

In This Issue...

2 [Sky Watch Review](#)

*West Manchester
Community Library
Gordon-Nash Library
J A Tarbell Library
Girl Scouts Septemberfest
at Camp Runels
Kensington Public Library*

3 [Society Activities](#)

*Fall Messier Marathon
The LTP Mod Party
The 100th LTP Scope
Autumnal Jeopardy
Coffee Night at YFOS
Rey Center*

11 [Images of the Month](#)

Mars at Opposition

12 [Object of the Month](#)

October: M30

13 [Featured Articles](#)

*Yet Another LTP Story
A Victorian Refractor*

20 [The Regular Items](#)

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

A Cosmic Bubble over Litchfield NH



NGC 7635: The Bubble Nebula in Cassiopeia

(Image: Gardner Gerry)

The last week of August 2014 turned out to be a highly productive period for our own Gardner Gerry. In addition to attending 2 skywatches, he managed 4 nights of astrophotography and greeted September with this image on Labor Day, the result of a couple of hours spent in his suburban Litchfield driveway the night of August 29-30.

NGC 7635, object number eleven in Patrick Moore's Caldwell list of objects, lies a Moon-width away from the open cluster M52 in the constellation of Cassiopeia. A cropped image of C11 (also known as Sharpless 162), rotated by 90°, is featured for the month of April 2015 in Astronomy magazine's Deep Space Mysteries calendar. For more details on the Bubble Nebula, read the accompanying text on that calendar page. The bubble spans approximately 6 light-years and is about 7,100 light-years away, although estimates of both figures vary, as usual. BD +60° 2522, a massive blue star of spectral type O6.5 that is responsible for the bubble, is located off-center just below the shiny part to the left.

Gardner captured the ghostly stellar wind that defines the bubble and its environs over two hours of imaging with his C9.25 XLT @ f/6.3, using QHY9C @ -20°C (controlled by Nebulosity 3.1 software) and an IDAS LPS-P2 light pollution filter. He stacked a dozen 600-second exposures from the 8MP one shot color camera saved as 32-bit files of ~60MB each. Post-processing was done in PixInsight 1.8, sometimes in 64-bit to get that last bit of information out of the data. Labor over that weekend came in many forms!

To quote fellow practitioner Herb Bubert, who loved the color and ethereal softness of the image: "I want to go there!" But it is very hard to imagine Herb as the Man in the Bubble.

West Manchester Public Library, Manchester NH, September 3

The event took place as scheduled under clear and steady skies, but unfortunately we were set up in a lit parking lot in Manchester. I ended up showing only three objects (the Moon, Saturn and Mizar) because I couldn't find anything else. The 10 or so members of the public who showed up were delighted nonetheless. NHAS members participating were **Elaine Grantham-Buckley, Gardner Gerry, John Pappas, Steve Rand** (who gave the indoor presentation) and **Ed Ting**.

- **Paul Winalski**

Gordon-Nash Library, New Hampton NH, September 14

The event took place under clear skies but damp air, and was being held to inaugurate their newly acquired Library Telescope.

Unfortunately the viewing location (the soccer field of New Hampton High School) was floodlit by three powerful sodium lamps. This made it very difficult to find objects by star-hopping. It was most disappointing because the skies in New Hampton are very dark. There is a much better viewing site in town (Pinnacle Hill) but it was not available for this evening.



Paul Winalski and Steve Rand set up at the edge of the soccer field in New Hampton.

Only a couple of library patrons and a few New Hampton School students showed up. Other NHAS members participating were **Gardner Gerry, Ramaswamy, Steve Rand** and **Bob Veilleux**. **John Bishop** did not stay as there were more than enough scopes for the event.

I showed Mars (Saturn was in the trees from where I set up), Mizar, Albireo, 61 Cygni, Cor Caroli, and M13. Gardner found and showed Comet Jacques in his 9.25" Schmidt-Cassegrain, which was the first (dim) view for a couple students, as well as Ramaswamy and Steve Rand.

