



# OBSERVER

Vol. 2015, No. 9

Newsletter of the New Hampshire Astronomical Society

September 2015

## *In This Issue...*

### **2** [President's Message](#)

### **3** [Sky Watch Review](#)

*Omni Mount Washington Resort  
Josiah Carpenter Library  
Kilton Public Library  
Rochester Paranormal/UFO  
Festival  
North Hampton Public Library*

### **4** [Acadia Night Sky Festival 2015](#)

### **8** [A Super Lunar Eclipse](#)

### **13** [Object of the Month](#)

*October: M2*

### **14** [Images of the Month](#)

*A Superb Ashen Moon*

### **15** [The Regular Items](#)

*Business Meeting Report  
Treasurer's Report  
Contact Information  
Club Loaner Scopes  
Astronomy Resource Guide  
Upcoming Events  
Credits*

## *A Super Blood Moon*



*Midway through Totality.*

*(Image: Michael Maas)*

*The lunar eclipse of September 27 was the last of a Tetrads of Total Lunar Eclipses, a sequence of 4 successive total eclipses occurring over a 2-year period that began on April 15, 2014. There are up to 8 such occurrences each century; the last Tetrads was in 2003-2004 and the next one will be in 2032-33, and yes, the last event in that Tetrads on Oct. 8, 2033 will be another "Super Blood Moon."*

*A Super Moon occurs every month; the catch is that it is not always coincident with a Full Moon. This time the Moon was at perigee 15 minutes after the partial eclipse had ended. A Super New Moon is never noticed by mankind, except when it gets in the way of the Sun, producing some of the longer Total Solar Eclipse events.*

*The 72-minute duration of totality was not very long (umbral magnitude was 1.28), just a bit over the average, since most Total eclipses are near an hour in duration. The upper limit on totality is 107 minutes and 2 eclipses in this decade have or will come close: on June 15, 2011 totality lasted precisely 100 minutes (umbral magnitude of 1.7), whereas on July 27, 2018 it will for 103 minutes, the longest of this century (umbral magnitude of 1.61). Unfortunately, neither event was or will be visible from North America and only in part from Europe, and therefore not publicized much.*

*The Total eclipse of June 26, 2029 is likely to be one of the darkest seen in recent times since the Moon will track almost across the center of Earth's shadow, with a staggering umbral magnitude of 1.84! Totality will last 102 minutes and South America will be the place to be. For New Englanders it will begin on June 25 a bit after 10:30pm with the Moon low in the south, just above the Teapot. Under good conditions you'll not only see stars pop up in the FOV, but an entire Globular cluster. M28 will be 40 arc-minutes off the limb and the venerable M22 just 3 degrees away.*



*The NHAS web-site banner leading up to the October presentation.*



### *Your First Telescope*

Next month's business meeting is going to be very different from our usual meetings. The formal part of the meeting (committee reports etc.) is going to happen quickly and off to the side because instead of focusing on club members, we are going to educate the general public.

Our own local telescope expert, **Ed Ting**, will tell people which telescopes make good gifts. We are doing this because every year after Christmas we see eager children and teens who have gotten a telescope as a gift from a loving parent or other relative. Unfortunately, many of these are "trash scopes" which don't give good views and are hard to use. They are instruments which will crush the enthusiasm of their owners instead of encouraging it.

It doesn't have to be like this. Ed's talk is part of our mission but there is a part for you to play as well: if you have a good cheap telescope, please bring it to our October meeting and set it up for the post-meeting sky-watch at MSDC. Then the people who just heard about what to buy can come out and see examples in use.

Don't forget: bring a good small telescope to MSDC on October 9th!

***John Bishop***  
**NHAS President**

### ***Omni Mount Washington Resort, Bretton Woods NH, September 5***

The event took place as scheduled, with clear, steady, but humid skies. About 20-30 guests of the hotel looked through telescopes manned by **Steve Forbes, Gardner Gerry, Marc Stowbridge, Bob Veilleux** and **Paul Winalski**. We set up in one of the playing fields well away from the lights on the hotel. We only had to put up with stray light from one floodlight, and the hotel will see about that being either turned off or blocked next time.

The field has excellent horizon views. The skies in Bretton Woods are impressively dark. M22, M8, M16, M17, M31, and the Perseus Double Cluster were all visible naked-eye. I got my best view ever in the 14" TScope of M11. We were able to view a large number of deep-sky objects: M31/32/110 (all visible in the same field of view in a 35mm Panoptic eyepiece), M22, M13, M92, M15, M8, M17, M57, NGC 457, T Lyrae, V Aquilae, S Scuti, M11, M62, Perseus Double Cluster, and the Veil Nebula.

The hotel is considering arranging observing sessions on a monthly basis (or at least several times a year), similar to what we do for the Rey Center in Waterville Valley. If they're willing to do this, I think we should take them up on the offer.

This is a real gem of an observing site.

- **Paul Winalski**

*[A full report on the North Hampton Public Library skywatch (column 3) of September 27 is to be found in the narrative of the Total Lunar Eclipse of the same day. See page 8. –Ed.]*

### ***Josiah Carpenter Library, Pittsfield NH, September 16***

The event took place under clear but humid skies. I gave the indoor presentation at the library and then we drove off to the Keeley residence for the observing. The observing site is very nice – near the top of a hill with a wide field of view, very dark skies, and no significant artificial lighting. Ten or so library patrons were there for the observing. **Steve Forbes, Gardner Gerry** and I ran the observing session. The library telescope was also in use.

I showed off a bunch of deep-sky objects, including 61 Cygni, M13, NGC 457, M57, M11, M17, M31/32/110, the Perseus double cluster, and V Aquilae. This is an excellent observing venue.

- **Paul Winalski**

### ***Kilton Public Library, West Lebanon NH, September 17***

We had clear, albeit somewhat unsteady, skies. **Steve Rand** gave the indoor presentation. **Steve Forbes** and I manned the scopes. Unfortunately the library was unable to shut off the external lights in the parking lot and on the walkway, so there was a lot of ambient light that greatly restricted what I could show to the 20 or so library patrons and passers-by that looked through the scope. I showed 61 Cygni, Mizar, M13, NGC 457, Epsilon Lyrae, and V Aquilae.

There is a nearby dam site with no artificial lighting that we might be able to use next time.

- **Paul Winalski**

### ***Rochester Paranormal/UFO Festival, Rochester NH, September 18***

I did the skywatch presentation, which took place in the city hall council chambers, a mile or so from the town park observing site. I had seven or eight in attendance, and mindful of the UFO/Paranormal theme, I decided to emphasize the distances of the various objects in my talk, as well as mention what would be observed later on that evening. The presentation was well received and at the end involved a discussion of the alleged abduction of [Portsmouth's Betty and Barney Hill](#) in the White Mountains on Sept. 19, 1961. The group referred to a trade route star map seen abroad the alien craft seen by Betty and later drawn under hypnosis, which was recognized by an astronomer as zeta Reticuli. As the discussion ended, I pulled out NHAS's 8.6 lbs Campo del Cielo meteorite and offered it up as a proven traveler from space.

