



# OBSERVER

Vol. 2015, No. 4

Newsletter of the New Hampshire Astronomical Society

April 2015

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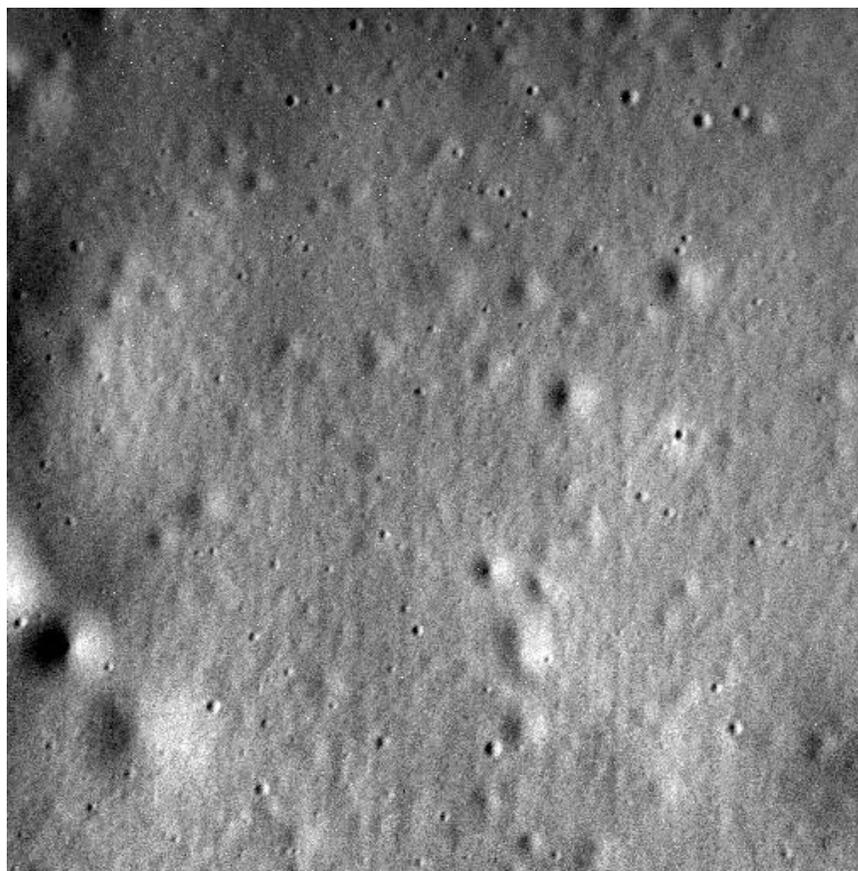
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## *The Parting Shot*



*The Last Image transmitted by MESSENGER*

*(Courtesy: JHUAPL/NASA)*

*At 3:26pm on April 30, 2015 the spacecraft that had been orbiting Mercury since March 18, 2011 slammed into the surface of the innermost planet of the Solar system. Having exhausted its on-board fuel and unable to maintain a stable orbit, MESSENGER's Surface, Space ENvironment, GEochemistry and Ranging created a crater on the side of the planet away from Earth. During its 4-year mission, perhaps the most surprising of MESSENGER's discoveries was that Mercury is one of the coldest planets in the Solar system. Since the planet's rotational axis has practically no tilt, interiors of the craters at its poles receive no sunlight and the temperature on their inner surfaces can be less than -280°F. Radar imaging has confirmed signatures consistent with presence of water ice. Mercury also appears to have a global magnetic field generated by an active dynamo and a liquid-metal core, which may make up to 60-70% of the planet's mass. And would you believe that Mercury's ultra-thin exosphere (that is known to contain hydrogen, helium, sodium, potassium and calcium) is stretched out into a comet-like tail as long as 2 million km as it is buffeted by the intense solar wind?*

***Spring is Here!***

Now that it's warming up, and it's no longer uncomfortable to be outside in the evening, the public is more willing to come to our events. But more people means we need more telescopes!

I've heard people express a doubt that they knew enough to answer questions or find obscure objects. It can be daunting if you compare yourselves to some of the super-knowledgeable members. But if you can point your

telescope at the Moon or Jupiter, that's all that's required! No matter how much of a beginner you are, you already know far more than most of the general public. If you just point out Orion and Canis Major, explain that the galaxy is bigger than the Solar System, then you'll impress them. For any other question, you can just say you don't know and suggest they ask some other member.

So give it a shot; I hope to see you there!

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

***Sky Watch Review******John Stark High School,  
Weare NH, April 15***

Skies were clear and seeing improved as the evening progressed. The teacher, **Kevin Munroe**, was able to get all of the parking lights and school floodlights turned off, which was a big plus. Kevin was operating the school's telescope, an Orion XT8. We had 15-20 students over the course of the evening. NHAS members participating were **Gardner Gerry, Steve Rand** and **Paul Winalski**.

Objects that I showed in the 14" TScope: Venus, Jupiter, M42, Castor, Gamma Leonis, M44, M45, M35, M3, M81, M82, and Comet Lovejoy. Gardner showed a shadow transit of Europa across the middle of the Jovian disk. There was also an ISS pass. We watched for the predicted SpaceX Dragon capsule pass, which was supposed to be of 2nd magnitude, but we didn't see it.

- ***Paul Winalski***

***Beech Hill School,  
Hopkinton NH, April 21***

This event took place under clear skies. For a site so close to Concord, it was quite dark once the school figured out how to turn off the parking lot lights. There was also a loud chorus of frogs all evening from the nearby beaver pond.

Other NHAS members present: **Gardner Gerry, Ramaswamy** and **Steve Rand** There were about 20 students, parents, teachers and neighbors.