- **Paul Winalski**

J A Tarbell Library, Lyndeborough NH, September 18

Steve Rand gave the indoor presentation, but the outdoor observing got clouded out and was postponed to the backup date of September 25. But a cancellation ensued because of bad conditions again, and the Library plans to schedule a new event later this year or next year.

- **Paul Winalski**

Girl Scouts Septemberfest, Pelham NH, September 20

It was almost completely overcast when we first arrived at the grounds at Camp Runels, but by the time the event started the sky had cleared and only a bit of background haze remained.

NHAS astronomers present were **Joe Dechene, Rich DeMidio, Ramaswamy** and **Paul Winalski**.



Joe Dechene polar aligns his scope on the hill at Camp Runels.

About 10-15 people showed up. The attendees got to see a wide range of objects, including Saturn, double stars, carbon stars, open and globular star clusters, planetary nebulae, and a few galaxies.

- **Paul Winalski**

Kensington Public Library, Kensington NH, September 26

I gave the inside presentation in the library to around 30 or so people, and NHAS members **Rich DeMidio** and **Ted Blank** supported with their telescopes. More people came by for just the observing, for a total of about 40 patrons. I showed Alberio, M13 and M57 with the C9.25.

- **Gardner Gerry**

*[The skywatch at the **Owls Landing Campground** in Holderness NH was cancelled after both dates were clouded out; it is an exceptional site. Skywatches at both **Franconia Notch State Park** and **Webster Free Library** have been postponed to their backup dates in October – please consult the calendar. -Ed.]*

The Fall Messier Marathon, September 19

The event needed no postponement as the first scheduled day, a Friday, was bright and clear. Our gracious host **Scott Wickett** had mowed most of the field over the previous 3 days, and the locale was lush and level. At about 5pm, a few inquisitive wild turkeys showed up, but did not linger. They flew off, and not just to a nearby tree limb.

Attendance at the event was healthy, with the first scope (a 7" Oak Starmaster, not an Obby) rolling up the Wickett driveway in its owner's car by about 6pm. Over the next hour, most of the participants had shown up. But delivering their contribution to the pot-luck setup in the kitchen and dining area, supervised by **Sue Wickett**, had priority over setting up their gear. Indeed, some experienced marathoners started "carbo-loading" while awaiting twilight. Sue had also very thoughtfully substituted red bulbs for all outdoor lighting; many, many thanks to the **Wicketts** for their generous hospitality.



The front yard location was to the left of the driveway, and stretched further left than this view of the site.



The backyard location was at the back end of this meadow (mowed along a north-south axis), far into the shadows seen.

Rob and **Brian Mack**, **Scott McCartney**, **Mike** and **Jim Townsend**, and "**Rags**" were in the group occupying the front yard site, which had to deal with the interference of headlights along Center Road – for some reason, there was a lot of traffic until well past 10pm! The backyard was the site of choice for **John Bishop**, **Herb Bubert**, **Rich DeMidio**, **Bob Gaimari**, **Larry** and **Linda Lopez**, and **Curtiss Rude**, some of whom had to deal with trees that insisted on getting in the way, time and again.

Rick Marshall, **Liam McCartney**, **Sue McPhee**, **John Rose**, **Ben Wickett** and I were the non-scope marathoners, getting as

many looks-in as possible without keeping a tally. **Ed Ting** dropped in for a while early on, and **Ken Charles** swung by later in the evening – his **Ghost Hunt** marathon will be taking place at the same venue next month, along with another pot-luck.

Talking of the pot-luck, this version featured many goodies, including Rich DeMidio's beef jerky, Linda Lopez's beef stew, the Macks' chilli, Ramaswamy's Chicken Korma, Mike Townsend's beans with molasses, Herb Bubert's shrimp platter, and Nori's (un)usual assortment of treats. (I have left space here for more favorites I cannot recall!)



