



OBSERVER

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Newsletter of the New Hampshire Astronomical Society

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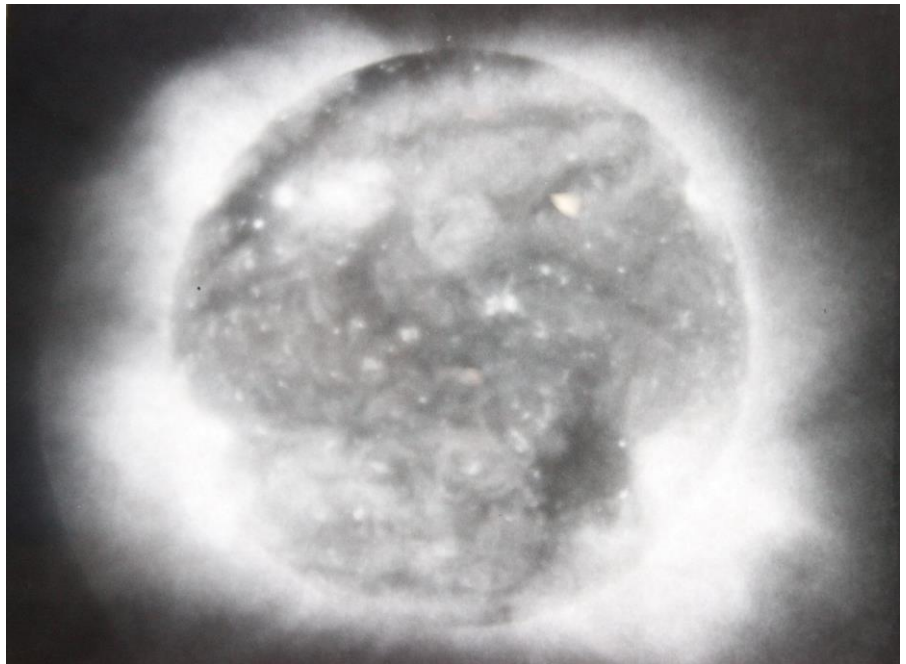
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The Sun in X-rays



The Sun in all its glory, sporting a different look in X-rays, even though the solar disk is discernable and the corona obvious. (Image on Kodak film developed by: Rich Schueller)

On a crisp December day in 1987 at the White Sands Missile Range in New Mexico, a NASA mission was launched. Tasked with imaging the Sun in X-rays with a special telescope carried well clear of Earth's atmosphere, it went on to capture the finest detail of the Sun in the X-ray band seen up to that time. The payload specialist in the team headed by Dan Moses was Rich Schueller, who was responsible for the cryogenic and vacuum systems and also for the calibration of the X-ray film.

The experiment payload was developed by American Science and Engineering (AS&E). The Wolter X-ray telescope with a focal length of 54 inches was coupled with the first CCD camera flown in space (made by EV Products), with the trusty Kodak SO-212 film as backup. X-ray mirrors will work only if the angle from the plane of reflection is very low (10 arc-minutes to 2 degrees), else the rays will be transmitted or absorbed, not reflected. These are called grazing incidence mirrors and Hans Wolter showed in 1952 that by using two such mirrors, an X-ray telescope with a fairly wide field of view could be built.

An H-alpha camera (with 0.1Å bandwidth) made by Daystar was part of the SPARCS S19 pointing system responsible for precise guidance of the two-stage Sounding Rocket that would propel the payload. The rocket's first stage was a Terrier booster, coupled with a Black Brant sustainer stage. In an imaging session of over 30 minutes with the rocket traveling at speeds of up to 7700 ft./second (5250mph), the excellent engineering of the S19 aiming mechanism kept the telescope pointed in the correct direction. The result was a 60-second exposure of the Sun through a 1 micrometer layer of aluminized polypropylene, the best X-ray image of the Sun generated up to that point.

Rich Schueller presented his personal account of that day at the August 2014 Business meeting and his article about that achievement appeared in the August 2014 edition of the Observer. (page 10).



Remembering Rich Schueller

On June 19, one of our club members died. In this issue of the newsletter there are remembrances of Rich Schueller as an EOC chair, as an advocate for the Library Telescope Program, as an astronomer and as an all-around good guy. Some of us might think this a bit unfair; they might wonder whether as much of a fuss will be made for other members that die.

There are two answers: first, Rich was very active in the club, so many more of us knew him well and so feel a loss; second, that his progress from full activity to death was rapid, so we have not forgotten him due to the passage of time. But the better, truer answer is that these remembrances and mourning are not for Rich but for us; we have suffered a loss and we need to acknowledge that. This club is the sum of its members and we have lost a term in that sum.

John Bishop
NHAS President

In Memoriam: Rich Schueller (1961-2015)



"Here's looking at you!" – Rich en route to Florida for the Winter Star Party, February 2010.

(Photo: Gardner Gerry)

He has been described as a renaissance man, but to us at NHAS he was a gregarious gesticulator and infectious go-getter that co-chaired EOC, the Educational Outreach Committee.

He initiated the in-reach skywatches program for members at Benedictine Park in Bedford, conjuring up park permits that expired at 10pm but really didn't. He was the "sound mind" that took over the Library Telescope Program when set to take off in 2010 and established the relationship with Lee Grodzins of Cornerstones of Science. He was the guy who welcomed "to the dark side" newbie amateur astronomers with ambitions to image deep sky objects, the guy who brought hot chocolate to cold volunteers at events like the Nashua Winter Stroll, and he was also the guy who sneaked a run down a kiddie slide at Reeds Ferry School when he thought no one was watching.

A new lease on life was on the cards for **Rich Schueller**, it was thought, when with his wife Susan he escaped the carnage at the finish line of the Boston Marathon 2 years ago, by not being there at the dreadful moment – they felt the need to get some lunch. But within a few months he was unexpectedly battling glioblastoma multiforme and after a series of ups and downs, [passed away peacefully at home](#) in Chelmsford on June 19, in the company of family and close friends.