I had both the 14" TScope and the TeleVue 85mm refractor set up. I showed: the Moon, Venus, Jupiter, Mizar, M44, M35, M3, M81, M82, and even Comet Lovejoy which still shows well-defined structure. We also saw a long pass of the International Space Station.

- ***Paul Winalski***

***J A Tarbell Library,  
Lyndeborough NH, April 28***

**Gardner Gerry** and **I** were representing NHAS. A handful of library patrons and some of the library and school staff showed up. The site was very good, as all lights on the school building were turned off. Unfortunately, sky conditions progressively deteriorated and the sky was completely clouded over by the time it really got dark.

I set up the TeleVue 85mm refractor and showed the Moon, Venus, and Jupiter. The librarians had brought their library telescope with them and they got in good practice finding objects with it.

- ***Paul Winalski***

*[Sky watch events scheduled for Sanborn Regional Middle School, Goffstown High School, Gordon-Nash Library, Daland Memorial Library and Maple Avenue Elementary School's 3rd Graders had to be cancelled or postponed to a later date due to bad weather conditions. —Ed.]*

## Three Scopes of Three Months

*[There really wasn't a "Scope of the Month" talked about at the **January Business Meeting**, but when the **Smiths** go to town on a proper Solar scope, then acquire an EQ mount for it at a pot-luck, and finally buy the clock-drive, it is time to take notice. –Ed.]*

### Lunt LS50THa

Ever since attending a Solar skywatch with **Ted Blank** a few years ago and comparing the views from his Lunt to the views from our XT8 with Baader white-light filter, both my wife Gerry and I have wanted an H-alpha scope. In December (2014), we decided to buy the Lunt LS50THa, partly because it fit our budget and partly because of the good reviews it had.

The scope came nicely packaged in custom-fit dense foam in a cardboard box. It could easily be customized into a hard case, but that's a story for another day. It has a mount that accepts a Tele Vue Sol Searcher but it is not included, so the Sol Searcher was our first accessory purchase.

At the NHAS December pot-luck, we scooped up an Orion EQ1 mount from **Ed Ting**, and to complete the package I added Orion's 1/4"-20 adapter which fit the threaded mount holes in the scope. Then on one very cold day in my kitchen, I assembled all this and tried to get some views of the sun. I quickly realized that even though this is a relatively small scope, having a single bolt holding it to the mount was just not enough. The scope had a bad habit of spinning no matter how tightly I cranked the mount screw. The Orion adapter has only a single 1/4"-20 bolt to attach the scope, but the Lunt has 3 threaded holes. I fabricated a stainless steel stud to act as a guide pin in the scope and then drilled a matching hole in the Orion adapter. Now the Lunt is fastened securely to the adapter with no spinning.



*The Lunt OTA with Sol Searcher in place.  
(All Photos: Ed Ting)*



*The Lunt on the EQ1 mount (left), with the special mods for secure fastening (right).*



We had several good days of viewing in January. The Lunt gives fair surface detail and some nice views of the flares and prominences. I am not experienced enough to offer up an opinion on how it compares to costlier Lunt models, but I am pleased with the views so far.

Then **Gerry** decided that one push-to scope (our XT8) was enough for our family.

She bought me Orion's motorized drive for the EQ1 mount. The drive assembled very easily but I did not like the set screws that came with it. I really wanted thumb screws so that I could move the scope manually whenever I wanted (I guess I'm a push-to guy at heart). So after a quick visit to the local hardware store and little bit more fabrication, I had the thumbscrews I wanted.

I am pleased with the scope and the mount. They fit well together and even with my sloppy polar alignments, the scope tracks its target quite well.

- **Pete Smith**

### *Takahashi-Mewlon 180 [February]*

If you could have one scope, what would it be? Made my head spin thinking about it. Luckily I had a very good mentor when I first started out. Did I listen to him every time? No. Did I pay the price for not? Mostly, Yes. What does this have to do with the Mewlon, you might ask? I started asking myself: is there a Swiss Army knife of telescopes? I think I came up with the Mewlon, or maybe my mentor did, but either way it was a good scope. I started reading every review that I could find on it. The overall theme of the reviews were:



*The Takahashi-Mewlon 180.*

*(All Photos: Pat Adams)*

Excellent build quality (it's a Takahashi)  
Doesn't dew up (a bonus in New England)  
Refractor like views  
No color (CA)  
Long focal length  
Finder scope can be used as a carry-handle  
(and it is also an excellent finder).

The down side: there are diffraction spikes on bright stars from the secondary spider. This is to be expected. The images that this scope provides are excellent. The first time I saw the Moon through it, I felt like I was looking at an HD version of it. The detail is amazing.

#### **The Specifications:**

Effective Aperture - 180mm  
Focal Length - 2160mm  
(1763mm with Takahashi's focal reducer)  
Focal Ratio - F/12 (F/9.8 with the reducer)  
Diameter of the main tube - 210mm (~8.25")  
Secondary mirror diameter - 54mm (or 30%)  
Weight of main tube assembly - 6kg (13.2 lbs)  
Length of the main tube assembly is ~22"

I have not gone above 200x, so I am not sure where it starts to fall apart. When **Mike Townsend** collimated it, he said that it has trouble holding collimation over 450x. I'm okay with that. On Saturn, the Cassini division is readily apparent, but I think what struck me the most is the black bit between the rings and the planet is **BLACK**. The contrast on the scope is amazing. Even when the first stars pop out and you look through the scope the background is well... blacker.

As all good mentors will do, he finally was tired of hearing me talk about the Mewlon, so he found one, bought it, and then made me buy it from him. What a guy! All kidding aside, I'm glad for the help and a little kick when I need it.



