



# OBSERVER

Vol. 2015, No. 12

Newsletter of the New Hampshire Astronomical Society

December 2015

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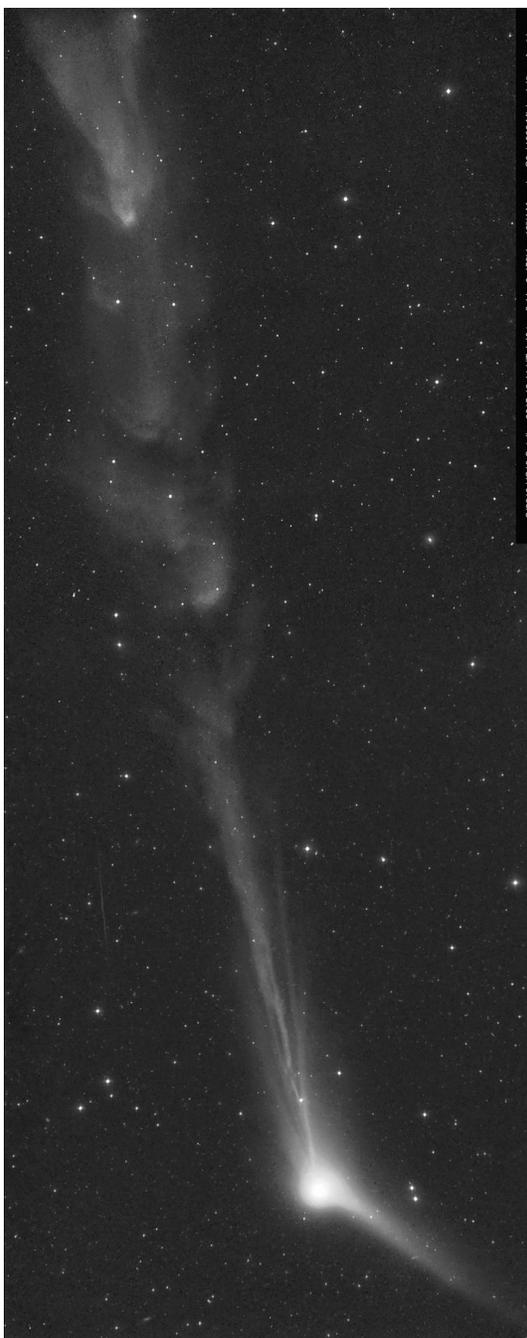
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## *Yet Another Disconnection Event*



*Comet C/2013 US10 (Catalina), its tail buffeted by solar wind, shown in a mosaic of 2 frames imaged on December 11 from Jauerling, Austria in b/w (left) and rendered in LRGB color. (Credit: Michael Jäger)*

Coronal Mass Ejections and gusts of solar wind can often wreak havoc with an ion tail, leading to plasma blobs and 'disconnection events.' In an extreme case, a comet's tail can be completely torn off, as happened to *2P/Encke* on April 20, 2007. [The event was captured by STEREO-A.](#)



### *Measured by Cycles*

The Fall, with its sure signs of coming winter and the loss of the summer's leaves, makes me think of the passage of time. Perhaps I should also see the warming of spring-time and the hazy days of August as signs of the passage of time, but somehow improvements and steady-states don't mark a change as strongly for me.

Our lives are measured by these cycles: solar days, lunar months, seasonal years. But the sequence stops there, and I think that's a shame. Sure, we have centuries and millennia, but those are just numerical accidents; if we used base eight we'd still have

centuries but they'd only be 64 years long. What I'm talking about is longer natural cycles.

Unfortunately the next-bigger cycle I'm aware of are the Milankovitch cycles in the characteristics of the Earth's orbit. These are a set of cycles of different periods which try to explain the 100,000 year apparent periodicity of the warm periods during ice ages. We're in one of those warm periods now, close to the predicted end and return to glaciation.

Then there's the solar orbit of the Galactic center. That's around 225 million years. In those terms, the Sun is eighteen and a half years old – old enough to vote but not old enough to buy beer. But it's forever in the human scale.

If you have a candidate for a fifty-year to thousand-year natural cycle, I'd like to hear about it!

**John Bishop**  
NHAS President

## *Sky Watch Review*

### *Alton Central School, Alton NH, December 8*

The weather was iffy, so we called it a go. **John Bishop** and I were there representing NHAS. The weather forecast turned out to be wrong – it was completely overcast. I gave an extended indoor presentation to the 3rd graders and answered a lot of random Astronomy questions.

