have been transits 121.5 years apart before the 6<sup>th</sup> Century, which represent the believed minimum of 2 per cycle. After 2846 AD, three transits will occur in a cycle of events that are 105.5, 129.5 and 8 years apart.

Transits of Galilean moons across Jupiter's disk are not easy to observe, but shadow transits are easier. October threw up multiple double shadow transits for North American observers, involving Io and Europa.

The night of October 11-12 featured a rare triple shadow transit, with Callisto leading Europa and Io across, three black dots crossing the Jovian disk one after the other. Unfortunately, seeing was rather bad that night all across New England, and no worthwhile images were realized (to my knowledge). Information about upcoming Galilean moon transits and shadow transits is readily available at the [Astronomy Live website](#).

## The Terms

A **Transit** is when, from the observer's viewpoint, a smaller object passes in front of a larger object (smaller and larger being apparent sizes). Examples: the transit of Venus across the Sun (in June 2004 and June 2012) and the transits of Jupiter's Galilean moons across the Jovian disk.

An **Occultation** is when, from the observer's viewpoint, a larger object passes in front of, and therefore hides (occults) a smaller object (again, smaller and larger being apparent sizes). An example is occultation of various stars of the Pleiades by the Moon, which happens quite a lot. Jupiter also occults its Galilean moons quite frequently.

An **Eclipse** is when, from the observer's viewpoint, the solar shadow cast by an object blocks the illumination of another object. Jupiter eclipses its Galilean moons quite often. The Earth casts its shadow on our Moon from time to time, causing Lunar eclipses. The International Space Station (ISS) frequently disappears into the Earth's shadow; it is then being eclipsed by the Earth.

The term "Solar Eclipse" is technically a misnomer. When the Moon blocks view of the Sun from the perspective of a point on the Earth, this is an occultation of the Sun by the Moon. Strictly speaking, since the Sun is the illuminating body that is casting the shadows, it is impossible to eclipse the Sun. But lunar occultations, partial occultations, and transits of the Sun are called (respectively) Total, Partial and Annular "Solar Eclipses."

- **Paul Winalski**

## Occultations

In decreasing order of apparent size, we may also observe celestial bodies being hidden from our view by the Moon, a planet, or an asteroid (dwarf planet). Sometimes planetary rings also get into the act – during the occultation of the star SAO 158687 by Uranus in 1977, being used to study the atmosphere of Uranus, evidence for five rings around Uranus was uncovered.

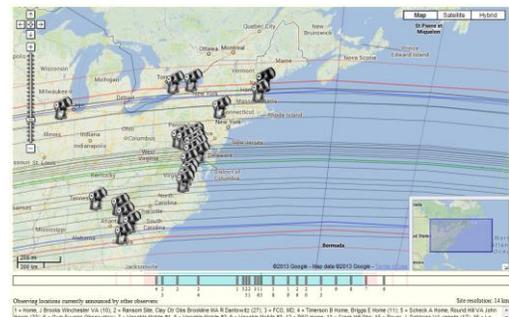
Total Lunar occultations of stars are frequent, with stars within 6.5 degrees of the ecliptic the usual candidates. Early radio astronomers used occultation of radio sources by the Moon to determine their exact positions. The unambiguous co-identification of the radio source 3C 273 with the optical quasar was possible only after its lunar occultation was observed on August 5, 1962 with the Parkes Radio Telescope in Australia. The coordinates computed by Cyril Hazard of Sydney University and John Bolton of CSIRO were then used by Maarten Schmidt (in California) to image an extremely red-shifted object using the 200' Hale telescope at Mt. Palomar. (The Parkes facility also brought mankind the live pictures of Neil Armstrong's first step on the Moon 7 years later, and played a big part in the Apollo 13 saga).

Since the Moon has no atmosphere, a star occulted by the Moon will typically show an instantaneous disappearance at the Moon's leading (dark) edge or reappearance at the trailing (dark) edge. However, video analysis of the D or R events may show steps in light intensity which exposes the star as a double. Visual sighting was sufficient to discover the companion of Antares during an occultation in 1819 – it is usually washed out by the ruddy brilliance of the giant primary star. For occultations where the star passes close to the Moon's north or south poles, an observer may see the star intermittently disappearing and reappearing behind lunar mountains in what is called a *Grazing* lunar occultation. Careful planning is required to observe grazing occultations as they are only visible on a path a few kilometers wide.