- **Steve Rand**

NHAS members **Steve Forbes** and **Gardner Gerry** showed off a thin crescent moon and a few of the brighter deep sky objects. We were set up at the edge of a park and there was considerable local light pollution.

- **Gardner Gerry**

### ***North Hampton Public Library, North Hampton NH, September 26 and 27***

This 2-day event took place around the Total Lunar Eclipse of Sunday, September 27. Only about 10 people attended the indoor presentation I did at noon on Saturday at the Library. For the eclipse itself we had about 20 people looking through the scopes.

- **Paul Winalski**



The seventh annual Acadia Night Star Festival was held this year at Bar Harbor, Maine on September 10-14. NHAS was represented by **Ken and Sheila Charles, Joe and Bonnie Derek, Gardner Gerry, “Rags” Gilmore and Nori Odoi, Bill Lincoln, Larry and Linda Lopez, Don McDaniels, Wayne Mitchell, Jason Paul, Marc Stowbridge, Bob Veilleux and Mark Warend.** We begin our coverage with the traditional panoramic portrait taken atop Cadillac Mountain by one of the event organizers: **Dwight Lanpher** (one of whose hats spells NHAS). Our correspondent is **Nori Odoi**, who also took all the other pictures included in this report. Thanks Nori, for this treat!



*A Double Take: The panoramic view atop Cadillac Mountain, courtesy of Dwight Lanpher (above) and Nori Odoi (below).*



Acadia National Park is one of the most beautiful places on Earth during the day, and the annual Night Sky Festival shows it to be equally beautiful at night. Rags and I were among the large contingent of NHAS members who journeyed up there to share these wonders with hundreds, maybe thousands of visitors from around the country and around the world.

Sadly, the weather in the early part of the festival was rainy and cloudy, so a number of events were cancelled. We arrived Friday night and comforted ourselves for the lack of stars by exploring Bar Harbor. But Saturday was fairly clear -- I was even able to see the sun rise over Mount Cadillac. Since Rags was sleeping at the Inn, he didn't!



*And why not a third one? But this panorama is strictly a filler item, so just read on...*



Saturday from late morning to early afternoon was spent with Solar viewing at Jackson Laboratory, just outside of Bar Harbor. Rags brought his 127-mm Burgess refractor which he used with a homemade white light filter. NHAS was also represented by a number of members including Gardner Gerry, Larry and Linda Lopez, and Bob Veilleux. The crowds ebbed and flowed, but kept everyone busy showing sun spots and solar prominences. Older folks, young children, and all the ages in between sighed and gasped, amazed to be so intimate with the sun. Afterwards we attended **Dr. Alistair Davey's** wonderful talk: *"What's up with the Sun? The Story of Solar Cycle 24 and Beyond!"*



*Bob Veilleux and Marc Stowbridge fielding questions about the Sun.*



*Rags, whether with white light scope or the H-alpha Coronado, is gallant as ever with the shade for old and young alike.*

After a break for food, we headed up Mount Cadillac for the big star party at the top of the mountain. If you had a telescope, you could park in the parking lot on top of the mountain. If you were a visitor though, you had to park off site and be bused to the star party. This prevented massive traffic jams and kept the top of the mountain free for telescope usage.

Mount Cadillac is a majestic mountain, said to be the first place that the sun rises in the US. It looks out over Frenchman's Bay and the Porcupine Islands. But this night the focus was on the parking lot where astronomers from all over the East Coast dragged up their telescopes in preparation for the curious hordes that would soon be arriving. Astronomers and telescopes circled the central island of the parking lot like a necklace. NHAS members formed a little nucleus on the rim and we joined them.

The Park Rangers oriented the astronomers and their helpers as to what was about to occur. One particularly great idea was passing out small glow stick loops that could be placed around the feet of the telescopes so that people would not trip over them. Some astronomers also put them around their eyepieces so that they were easy to find.





*Gardner Gerry is ready and set to go, Rags is still setting up his SCG for the night session with Larry being Larry in the back, while "Cowboy Bob" Veilleux is just biding time to the first bus-load of visitors to arrive at the top of Cadillac Mountain.*

Rags used his Celestron 8-inch Schmidt-Cassegrain reflector. I was there as his helper, talking to people in line about what they were to see, what constellations could be seen in the sky, and answering questions. Waiting in line to look through the telescope can be a long process, and there is not much time to answer questions then.



*As Larry Lopez once described them, the Park Rangers know a thing or three. Orientation for the astronomers is as important as managing traffic in the dark of the bus-loads of eager visitors. And they are veterans at this.*

As the buses began to arrive with darkness still not deep, many telescopes focused on Saturn. But as the sky darkened, it was at first pretty clear -- with the Milky Way very visible despite some haze. Targets included The Lagoon Nebula, M13, Ring Nebula, the Double Cluster and the Pleiades.

Viewers included young couples, older folks, even families with young children. A number had accents that clearly placed them out of this country, but it was too dark to distinguish their features. Lines were often long, but everyone had a lively interest in the skies and marveled at what they could see. Some visitors said they came every year just for this event.

Unfortunately about two hours after it started, clouds started rolling in. Astronomers started packing up and the crowds thinned. But just like that, the clouds parted and several astronomers (including Rags) unpacked their telescopes to give the lingering viewers one last glimpse of the sky's wonders. Then we re-packed and headed down the mountain.

On Sunday we said a last farewell to Acadia and headed back to New Hampshire.

- *Nori Odoi*

### *Dwight Lanpher tosses in a few statistics:*

On Friday September 11, the Visitor's Center and Seawall viewing events were cancelled due to weather.

On Saturday September 12, there were 15 solar telescopes at the Jackson Laboratory and a total of 43 telescopes and 6 binocular stations at Cadillac Mountain that evening. I counted 60 people in the panoramic photo of Cadillac Mountain taken late in the setup process. Last year, on Saturday September 27, 2014 there were 48 telescopes and 5 binocular stations on Cadillac Mountain. I counted 70 people in a similar panoramic photo taken at a similar time.

The official count for this year was 1500 people on top of Cadillac Mountain. The festival ran 12 buses continuously from Mt. Desert Island High School, whose parking lot held 50% more cars than last year's Visitor's Center lot.



*Glow stick loops marking tripods.*





The “official” Eclipse site for NHAS was the New Hampton Public Library skywatch, but late requests came in from other quarters and **Paul Winalski** managed to coordinate participation up and down the State. There were four sites in NH and if one were to poach in ATMoB territory in Massachusetts, a case for a fifth site could be made on the basis of dual-membership. One of the ironies of the day was that **Steve Forbes**, who provided impetus for the Portsmouth Market Square event when participating in the monthly Sidewalk event earlier in the month, ended up at the Omni Mt. Washington Resort at Bretton Woods for the evening. The NHAS volunteers for the evening were:

North Hampton Public Library. North Hampton NH McAuliffe-Shepard Discovery Center Concord NH Omni Mount Washington Resort Bretton Woods NH Market square Sidewalk Astronomy Portsmouth NH Chelmsford Telemedia Studios Chelmsford MA	<b>Paul Winalski</b> (a solo mission as planned)  <b>John Bishop, Lynda Bloomberg, Gardner Gerry and R. P. Hale</b> <b>Steve Forbes, Bob Gillette and Marc Stowbridge</b>  <b>Tom Cocchiaro and Andy Jaffe</b>  <b>Kelly Beatty, Bruce Berger</b> , with help from ATMoB members <b>George Paquin and Joe Wolfe</b>
---	---

### North Hampton Public Library

Only about 10 people attended the indoor presentation I did at noon on Saturday at North Hampton Public Library. For the eclipse itself we had about 20 people. Skies were clear and steady, but very damp. I had to break out the 12-volt hair dryer several times to de-fog both the finder scope and the eyepieces. The Library set up a row of chairs facing East so that we could observe the eclipse in comfort.