- **Paul Winalski**

### *Goffstown High School, Goffstown NH, December 15*

The event took place on its backup date. Skies were mostly overcast but with a generous sprinkling of sucker holes that allowed us to get some observing in. **Steve Rand** and I were there from NHAS. I showed mainly the Moon and the Pleiades

but also managed to get Orion's sword in the Tele Vue 85mm refractor.

- **Paul Winalski**

### *Greenville Homeschool Co-Op, Greenville NH, December 16*

Even though the forecast was iffy, **Paul Winalski** and I were lured to the site by viewing the crescent moon from our respective driveways. The presentation was at the Sacred Heart Church, whereas the observing was to be from a site on Adams Hill Road. Our hosts had no electronics, so Paul had brought along the club projector.

It was soon obvious that the skies weren't going to cooperate.

We decided to extend the presentation and answered many questions from the 40 or so attendees. We recommended that the Greenville Library participate in our Library Telescope Program. We were also able to explain and evaluate an inexpensive Celestron refractor brought along by one of the parents.

The organizers seemed very pleased and gave us a small cash donation. That was followed up by emails thanking us again, with the promise of rescheduling in 2016. Special thanks also have to go to **Gardner Gerry** who patiently waited at the planned observing site two miles away for over an hour.

- **Steve Rand**

*[Observing at John Stark High School in Weare NH and Solar observing at Henry Wilson Memorial School in Farmington NH had to be cancelled and will be re-scheduled. –Ed.]*

### *An Occultation of Venus, December 7*

Two months ago (on October 8) we observed Venus shining brilliantly at high noon, thanks to a nearby thin crescent Moon. This time around the lit limb of the Moon occulted Venus at about 12:42pm on Pearl Harbor Day.

The exact time of disappearance (D) for the more than hour-long occultation depended on the observer's latitude and longitude, since lunar parallax is a significant factor. With the ecliptic considerably closer to the southwestern horizon than two months ago, the reappearance (R) event would have been almost impossible to spot from the Eastern time-zone, with the dark lunar limb no more than 4° above the horizon.

A number of NHAS members set up scopes over their lunch hour to witness and to show colleagues the remarkable sight. The speed at which Venus 'closed in' on the Moon was quite impressive, resulting in anticipation being cut short for some!

**Joe Dechene** borrowed his son Ian's scope to image the event and got a bonus, while **Rob Mack** in Concord pointed his Canon 6D armed with a 300mm lens at the target and kept shooting, initially in autofocus mode – not the best of options when in the vicinity of tree limbs: *I was lucky that the manual setting was close to exact infinity as it was hard to fine focus in the daylight through the view finder.*



*"It's gone! It's GONE!!" – Louise Hyland in Nashua.*

And then there were those that generated a mosaic of the approach of Venus. **Phillip Cruden's** effort with nine images in the last 5 minutes before occultation, captured from Phoenix AZ, was [APOD of December 10](#).



*Rob Mack managed to focus for infinity in the nick of time (left), while Joe Dechene managed to catch a flyby transit as well!*

### *The Year-end Pot-luck, Concord NH, December 11*

We never did 'find' a pot-luck coordinator this year – "Rags" just took charge in the last week and everything ticked like clockwork until the appointed hour on December 11. It was foggy beyond belief and he got 'lost' on the way to MSDC. Just one of those blips in life that Mother Nature generates to show everybody who's boss!

Attendance was as healthy as in the past couple of years, easily exceeding 40. The swap table was a bit on the lean side, but the food tables were well stocked – space for crock-pot covers was at a premium. The election was yet another vote-by-acclamation and VP Matt Marulla saved the club even in absentia. It was simply the best of times.