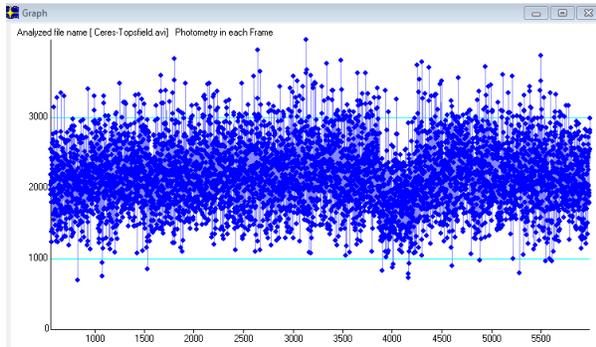
At the April 2012 NHAS Business meeting, Rick Fienberg of *Astronomy* magazine did a presentation on the occultation of a distant star by Pluto, as observed from the airborne Observatory SOFIA over the Pacific ocean in the early morning hours of June 23, 2011. The star at mag. 13.5 had greater luminosity than the mag. 14 Pluto, and the converted 747 managed to fly within 50kms of the center of the track of Pluto's shadow. The light curve showed the two objects merging into one dot, and fading (in comparison to a nearby star) as Pluto occulted the star. About 90 seconds later the dot brightened again, and soon the 2 objects separated. Further analysis will add to the knowledge of Pluto's atmosphere.

On October 25, 2013, the minor planet Ceres occulted the 10<sup>th</sup> magnitude star TYC-0865-00911-01. The center track of visibility ran south of DC and Delaware, but the northern edge (in red) ran above southern NH. Ted Blank of NHAS operated 3 scopes (with video imaging) pointed at where Ceres would be at occultation time from Topsfield, Mass., Hampton Beach NH, and Biddeford, Maine.

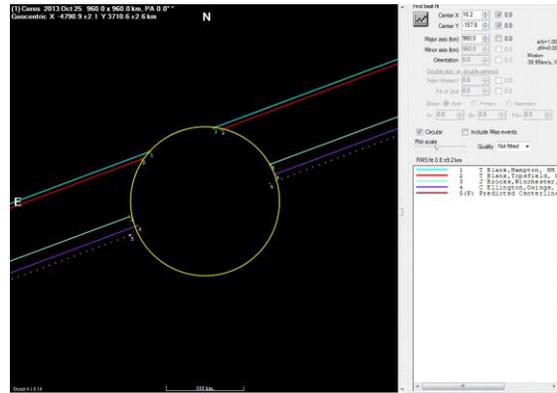
Since Ceres is itself at mag. 8.8, the combination would brighten to about mag. 8.5 as the objects merged. Then the luminosity would drop to 8.8 as the star's contribution was occulted, only to shoot back up to 8.5 as occultation ended and before the objects separated in the Field of View.