*Front and Rear views. What else is there to say – it is a Takahashi. And what's more, it is a Number 2, not a Number 6!*

A closing thought: when I brought the scope up to the February meeting as the "Scope of the Month," **Gardner Gerry** looks at it and asks this is #2? I look at the serial # and sure enough it says SER# 00002. That's cool!

- *Pat Adams*



### *Telescope World 12" F/6 Newtonian [March]*

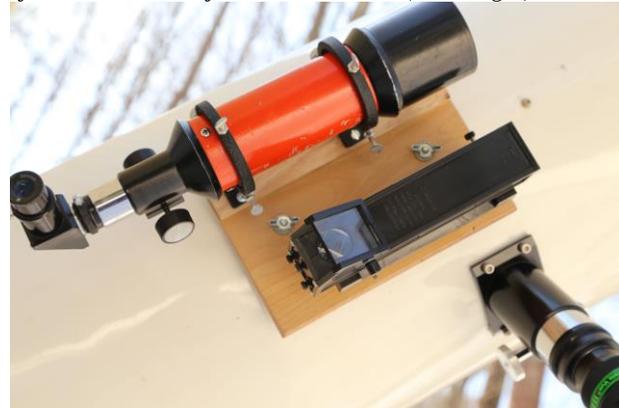
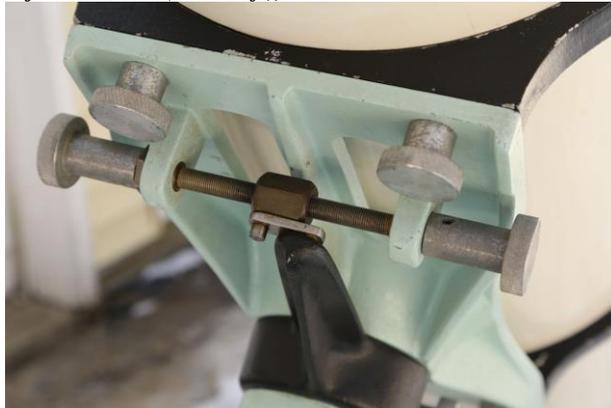
I purchased this Telescope World 12-inch F6 around 1980, my first big scope. Telescope World (Hayward California) manufactured a line of large equatorial-mounted Newtonians for a few years in the early '80s. It was cobbled together with various standard components available from the principle manufacturers of the day, but the light-blue mount appears to be largely their own make. The large stable mount was what attracted me to this scope after using some of the popular, but more-wobbly mounts provided by Cave and Meade with their larger reflectors of the era. The hefty mount is cast aluminum, with 4-inch diameter shaft housings and 2-inch solid stainless steel shafts and bearings. The clock drive features a 10-inch brass gear. All the bolts and fittings are either stainless, brass or aluminum. The counterweights are 10lbs and 75lbs. A 12-inch tangent arm with threaded brass rod provides a smooth declination fine-adjustment. A similar hand-adjustment is located on the pier for changing the polar shaft's altitude. Stainless/brass leg-levelers stabilize and level the mount after it has been rolled out on small casters.



*At Home at Stellafane (All Photos: Rob Mack)*



*Close-ups of some of the finer points: the EQ head (top left), the clock drive gears (top right) and the Declination fine-adjustment arm (below left), as well as the removable wooden platform with a 60mm finder and a Telrad (below right).*



The optical tube unit (OTA) includes the 12.5-inch primary (2-inch thick) on a 9-point flotation mirror cell. The solid tube is about 1/2 inch thick and made of some sort of epoxy-infused material. The mirror has a wonderful figure and on rare nights of great seeing, one can see pinpoint star images at 600x. The scope has picked out Pluto and a few of the globular clusters in M31 from light-polluted, but steady, skies.

The interesting home-made feature includes my removable wooden platform that holds a 60 mm F4 finder and a Telrad. For ease of transport, I simply wing-nut on/off the removable platform, using bolts pre-installed in the

original finderscope mounting holes in the OTA. Interestingly, the 60 mm finder is a modification of my first scope (a Sears 60mm refractor) that I cut down and fitted with a 60mm F4 objective from A. Jaegers. I have a second interchangeable platform with a small finder and a piggy-back camera mount for an SLR.

This is a great scope for rolling out of the garage onto the paved driveway or keeping on a pier in the backyard. It is good to go in minutes. But a trip to a dark sky site or observing party is a workout due to the weight of the components: equatorial head and pier are about 150lbs, counter-weights 85lbs and the OTA 75 lbs.

Add a 2" Panoptic eyepiece and you're in for a body-building session in breaking it down and setting it up for travel. But observing deep-sky objects with it in dark skies is breathtaking, but it's more likely that this bad boy will be gracing the back yard and at the ready for impromptu observing fun and planetary imaging.

- **Rob Mack**

### *A Total Lunar Eclipse – Blink and You'd have missed it*

*[On April 4, it was time for the Full Moon to undergo an eclipse to pair with the March 20 Total Solar Eclipse. It was to be a Total eclipse with a difference – whereas TSEs manage only a few precious minutes of totality, TLEs are somewhat leisurely affairs, usually lasting an hour. This one was different. Totality lasted about 5 minutes and it was not visible from the east coast of the US in any case because it occurred about 90 minutes after moonset. But these days we have a member living three convenient time-zones away and presumably with no overcast! –Ed.]*

The sky was fairly clear here in Arizona for Saturday morning's Total Lunar Eclipse. In this montage of images I took, the Moon is seen at various times during the eclipse. I have drawn a circular outline of the (invisible) shadow cast by the Earth to indicate the very slim margin by which the Moon just made it completely into the Earth's shadow, making this barely a total eclipse.