The Wake at the Blake Funeral Home in Chelmsford was in the evening of Sunday, June 21, with the Funeral Mass held the following morning at St. Mary's Church on North Road, Chelmsford. Among the NHAS members attending the services were Bruce Berger, Herb Bubert, Tom Cocchiaro, Rich and Jean DeMidio, Gardner Gerry, Rags Gilmore, Stu May, Chase McNiss, Pete and Gerry Smith, Marc Stowbridge, Michelle Thomas and Dave Weaver. Ted Blank also put together [a slide show set to music](#) that was played continually at the Wake.



*Solar observing from the shade, at NEFAF 2013.
(Photo: Ted Blank)*



A couple of his prized mementoes: 4 pieces of the waste cutoff from the Wolter type I mirror on-board the Einstein Observatory launched in 1978, and the prototype of the first X-ray telescope to image the Sun in October 1963.

Ted Blank remembers his friend

I first got to know Rich as the co-chair (with Matt Amar) of the newly-formed Educational Outreach Committee (EOC).

The EOC met in the early years in the offices of Chase McNiss, where we hashed out ideas for the new website design, public outreach, helping the newly-minted McAuliffe-Shepard Discovery Center and many other new and old ideas. Rich always made everyone (including us newbies) feel welcome. The EOC continues to be a place where new members can jump in and make a real contribution to the club.

His work managing the LTP program through its "inflationary epoch" (which lasted much longer than ten-to-the-minus-32 seconds) is well known and has been a foundation of NHAS's reputation for the years since. He also organized numerous "in-reach" sky watches for members where we could help each other understand equipment and the sky without the "distraction" of trying to educate members of the public at the same time. I hope this program continues, as it was very well received.

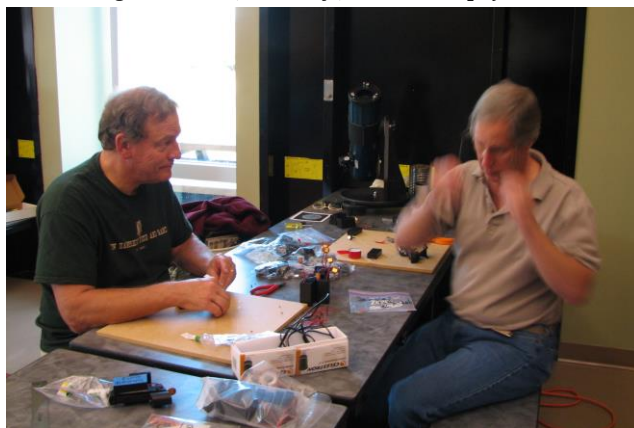
He sold me my first USB imaging camera and helped me understand all the sliders and knobs in the software so that I could attempt to get some solar images through my Lunt scope. My failures in this direction can be attributed only to the student, not to the teacher.

Rich's dream of presenting to NHAS on his work in X-ray astronomy with sounding rockets was realized last August when he spoke on this topic at our club meeting (see page 1).

Over the past year Rich and I enjoyed a weekly breakfast together at Einstein's Bagels in Chelmsford. The sight of Einstein's iconic yellow signs will always remind me of him.



(Above left and right): Listening intently as Pete Smith covers the basics of a LTP Mod procedure, and also demonstrating how not to go about it. (Below left): Rob Mack pays close attention to the blur that is Rich emphasizing a point.



*(Above right): Rich co-authored (with Marc Stowbridge and Tom Cocchiaro) the Focal Point article about the LTP that **Sky & Telescope** published on the last page of their January 2011 issue, and in October 2014, this group photograph from the last LTP Mod party of 2013 made **Sky & Telescope** as well, as part of the John Goss article about the LTP.*



*The whole enchilada, and Rich.
(All Photos: Gardner Gerry)*

Two for the Road

Gardner Gerry was Rich's mate on many an astronomically-themed adventure, not least on an excursion to Florida for the Winter Star Party in 2010. A pictorial diary of the trip, also involving a winter-resident of Florida named Bob Veilleux, follows. For benefit of old-timers in the NHAS, we are rehashing something Gardner talked to you all about at the March 2010 business meeting.

In February 2010, Rich and Gardner loaded their gear and car onto the Amtrak Auto-train down to Florida, to attend the Southern Cross Astronomical Society's Winter Star Party. The leisurely ride also allowed for the convenient transport of their astro-gear, which had all been staged and checked out prior to boarding. The gear went into the car for the journey; only the laptops and overnight bags were brought along to their sleeper berths.

Booking their sleeper berths entitled the duo to a wine tasting in the restaurant car, and thus the iconic shot on page 2 came to be.

Gardner explains the rationale behind the setup shown to the left and below right:



Destination sighted, target banner reached, but is the Ethos really the right EP for the job? He purchased this 17mm at the WSP and Rich being Rich, pretended to juggle it with two other imaginary 17mm Ethos EPs. The choice of this oceanside site was more the problem as coconuts started landing on them, forcing relocation to a circle defined by the Tiki Huts inland.

The gear is my G11 and FSQ106 (on the right in the picture. Takahashi green cap is the giveaway) and Rich's TS127 side by side. When we loaded Rich's car with his mount, scopes and gear and my G11, scopes and gear, the car was seriously overloaded. So we decided to take only one mount and use a dual scope setup. The car was still close to the limit!

In the pre-WSP setup (top left photo) we were checking if my G11 could carry the setup of Rich's TS127 with his TV-76 on top, plus my FSQ106 and Borg 50 guide scope. We took it off in one piece and it weighed 53 lbs. It took 43 lbs. of counterweights to balance, but it worked just fine.

My Horsehead image of 2010 was shot in this configuration at WSP. We observed/imaged for 1 and 1/2 nights. It was cloudy a few nights. I don't recall any double stars and I didn't keep a log. We did see the Gegenschein late one night. Bob had tremendous views of Mars in his 8" SCT the night we were imaging.



The before and after images of the Three Amigos, or is it the other way around? Sometimes it is hard to tell. The watering hole was the aptly named the Hog's Breath Saloon in Key West.



Examining the depths from the old 7-Mile Bridge that is now closed to vehicles, but pedestrians and bicyclists are welcome.

For the Transit of Venus in June 2012, Rich and Gardner went to shores of Lake Ontario in Port Bay, NY. They observed and imaged from a small parking lot overlooking the lake. 43°18'12.12"N and 76°50'38.76"W marked the spot.