**The predicted track of the Ceres occultation, with locations of amateurs who planned to observe it.**



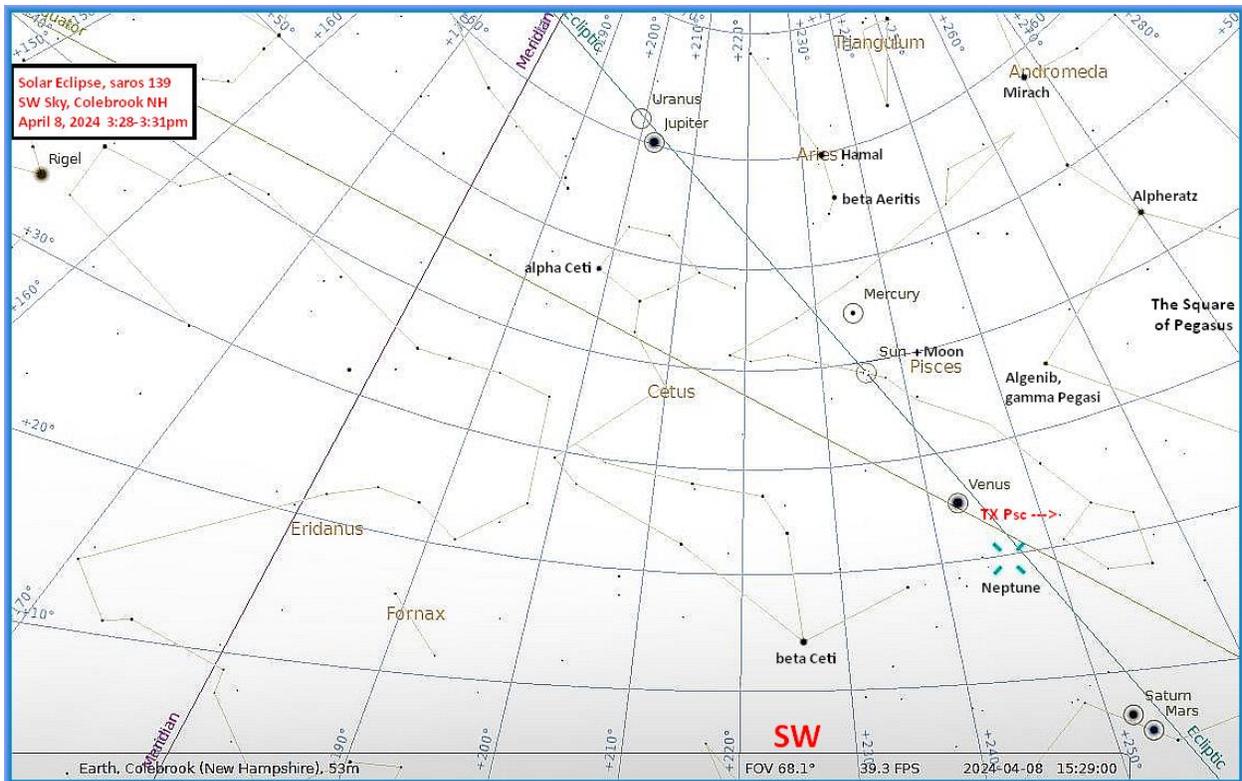
*The dip in the Ceres+Star light curve (12.7 seconds long) as Ceres passed in front of the star. (Ted Blank, Topsfield, MA)*



*The first four reports from the Oct 25, 2013 occultation are sufficient to begin to show the size and shape of the asteroid.*

Analysis of the videos indicates a 12.7 second occultation at Topsfield, and a 10.0 second event at Hampton (since the star crossed behind Ceres closer to its north pole as seen from Hampton). The timings of occultations allow the shape and size of asteroids (in this case, Ceres) to be obtained with greater accuracy than any other technique.

- *Ramaswamy and Ted Blank*



*Chart of the Total Solar Eclipse of April 8, 2024, generated using Stellarium 12.2, showing the seven planets from the top: Uranus, Jupiter, Mercury, (Sun/Moon), Venus, Neptune, Saturn and Mars. The First Point of Aries is just above Neptune.*

### ***A Spate of Cancellations***

The first weekend saw a triple cancellation, including both dates for the Fall Messier Marathon (Oct. 4<sup>th</sup> and 5<sup>th</sup>). The other events were First Friday at MSDC and the Rey Center Sky watch. The next weekend saw the Portsmouth Sidewalk event's cancellation due to overcast conditions. The Coffee House Night over the last weekend was also called off because of bad weather.

### ***The Fall Messier Marathon***

The pot-luck portion of the Messier Marathon went ahead on the back-up date of Oct. 5<sup>th</sup>, graciously hosted as always by Scott, Sue and Ben Wickett at their home in Lyndeborough. In attendance were Rich DeMidio, Andy Jaffe, Linda and Larry Lopez, Ramaswamy, John Rose, Ed Ting and Mike Townsend. The evening featured good food and drink, great conversation and plenty of laughs. Some could figure out Larry's riddle, some couldn't (at first):

6 is afraid of 10.  
Why?  
789.

You just had to be there!

### ***LTP Scope Deliveries***

Nine of the 10 scopes from the final batch of 2013 have been delivered to their respective Libraries, including the twins to Bedford Library by Scott McCartney (below). The last delivery by Ramaswamy is still on hold, first due to coordination problems with the Salisbury Free Library, and then at the request of the Library staff. It will find its home by Nov. 19<sup>th</sup>.



***Above Left: Bedford Library now has 4 telescopes to lend to patrons.  
Above Center: Dalton Librarians with their first scope, delivered by Peter Smith.  
Right: The Hill Library staff in CenterStrafford welcome their first telescope.  
(Photos: Melinde Byrne, Gerry Smith and Ramaswamy)***

## NHAS October 2013 Business Meeting Report

The October business meeting was held at the McAuliffe-Shepard Discovery Center on Oct. 11<sup>th</sup>, with 31 members present and our President Rich DeMidio presiding. The Treasurer's report by "Rags" follows.