The most frequent question I got was "why are they calling this a Blood Moon?" My answer was, "stick around until totality and you'll find out." This was indeed the most impressively dark lunar eclipse I can remember.

I was the only one from NHAS there (we planned it that way). Three telescopes were present. I brought the 14" TScope and the Takahashi FSQ 106mm. The Library brought out their library telescope. All three were pretty busy while the Moon was entering the umbra. Once we had totality I turned the TScope to Albireo, the Perseus Double Cluster, and M31 and M32.

Incidentally, the Library Telescope is an excellent instrument for observing lunar eclipses. The aperture cut-down hole leaves you with a Moon that isn't dazzlingly bright during the early parts of the eclipse. The zoom eyepiece is very convenient for adjusting the Moon to just the size you want.

• *Paul Winalski*

### Omni Mt. Washington Resort

I was there with Steve and Marc, having brought my 60 mm 12x German anti-aircraft binoculars on a tripod. Not a scope, but great optics (probably Zeiss). I used a 200 mm Canon lens on a Canon D30 at f/5.6 between 8:18pm and 10:33pm, before dew and cold chased us away.

• *Bob Gillette*



*Tracking the first half of the eclipse.*

*(Image composite: Bob Gillette)*



## MSDC

There was already a large crowd in the MSDC parking lot, well over 50 people, when I showed up at 8:20 pm. There was a line of telescopes already up – I estimated around ten. I didn't walk around to see if anyone else from NHAS was there, I just set up in an empty spot next to R. P. Hale and showed the Moon.

There was always a group of three to six at my telescope. Some would ask questions, some would just look and move on. Early in the process a group of NHTI students with clipboards came by; they were in an astronomy class and this was an assignment for them. I did a mini-lecture on umbra vs. penumbra for them. As far as I can tell, they didn't stick around for even the first umbral contact but I don't think that was the result of my explanation.

There were a number of people who didn't look through the telescopes at all but instead were only looking up while sitting on chairs or a blanket. I heard from the people who looked through my telescope that there was at least one telescope showing the eclipse on video. Around totality someone started playing spooky New-Age music on a car speaker. I don't know whether MSDC wanted that music or not.

Viewing conditions were very good; the sky was completely clear and the air was still. The eclipse itself was classic, with the left side of the Moon visibly dark towards the end of the penumbral eclipse and a very clear umbral contact and progressing across the face of the Moon. You could clearly see that the umbra was a circle a few times larger than the Moon. By the way, if you estimate the size of the umbra in terms of the Moon's diameter and some simple geometry you can calculate the distance to the Moon.

The ancient Greeks did that and got a very reasonable number.

Shortly before totality the shadowed part the Moon showed dark red with the maria almost black. When total, the color was a dark red-orange but the maria were still apparently black. With or without a telescope you could see that the umbral color wasn't even and one side of the Moon was lighter than the other.

Knowing that the end of the eclipse was the same as the beginning in reverse and that I had to go to work the next day, I packed up around 10:30pm and left. The crowd was still big at that point and most of the other telescopes were still there.

- **John Bishop**

*[A Thank You note was received the next day from the organizer of the Eclipse event at MSDC. –Ed.]*

*Hi John,*

*I wanted to send a thank you to you and all of your members for making the lunar eclipse viewing at MSDC a memorable experience for all who participated.*

*I was amazed to see 15+ telescopes set up--especially on such short notice. Please send my heartfelt thanks to all the NHAS members who took time out of their weekend to be with us and share their expertise with our visitors.*

*Looking forward to more viewing opportunities in the future!*

*Best,  
Kim*

--  
Kim Duncan  
Education Coordinator  
McAuliffe-Shepard Discovery  
Center, Concord NH

## Market Square Sidewalk

Andy Jaffe and I were on hand from 7pm to 12:30am hosting hundreds of visitors who stopped. We started out the evening with views of Saturn, before turning to the full moon in preparation for the eclipse.

Andy brought his TV-76 and I set up my Vixen ED-80sf with binoviewer – and for the first time in a long time my William Optics FLT110 and a piggy back WO Megrez 72mm (both with Televue 13mm eyepieces) on the Orion Atlas G mount. After a while, the main scope became the primary eclipse viewing scope while excited onlookers stepped to the side to shoot smartphone pictures of the eclipse through the 72mm.

- **Tom Cocchiaro**

## Chelmsford Telemedia Studios

A team from Sky & Telescope Magazine and Chelmsford Telemedia to put on a live webcast of the event from the TV studio parking lot. The mount used a Meade LXD-75 on loan from ATMoB, and the broadcast camera was a Canon EOS C100 with a Sigma 500mm Telephoto lens with a 2X Telecompressor. We had excellent results and produced a rock-solid image during the entire event. The one glitch was that we lost our live feed through our video streaming provider LiveStream about midway through the event. We did web stream through Chelmsford Telemedia and broadcast live on local cable television stations. [The webcast is archived on their server.](#)

Kelly Beatty was the show's host and producer, and he interviewed several guests in the studio talking about everything lunar.

- **Bruce Berger**

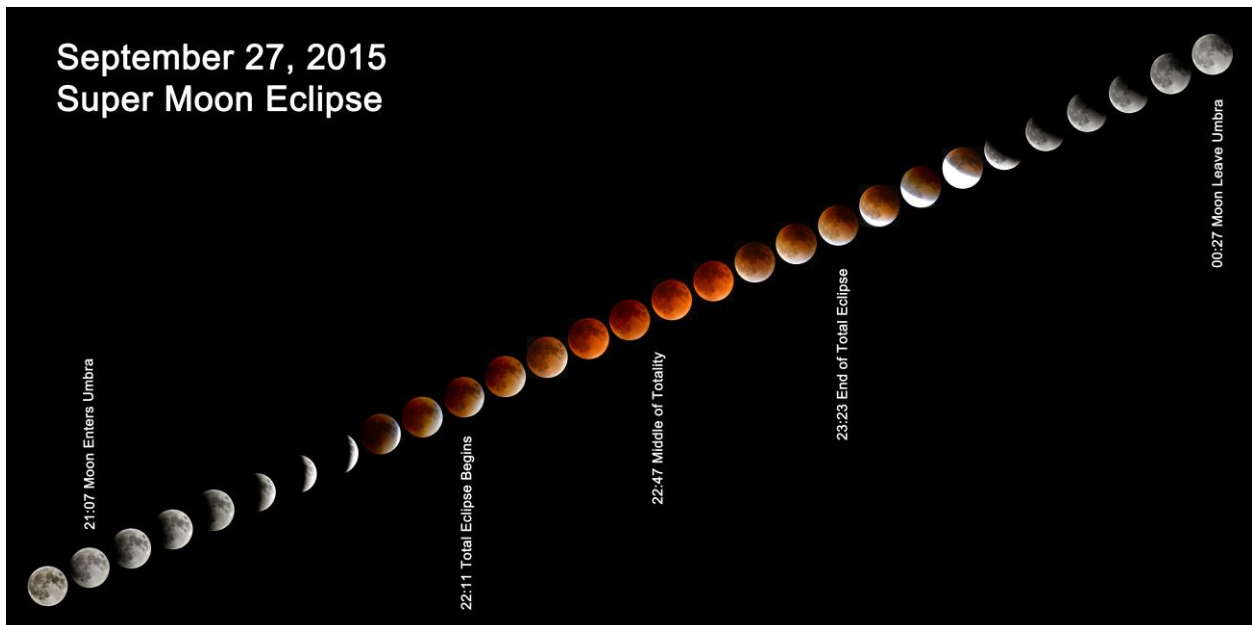
In terms of astrophotography on the day of the event by NHAS members, our favorite luna-tic **Ed Ting** led the way by celebrating the *5 clear days to the eclipse* with a montage. One could say that it set the tone. On Sunday evening he generated another sequence charting the progression of the eclipse from 8:20pm to 12:47am.