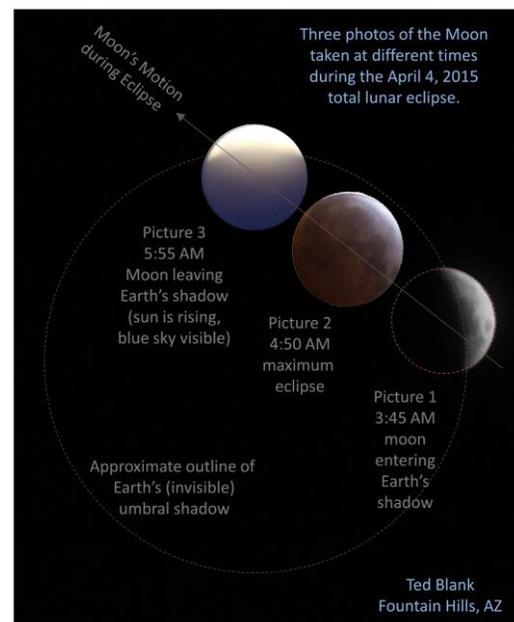
As the northern edge of the Moon slipped into Earth's umbral shadow, even at the maximum eclipse I could still see some sunlight illuminating the north pole of the Moon. That image makes it look brighter than it really was, in order to bring out the red color on the dimmer parts of the Moon. The reddish glow is due to light from all of the sunrises and sunsets on Earth scattered into the umbral shadow. Eclipses happening just after significant volcanic eruptions (which put lots of particulate matter into the atmosphere) have the darkest, reddest Moon at maximum eclipse.

**Aristarchus of Samos** (circa 310-230 BC) was the first to notice that the rounded shadow of the Earth on the Moon during a lunar eclipse was strong evidence that the Earth was round, and not flat as most people thought at the time.

- **Ted Blank**



*Brian Mack and Rick Lilly on a body-building exercise at Stellafane. (Photos: Ted Blank)*



*Annotated montage of images of the Moon during TLE.*

### *A Trip Report, April 19*

The pilgrimage to Suffern this year was undertaken on the Sunday for the first time, on April 19. Travel was easier with the later start, as doors at the exhibit hall opened only at 10:30am (Saturday hours are from 8:30am). I also got to attend the keynote address at the Celestron Theater, the last item on the agenda for the day and the event. **Steve Rand** (heading to his first NEAF) and I carpoled, while **Mike Townsend** and **John Rose** had **Larry Lopez** and **Dan Smith** along for their ride. Not too many NHAS members attended the second day, it would seem.

The pace of the day was more subdued than on previous trips (which were always on the Saturday). There were a number of no-shows amongst the vendors: for the second year in a row (at least as noted by me) both *Astronomics* and *Orion* were missing in action. This year *William Optics* was also absent, as was *Kendrick Astro Instruments* (who reportedly have had too many US Customs issues of late regarding merchandise being brought down from Canada for the show).

**Al Nagler** was there in person to promote Tele Vue's DeLite series of high eye-relief eyepieces – in effect they are lighter versions of the Delos line. Only the 18.2mm, 11mm and 7mm eyepieces will be available this year. Later in the day, his was the last talk at the OPT/Stellarvue theater (more on that later).

I also met with **Charlie Warren** of *Amateur Astronomy*, who was promoting DVDs of all past issues. But perhaps the most intriguing presence was that of the *Dubai Astronomy Group*; its representative, **Hasan Ahmad al-Hariri**, was presumably there with a meet-and-greet agenda, with no exhibits in the booth except plates of delicious dates!

*Astronomy* magazine and *Sky & Telescope* were present as usual handing out their May issue to the attendees, but a *UK entity* made its presence felt with its coffee-table style *Astronomy Now* magazine. Their April 2015 issue was the freebie, perhaps because they are not as ahead of the calendar as their US counterparts, but their subscription offer was a bit curiously priced. A NEAF-only special offer of a \$55/year subscription was not outlandish but the advertised savings of \$70 certainly was, since the newsstand price of an issue is only £4.50. The magazine is slick and thick; the April edition celebrated 25 years of Hubble by devoting 30 of its 130 pages to the topic (in 7 articles). But the rest of the magazine seemed very Britain-centric, without much coverage of continental European activities.



*Ted Blank and Jim Moe (representing IOTA) flank Steve Rand and Larry Lopez in the Exhibit Hall.*



*Bob Summerfield in his element talking about his meteorites, especially the Sikhote-Alin ones.*



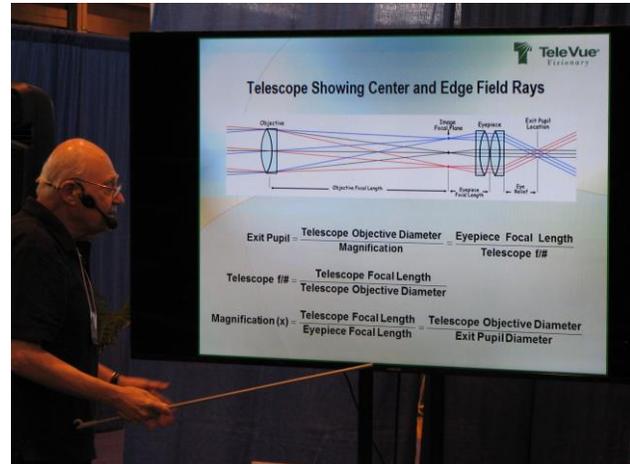
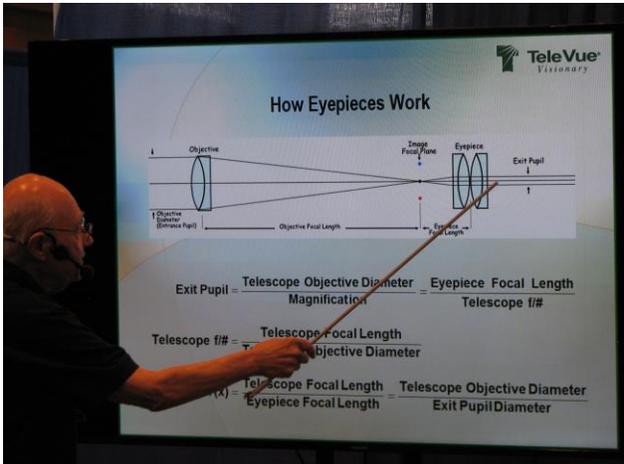
My most entertaining encounter of the day was with **Bob Summerfield** of *Astronomy To Go* (based in Elkins Park, PA near Philadelphia). I tend to give booths with lots of knick-knacks a miss, but this one had an array of meteorites on display, to show and tell and to sell, plus a very passionate lecturer on the subject. He explained at length about how to distinguish