Mike and Jim Townsend, setting up and set up respectively, but with plate in hand, "Rags" is ahead of them both.



Part of the setup area in the backyard. Only one guess as to where the owners were.

(below): Brian Mack taking a shrumpy bite.



My own floating marathon was a great (and carefree) success, including a couple of firsts: the first look at the most distant globular cluster that can be seen with an amateur telescope (NGC 7006, courtesy of Mike Townsend), and the first definitive look at the Triangulum Galaxy (M33, courtesy of “Rags”). For me, the latter was the sole holdout among the major elements of the Local Group, having never afforded a convincing look. This night it was obvious. I also had another look at the Blue Snowball (NGC 7662), one of Mike’s favorites; he had shown it to me first last year at YFOS, but this night it looked bluer and better. With skies that good, non-Messier objects were fair game!

“Rags” Rocking and Rolling

He was having the time of his life, with the 10” Coultter performing flawlessly. Its Telrad had an improvised dew-shield (that was not really needed until 10pm) and saw good use, but the ease with which he was zeroing in on the fuzzies was freaky. I helped him locate 3 Messier objects around Arcturus (M3, M5 and M53), but the M81/M82 pair, long his nemesis, submitted at first attempt. As for (M31 and) M33, “Rags” in his own words:

M31 and M33 were both naked-eye objects during the Marathon, at least for me, before midnight. Ramaswamy was skeptical until I just pointed the telescope at what I saw in the sky. No star hops, nothing. I just swung the Telrad to the fuzzy spot and bingo – M33! Sky conditions on Friday were the best I have seen at any MM since I joined NHAS.

The Macks Trucking mostly on Binoculars

Rob Mack has shown up at Stellafane (and at least once at YFOS) with his 12½ inch f/6 Newtonian on a GEM. The sizeable white Telescope World OTA (circa 1980) is a handful, so this time he went down-market:

Brian and I observed until about 2am. We were surprised that most of the objects could be spotted with 10x50 binoculars, our observing tool of choice. It was quite unexpected to be able to hunt down and spot some of the globulars in Ophiuchus like M10 and M12, though M14 proved to be quite a challenge to star-hop to.

We used an 80mm short-tube refractor to spot some of the smaller objects such as M57 (the Ring Nebula) and M32/M110 (Andromeda Galaxy’s satellites) which were too star-like in the binoculars to identify. There were three that we couldn’t identify (M 70, M72 and M73) with our small equipment because of faintness and small size. We used an all-sky map printed off the web as a guide of where the M-objects were in a particular swath of sky. For all but the easiest “old-time favorites,” we used Sky Atlas 2000 charts to locate and star-hop to the object.

While we longed for a bigger view of most objects, we had left the bulky (and cumbersome) 12-inch home in favor of trying to observe only with small, finder-scope-sized optics (akin to doing a road rally in a Miata versus a semi-trailer). In total, we found 55 Messier objects. The ease in finding things and seeing them in a new perspective against the starry background was an unexpected pleasure. Speaking of ‘unexpected,’ our observing group in the Wicketts’ front yard (with the southern-sky view) collectively saw a spectacularly long and bright meteor streaking left-to-right above the southern horizon and leaving a trail visible for a second or two behind it. The backyard group remarked that they had heard the whoops and hollers ringing through the darkness and wondered what they missed.

What a great time we had! Great company, great food and great skies. It was our first MM, and won’t be our last.

Curtiss overcoming Rude Beginnings

Curt Rude set up his EQ mount in the backyard site, using a 2-star alignment augmented by a calibration star. He then went to work on his list of objects. At least the first 7 were blocked by tree tops and tree limbs, the sort of start that would have left me fuming. I shall shamelessly take credit for breaking the log-jam – I talked him into going off the list and targeting M3. Instant success and a much-needed morale boost! It was the second time I had assisted someone bag M3 that night. Curt did very well in his first marathon –35 objects before the lull at midnight.