*The waxing Moon leading up to the night of the eclipse (above) and on that night itself (below). (Credit: Ed Ting)*



Meanwhile **Michael Maas** was having his own dreamtime with the eclipse. He divided the 72 minutes of totality into equal 8 minute intervals. With 64 minutes of partial (umbral) eclipse preceding and succeeding totality (again a multiple of 8), his a-frame-every-8-minutes sequence covered the entire event, from 9:07pm to 12:27am.



*The Eclipse as it unfolded, with a proper Full Moon tossed in for good measure at the very beginning. (Credit: Michael Maas)*



**Michael Maas** picks up the story:

*The equipment I used to take the images was a Stellarvue SV115-3FT refractor with a Nikon D3200 at prime focus, on a Celestron CGE Pro Mount. The exposure times were 1/200th of a second at the beginning and end of the eclipse. As the moon entered further into the umbra the exposures increased to about 1/10th of second while there were still uncovered elements of the moon. During totality the exposures were increased to 10 seconds, however in the earlier phases were limited to 6 to 8 seconds, so as to balance the light and dark elements of the moon. It was a real challenge to maintain the best shutter speed to maximize the dynamic range of the exposure so that the light areas were not over exposed and the dark areas under exposed. So at times I took a series of exposures to ensure at least one was optimal for each of the 8 minute shoots. The moon was tracked with the mount for all exposures.*

*The shots were done with the camera in manual mode and the live preview screen on. An ISO 100 setting was used for all exposures. The raw images were processed in Photoshop to crop the images and combine them into the full sequence. Photoshop was use, but not much adjustment was required to increase the dynamic range of the photos using the enhance-lighting tool. I used a stop watch application on an iPad to time the 8 minute intervals. I actually started recording images in the Penumbra phase, starting about 8:11pm but couldn't really see any shadow during this phase so did not include them in the full sequence which runs over the umbra phase only. I was surprised by the number of stars that became visible at the mid-point of the total eclipse (10:47pm), which make the images all the more interesting.*

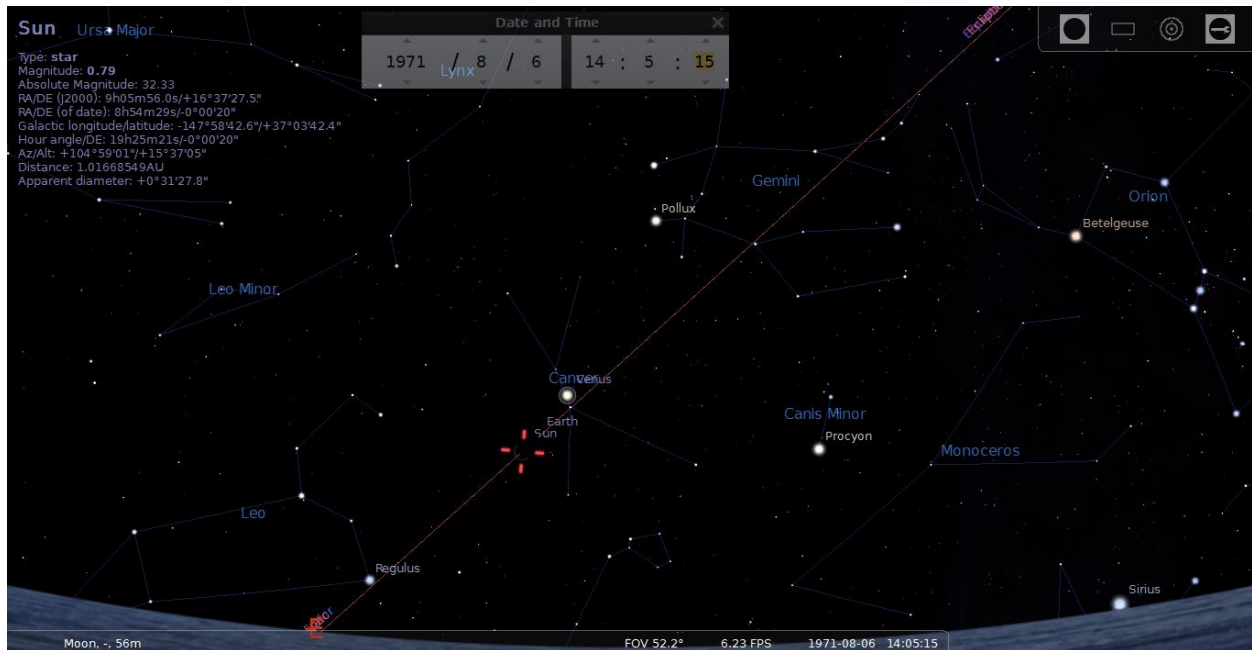
As Umbral magnitudes go in a Total Lunar Eclipse, this one was up there in “the degree of totality” with a figure of 1.2764, i.e. a moon 27.64% larger in radius would have just touched the edge of the umbral shadow at Greatest Eclipse. A year ago, there was the chance to spot something other than stars off the darkened limb of the Moon at greatest eclipse. From Fairbanks, Alaska on October 8, 2014, one could have spotted the planet Uranus a mere **5 arc-minutes** south of the Moon. Read about it in the [October 2014 Observer](#) (page 16). For now, we simply gaze at:



*A wider angle view of the Moon at mid-eclipse (10:47pm), moving toward the parallelogram of stars above left.*

*(Credit: Dave Weaver)*

### Same Eclipse, Different World



A simulated look from the Moon of the Earth (marked in red) occulting the Sun on August 6, 1971. (Courtesy: Stellarium)

As the Moon moved into Earth's shadow, to a resident of the Moon the event would amount to an Occultation of the Sun by Earth, in effect a Total Solar Eclipse of a very different sort. It would be different than what we are used to on Earth when the Moon obstructs the Sun because **1)** the apparent size of the Earth would be about 4 times that of the Sun, **2)** the corona of the Sun won't be visible at all for most of the time since the effect would be similar to an image by a *SOHO LASCO C4* camera (which doesn't exist) and **3)** the length of the "lights out" condition would be in the order of hours, not a few minutes. The look and feel of the phenomenon would be very strange indeed.