The Transit of Venus experience being relived, this time in the evening.

(All Photos: Gardner Gerry)

He was the first NHAS colleague to visit me at home, when back in the early summer of 2012 he insisted on hand-delivering a piece of Baader white filter paper that could work for an 80mm scope – this was a couple of weeks before the Transit of Venus. I then showed him my newly acquired Explore Scientific 127 ED Carbon Fiber APO, which he had almost bought at NEAF the month before. But it was as he was leaving the house that I noticed something strange – he was putting his shoes back on. I always slip mine off when going into the house and must have done so on that occasion as well, and he had evidently followed suit. I will always remember that about Rich, the attention to seemingly innocuous things. This sign at Gerry and Peter Smith's place will always remind me of Rich and make me smile.



Whenever I could, I joined in at Ted's breakfasts with Rich at Einstein's Bagels (always on Tuesday mornings). Later, when Ted moved to Arizona, Bruce Berger took over and the site shifted to Panera's some 100 yards away. It was at times painful but always a matter of brotherhood, and a cycle of highs and lows. And now that cycle has been broken; so whenever possible, I will stop by at Panera's and have their cherry pie that Rich absolutely loved.

One of my prized recordings is from an LTP Mod Party featuring an impromptu prologue to a Peter Smith talk on "How to deliver an LTP unit to a Library." In less than 2 minutes, Marc Stowbridge and Rich took apart the central NH communities' mindset in a commentary that is both hysterically on-target and outrageously libelous!

I last saw him in company with Gardner when we visited Rich and Susan for a few hours on May 21, a couple of days before I left for India. It was lunch-time at the north Nashua Rehab. Facility and he was having fun with the cutlery and the 'fence' around the plate to keep the veggies in, while making idle talk. Towards the end, almost out of the blue, he looked at me and pronounced: "The ambiguous Ramaswamy!" For a moment I wondered if he had managed the right word, but one look at that arch expression removed all doubt. I did not know it then, but he had left me with an enigma, a riddle. Four weeks later, he was gone. Rich was such a funny man. I miss him.

- **Ramaswamy**



Breakfast at Panera's starring Ramaswamy, Rich Schueller and Bruce Berger.

(Photo: Bruce Berger)

Alton Central School, Alton NH, June 4

Sky conditions were very good for this event, their annual QUEST Fest. The overcast skies cleared out as predicted. There was some turbulence and residual high cloudiness, but we got in a lot of good solar observing before sunset and deep-sky observing after sunset.

I was on the hook for three indoor presentations from 5:00-7:00 PM, so I was very grateful that **Steve Forbes** and **Marc Stowbridge** were there with both white light and H-alpha solar scopes. I brought my Takahashi FSQ-104 refractor fitted with a white-light filter, along with a Coronado PST for H-alpha observing. Marc brought a Lunt 60mm H-alpha scope, which trumps the PST big-time. The Gemini-II controller on the mount for my FSQ has been wonky of late, so while I was indoors Steve put it on his brilliantly modified iOptron Mini-Tower, where it gave good service.

About 25 people showed up for the indoor presentations. I don't know how many showed up for the solar observing, as I was indoors the whole time. I estimate 15-20 for the folks showing up for the nighttime observing. My thanks to Steve and Marc for carrying the weight of the observing. My EQ mount was aligned nearly perfectly (thanks again to Steve for his assistance in pointing to true North), but the mount kept insisting it was at its slew limits, and wouldn't move properly for me. I need to figure out how to operate this thing properly. I'm too used to my entirely manual 14" TScope.

- **Paul Winalski**

Paul was already set up when I met Steve Forbes at the Alton Elementary School. Paul was busy with the inside presentation while Steve and I set up our solar scopes. We had a steady flow of kids, parents and staff lining up to see the Sun. The turnout was good, helped by the Rotary folks and their hot dog grill set up nearby (they fed us too!)

I had scored a bunch of solar glasses from the Astronomical League just a few weeks ago, so we had plenty to handout to families. They were a big hit, rather like a day-time version of a green laser. Paul came out and moved his kit to be closer to the hot dogs (or us, I'm not sure) and we were well covered with both H-alpha and white light scopes.

The weather was warm and there was a slight breeze. The sky was clear and steady. The families were enthusiastic and well behaved, even the kids. Steve and I were the last to leave around 11:30, I think. It was starting to cloud over and we all had miles to go before we might sleep.

- **Marc Stowbridge**

[The Alton QUEST Fest being an annual summer event, the following commentary by Steve Forbes regarding directions to the site is being recorded here for posterity, for all NHAS members to absorb and to follow in the years to come. -Ed.]

I was there a day early because I got the days mixed up. My advice to anyone who wishes to keep their equipment from being bounced around like it was in a Wells-Fargo stagecoach: DO NOT use Rt. 140 as will be suggested by your GPS or mapping software! That road takes you through Belmont and Gilmanton and makes the bombed out roads in Iraq seem like super highways! Instead, go on Rt. 11 East to the Laconia By-Pass, and once you have gone around Laconia, Rt. 11 continues right into Alton Bay and then Alton. The distance is a few miles longer but it's a lot smoother and takes almost the same amount of time.

Y'all have been warned!

Once you get into Alton, you will see the docks on the left along with a bunch of dockside restaurants. To the right you will see Shibley's Ice Cream stand. Just after that the road will dogleg left over the water and then back to the right. Rt. 11 and 28A are now joined and become Main Street; follow that into the downtown area. You can turn onto Church Street when you see City Hall. If you see the library on your left, you have gone too far, so take the next right onto School Street or else you will need to turn around. Continue to the intersection of Church Street and School Street.

Depending upon which one you just used, you will either go straight or turn left onto what will now be Pine Street. Take that to where it turns left and becomes Appleyard Lane. It will then lead right into the playground and parking area and then you can set up on the ball field, which where the fun is to be had. That's the only way in, or out. One last note: bring a warm jacket and a watch cap! Once the Sun goes down in the evening the temperature can plummet from the low 70s to about 50F in about one hour. I went fishing on the docks and I almost froze in the hour that I was there, and the stiff wind only made it worse.

Once again, y'all have been warned!