### President's Report

Everyone was reminded that the December pot-luck had to be moved to Dec 20<sup>th</sup> (3<sup>rd</sup> Friday) but that in 2014, we will target the 2<sup>nd</sup> Friday of each month for business meetings at both venues. Planning has started for outside speakers for next year, and more "clinic" type events will be held for the evening program. The PayPal option is now operational for dues and donations.

Nominations for 2014 Officer elections will be in November and December. All members are asked to consider serving themselves or nominating others.

IBM Smartcloud will provide Web conferencing capability, but the audio component is still being evaluated. We hope to have a test call session before year-end.

The Q4 Officers' Meeting has been scheduled for Oct. 26. The main topic on the agenda will be: working within our means to maintain balance.

NHAS activities that need planning:

Major events

NEFAF/AeroSpaceFest/Stellafane

Recurring events

Monthly meetings for Club/EOC

First Friday/Portsmouth Sidewalk

Rey Center

Coffee House Night

Newsletter publication

Membership processing/Activities

On demand events

Sky watches

MSDC staff augmentation

An analysis chart of club activities was presented. We have a core group of 25 or so people managing 80% of our activities. To maintain balance, we may have to drop a few things. And we are still looking for a Membership chair.

### What's on Your Mind?

Rich Schueller (EOC) reported that NEFAF is looking for pre-event help next year.

Rags thanked Peter Wolczko for volunteering to collect mail from NHAS's Manchester P.O. Box.

Herb Bubert asked members to check out new images at the Pictures Forum.

Marc Stowbridge showed his latest batch of DIY accessories, including eye guides for the LTP zoom EP and a shield that can be custom-fit to an OTA to help with solar observation.

### The Evening Presentation

Ed Ting presented "Kepler's Kafeteria – a Random Walk through our Astronomical Hobby."

Ed's memory lane stretched back to his Illini days at the Urbana, Ill. campus and the beginning of his interest in astronomy; in particular, the 12" Warner & Swazey f/15 refractor he got to play with there. That instrument has been recently restored to its former glory.



*The restored Warner & Swazey f/15 refractor (2013)*

Comparison images of lunar crater Copernicus taken in 1981 and 2011 illustrated the advances in imaging technology and increased aperture. He showed an image of craters that remained unidentified for years, and the lucky 13<sup>th</sup> exposure on a 12-shot film roll he used, the only success.

Ed also paid tribute to Luis Eduardo Vega, who used to run the Vega-Bray Skywatcher's Inn near Benson, Arizona. Dr. Vega, a pathologist and avid amateur astronomer, made available an array of scopes in his Observatory to the Inn's patrons. He died in 2003.

Ed concluded his talk with a list of Great Telescope Ads, featuring amusing images, outlandish claims and sky-high prices. As the saying goes:

Caveat emptor!



***NHAS Treasurer's Report****(as of October 9, 2013)***Starting Balance:** \$11,222.62**Deposits:**

Membership	570.00
Donations	1,053.00
Calendar sales	133.00
Total:	1,756.00

**Expenses Paid:**

Larry Lopez (Stellafane)	81.85
Rymes Propane & Oil	20.85
Cornerstones of Science	323.96
Peter Smith (LTP reimbursement)	251.96
OPT	149.92
Total:	828.54

**Current Balance:** \$12,150.08**Petty Cash:** \$100.00**Current Cash Balance:** \$12,250.08**EOC Share:** \$5,982.79**Current Members:** 31**New Members:**

Marc Sullivan	Raymond, NH
Philip Pierce	Conway, NH

**Membership:**

Renewals:	510.00
New:	60.00
Total:	\$570.00

**Donations:**

Michael O'Shaughnessy	5.00 GEN
Peter Wolczko	20.00 EOC
Scott McCartney	20.00 EOC
Michael LaBree	10.00 GEN
April South	3.00 GEN
Webster Library	325.00 LTP
Rotary Club of Bedford	650.00 LTP
Philip Pierce	20.00 GEN
Total:	\$1053.00

**Contact Information****How to join NHAS**

**Write to us:** **NHAS**  
**P. O. Box 5823**  
**Manchester, NH 03108-5823**

**Send Email to:** [info@nhastro.com](mailto:info@nhastro.com)

**Visit our web site:** <http://www.nhastro.com>

**How to contribute to the Observer**

**Email articles and snapshots to the Editor:**

[ramax.astro@yahoo.com](mailto:ramax.astro@yahoo.com)