- ***Ramaswamy***

The LTP Modification Party, September 21

It was unusual in that it attracted not eight, not ten, but eighteen NHAS members on a Sunday morning at MSDC, Concord NH. The starting hour was earlier than usual (10:30am), but with only 7 scopes to build the end was just four hours away. It was a very successful Modification party, thanks to the following cast of characters:



(from the left): Elaine Grantham-Buckley, Gerry and Pete Smith, Marc Stowbridge, Scott and Liam McCartney, Curt Rude, Jill and Rob Mack, Steve Rand, Doug Novielli, Ramaswamy, Larry Lopez, Bob Veilleux, Mike Miller, Rex Gallagher and Jeff Eitreim. (not pictured above): John Bishop.

It began with the familiar run-down by the LTP concertmaster **Pete Smith**, introducing newcomers to the many stages of the LTP assembly line, as well as refreshing the memory banks of old-timers. Once that was done, the assembly broke into groups to work on the various components, mostly in parallel.

Most of these Acts are chronicled below, but left as an exercise to the reader is the task of identifying some of the people not explicitly mentioned in the captions, as well as filling in some of the captions. This would be in addition to **Bob Veilleux's Autumnal Jeopardy** quiz.

The mirror cell modifications were done by old hands like **Liam McCartney** and **Marc Stowbridge**, as well as newcomers like **Rex Gallagher** and **John Bishop**. John has been part of this LTP exercise for quite a while now, but on this day he undertook his first (mirror) cell modification; he went on to process a second unit, promising to introduce a mitochondrial element to it.



Pete Smith points out the collimation screws modification.



At the back end of the room, **Curtiss Rude** and **Steve Rand** soldered on with the modifications to the EZ Finder's power source, namely the introduction of the AA battery pack. They were taking great pains to keep their fingers out of the fray (but failed on one yelp-inducing occasion). And when Liam McCartney dropped by on his break, Steve and Curt promptly turned it into a teaching moment.



The replacement of the CR2032 coin battery with an AA battery pack required intense concentration, and it attracted interest.

The front end of the room, as usual, was the domain of **Gerry Smith** and her decal warriors.

I was the first volunteer at this table and I had barely managed to trim one copy of the Moon Map before being replaced by **Jill Mack** – I didn't mind a bit as it freed me to roam around the room recording the activity. **Rob Mack** lent assistance, Liam McCartney subbed in for a short while, but mostly the Third Man was Bob Veilleux, working with scalpel and ruler alongside Gerry; they applied the decals to the Library scopes.



Slicing paper figures along straight edges, laminating the pieces, cleaning surfaces with alcohol swabs and sticking the decals onto the scopes with precise placement is a job Gerry makes look easy. Meanwhile, in true multi-tasking mode, Mike Miller steps in quietly to attach the pouch (with its two booklets and a red-light) to the telescope's base.



Mike Miller undertook a number of roles on this day, as a pouch-stuffer, a battery-pack affixer and a lanyard expert. In an odd sort of way, he managed to bridge the front and back ends of the room.



The String Theory of Un-losable Caps is being put to the test by Mike Miller and Doug Novielli.



Attaching the AA pack to the side of the EZ Finder is a sticky business.



John Bishop engages Liam's and Elaine's attention, while waiting for pizza time (below).

Half-time was called, remarkably enough, at about 12:30pm. The high turnout had a beneficial side-effect – the variety of pizza pies for lunch increased due to the larger number being ordered.

The post-lunch period consisted mainly of doing collimation and alignment checks on the scopes, plus some quality control steps.



The collimation exercise involved Marc, Jeff, Bob, Rob and Rex (not shown). The modified collimation bolts behind the mirror cell, once tightened in adjustment, hold their setting for a long while, thanks to a dab of epoxy used on the nut .