*This was no case of eats shoots and leaves – this was a time to eat, chat and stay, as Marc demonstrates to Sergio Alvarez, while Sue Stowbridge’s attention is elsewhere.*



*Steve Rand finds the fare a lot more appetizing than Marc in the background and Sergio in the (center) foreground. Food was aplenty and delicious, but it is a relative world.*



*Shift attention if you will to “Rags” engaging new members Jason Dubrow and Becky Barlow-Dubrow.*



*Nori Treats on display on the table and a thumbs-up from Ed Ting – perhaps a coincidence, perhaps not.*



*Herb Bubert and John Pappas look on (left), while Stu May and “Rags” catch up on news. Mike Townsend and Larry LaForge (obscured) are to the right.*



*The flip side of the same coin – Larry and Mike conversing with Dan Smith, while Gardner Gerry, Herb (obscured) and John Pappas form the other trio.*



*Becky and Jason with their 5-year old daughter Cassiopeia, born with a facility that serves well in amateur astronomy...*



*Cassiopeia Barlow-Dubrow can observe objects at zenith without any neck discomfort. Marc is obviously impressed!*



*All set for another year at the helm, but right now a crock-pot with residual beef stroganoff demands John Bishop's attention.*

### *Sidewalk Astronomy, Portsmouth NH, December 19*

Streets around Portsmouth's Market Square were packed with last-minute shoppers trying to finish off their gift lists on the last weekend before Christmas, as **Michael Deneen, Joe Derek, Andy Jaffe, Gardner Gerry** and **Tom Cocchiaro** intercepted them from 5pm to almost 11pm, showing folks views of the Moon and the Orion Nebula.

Skies were mostly clear with a stiff northwest breeze that kept the group cold, so a special vote of thanks goes to **Bonnie Derek**, who bought some welcome and "warming" hot chocolate. Joe Derek set up his "cannon" 12-inch home-made reflector which drew a lot of attention. Some people commented that they were waiting for someone to be shot out of it into the square! Michael Deneen brought a 10-inch Meade SCG, Gardner his 9 1/4-inch Celestron, Andy had his Tele Vue Pronto (older brother to the TV-76) and I set up the Vixen ED80sf with a William Optics binoviewer that generated repeated exclamations of "OMG! That's not real -- is it?"

- **Tom Cocchiaro**

### *The LTP Year in Review*

2015 was another quiet year for the Library Telescope program in New Hampshire, but it is growing steadily in other states and abroad.

We delivered a single scope to the Nelson and Harrisville libraries in April. These libraries are very close to each other and are sharing the scope. In July, we had a mini mod party and built scopes for Wilmot and Bath libraries. We also updated a OPT scope for Milton Mills. The final scope of the year was delivered to Windham in October.

*The St. Louis Astronomical Society* started their program as recently as 2014 and they may well be the LTP Poster Child of 2015. Check out their [facebook page](#) and be sure to scroll all the way down to the bottom of the page – the work they are doing is amazing!

Marc Stowbridge and I have been busy helping clubs and individuals start their own LTP. Some of the states that have begun programs in 2015 are Montana, Connecticut, Vermont, Washington, Illinois, Georgia, New Mexico, New York, Wisconsin, Nova Scotia, Ohio and California. Several of these states have multiple clubs involved.

*Cornerstones of Science* has placed at least 50 scopes in Maine and the *Aldrich Astronomical Society* has placed almost 50 scopes in Massachusetts. *The Astronomical League* also got on board this year and [their web-site is spreading the word on LTP.](#)

Special recognition this year goes to **Curtiss Rude, Steve Rand** and **Marc Stowbridge** for reaching out to libraries and assisting with training and LTP presentations. Looking forward to 2016, we already have six libraries interested in the March build. Perhaps the formal LTP mod parties will rise yet again!

- **Pete Smith**

*[John Goss, President of the Astronomical League, brought to Marc Stowbridge's attention [a recent editorial in the Roanoke Times](#), a newspaper local to him in Virginia. The Gainsboro Library's unit mentioned in the article was donated by the Roanoke Valley Astronomical Society. –Ed.]*



*Pete Smith with the refurbished unit of the Mary E. Bartlett Library in Brentwood NH.*

## *The Richard Schueller Memorial Telescope Award*



*Rich Schueller with Matt Amar (as EOC co-chairs) in 2009.*

**Rich Schueller** was an early and enthusiastic supporter of the Library Telescope Program, declaring that it would “go viral” when I was still wondering how to place a scope or two per year. Back in 2011, Rich mentioned the LTP to Lee Grodzins (Professor Emeritus of Physics at MIT) with whom he had worked before. Lee is the President and Founder of Cornerstones of Science, a non-profit that delights in getting STEM materials into the hands of the public through town libraries. The LTP was a natural fit for their goals and a partnership was born between Cornerstones and NHAS.