*Charles Messier lived in an apartment of the Hôtel de Cluny in the center of Paris, and his Observatory was located at the top of this tower (no trace of the facility remains today, as the building, now a museum, has changed hands many times since his domicile). Messier did most of his observing using a 100mm refractor, and over a 25-year period discovered a dozen comets.*

*(Photo: D. Lanpher in Paris, Oct. 2013)*

**Regional Astronomy Clubs**

**New Hampshire Astronomical Society [NHAS]**  
*Skywatches around the State*  
*Sidewalk Astronomy in Portsmouth*  
[www.nhastro.com](http://www.nhastro.com)

**Amateur Telescope Makers of Boston**  
 (Westford, Mass.)  
[www.atmob.org](http://www.atmob.org)

**Astronomy Society of Northern New England** (Kennebunk, Maine)  
[www.asnne.org](http://www.asnne.org)

**McAuliffe-Shepard Discovery Center [MSDC]** (Concord, NH)  
*Planetarium and Observatory*  
*First Friday Observing Event*  
[www.starhop.com](http://www.starhop.com)

**North Shore Astronomy Club**  
 (Groveland, Mass.)  
[www.nsaac.org](http://www.nsaac.org)

**Penobscot Valley Star Gazers**  
 (Bangor, Maine)  
[www.gazers.org](http://www.gazers.org)

**Online Live Observatories**

**Astronomy Live** (broadcasts)  
[www.astronomylive.com](http://www.astronomylive.com)

**SLOOH** (Tenerife, Canary Is.)  
[www.slooh.com/about.php](http://www.slooh.com/about.php)

**Worldwide Telescope**  
[www.worldwidetelescope.org](http://www.worldwidetelescope.org)

**Magazines**

**Astronomy**  
[www.astronomy.com](http://www.astronomy.com)

**Sky & Telescope**  
[www.skyandtelescope.com](http://www.skyandtelescope.com)

**Sky at Night**  
[www.skyatnightmagazine.com](http://www.skyatnightmagazine.com)

**Astronomy Gear**

**Agena AstroProducts**  
[www.agenaastro.com](http://www.agenaastro.com)

**Astromart**  
 (Used equipment and advice)  
[www.astromart.com](http://www.astromart.com)

**Astronomy-Shoppe**  
*(in Plaistow, NH 03865)*  
[www.astronomy-shoppe.com](http://www.astronomy-shoppe.com)

**Celestron**  
[www.celestron.com](http://www.celestron.com)

**Cloudynights**  
 (Used equipment, Articles, Forums and Reviews)  
[www.cloudynights.com](http://www.cloudynights.com)

**Explore Scientific**  
[www.explorescientific.com](http://www.explorescientific.com)

**High Point Scientific**  
[www.highpointscientific.com](http://www.highpointscientific.com)

**Kendrick Astro Instruments**  
[www.kendrickastro.com](http://www.kendrickastro.com)

**Lunt Solar Systems**  
[www.luntsolarsystems.com](http://www.luntsolarsystems.com)

**Meade Instruments**  
[www.meade.com](http://www.meade.com)

**Oceanside Photo & Telescope**  
[www.optcorp.com](http://www.optcorp.com)

**Orion Telescopes**  
[www.telescope.com](http://www.telescope.com)

**ScopeStuff**  
[www.scopestuff.com](http://www.scopestuff.com)

**TeleVue**  
[www.televue.com](http://www.televue.com)

**Vixen Optics**  
[www.vixenoptics.com](http://www.vixenoptics.com)

**William Optics**  
[www.williamoptics.com](http://www.williamoptics.com)

**Astronomy Web Sites**

**CalSky**  
 (Sky Calendar to plan Observing)  
[www.calsky.com](http://www.calsky.com)

**Heavens Above**  
 (on Satellites, Spacecraft, Planets)  
[www.heavens-above.com](http://www.heavens-above.com)

**NASA**  
[www.nasa.gov](http://www.nasa.gov)

**ScopeReviews**  
*(Reviews by Ed Ting, NHAS)*  
[www.scopereviews.com](http://www.scopereviews.com)

**SpaceWeather**  
 (Solar activity, Asteroid passes)  
[www.spaceweather.com](http://www.spaceweather.com)

**Computer Software**

**Cartes du Ciel** (*aka Skychart*) (Free)  
[www.ap-i.net/skychart/](http://www.ap-i.net/skychart/)

**Celestia**  
[www.shatters.net/celestia](http://www.shatters.net/celestia)