*Meadowbrook Dads Campout,
Waterville Valley NH, June 6*

This is a camping event for students of the Meadowbrook School in Weston, MA, and their fathers. Being from suburban Boston, all of the attendees were astounded at how dark the skies are in the Osceola Vista Campground in Waterville Valley. And I must say that it was also a treat for me as NHAS presenter, to have such dark skies as raw material for a sky watch. I'm used to battling both light pollution and ambient ground artificial light. Only background haze and relatively poor seeing due to air turbulence interfered with the views – far fewer problems than we usually have at these events.

I was the only one from NHAS at this event. I could have used some help early in the evening as we had 30-40 students and parents looking through the 14" TScope at Venus, then Jupiter, then Saturn, as sunset progressed. Venus was 1/2 illuminated (not sure if it is first or last quarter phase). Jupiter had all four Galilean moons visible. Saturn had the rings and several of the parents noticed the Cassini division and three moons on offer. For deep-sky objects, I showed Mizar, Albireo, M57, M13, M3, M81, M82, and M51.

I was very impressed by the darkness of the skies in Waterville Valley. I usually have trouble star-hopping to M81/M82, but I was able to spot M81 in my 9x50 finder, something I've never done before. The organizers were very pleased with the event, and I suspect this will become an annual event for NHAS. If we do this again, at least one other NHAS astronomer would be helpful. The lines were a bit long for a single scope to handle.

- *Paul Winalski*

*Goffstown High School,
Goffstown NH, June 10*

Steve Forbes and **Paul Winalski** were there from NHAS. Ten or so students showed up. Skies were a bit hazy and turbulent. To avoid the floodlights on the school building, we set up in the athletic field instead of in the parking lot. I was using the TeleVue 85mm and so I concentrated on Venus, Jupiter, Saturn, and double stars. Steve was showing off the deep-sky objects.

- *Paul Winalski*

*Epping Middle School,
Epping NH, June 19*

Gardner Gerry and I represented NHAS under clear skies. The parking lot lights were off until 10:00 PM, which was a godsend; we only had one bright sodium floodlight, well outside the school grounds, to annoy us.

The event started at sunset, and, unfortunately this time of year, it takes a good hour afterwards for skies to become decently dark. I showed the Moon, Venus, Jupiter, Saturn, and Mizar, and then I started fishing for things to look at, and lucked out. I found Albireo in twilight, 61 Cygni and the Ring Nebula. I then found NGC 457 in the muck to the Northeast.

Right around 10:00 PM, I got a really good view of M13; a few students got to see it, but just then the parking lot lights turned on, and that was that.

We also got an excellent view of the International Space Station, which turned out to be a very instructive sighting: it was faint at first, then rapidly gained brightness as it rose higher over the horizon, and then it suddenly faded as it entered the Earth's shadow. It had been eclipsed.

Epping Middle School tried several times to schedule an event with us this past fall, but everything got clouded out. I'm glad we got this chance to do some observing.

If we do another summer observing session, we will arrange to have the parking lot lights turned off until 11:00 PM. The teacher said she would like to have us back in the fall. I suggested scheduling something after daylight savings time ends, when sunset will occur more conveniently for us all.

- *Paul Winalski*

*[The indoor presentation and observing session for the **Lebanon Public Libraries** in West Lebanon NH, scheduled for June 18, was cancelled due to overcast conditions. It will be re-scheduled at a later date. -Ed.]*

AeroSpaceFest at MSDC, Concord NH, June 13

I showed up at the MSDC just after 9am to find Mike Townsend in the middle of setting up; we set up the pop-up tent and some chairs; we were glad of the shade later in the day. My one telescope was as simple as set it on the ground and put on the white light filter, although it still had "Facts about the Sun" stuck on it from Children's Day, which served in good stead here.

Mike Townsend had two white light and one H-alpha, whereas I had the one white light scope. Lynda Bloomberg brought her 4.5" Starblast, which wasn't used for viewing but was referred to during explanations about telescopes and their operation. Since mine didn't track, we kept it on a wide view along with the H-alpha; Mike put one white light on a group of sunspots with some magnification to show more detail and the other alternated between a full view of the Sun and for few hours on Venus, which he had found.

I took an image of the Sun through my telescope by holding the phone up to the eyepiece. One woman was very interested in this and spent some time trying it on the various telescopes, so I joined her. H-alpha views in particular are very hard to get a good image of, but the image below is probably the best in white light.



AeroSpaceFest was a steady trickle throughout the day. Rarely more than seven people, with frequent stretches of no one, but those periods were refreshingly short for most of the day and a bit longer as

the afternoon wore on. I expect **Lynda Bloomberg, Marion Hochuli, Dan Smith, Mike Townsend** and I regaled about 50 people with views of the Sun and Venus.

- **"Rags"**

Mike Townsend adds:

There were four of us from NHAS and we had enough scopes between us, though the event could have been better attended. Solar observing on my scopes was done on the 60mm Coronado H-alpha, with the Takahashi FS102 used for white-light and for tracking Venus in daylight, while the TV101 was used strictly for the Sun in white light. I found Venus (using binoculars) by 10:45am and switched the Tak to it, after removing the white light filter of course! We viewed it till about 3pm, when a little girl pulled it off target and haze prevented any recovery of Venus. Dan Smith was around for about 1.5 hours; in fact when Venus was lost, he spotted it once with his binos but then lost it in the haze again.



The wonder of the first look in H-alpha light at a prominence. It might well sink in, over time. But looking at Venus in broad daylight (below) is likely to be remembered and wowed about.

(All Photos: "Rags" Gilmore)



Market Square Day, Portsmouth NH, June 13

The weather was looking grave for Market Square Day in Portsmouth just days before the event as was the list of volunteers willing to travel out on the off chance the clouds would clear early as the forecasts predicted. As always, however, a handful of dedicated NHAS regulars travelled from all over the state to share the wonders of the Sun with literally thousands of passers-by – adults, teens and toddlers who stopped by our booth and were awestruck by the views.