It is curious to note that none of the 6 Apollo missions to land on the Moon did so during a Lunar eclipse of any sort. But *Apollo 15* could have managed it, had it been launched 5 days later. As events unfolded, a nearly 100-minute Total Lunar eclipse occurred on August 6, 1971 just as the spacecraft and crew were returning to Earth for a Pacific ocean splashdown the next day – it would have been a Solar eclipse of more than 150 minutes back on the Moon. It is doubly ironic because **David Scott** and **Jim Irwin** spent nearly 3 days on the Moon, were the first to use a rover to ride around for up to 19 hours in 3 separate EVA sessions, and during the last EVA Scott famously undertook the [Hammer and Feather Drop experiment](#) to prove Galileo right. [NASA's clip of the experiment is worth a look!](#)

### The Other Eclipse of the Month

The Solar siamese-twin event of the Lunar eclipse of September 27 occurred first, on September 13. It was a partial eclipse, visible only from southern Africa and Antarctica. Not surprise in guessing that it was not noticed much. But on that date an alignment occurred in space of four objects: The Sun, the Moon, the Earth and **SDO**, the **Solar Dynamics Observatory**, or the [four most important objects in the Solar System](#) according to SDO blogger **Dean Pesnell**. From 06:13 UT to 07:21 UT that morning, first the Earth and then the Moon occulted and transited the Sun respectively, getting in the way of SDO's job of monitoring the Sun (SDO is parked in a geosynchronous orbit about 22,240 miles above the Earth at longitude 102°W). For another look at this event, complete with captioned images from SDO, look up the [September 14 report at Spaceweather.com](#).

Lastly, for the definition of the terms: *Eclipse*, *Occultation* and *Transit*, see page 10 of the [October 2013 Observer](#).

- **Ramaswamy**



## Messier 2 (NGC 7089) – Globular Cluster in Aquarius

by Glenn Chaple

October can be a depressing month for the globular cluster aficionado. Sagittarius, Scorpius and Ophiuchus and their treasure trove of globular clusters have ridden off to the west, leaving us with the barren-looking skies of autumn.

But all is not lost! Pegasus is home to the wonderful globular M15, and Aquarius sports a pair of globs, M2 and M72. The former is our “Object of the Month” and a worthy rival to M15.

M2 was discovered by French astronomer Jean-Dominique Miraldi in 1746, and catalogued by Messier 14 years later. At magnitude 6.5, M2 is barely visible to the unaided eye from dark-sky locations. You can find it with binoculars or finderscopes by searching the area 5 degrees north of beta ( $\beta$ ) Aquarii and looking for what appears to be an out-of-focus star. Viewed with small-aperture scopes and magnifications between 60-120X, M2 is an unresolved, condensed circular haze some 5 or 6 arcminutes in diameter. Larger scopes and magnifications in excess of 150X expand the overall dimensions to 8-12 arcminutes and reveal stars in the outer regions.

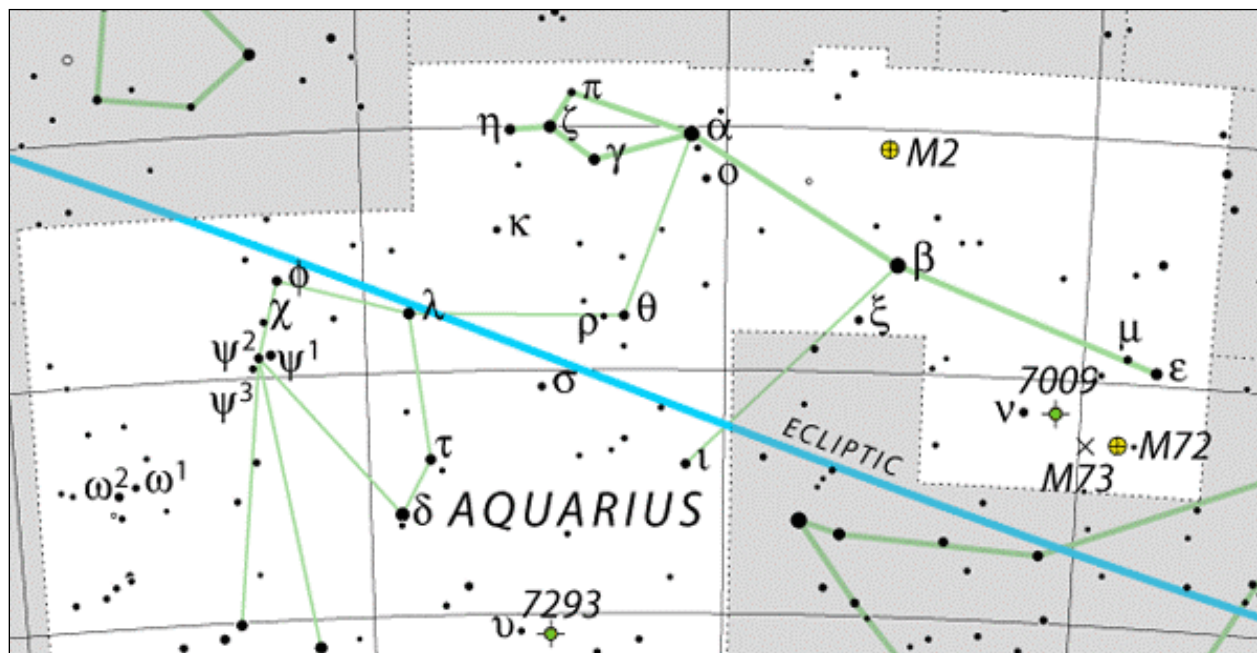
Recently, I compared M2 and M15 with my 13.1-inch Dob and an 18-inch Dob owned by fellow ATMoB member Steve Clougherty. Both globulars appeared similar in size; their outer regions nicely resolved by the two scopes. M15 seemed more concentrated toward the middle – a surprise to me, as some observing guides describe M2 as having an almost stellar-looking center. I didn’t see it; neither did Clougherty. What’s your opinion?

M2 lies about 37,000 light years away. It’s one of the richer and larger globular clusters - an estimated 100,000 stars fill an area 175 light years across. At a calculated age of 13 billion years, M2 is also one of the oldest globular clusters in the Milky Way.