between pieces that truly originated in space and those created by the explosion of a large meteor tearing through the atmosphere – the former have a relatively unpitted surface on the side barreling through air, while hemispherical cavities are excavated on their other side by eddy currents created by the meteor's motion through the atmosphere. The latter tend to be like shards and often have curled up edges. The manner of rotation of the objects can also be deduced by shapes and contours on the surface. A very heavy iron meteorite was displayed on a chair. Poor chair.



*The Conductor of the Tele Vue Orchestra, hitting all the big notes through the years. [Their website has all the historical details.](#)*

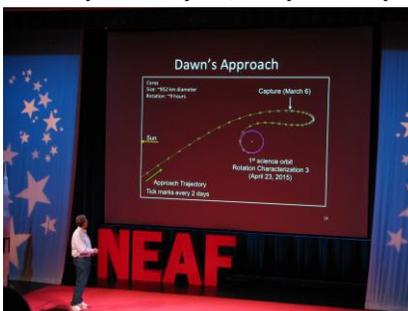
The last talk of the day in the OPT/Stellarvue Theater was on the origin and evolution of Tele Vue eyepieces by **Al Nagler** himself. But before tracing the history of his EPs, he talked of his days in the mid-1960s [when he developed optical systems for NASA's Gemini and Apollo manned space programs](#). These systems were incorporated into the simulators used to train astronauts and there was a 110° FOV out of the port windows of space capsules and the lunar excursion module. Somewhat tongue in cheek, Ethos Eyepieces with 110° FOV (4.7mm and 3.5mm) are being called Ethos SX (Simulator eXperience). After tracing the arc from the earliest Naglers to the current DeLites, he started explaining how the multi-component eyepieces worked and the many ways to calculate things like the scope's F-number, exit pupil size etc. It was a delight and it ran over a bit, so both audience and speaker had to make haste toward the Celestron Theater for the keynote address.



*Every known equation to calculate observing numbers was spelled out in a series of diagrams about the optics of Eyepieces.*

The final talk of the day was to have been by **Marc Rayman**, Chief Engineer (out of JPL) of the *Dawn* mission to Vesta and Ceres, but his indisposition led to **Jim Green** substituting a talk on both *Dawn* and *New Horizons*. It was an informative hour at the Celestron Theater, covering the (upcoming) agenda of the science at Ceres from April 23, and of course the much anticipated fly-by of the Pluto system by *New Horizons* on July 14. The best moment, by far, was at the Q&A session where a 10 year-old piped up with: “*Of Vesta, Ceres and Pluto, which do you like best?*” And the answer was classic: “*I am the Director of Planetary Sciences at NASA and I love all my children equally.*” It brought the house down.

As Steve and I left the auditorium, one of the NEAF organizers was ecstatic about how “NASA is now taking NEAF seriously!” Next year, last year’s keynote speaker **Alan Stern** will return with findings from his own *New Horizons*.



*Dawn's approach and imaging of Ceres (left and center), and how New Horizons will thread the needle at Pluto.*

### Day 1, the Saturday

**Kelly Beatty** of *Sky & Telescope* on “Preparing for Pluto” and **Christopher Go’s** “Getting started with Planetary Imaging” were the talks of Day 1 that I’d like to have attended. There was also a special movie presentation at 6pm – *Saving Hubble* – to commemorate Hubble’s 25th anniversary for benefit of those who stayed late or overnight.

**Gardner Gerry** drove down solo for the first day’s proceedings. His report:

*I saw **Ed Ting** and **Dave Speltz** as soon as I got onto the exhibition floor. Ed had found **Christopher Go** and we talked about the new cameras and I took pictures for them both with their phones. I also ran into **Mike Deneen** and later on I found **Ted Blank** and spent some time with him at the IOTA booth. I checked out the Stellarvue booth and their new 60mm scope and eventually struck a deal for one with the dedicated field flattener for imaging. A visit to the TeleVue booth followed, to check out the new DeLite eyepiece line and a personal demonstration of them from Al Nagler. I picked up some solar holograms for **Marc Stowbridge** at the NEAF solar star party and enjoyed some fantastic hydrogen-alpha views of the Sun.*

**John Rose** talks about his day, Day 2 that is:

***Mike Townsend** was interested in a Sunday trip and we drove down with **Dan Smith** and **Larry Lopez**. Fortunately Mike’s small station wagon was up to the task of four passengers and we had a decent ride down. Sunday is a nice day for looking at stuff. It is not as crowded as the two times I have been there on Saturdays; it was easier to get at the vendor tables. The solar observing had a number of scopes from white light to spectroscopes. There was still plenty of tempting things to buy (new and used) but we did not fill Mike’s car up too much; it was full behind the rear seat but none of the passengers rode home with a lap full of stuff. Getting back to Mike’s place after 8:00pm with an early start time at work Monday was the down-side of a Sunday trip to NEAF.*