The first volunteers arrived between 6:30 and 7am to set up the tent, tables and literature; the crew of **Pete and Gerry Smith, Marc Stowbridge, Gardner Gerry** and **Tom Cocchiaro** went about the business of staging equipment and materials in preparation for a 9am start. **Larry LaForge** joined up later in the morning, just in time for the flood of humanity. Early clouds quickly gave way to clear blue skies with a sliver of the new moon just barely visible above the North Church steeple. The Sun was at its dazzling best throughout the day with some sunspots and solar prominences to show off.

A special thanks to the NHAS volunteers who came out and spent the entire day on the street, without a break, baking under what became a very hot sun. Your efforts were greatly appreciated by all who dropped by the NHAS booth.

- **Tom Cocchiaro**



Gerry and Pete Smith, Gardner and Marc, not necessarily in Tom's shadow from behind the camera. Larry LaForge joined them soon thereafter. By midday, the crowd was appreciable and appreciative. (Photos: Tom Cocchiaro)



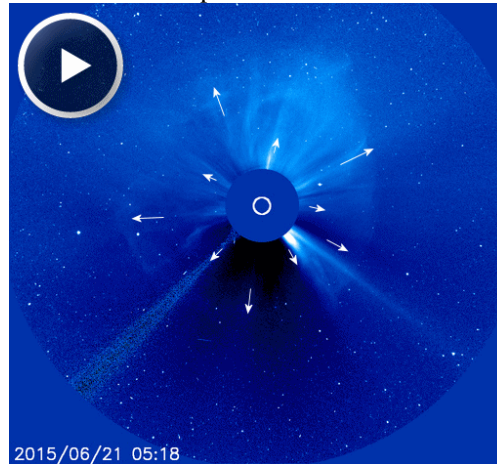
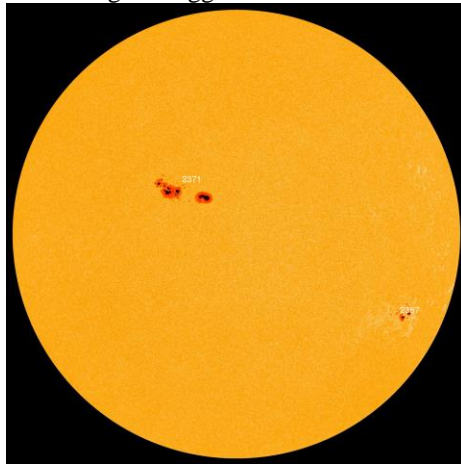
(Left): Pete Smith has a young customer for a white-light view of some sunspots. (Below left): Gardner Gerry showing off prominences with his H-alpha PT Lunt. (Below right): Pete, Marc and Gardner parked in statue-mode as racers whiz by. (Photo by: Gerry Smith)



Auroras at the Solstice, June 22

For reasons not yet known to mankind, aurora displays prefer the time around the equinoxes; the booking of aurora watching tours is usually in September and March. But the summer solstice this year saw some exceptional aurora borealis displays. Here in New Hampshire, the colors barely rise much above the horizon, yet as **Larry LaForge** reported from Wilton NH on June 23: “Clouds opened up (last night) and my wife and I observed a nice bright irregular band low on the northern horizon between 11:30pm and 12:30am. Pillars would creep up to about halfway to the north star. Waves of flashing also observed.”

It was all the handiwork of AR2371 that swung into view on June 17 and went into action the very next day by unleashing the biggest solar flare in 2 months – an M3-class explosion whose CME would deliver only a glancing



The SOHO view of the Active Region 2371 and the LASCO C3 view of the Full Halo CME. (Courtesy: SOHO/ESA/NASA)

blow to the Earth's magnetic field. With its unstable 'beta-gamma-delta' magnetic field harboring energy for strong explosions, a succession of CMEs was in the cards and on June 21, SOHO caught view of a Full Halo CME. By June 22, a severe G-4 class geomagnetic storm was in progress, under conditions to sustain it for many hours. In the meantime, AR2371 erupted again on June 22 and X-ray and UV emissions from that M-6.5 flare caused radio blackouts here on Earth, not to mention another major CME was headed our way. On June 22, aurora was visible as far south as Georgia and Arkansas, and this G-4 storm was dubbed the *Solstice Storm of 2015*. From June 21 onward AR2371 generated CMEs on a daily basis until it swung out of view by June 27. It was quite a week and then it went very quiet.

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EOS 6D, ISO 6400, 16mm, f/2.8, 10-second exposure; applied a curve to improve the exposure to bring out the colors a bit more. (Both Images by: Dave Weaver)

Aurora through the clouds taken by Dave Weaver at 1:36am on June 22-23, when the storm was at Kp=7. The Kp index went up to 8 at 2AM, but by then it was too cloudy.



EOS 6D, ISO 6400, 16mm, f/2.8, 8.3sec, cropped; this one has the auto tone correction from Photoshop, and so the colors are probably more accurate.

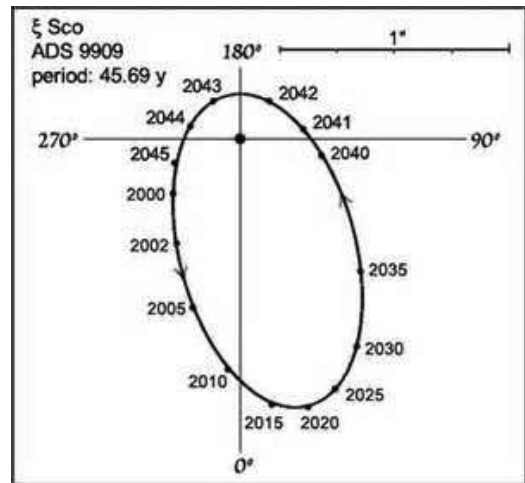
Xi (ξ) Scorpii (Σ1998) – Double Star in Scorpius

by Glenn Chaple

Our cosmic wanderings take us 93 light years away to xi (ξ) Scorpii (Σ1998), located in the Scorpion’s northwest corner. A 60mm refractor magnifying 60X will reveal two stars (xi Scorpii A and C), of magnitudes 4.9 and 7.3 and separated by 7.0”.