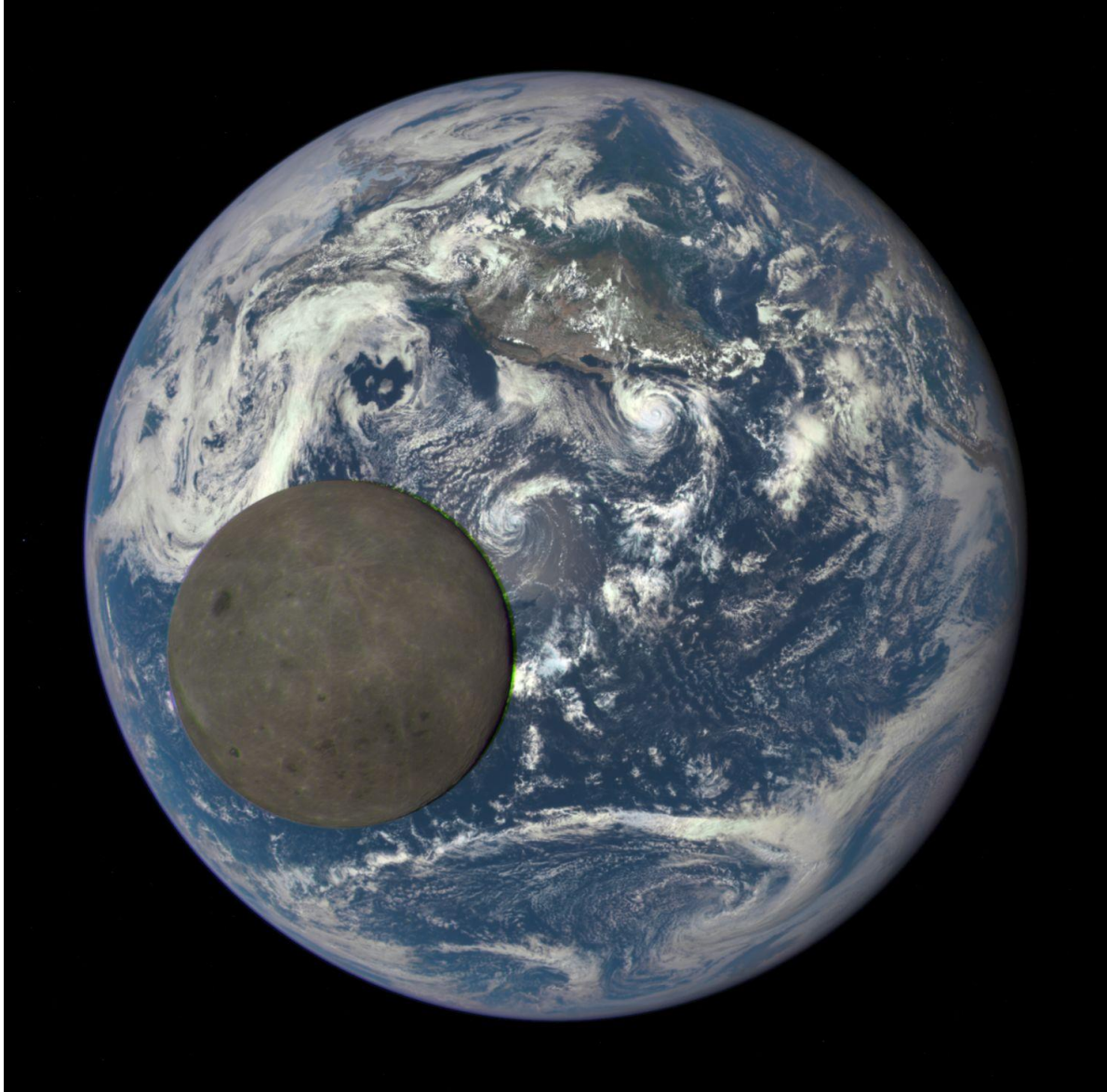
M2

(Image: Mario Motta, MD)



(Courtesy: [www.constellation-guide.com](http://www.constellation-guide.com))

### *A Superb Ashen Moon*



*DSCOVR images a transit with its EPIC camera.*

*(Credit: NASA/NOAA/DSCOVR)*

On July 16, Earthlings ‘saw’ a New Moon, or rather didn’t see it at all for the glare of the Sun. But for the *Deep Space Climate Observatory (DSCOVR)* spacecraft launched on February 11 to monitor the Earth and study solar wind and CMEs, now hovering about 1.5 million kilometers away from Earth at the first Lagrangian point (L1) between the Sun and the Earth, it was a case of a Full Moon and a Full Earth. Since the ‘nearside’ of the Moon was facing the Earth, DSCOVR imaged its farside – thus this view of an Ashen Moon in front of a Blue Marble.

The surface features of the farside of the Moon have been known to mankind only since the Soviet spacecraft Luna 3 imaged them in 1959, although the orbiting survey crafts in support of the Apollo missions did a more thorough job in later years. There are not many maria to be found here, and limited surface features. The dark spot to the upper left of the lunar disc is **Mare Moscovense** (Moscow Sea), while **Crater Tsiolkovskiy** can be seen sharply delineated to lower left. The **Mendeleev Basin** is about midway between them.



## NHAS September 2015 Business Meeting Report

The monthly business meeting was held at St. Anselm College, Manchester NH on September 11th, with our Vice-President **Tom Cocchiaro** presiding. The Treasurer's report by "**Rags**" follows on the next page.

### Vice-President's Report

It is membership renewal time, beginning in October. Payment can be made via PayPal at the club website. For more details visit the Membership Committee Forum and click on "Membership Renewal"

The **Wicketts** will be hosting the Ghost Hunt on October 16; it is the substitute this year for the Fall Messier Marathon. It is also time to start thinking about club officer nominations, the election and of course, the pot-luck!

### NASA in the News

Thanks to the extensive and high resolution imaging of the Moon by the Lunar Reconnaissance Orbiter, NASA can now let viewers see some lunar landscapes in 3D (using the usual red-blue glasses).

Two new apps, called *Mars Trek* and *Experience Curiosity*, have been released to allow viewers to see the Martian terrain in 3D or journey along with the rover in real-time.

### Other Reports

#### Speaker Search Committee: (Michelle Thomas)

Speakers for 2016 are being sought. You can send in suggestions to [speakers.2015@nhastro.com](mailto:speakers.2015@nhastro.com) even for the coming year. One speaker has already accepted for January and NHAS membership is being polled for their choice of topic for the talk by **Dr. Nicole Gugliucci** of the Physics Department at St. Anselm College, Manchester NH.

### Astronomy Shorts

*Don Byrne:* went to a skywatch in fossil beds while visiting Colorado. Handed out one page "*The Globe At Night*" brochures to let people judge the darkness of the sky. The Globe at Night is measuring light pollution worldwide.

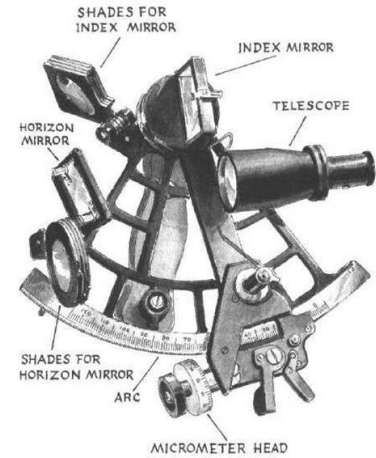
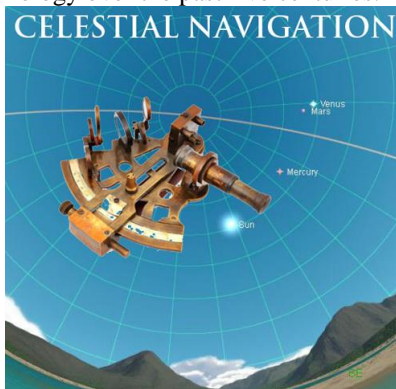
*Wayne Mitchell:* got a DVD of the PBS broadcast "Chasing Pluto."