Cindy Randall is the Executive Director of Cornerstones of Science (CoS), based in Brunswick ME. She and I met with the Southern Maine Astronomers (SMA) at the Southworth Planetarium (in Portland ME) to present the Library Telescope Program. SMA became enthusiastic supporters of the program, travelling to Brunswick to learn how to modify the scopes and place them in libraries throughout Maine.

To facilitate buying of the telescope kits, CoS became a distributor of Orion Telescopes and Binoculars, Inc. Orion, understandably pleased to have their telescopes used in this way, provided discounts and other incentives. CoS thus began their own STAR (Sharing Telescopes and Astronomical Resources) program that featured: 1) librarian training, both face to face and remotely via Skype, on how to establish the loan process and facilitate use of the telescopes by their patrons; 2) help with organizing star parties by libraries; 3) astronomy club training for telescope modifications and 4) significant discounts secured from various vendors so that placing telescopes in libraries could be cost-effective.

Working with astronomy clubs across the nation, CoS has placed over 150 telescopes in 8 states. Libraries get modified telescopes in one of two ways: 1) CoS receives the telescopes in their Brunswick offices, modifies them and sends them to libraries or 2) unmodified telescopes are shipped directly from Orion and CoS sends the additional parts necessary to convert the units to “library telescopes.” A local astronomy club, with training from CoS, then modifies them for their libraries.

CoS has recently been awarded a substantial grant from NASA – the funds will be used to connect communities all over the United States to various NASA research activities in meaningful ways. The grant will allow them to place an additional 100 telescopes in 3 states. It is the CoS belief that checking out a telescope is the first step in the journey to explore the night skies. Along with the scopes, CoS will create a “continuum” of programs, resources and experiences, allied with NASA scientists and local astronomy clubs. This will allow library patrons to explore these fields in depth, helping communities appreciate the value of understanding space, seek repeated engagement with the clubs and want to be a part of collecting data in various citizen science studies.

***The Richard Schueller Memorial Telescope Award*** (RSMTA) is an extension of the work done by Cornerstones of Science, SMA and NHAS. Rich was instrumental in bringing the LTP to the world through public speaking at NEAF, and he helped write the first Sky & Telescope article on the subject. Rich has been likened to Johnny Appleseed, a moniker that would have made him laugh and wince in turn.

I recently met with a patron of the Brownfield Public Library in Brownfield ME, who thought her gem of a library would love to get a telescope. I contacted Judi Schenstrom, the Librarian, and sent her articles about the LTP. I recommended the Brownfield Public Library to Cindy as a fitting place to begin the RSMTA. Cindy has contacted the SMA to work with the BPL. The date of presentation of the scope will be announced soon.

This will be the model for future RSMTA placements: a local club will receive the telescope, modify it and then present it to a library that otherwise might not be able to afford one. The club will continue to work with the library, providing support and outreach services. The award will be presented once a year, with input from the astronomical community as to which library would benefit most.

People and clubs interested in making a donation to the Richard Schueller Memorial Telescope Award are encouraged to contact Cynthia Randall at Cornerstones of Science: [cynthia.randall@cornerstonesofscience.org](mailto:cynthia.randall@cornerstonesofscience.org)

I believe that this is a fitting way to honor Rich and his wife Susan, by ensuring that his name and their interests and charitable nature will continue to inspire people to follow suit.

- ***Marc Stowbridge***

### Corona over Kiruna



*Aurora on a night to remember.*

*(Credit: Mia Stålnacke)*

*Imaged using Nikon D800 and 14mm wide-angle lens at f/2.8 and ISO-800, in a single 8-second exposure.*

**Mia Stålnacke** is [an avid aurora photographer](#), based in **Kiruna, Sweden**. Her images have been published in the **Observer** this year in the [March](#) and [October](#) issues, in the latter instance as part of a featured article on Aurora surprises. Her image of a St. Patrick's Day display over her hometown was [APOD of March 30, 2015](#) – the iconic “*Flag over Sweden*.” [Her guide to Aurora Imaging](#) is equally impressive with its “keep things simple” approach: note the tip for dealing with camera shake when the shutter is being manually operated! Mia was at nearby **Pirttivuopio** the night of September 10, 2015 and one of her many images taken that night is shown above.