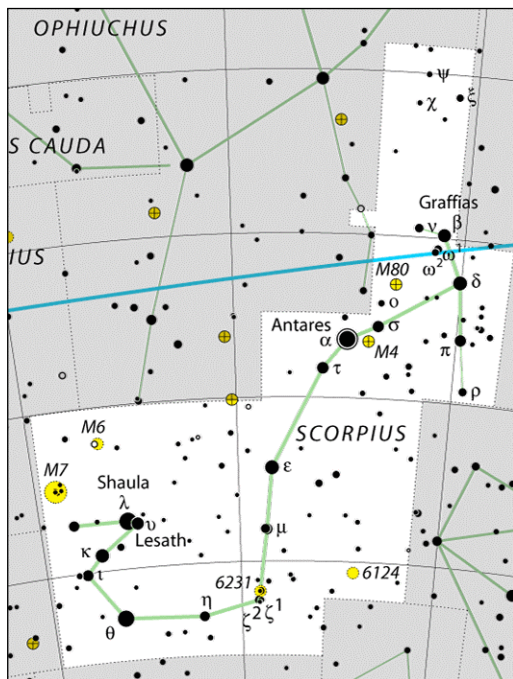
If the seeing is extremely steady, check out the brighter star with a larger scope (minimum aperture of 4 inches) and magnification of 150X or more. You should capture a magnitude 5.2 companion (xi Scorpii B) just 1.1” away. Xi Scorpii A and B is a binary pair with an orbital period of about 46 years. As the diagram shows (right), they are currently at near greatest separation.

When I first viewed xi Scorpii with a 3-inch reflecting telescope in the summer of 1971, I was surprised to see a faint double star in the same field. I had “discovered” Σ1999 (magnitudes 7.5 and 8.1; separation of 11.8”). Although nearly 5 minutes of arc separate Σ1999 from xi Scorpii, the two have the same common proper motion and are likely gravitationally bound.

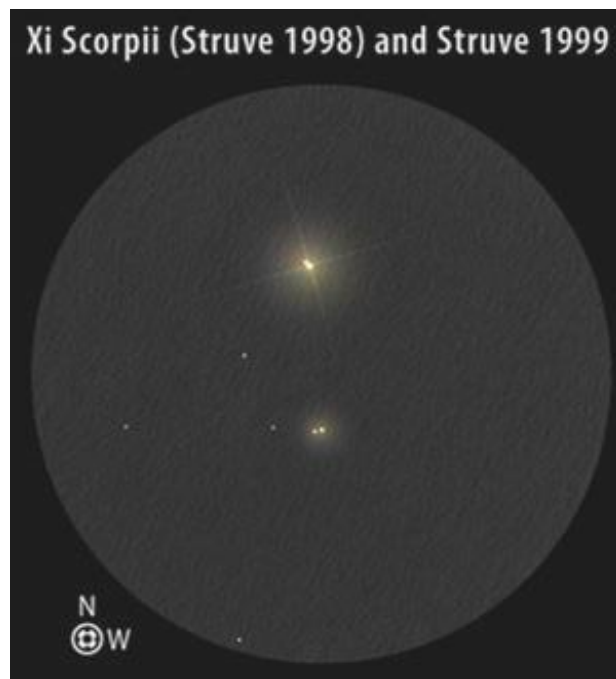


(Courtesy: www.dibonsmith.com)

When viewing xi Scorpii and Σ1999, pay close attention to the colors of their component stars. Xi Scorpii A and B are F-type stars, while C is a cooler G8 dwarf star. Both Σ1999 stars have K class spectra. What colors do you see?



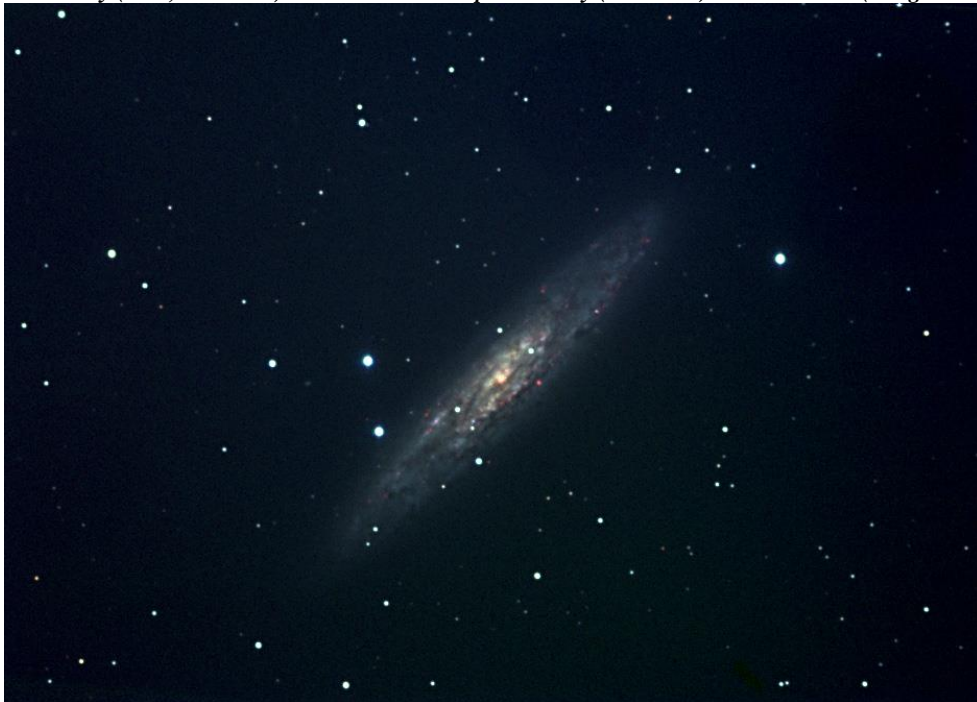
(Courtesy: www.constellation-guide.com)



Sketch by Jeremy Perez (www.perezmedia.net)

From the Dark side

*The Triangulum Galaxy (M33, NGC 598) **above** and the Sculptor Galaxy (NGC 253) **below**. (Images: Rich Schueller)*



The monthly business meeting was held at MSDC, Concord NH on June 12th, with our President **John Bishop** presiding. The Treasurer's report by "**Rags**" follows on the next page. The evening's program took place in the reverse of the usual order, with the guest speaker **Prof. Daryl Haggard** going first. This report will however keep to the usual structure, with the presentation being covered last.