### Book of the Month

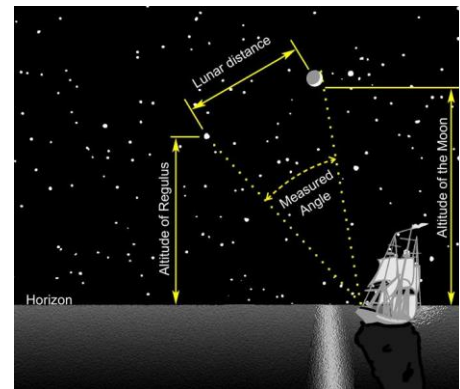
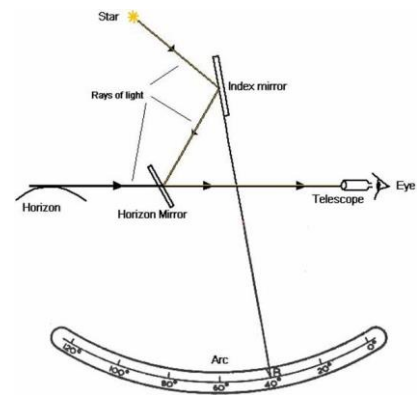
**Tom Cocchiaro** presented his take on "*Capturing the Stars – Astrophotography by the Masters*" by Robert Gendler. It is a great book with great pictures.

### The Evening Presentation

**Paul Winalski** talked about how mariners tackled the complexities of "*Celestial Navigation*" at sea. Using the sextant and the octant to determine latitude in the northern seas (using Polaris), to much more complicated methods to determine the longitude (which is dependant on accurately determining local time), he traced the evoluion of this technology over the past five centuries.



**The Sextant and how it is used (below). (bottom): The Lunar Distance Method in action, using a known star and the known rate of motion of the Moon (1/2 deg/hr).**



### *NHAS Treasurer's Report* (as of September 8, 2015)

<b>Starting Checking Balance:</b>	<b>\$13,104.50</b>	<b>Membership:</b>	<b>146</b>
<b>Deposits:</b>			<b>Single + Family or Student</b>
Membership	229.42	Cash Renewals:	0x18.00+0x10.00 18.00
Donations	95.50	Cash New Members	0x30.00+0x10.00 0.00
Interest	0.33	PayPal Renewals:	3x28.83+1x 9.61 96.10
<b>Total:</b>	<b>\$325.25</b>	PayPal New Members:	4x28.83+0x 9.61 115.32
<b>Expenses Paid:</b>		<b>Total:</b>	<b>8 \$229.42</b>
Rackspace Cloud (Web site)	59.92	<b>Current Members:</b>	<b>154 [-2 = 152]</b>
GoDaddy (nhastro.com domain)	9.99	<i>[19 Family memberships; 85 members paid by PayPal]</i>	
<b>Total:</b>	<b>\$69.91</b>	<i>[The PayPal factor: 2 members have already renewed for 2016, hence the correcting element for the member total]</i>	
<b>Current Checking Balance:</b>	<b>\$13,359.84</b>	<b>Donations:</b>	
<b>Petty Cash:</b>	<b>\$100.00</b>	Castle Preservation Society,	GEN 95.50
<b>Current Cash Balance:</b>	<b>\$13,459.84</b>	Moultonborough NH	
		<b>Total:</b>	<b>\$95.50</b>
<b>New Members:</b>			
Megan Gialluca	Brookline NH		
Brandon Beals	Brentwood NH		
Thomas Smith	Concord NH		
Don Swift	Raymond NH		
Jeremy Burton	Londonderry NH		

### *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)

#### *NHAS Officers:*

**President:** [John Bishop](#)  
**Vice-President:** [Tom Cocchiaro](#)  
**Secretary:** [Paul Winalski](#)  
**Treasurer:** [David "Rags" Gilmore](#)

#### *Board of Directors:*

[Ken Charles](#)  
[Pete Smith](#)  
[Steve Rand](#)

## How to Borrow a Loaner Scope in 3 Simple Steps

- Contact the custodian of scope you're interested in
- Arrange to meet for the transfer (usually at a monthly Business Meeting)
- Sign the requisite papers and leave with the scope

**It is a benefit of your membership in NHAS.** The loan will be for 2 months; an extension might be granted if no one else is waiting for the unit. The objective is to help new members get to know what will suit them personally, to experiment with options and to understand **what will work** in the time available to them to pursue their new hobby, and equally, **what may not**. A suitable (beginner's) telescope is invariably one that is easy to transport to the observing site and easy to setup, and not necessarily the one with the most aperture or sophistication.



### **Orion Starblast 4.5 – LTP-style Telescope**

**Custodian: Pete Smith**  
**Contact: [psastro60@gmail.com](mailto:psastro60@gmail.com)**

*Equipped with:*

Commercial red-dot finder with a special Joel Harris mount.

Celestron 8mm-24mm zoom EP, plus 17mm and 6mm EPs.  
 A red/white Headlamp and a Lens Cleaning Pen in the pouch.  
 A simple Collimation Cap to learn to collimate the old way.  
 A Planisphere, a Moon Map and Richard Berry's "Discover the Stars" Instruction booklet and an Audubon constellations guide.



### **Lunt LS60TH $\alpha$ /B600PT H-alpha Solar Telescope**

**Custodian: Pete Smith**  
**Contact: [psastro60@gmail.com](mailto:psastro60@gmail.com)**

*Equipped with:*

Tele Vue Sol Searcher  
 Celestron 8mm-24mm Zoom EP

Feathertouch focuser for smooth and precise focusing.  
 Celestron CG-4 EQ Mount with RA/Dec. motor drives and controller.  
 Sun screen to shade the observer, a Marc Stowbridge special.  
 Booklet with quick start instructions.  
 Foam-lined custom hard case for the OTA.