**Mike Townsend** adds:

*It was not very crowded (we got a good parking spot right away) and there was better access to vendors, who had more time to talk instead of pushing off to sales. New scopes from Skywatcher included their 190mm Mak-Newt and they are starting a new line of Mak-Schmidt as well. Explore Scientific had a new 8” F/4 astrograph on display in Carbon Fiber tube, and their 165mm F/7 APO refractor (CF) really caught my eye. Gary Hand of Hands On Optics was there with lots of stuff, both new and used, and we had a good chat. My overall impression was of lower attendance than years past and some vendors spoke about less than the usual level of sales the day before.*

And **Steve Rand** has the last word:

*This year I took the plunge and drove down to my first NEAF Expo. The amount of equipment, accessories and display was overwhelming. I managed to find heat tapes for my secondary and focuser (for my XX14G) and fell under the spell of collimator guru **Howie Glatter**. The talks by Al Nagler and Jim Green were very informative and **Bob Summerfield’s** passion for meteorites made the day. Overall, it was a good experience, but be ready to spend money!*

- **Ramaswamy**



*Al Nagler in the audience awaiting Jim Green’s talk, as Christopher Go’s image of the Jovian little spot was being projected behind him.*

## M98 (NGC 4192) – Spiral Galaxy in Coma Berenices

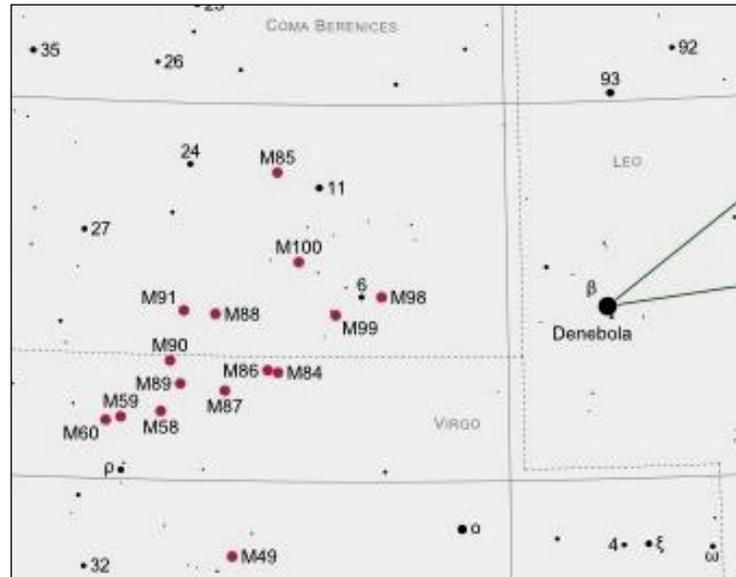
by Glenn Chaple

This month, we journey to the edge-on spiral Messier 98, located near the westerly border of the Coma-Virgo Galaxy Cluster. M98 and its neighbor galaxies M-99 and M-100 were discovered by Pierre Méchain on the night of March 15, 1781 and confirmed by Messier a month later. While the latter two are roundish face-on spirals, M98 is more edge-on with apparent dimensions of 9 by 3 arc-minutes.

At magnitude 10.1, it is one of the fainter Messier objects, but is still visible with small-aperture scopes. The accompanying sketch shows its appearance through a 4.5-inch reflecting telescope on an evening when the limiting magnitude was 5.0. Patience and averted vision were requisite!

Finding galaxies in this part of the sky can be a daunting task, but M98 is relatively easily picked up just one-half degree west of 6 Comae Berenices. This 5th magnitude star forms an isosceles triangle with Denebola (beta Leonis) and omicron Virginis (see finder chart above).

M98 is somewhat of an oddball as galaxies go. While a vast majority of galaxies are moving away from us as the universe expands, this one is actually heading our way at a 125 mile per second clip. Don't expect M98 to loom larger as the years go by. It's a whopping 55 million light-years away!



M98: 6 Comae Berenices is alongside, at the center of this chart.  
(Courtesy: [www.freecharts.com](http://www.freecharts.com))



Sketch by the author.

*In the Virgo Cluster*

*Section of the Virgo Cluster containing M86 and M84*

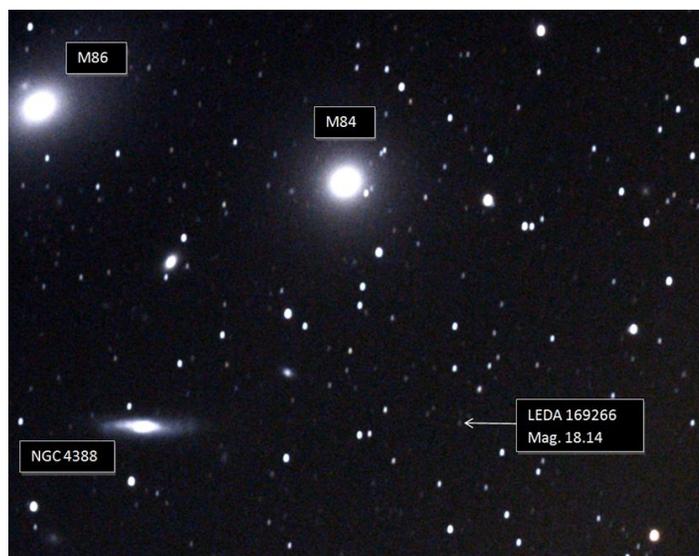
*(Both images: Rob and Brian Mack)*

*AT 111, 46 minutes @ 90 sec sub-frames, unguided on Losmandy G11 with a Canon 6D, slightly cropped.*

This is a section of the Virgo Cluster imaged by Brian and me from YFOS on April 12, 2015 using the AT 111. M86 and M84 are prominent at the center and center-right respectively, with countless faint members of the galaxy cluster visible all around the frame. The Markarian chain begins here, stretching out well beyond the top-left corner of the image.