President's Report

Ed Ting will be presenting "*What Telescope to Buy*" at the October meeting at MSDC, and it will be open to the public outside the pay-wall. More publicity is needed and **John Bishop** has the action item to contact WMUR to put them in the know to put the public in the know.

Stellafane still needs a coordinator. And NEFAF 2015 is unlikely to happen. **RP Hale** is giving up his position as Education Director at MSDC, and John has to find out who the successor is to be.

The Summer Barbeque is to be at the **Byrnes'** in Bedford, and the Observing might be at Benedictine Park. We need a coordinator; please bring your pot-luck contribution.

Other Reports

YFOS: (Larry Lopez)

Thanks to the two volunteers for the mowing: **Linda Lopez** and **Steve Forbes**. But we need more people. Also need a push mower to get into small and odd places.

Speaker Search Committee: (Michelle Thomas)

Found speakers for the whole year by June, but the long lead time means that we have start on the 2016 speakers pretty soon.

Book of the Month

Marc Stowbridge presented the Smithsonian "*Stars*" book. It is very compact and has excellent charts of the constellations.

Astronomy Shorts

Larry Lopez: at Messier Marathon used his observatory as a point and shoot camera to image the objects.

"Rags": has snagged a Coulter 17.5 dob, vintage 1983.

The Evening Presentation

Prof. Daryl Haggard of the Department of Physics and Astronomy at Amherst College spoke about her research on Active Galactic Nuclei (AGN) and their host galaxies in a talk entitled: "*The Milky Way's Black Hole Laboratory*." By all accounts, it was a thrill for the attendees. Alas, no video of the talk is available to NHAS members absent that day!

Paul Winalski reports on the talk:

It is always a delight to hear information straight from the original researchers. It is especially so when we have such an eloquent and enthusiastic presenter. I was captivated, enthralled, and entertained by her presentation of research regarding the core of our home galaxy, the Milky Way.

It is by this point well established that the Radio Astronomy object long called Sagittarius A* can be, by our present knowledge of Physics, nothing other than a super-massive black hole. It's unfortunate that opaque dust clouds obscure direct observation of the galactic core in visual light. Dr. Haggard's research involves analysis of infrared and especially X-ray spectrum images of the core of the Milky Way.

One surprising observation is that the super-massive black hole is absorbing a lot less matter than we originally thought would be the case. Apparently most matter falling in just gets sling-shot around the black hole and then back out again.

There is an open star cluster closely orbiting the black hole that consists of mostly what appear to be spectral class B main sequence stars. Finding such a young cluster so close to the center of the galactic core is somewhat surprising. These stars may not be what they seem to be.

We have recently observed what appears to be a gas cloud falling on a direct trajectory into the black hole. This cloud has not behaved as predicted and is being tracked closely.

This was by far the best NHAS guest lecture I've heard since [we had Dr. Brian Marsden 9 years ago.](#)

"Rags" concurs and adds:

The spin axis of the supermassive black hole SA* (ess alpha star – the nomenclature got its own segment, being counter-intuitive) is not perpendicular to the plane of the Milky Way, which is what one would expect. It's about 16 degrees off, as was determined by studying the accretion disc. Very intriguing.

Daryl was also quite impressed with the number of sky watches and outreach we do; she said that just about no one she knows looks through telescopes and most don't even know how to use one, which is a relatively recent development that she considers a loss. Fortunately NHAS and those like us are doing our part to inspire the next generation of astronomers.

NHAS Treasurer's Report (as of June 9, 2015)

Starting Checking Balance:	\$12,101.62	Membership:	129
Deposits:		Single + Family	
Membership	38.44	Cash Renewals:	0x30.00+0x10.00 0.00
Donations	0.00	Cash New Members	0x30.00+0x10.00 0.00
Interest	0.33	PayPal Renewals:	1x28.83+0x 9.61 28.83
Total:	\$38.77	PayPal New Members:	0x28.83+1x 9.61 9.61
Expenses Paid:		Total:	1 \$38.44
Rackspace Cloud (Web site)	58.06	Current Members:	130
Cornerstones of Science	318.00	<i>[15 Family memberships; 65 members paid by PayPal]</i>	
Total:	\$376.06	New Members:	<none>
Current Checking Balance:	\$11,764.33	Donations:	
Petty Cash:	\$100.00	Total:	\$0.00
Current Cash Balance:	\$11,864.33		
EOC Share:	\$6,801.52		

Contact Information

How to join NHAS

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

Send Email to: 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

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

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 α /B600PT H-alpha Solar Telescope

Custodian: Pete Smith
Contact: 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.



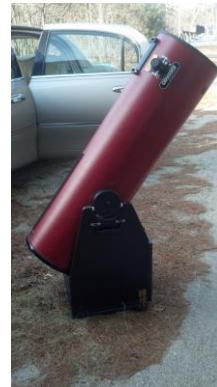
Orion XT6 – 6" Newtonian on a Dobsonian mount

Custodian: Tom Cocchiaro
Contact: tomcocchiaro@comcast.net

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

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

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

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

Amateur Astronomical Society of Rhode Island (North Scituate, RI)
www.theskyscrapers.org