In Mia's own words (edited ever so lightly): *The sky just kept exploding for hours that night, it was spectacular! This image was taken at 14mm, so you can imagine how massive this was in the night sky. This is an effect of perspective called a Corona. This is what it looks like when the field lines lead to a point directly above you. It's like an explosion of color in the sky and amazing to see first-hand, as the aurora appears directly overhead. This is probably the most beautiful phenomenon you will ever see – bright rays shooting out of a seemingly dark (center) spot. On one occasion I have seen it occur right over the Milky Way!*

If and when **Cassiopeia Barlow-Dubrow** gets up to Kiruna, or some other place inside the Arctic Circle, she is bound to have the time of her life, rubber-necking without penalty!

### NHAS December 2015 Business Meeting Report

The monthly business meeting was held at MSDC, Concord NH on December 11th, with our President **John Bishop** presiding. The Treasurer’s report by **David “Rags” Gilmore** follows on the next page.

#### President’s Report

A quick agenda with a few reports, awards and then the election, leading up to the pot-luck feast. There was EOC news for a change, with 5 LTP scopes delivered. **Steve Rand** and **Curtiss Rude** were recognized for their work with the training sessions.

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

NHAS member **Joe Dechene** will present in March, while **Edward Gleason** (of University of Southern Maine) will present in July. More speaker suggestions are always welcome and needed!

#### The 2016 Election

The nominations from November were added to, completing the slate of officers for the year 2016:

- President: John Bishop
- Secretary: Paul Winalski
- Treasurer: David Gilmore
- Director: Joel Harris

December nomination (in absentia):  
Vice-president: Matt Marulla

A motion to elect an unopposed slate by voice acclamation passed unanimously, and the slate of officers and director was elected by unanimous voice acclamation. There was no possibility of a group photograph as both Matt Marulla and Joel Harris were absent.

The Board of Directors in 2016 will be chaired by **Pete Smith**, with **Steve Rand** and **Joel Harris** as the other ranking members.



(from the left): Ramaswamy, Paul Winalski, Marc Stowbridge, Gardner Gerry, Tom Cocchiaro and Ken Charles (in absentia: Matt Marulla). (Photo: Steve Rand)

#### The Annual Awards

The following members were recognized for contributions to the club over the course of the year:

**Paul Winalski** and **Gardner Gerry** for managing the very successful Public Observing program.  
**Ramaswamy** for editing the NHAS Observer.

**Tom Cocchiaro** for conducting monthly Sidewalk Astronomy events in Portsmouth.

**Ken Charles** for liaising with the Astronomical League programs and hosting Officers’ meetings.

**Matt Marulla** for managing the transition of the *nhastro.com* site to new servers.

**Marc Stowbridge** for his work on the Library Telescope Program.



Steve Forbes as Steve Forbes.



Sue Stowbridge and Melinde Byrne in a quiet interlude, and not a plate in sight.

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

<b>Starting Checking Balance:</b>	<b>\$15,880.38</b>	<b>Membership:</b>	<b>118</b>	
			<b>Single + Family</b>	
<b>Deposits:</b>		Cash Renewals:	5x30.00+1x10.00	160.00
Membership	448.30	Cash New Members	0x30.00+0x10.00	0.00
Donations	125.00	PayPal Renewals:	7x28.83+0x 9.61	201.81
Interest	0.38	PayPal New Members:	3x28.83+0x 9.61	86.49
Calendars	105.00	<b>Total:</b>	<b>15</b>	<b>\$448.30</b>
<b>Total:</b>	<b>\$678.68</b>	<b>Current Members:</b>	<b>133</b>	
		<i>[19 Family memberships; 83 members paid by PayPal]</i>		
<b>Expenses Paid:</b>		<b>New Members:</b>		
Rackspace Cloud (Web site)	60.20	Christine MacEachern	Northwood NH	
State of NH (Nonprofit report)	27.00	Kevin Bennett	Intervals NH	
<b>Total:</b>	<b>\$87.20</b>	Daniel Rosenbaum	Bedford NH	
<b>Current Checking Balance:</b>	<b>\$16,471.86</b>	<b>Donations:</b>		
<b>Petty Cash:</b>	<b>\$100.00</b>	Pete Smith, Milford NH	GEN	100.00
<b>Current Cash Balance:</b>	<b>\$16,571.86</b>	David Weaver, Nashua NH	GEN	20.00
		Joel Harris, Epping NH	GEN	5.00
		<b>Total:</b>		<b>\$125.00</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>