At right is a blow-up of the above frame with a few galaxies annotated. For me, the most remarkable one is an 18.14 magnitude galaxy (LEDA 169266), one of the faintest galaxies I've identified on the image so far. Amazing for such a small scope!

- *Rob and Brian Mack*



*The annotated sub-section.*

The monthly business meeting was held at MSDC, Concord NH on April 10th, with our President **John Bishop** presiding. The Treasurer's report by "**Rags**" follows on the next page.

### President's Report

An Inter-Club meeting was held on March 29 in Gloucester MA, with participants from NHAS, ATMob, GAAC and NSAAC to facilitate coordination and address issues like getting new members, avoiding burnout, finding dark skies and getting speakers. Differing focus with ATMob on scope making, GAAC and NSAAC on observing sessions, and NHAS on public observing and LTP. We'll follow-up with a shared calendar.

Stellafane needs a coordinator. This year AerospaceFest is on the same day as Market Square Day: June 13. Fall Messier Marathon will likely be at the **Wicketts** and the theme will be Ghost Hunt. "**Rags**" will contact Oak Park for the Summer Barbecue.

### Other Reports

#### YFOS: (Larry Lopez)

There may be problems parking due to the mud at the site.

#### EOC: (Steve Rand)

**Pete Smith** is making progress in mailing out instructional DVDs to libraries.

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

Two speakers have been scheduled in coming months: **Paul Winalski** and **Alan Hirschfield**. **Gerry Smith** had sent out 16 requests for speaker information from other groups. Interesting topics have come through but no speakers as yet. In an event that will be publicized widely, **Ed Ting** will talk about "*What telescope to buy*" in September or October, well in time for Christmas.

### Astronomy Shorts

*Paul Winalski:* Comet Lovejoy is still with us and still quite bright.

*Matt Marulla:* spent 6 days wandering in central Nevada, where it is very dark, but couldn't get any astro-images because the remote control cable had been left behind and exposures of more than 30 seconds were not possible.

*Larry Lopez:* Messier Marathon actually happened; powered up the observatory and took some images.

"**Rags**": had a new high of 44 objects at the MM.

*Steve Rand:* at DWC skywatch saw an isolated mountain peak on the Moon off the terminator, whose peak alone was catching sunlight.

### Scope of the Month

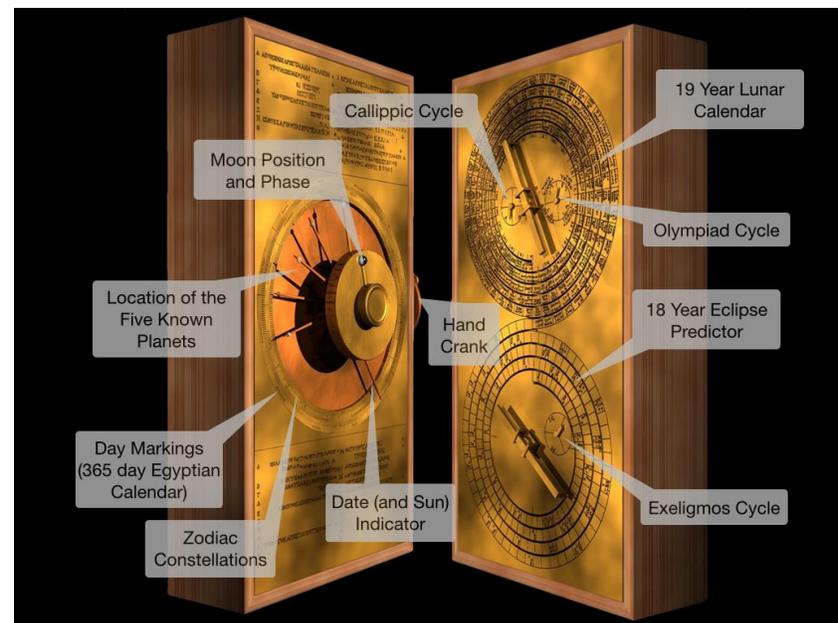
**Ed Ting** demonstrated the club's Lunt 60mm H-alpha scope. It has a Tele Vue clamshell, so it can take Sol Searcher and other accessories.

### Book of the Month

**Steve Rand** talked about an observing guide: "*Stargazing Journal*" by Potter Style, published by Random House.

### The Evening Presentation

**Matt Marulla** talked about "*The Antikythera Device*," found in the wreck of a 2200 year old Roman galleon in 1901, that may very well be the world's first computer. A very sophisticated device that displayed the positions of the Sun, Moon and the known Planets, predicted Lunar and Solar eclipses with astonishing detail and even accounted for minute orbital variations like precession of the equinoxes, a concept that wasn't fully understood until the late 20th century. While recent investigations using tools like 3D X-Ray have brought a far more detailed understanding of the device, its true origin remains unclear. It is also a mystery why no record has ever been found of similar devices from a time before or immediately after this single device.