Amateur Telescope Makers of Boston
(Westford, Mass.)
www.atmob.org

Astronomy Society of Northern New England (Kennebunk, Maine)
www.asne.org

Gloucester Area Astronomy Club
(Gloucester, Mass.)
www.gaac.us

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

Northeast Kingdom Astronomy Foundation (Peacham, VT)
www.nkaf.org

North Shore Astronomy Club
(Groveland, Mass.)
www.nsaac.org

Penobscot Valley Star Gazers
(Bangor, Maine)
www.gazers.org

Online Live Observatories

Astronomy Live (broadcasts)
www.astronomylive.com

SLOOH (Tenerife, Canary Is.)
www.slooh.com/about.php

Worldwide Telescope
www.worldwidetelescope.org

Magazines

Astronomy
www.astronomy.com

Sky & Telescope
www.skyandtelescope.com

Astronomy Gear

Adorama
www.adorama.com

Agena AstroProducts
www.agenaastro.com

Astromart
(Used equipment and advice)
www.astromart.com

Astronomy-Shoppe
(in Plaistow, NH 03865)
www.astronomy-shoppe.com

Celestron
www.celestron.com

Cloudynights
(Used equipment, Articles, Forums and Reviews)
www.cloudynights.com

Explore Scientific
www.explorescientific.com

High Point Scientific
www.highpointscientific.com

Kendrick Astro Instruments
www.kendrickastro.com

Lunt Solar Systems
www.luntsolarsystems.com

Meade Instruments
www.meade.com

Oceanside Photo & Telescope
www.optcorp.com

Orion Telescopes
www.telescope.com

ScopeStuff
www.scopestuff.com

Stellarvue
www.stellarvue.com

TeleVue
www.televue.com

Vixen Optics
www.vixenoptics.com

William Optics
www.williamoptics.com

Astronomy Web Sites

CalSky
(Sky Calendar to plan Observing)
www.calsky.com

Free Star Charts
(Star Charts for MM, Planets etc.)
www.freestarcharts.com

Heavens Above
(on Satellites, Spacecraft, Planets)
www.heavens-above.com

NASA
www.nasa.gov

Dark skies Observing Sites
(Horizons and Clear Sky information)
www.observingsites.com

ScopeReviews
(Reviews by Ed Ting, NHAS)
www.scopereviews.com

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

SpaceWeather
(Solar activity, Asteroid passes)
www.spaceweather.com

Computer Software

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

Celestia
www.shatters.net/celestia

Computer Aided Astronomy (Free)
www.astrosurf.com/c2a/english/

Earth Sky Tonight
www.earthsky.org/tonight

SkyMap Online
www.skymaponline.net










Starry Night
(many versions, Novice to Expert)
www.starrynight.com

Stellarium (Free)
www.stellarium.org

WinStars (Free)
www.winstars.net/english/

Event	Date	Time	Location
First Friday Skywatch for MSDC	Friday, July 3	7:00pm	MSDC, Concord NH
Chester Library Skywatch	Tuesday, July 7	8:30pm	Wason Pond, Chester NH
Chester Library skywatch (backup date)	Thursday, July 9	8:30pm	Wason Pond, Chester NH
NHAS Business Meeting	Friday, July 10	7:30pm	St. Anselm College, Manchester NH
Coffee House Night at YFOS	Saturday, July 11	5:00pm	YFOS
Castle in the Clouds Skywatch	Tuesday, July 14	8:00pm	455 Old Mountain Rd, Moultonborough NH
Lake Morey Resort Skywatch	Wednesday, July 15	9:00pm	1 Clubhouse Road, Fairlee VT
Community Roots Skywatch	Saturday, July 18	8:00pm	118 North River Road, Lee, NH
Rey Center Skywatch	Saturday, July 18	9:00pm	Waterville Valley NH
Mary E. Bartlett Library Skywatch	Tuesday, July 21	8:00pm	22 Dalton Road, Brentwood NH
Mary E. Bartlett Library skywatch (backup date)	Wednesday, July 22	8:00pm	22 Dalton Road, Brentwood NH
Mary E. Bartlett Library Skywatch (second backup date)	Thursday, July 23	8:00pm	22 Dalton Road, Brentwood NH
Lane Memorial Library Skywatch	Friday, July 24	8:30pm	931 Ocean Boulevard, Hampton NH
Sidewalk Astronomy Skywatch	Saturday, July 25	6:00pm	Market Square, Portsmouth NH
Gafney Public Library Skywatch	Wednesday, July 29	8:00pm	3 High Street, Sanbornville NH
Gafney Public Library Skywatch (backup date)	Thursday, July 30	8:00pm	3 High Street, Sanbornville NH
Lane Memorial Library Skywatch (backup date)	Friday, July 31	8:30pm	931 Ocean Boulevard, Hampton NH
Community Roots Skywatch (backup date)	Saturday, August 1	8:00pm	118 North River Road, Lee, NH
Madison Old Home Week Skywatch	Tuesday, August 4	7:00pm	1381 Village Road, Silver Lake NH
Goffstown Public Library Skywatch	Wednesday, August 5	8:30pm	North Mast Rd (Rt 114), Goffstown NH
Rindge Recreation Dept. Skywatch	Thursday, August 6	8:30pm	283 Wellington Parka Rd, Rindge NH
First Friday Skywatch for MSDC	Friday, August 7	7:00pm	MSDC, Concord NH
Nesmith Library Skywatch	Monday, August 10	7:30pm	8 Fellows Rd, Windham NH
Castle in the Clouds Skywatch	Tuesday, August 11	8:00pm	455 Old Mountain Rd, Moultonborough NH
NHAS Business Meeting	Friday, August 14	7:30pm	MSDC, Concord NH
Coffee House Night at YFOS	Saturday, August 15	5:00pm	YFOS
Rey Center Skywatch	Saturday, August 15	9:00pm	Waterville Valley NH
Nesmith Library Skywatch (backup date)	Monday, August 17	7:30pm	8 Fellows Rd, Windham NH
Goffstown Public Library Skywatch (backup date)	Wednesday, August 19	8:30pm	North Mast Rd (Rt 114), Goffstown NH
Sidewalk Astronomy Skywatch	Saturday, August 22	6:00pm	Market Square, Portsmouth NH
Harrisville Public Library Skywatch	Friday, August 28	8:00pm	76 Prospect Street, Harrisville NH

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

Date	Time	Lunar Phase
Wednesday, July 1	10:20pm EDT	 Full moon
Wednesday, July 8	4:24pm	 Last quarter
Wednesday, July 15	9:24pm	 New moon
Friday, July 24	12:04am	 First quarter
Friday, July 31	6:43am	 Full moon
Thursday, August 6	10:03pm	 Last quarter
Friday, August 14	10:53am	 New moon
Saturday, August 22	3:31pm	 First quarter
Saturday, August 29	2:35pm	 Full moon

Credits

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

Bruce Berger, John Bishop, Ted Blank, *Glenn Chaple*, Tom Cocchiaro, Steve Forbes, Gardner Gerry, "Rags" Gilmore, Rich Schueller, Gerry Smith, Marc Stowbridge, Mike Townsend, Dave Weaver and Paul Winalski.