#### *NHAS Officers:*

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

#### *Board of Directors:*

[Pete Smith](#)  
[Steve Rand](#)  
[Joel Harris](#)

## 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 LS60THα/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.



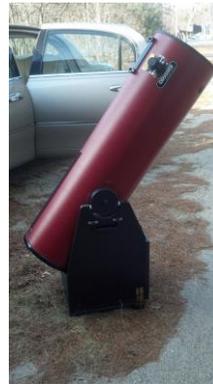
### **Orion XT6 – 6” Newtonian on a Dobsonian mount**

**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
Bedford High School Skywatch	Tuesday, January 5	6:30pm	Benedictine Park, Bedford NH
Bedford High School Skywatch (backup date)	Wednesday, January 6	6:30pm	Benedictine Park, Bedford NH
Coffee House Night at YFOS	Saturday, January 9	5:00pm	YFOS
Rey Center Skywatch	Saturday, January 9	6:30pm	Waterville Valley NH
Hampton Academy Skywatch	Monday, January 11	6:30pm	931 Ocean Boulevard, Hampton NH
Hampton Academy Skywatch (backup date)	Tuesday, January 12	6:30pm	931 Ocean Boulevard, Hampton NH
Massabesic District Order of the Arrow Skywatch	Friday, January 15	7:00pm	300 Blondin Road, Manchester NH
Sanborn Middle School Skywatch	Thursday, January 21	6:30pm	31 West Main Street, Newton NH
NHAS Business Meeting	Friday, January 22	7:30pm	St. Anselm College, Manchester NH
Sanborn Middle School Skywatch (backup date)	Thursday, January 28	6:30pm	31 West Main Street, Newton NH
First Friday Skywatch for MSDC	Friday, February 5	7:00pm	MSDC, Concord NH
Coffee House Night at YFOS	Saturday, February 6	5:00pm	YFOS
Rey Center Skywatch	Saturday, February 6	7:00pm	Waterville Valley NH
Parkside Middle School Skywatch	Monday, February 8	7:00pm	75 Parkside Ave., Manchester NH
Parkside Middle School Skywatch (backup date)	Wednesday, February 10	7:00pm	75 Parkside Ave., Manchester NH
Hollis Elementary School Skywatch	Friday, February 12	7:00pm	12 Drury Lane, Hollis NH
Milton Free Public Library Skywatch	Saturday, February 13	5:30pm	13 Main Street, Milton Mills NH
Hollis Elementary School Skywatch (backup date)	Monday, February 15	7:00pm	12 Drury Lane, Hollis NH
NHAS Business Meeting	Friday, February 26	7:30pm	MSDC, Concord NH

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

Date	Time	Lunar Phase
Saturday, January 2, 2016	12:30am EST	 Last quarter
Saturday, January 9	8:31pm	 New moon
Saturday, January 16	6:26pm	 First quarter
Saturday, January 23	8:46pm	 Full moon
Sunday, January 31	10:38pm	 Last quarter
Monday, February 8	9:39am	 New moon
Monday, February 15	2:46am	 First quarter
Monday, February 22	1:20pm	 Full moon
Tuesday, March 1	6:11pm	 Last quarter

**Credits**

Contributors to this month's **Observer:**  
 John Bishop, Tom Cocchiaro, Joe Dechene,  
 Gardner Gerry, "Rags" Gilmore, *Michael Jäger*,  
 Rob Mack, Steve Rand, Pete Smith, Mark  
 Stowbridge, *Mia Stålnacke* and Paul Winalski.

### *Editor's Note*

This marks the 28th and last edition of the NHAS **Observer** to be edited by yours truly (the 33rd if one counts the 2013 summer “backfill” issues). It has been quite a ride since September 2013 and I have thoroughly enjoyed myself taking liberties all over the place, but as the cliché goes: all good things must come to an end. The baton passes back to the publisher **Paul Winalski** with thanks and it is time for someone else to get things rolling in the new year.

I leave you with another image by **Mia Stålnacke** and as is the case up there in space, it is anyone's guess where this brilliant roadway in the sky is heading. Happy trails and a Happy New Year!

- *Ramaswamy*



*Aurora above Swedish Lapland on August 31, 2014, just before midnight. (Credit: Mia Stålnacke)  
Imaged using Nikon D800 and 14mm wide-angle lens at f/2.8 and ISO-800, in a single 10-second exposure.*