**Computer Aided Astronomy** (Free)  
[www.astrosurf.com/c2a/english/](http://www.astrosurf.com/c2a/english/)

**Earth Sky Tonight**  
[www.earthsky.org/tonight](http://www.earthsky.org/tonight)

**Google Sky** (Free, online use only)  
[www.google.com/sky](http://www.google.com/sky)

**SkyMap Online**  
[www.skymaponline.net](http://www.skymaponline.net)

**Starry Night**  
 (many versions, Novice to Expert)  
[www.starrynight.com](http://www.starrynight.com)

**Stellarium** (Free)  
[www.stellarium.org](http://www.stellarium.org)

**WinStars** (Free)  
[www.winstars.net/english/](http://www.winstars.net/english/)

Event	Date	Time	Location
First Friday Skywatch for MSDC	Friday, November 1	7:00pm	MSDC, Concord NH
Coffee House Night at YFOS	Saturday, November 2	5:00pm	YFOS
Rey Center Skywatch	Saturday, November 2	6:30pm	Rey Center, Waterville Valley
Hooksett Public Library Skywatch	Tuesday, November 5	6:30pm	Hooksett Public Library, Hooksett NH
Auburn Public School Skywatch	Thursday, November 7	7:00pm	Auburn Public School, Auburn NH
Auburn Public School Skywatch (backup date)	Friday, November 8	7:00pm	Auburn Public School, Auburn NH
Sidewalk Astronomy Skywatch	Saturday, November 9	6:00pm	Market Square, Portsmouth NH
Gafney Library Skywatch	Tuesday, November 12	6:30pm	Gafney Library, Sanbornville NH
Josiah Carpenter Library Skywatch	Wednesday, November 13	6:30pm	Josiah Carpenter Library, Pittsfield NH
Educ. Outreach Committee Meeting	Thursday, November 14	6:30pm	Manchester City Library, Manchester NH
North Hampton Public Library Skywatch	Thursday, November 14	7:00pm	North Hampton Public Library, North Hampton NH
NHAS Business Meeting	Friday, November 15	7:30pm	St. Anselm College, Manchester NH
Gafney Library Skywatch (backup date)	Tuesday, November 19	6:30pm	Gafney Library, Sanbornville NH
Josiah Carpenter Library Skywatch (backup date)	Wednesday, November 20	6:30pm	Josiah Carpenter Library, Pittsfield NH
North Hampton Public Library Skywatch (backup date)	Thursday, November 21	7:00pm	North Hampton Public Library, North Hampton NH
Pease Public Library Skywatch	Friday, November 22	6:30pm	Pease Public Library, Plymouth NH
Goffstown High School Skywatch	Tuesday, November 26	6:00pm	Goffstown High School, Goffstown NH
Rodgers Memorial Library Skywatch	Tuesday, November 26	6:30pm	Rodgers Memorial Library, Hudson NH
Winter Holiday Stroll Skywatch	Saturday, November 30	5:00pm	Downtown, Nashua NH
Campbell High School Skywatch	Wednesday, December 4	6:30pm	Campbell High School, Litchfield NH
Concord Schools (3) Skywatch	Thursday, December 5	6:30pm	Near White Farm, Concord NH
First Friday Skywatch for MSDC	Friday, December 6	7:00pm	MSDC, Concord NH
Coffee House Night at YFOS	Saturday, December 7	5:00pm	YFOS
Sidewalk Astronomy Skywatch	Saturday, December 7	6:00pm	Market Square, Portsmouth NH
Campbell High School Skywatch (backup date)	Tuesday, December 10	6:30pm	Campbell High School, Litchfield NH
Concord Schools (3) Skywatch (backup date)	Thursday, December 12	6:30pm	Near White Farm, Concord NH
Educ. Outreach Committee Meeting	Thursday, December 19	6:30pm	Manchester City Library, Manchester NH
NHAS Business Meeting (Pot-luck)	Friday, December 20	7:30pm	MSDC, Concord NH

**Note:** Please check [Calendar] at [www.nhastro.com](http://www.nhastro.com) for up-to-date information on upcoming events.

## Credits

Contributors to this month's **Observer:**

John Bishop, Ted Blank, Melinde Byrne, Rich DeMidio, Joe and Bonnie Derek, Gardner Gerry, "Rags" Gilmore, Lindsey Hansen (EMS), Larry LaForge, Dwight Lanpher, Larry and Linda Lopez, Scott McCartney, John Pappas, Steve Rand, John Rose, Gerry and Peter Smith, John Stetson (SMA), Ed Ting, Mike Townsend and Paul Winalski.