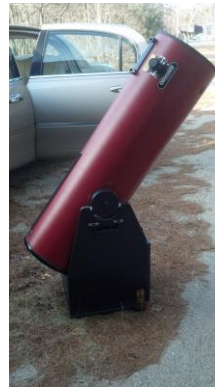
### **Orion XT6 – 6" Newtonian on a Dobsonian mount**

**Custodian: Tom Cocchiaro**  
**Contact: [tomcocchiaro@comcast.net](mailto:tomcocchiaro@comcast.net)**

*Equipped with:*

Telrad finder with a dew shield  
 32mm, 25mm and 10mm Plössl  
 EPs in a case

A Planisphere, Moon map, red light  
 Orion XT6 user manual  
 Richard Berry's "Discover the Stars"



### **Coulter Odyssey 10" Newtonian on a Dobsonian mount**

**Custodian: "Rags" Gilmore**  
**Contact: [nhas@ragnorok.net](mailto:nhas@ragnorok.net)**

*Equipped with:*

Telrad finder with a dew shield  
 26mm TeleVue Plössl and  
 15mm Celestron Plössl in a case

A Planisphere and a Moon map  
 Richard Berry's "Discover the Stars"  
*Also available in a separate slip-case:*  
 Sky Atlas 2000.0 by Wil Tirion and Sinnott

Sky Atlas 2000.0 Companion by Robert Strong and Roger Sinnott



### **Meade 8" Newtonian on a Dobsonian mount**

**Custodian: Scott McCartney**  
**Contact: [Scott\\_McCartney@nhb.uscourts.gov](mailto:Scott_McCartney@nhb.uscourts.gov)**

*Equipped with:*

Telrad finder with a dew shield  
 25mm and 10mm EPs  
 A custom-built base (made by  
 Joe Derek and Chase McNiss)



### **Orion XT10 Newtonian on a Dobsonian mount**

**Custodian: Pete Smith**  
**Contact: [psastro60@gmail.com](mailto:psastro60@gmail.com)**

*Equipped with:*

Telrad finder  
 Assorted EPs: 35mm, 25mm  
 wide-angle, 17mm and  
 a mystery one (25mm?).  
 An EP case  
 Richard Berry's  
 "Discover the Stars"



**Regional Astronomy Clubs**

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

**Amateur Astronomical Society of Rhode Island** (North Scituate, RI)  
[www.theskyscrapers.org](http://www.theskyscrapers.org)

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

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

**Gloucester Area Astronomy Club**  
(Gloucester, Mass.)  
[www.gaac.us](http://www.gaac.us)

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

**Northeast Kingdom Astronomy Foundation** (Peacham, VT)  
[www.nkaf.org](http://www.nkaf.org)

**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)

**Astronomy Gear**

**Adorama**  
[www.adorama.com](http://www.adorama.com)

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

**Stellarvue**  
[www.stellarvue.com](http://www.stellarvue.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)

**Free Star Charts**  
(Star Charts for MM, Planets etc.)  
[www.freestarcharts.com](http://www.freestarcharts.com)

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

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

**Dark skies Observing Sites**  
(Horizons and Clear Sky information)  
[www.observingsites.com](http://www.observingsites.com)

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

**Sloan Digital Sky Survey DR10**  
<http://skyserver.sdss3.org/>

**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)

**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, October 2	7:00pm	MSDC, Concord NH
Plaistow Public Library Skywatch	Saturday, October 3	7:00pm	85 Main Street, Plaistow NH
Goffstown High School Skywatch	Tuesday, October 6	7:30pm	North Mast Road (Rt. 114), Goffstown NH
Hooksett Library Skywatch	Wednesday, October 7	7:00pm	31 Mount Saint Mary's Way, Hooksett NH
Hooksett Public Library Skywatch (backup date)	Thursday, October 8	7:00pm	31 Mount Saint Mary's Way, Hooksett NH
NHAS Business Meeting	Friday, October 9	7:30pm	MSDC, Concord NH
Coffee House Night at YFOS	Saturday, October 10	5:00pm	YFOS
NH Boy Scout Jamboree Skywatch	Saturday, October 10	6:00pm	NH Motor Speedway, Loudon NH
Rey Center Skywatch	Saturday, October 10	7:00pm	Waterville Valley NH
Kimball Library Skywatch	Tuesday, October 13	6:30pm	5 Academy Avenue, Atkinson NH
Merrimack Parks and Recreation Skywatch	Wednesday, October 14	6:30pm	Wasserman Park, Merrimack NH
Robert J. Lister Academy Solar Observing	Thursday, October 15	1:00pm	35 Sherburne Road, Portsmouth NH
Merrimack Parks and Recreation Skywatch (first backup date)	Thursday, October 15	6:30pm	Wasserman Park, Merrimack NH
Merrimack Parks and Recreation Skywatch (second backup date)	Friday, October 16	6:30pm	Wasserman Park, Merrimack NH
Samuel Douglass Academy Skywatch	Friday, October 16	7:00pm	24 Townsend Hill Road, Brookline NH
Ghost Hunt/Fall MM at the Wicketts <sup>2</sup>	Saturday, October 17	6:00pm	[Members only]
Sidewalk Astronomy Skywatch	Saturday, October 17	6:00pm	Market Square, Portsmouth NH
Auburn Public School Skywatch	Tuesday, October 20	6:30pm	Preston Field, Auburn NH
Greenleaf Recreation Center Skywatch	Wednesday, October 21	6:30pm	195 Greenleaf Ave, Portsmouth NH
Robert J. Lister Academy Solar Observing (backup date)	Thursday, October 22	1:00pm	35 Sherburne Road, Portsmouth NH
Auburn Public School Skywatch (backup date)	Thursday, October 22	6:30pm	Preston Field, Auburn NH
Greenleaf Recreation Center Skywatch (backup date)	Wednesday, October 28	6:30pm	195 Greenleaf Ave, Portsmouth NH
Milton Free Public Library Skywatch	Saturday, October 31	6:30pm	Milton Town Beach, Milton NH
Epping Middle School Skywatch	Tuesday, November 3	7:00pm	33 Prescott Road, Epping NH
Bethlehem Public Library Skywatch	Wednesday, November 4	6:30pm	2245 Main Street, Bethlehem NH
Epping Middle School Skywatch (backup date)	Thursday, November 5	7:00pm	33 Prescott Road, Epping NH
First Friday Skywatch at MSDC	Friday, November 6	7:00pm	MSDC, Concord NH
GSAMA Aviation Day Skywatch	Saturday, November 7	9:00am	Concord Municipal Airport, Concord NH
Reeds Ferry School Skywatch	Tuesday, November 10	6:30pm	Lyons Road, Merrimack NH
Southeast Land Trust Skywatch	Wednesday, November 11	6:30pm	Ten Rod Farm, 195 Ten Rod Road, Rochester NH
Southeast Land Trust Skywatch (backup date)	Thursday, November 12	6:30pm	Ten Rod Farm, 195 Ten Rod Road, Rochester NH
NHAS Business Meeting	Friday, November 13	7:30pm	St. Anselm College, Manchester NH
Coffee House Night at YFOS	Saturday, November 14	5:00pm	YFOS
Rey Center Skywatch	Saturday, November 14	6:30pm	Waterville Valley NH

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

Date	Time	Lunar Phase
Sunday, October 4	5:06pm EDT	 Last quarter
Monday, October 12	8:06pm	 New moon
Tuesday, October 20	4:31pm	 First quarter
Tuesday, October 27	8:05am	 Full moon
Tuesday, November 3	7:24am <b>EST</b>	 Last quarter
Wednesday, November 11	12:47pm	 New moon
Thursday, November 19	1:27am	 First quarter
Wednesday, November 25	5:44pm	 Full moon

### Credits

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

Bruce Berger, John Bishop, *Glenn Chaple*, Tom Cocchiaro, *Kim Duncan*, Gardner Gerry, Bob Gillette, "Rags" Gilmore, Dwight Lanpher, Michael Maas, Nori Odoi, Steve Rand, Ed Ting, Dave Weaver and Paul Winalski.