Annotated model reconstruction of the Antikythera Device. (Photo: Matt Marulla)

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

**Starting Checking Balance:** \$12,069.82

**Deposits:**

Membership	115.32	
Donations	200.00	
Interest	0.34	
<b>Total:</b>		<b>\$315.66</b>

**Expenses Paid:**

Rackspace Cloud (Web site)	54.11	
Cynric Company, LLC (Plowing)	229.90	
Steve Rand (NHAS bookmarks)	80.00	
All About Pins (for awards)	290.00	
<b>Total:</b>		<b>\$654.01</b>

**Current Checking Balance:** \$11,731.47

**Petty Cash:** \$100.00

**Current Cash Balance:** \$11,831.47

**EOC Share:** \$7,081.52

**Membership:** 120

**Single + Family**

Cash Renewals:	0x30.00+0x10.00	0.00
Cash New Members	0x30.00+0x10.00	0.00
PayPal Renewals:	0x28.83+0x 9.61	0.00
PayPal New Members:	4x28.83+0x 9.61	115.32
<b>Total:</b>	<b>4</b>	<b>\$115.32</b>

**Current Members:** 124

*[14 Family memberships; 60 members paid by PayPal]*

**New Members:**

Lynda Bloomberg	Loudon, NH
Anthony Costine	Deering, NH
Brian Cote	Pelham, NH
Thomas Jacobs	West Lebanon, NH

**Donations:**

Reeds Ferry School, Merrimack NH	GEN	100.00
Friends of Wakefield Library, Sanbornville NH	GEN	100.00
<b>Total:</b>		<b>\$200.00</b>

**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@vahoo.com](mailto:ramax.astro@vahoo.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](#)



**Orion Starblast 4.5 –  
LTP-style Scope**

**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.  
Instruction booklet and an Audubon constellations guide.  
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 and a Moon Map.  
Richard Berry's "Discover the Stars"

**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.

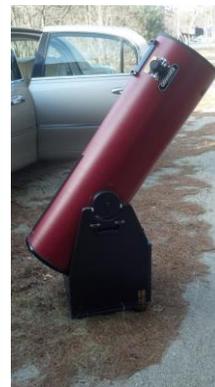


**Orion XT6 – 6" Newtonian  
on a Dobson mount**

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

*Equipped with:*

Telrad finder with a dew shield  
32mm, 25mm & 10mm Plössl  
EPs in a case  
A Planisphere, a Moon map  
and a red light  
Orion XT6 user manual  
Richard Berry's  
"Discover the Stars"



**Coulter Odyssey 10" Newtonian  
on a Dobson 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, independently of the  
telescope and in a separate slip-case:*

Sky Atlas 2000.0 by Wil Tirion and Roger Sinnott  
Sky Atlas 2000.0 Companion: Robert Strong & Roger Sinnott



**Meade 8" Newtonian  
on a Dobson 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 Dobson 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, May 1	7:00pm	MSDC, Concord NH
Portsmouth Children's Day Skywatch	Sunday, May 3	12:00pm	Market Square, Portsmouth NH
Sanborn Regional School Skywatch	Tuesday, May 5	7:30pm	31A West Main St., Newton NH
NHAS Business Meeting	Friday, May 8	7:30pm	St. Anselm College, Manchester NH
Manchester Girl Scouts Skywatch	Saturday, May 9	8:00pm	Camp Farnsworth, Thetford VT
Goffstown High School Skywatch	Thursday, May 14	8:00pm	27 Wallace Road, Goffstown NH
Coffee House Night at YFOS	Saturday, May 16	5:00pm	YFOS
Rey Center Skywatch	Saturday, May 16	9:00pm	Waterville Valley NH
EOC Meeting	Thursday, May 21	6:30pm	Manchester City Library, Manchester NH
Sidewalk Astronomy Skywatch	Saturday, May 23	6:00pm	Market Square, Portsmouth NH
Mount St. Mary Skywatch	Thursday, May 28	8:00pm	130 Corn Hill Road, Boscawen NH
Alton Central School Skywatch	Thursday, June 4	5:00pm	41 School Street, Alton NH
First Friday Skywatch for MSDC	Friday, June 5	7:00pm	MSDC, Concord NH
Meadowbrook Dads Campout Skywatch	Saturday, June 6	8:30pm	Osceola Vista Campground, Waterville Valley NH
Goffstown High School Skywatch	Tuesday, June 9	8:30pm	27 Wallace Road, Goffstown NH
Goffstown High School Skywatch (backup date)	Wednesday, June 10	8:30pm	27 Wallace Road, Goffstown NH
NHAS Business Meeting	Friday, June 12	7:30pm	MSDC, Concord NH
Market Square Day Skywatch	Saturday, June 13	9:00am	Market Square, Portsmouth NH
AeroSpaceFest at MSDC	Saturday, June 13	9:00am	MSDC, Concord NH
Coffee House Night at YFOS	Saturday, June 13	5:00pm	YFOS
EOC Meeting	Thursday, June 18	6:30pm	Manchester City Library, Manchester NH
Epping Middle School Skywatch	Friday, June 19	8:30pm	33 Prescott Road, Epping NH
Rey Center Skywatch	Saturday, June 20	9:00pm	Waterville Valley NH
Sidewalk Astronomy Skywatch	Saturday, June 27	6:00pm	Market Square, Portsmouth NH
First Friday Skywatch for MSDC	Friday, July 3	7:00pm	MSDC, Concord 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

**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, May 3	11:42pm EDT	 Full moon
Monday, May 11	6:36am	 Last quarter
Monday, May 18	12:13am	 New moon
Monday, May 25	1:19pm	 First quarter
Tuesday, June 2	12:19pm	 Full moon
Tuesday, June 9	11:42am	 Last quarter
Tuesday, June 16	10:05am	 New moon
Wednesday, June 24	7:03am	 First quarter

### Credits

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

Pat Adams, John Bishop, Ted Blank, *Glenn Chaple*, Gardner Gerry, "Rags" Gilmore, Rob and Brian Mack, Matt Marulla, Steve Rand, John Rose, Pete Smith, Ed Ting, Mike Townsend and Paul Winalski.