Scott McCartney checks the alignment of the EZ Finder and the OTA (left), while Pete Smith checks on the status of the battery modifications (center) and marshals the troops for the last push toward the finish line (right).

The array of 7 scopes shown in the Group photograph on page 5 includes one for the NHAS club Loaner Scope program, while the rest were built for the following New Hampshire libraries:

**Minot-Sleeper Library
Concord Public Library
J. A. Tarbell Library**

**Bristol NH
Concord NH
Lyndeborough NH**

**Hall Memorial Library
Blaisdell Public Library
Dudley-Tucker Library**

**Northfield NH
Nottingham NH
Raymond NH**

LTP improvements and Other Matters

Once the major build activity had subsided, Marc Stowbridge demonstrated a simple tube acting as a unit power finder that could stand-in for the red-dot EZ Finder. He left a few tubes with Pete for possible future consideration. But mostly, this addendum to the report is a *Marc-and-Liam-having-fun* page.



Marc and Liam test the plain white tube that could serve well as a finder, once properly painted black.

Late in the proceedings, Gerry and Pete Smith presented Liam McCartney with a gyroscope. Marc Stowbridge set about the task of instruction and what follows is a pictorial chronicle of the GDD: the *Great Diversion of the Day*.



Spool the thread around the stem, let it rip and watch the gyro spin!



The McCartneys with their respective 'scopes. Liam examines his gyro, while Scott makes an altitude adjustment on an EZ Finder to bring it into proper alignment with the OTA.

The best laugh of the day came at the very end – the sight of a spinning gyroscope atop Ninja Kiwi's Dome, [captured by Larry Lopez with his digital camera](#). Scott McCartney also recorded the hilarity.

Presentation of the 100th LTP Scope, Concord NH, September 24

The one-hundredth LTP scope to be delivered in New Hampshire was handed over to the **Concord Public Library (CPL)**, 3 days after its build. The Library has already started publicizing the arrival of its scope; NHAS will assist with the special event being held at 7pm on October 23 in the library's auditorium to introduce it to library patrons.

Pete Smith did the honors, familiarizing the library staff with the mechanics of the LTP scope and its transport, plus other details. **Marc Stowbridge**, **Rich Schueller** and **Ramaswamy** attended the event, as did **Rob Mack** (who will be the “foster parent” as he works nearby). **Deb Baker**, the Adult Services manager for the library, was the liaison. A pair of local news portals sent reporters – *The Concord Insider* and *Patch*. Marc, Rich and Pete answered their questions after Marc had given a talk on the Library Telescope Program. [The Insider article appeared on Sept. 30.](#)



The 100th in the State.



Deb Baker and the CPL telescope, flanked by Rob, Pete, Marc and Rich.



Marc and Rich answered questions for Tim Goodwin of The Concord Insider.

Autumnal Jeopardy: A Quiz

It had to end eventually. Astronomical summer, that is.

We welcome what promises to be an equally beautiful and considerably more colorful autumn. Autumn in New England is so brilliantly marketed as to be almost mythological, and we're as much a part of it as shadowed gables under an amber Moon. *[Look for a Total Lunar Eclipse early morning of October 8, shortly before sunrise. –Ed.]*

Instead of diverging wooden paths or splashes of fiery foliage, we'll usher autumn in with a quiz. And since it is so fiercely popular, this quiz will have the **Jeopardy** format. (A quick review of the format: we post the answers and the player must craft the right question).

1. On September 22, this season begins in New Zealand.
2. To meteorologists, autumn begins on this date.
3. This holiday marks the cross quarter day between the autumnal equinox and winter solstice.
4. The first day of autumn is known astronomically as this.
5. Leaves change color in autumn because as the amount of daylight decreases, leaves lose this.
6. The word “autumn” is derived from this language.
7. This season became known as “autumn” in the century. Prior to that time, the English called the season by this name.
8. The Sun occupies this constellation as autumn begins.
9. Thanksgiving can occur no earlier than this date. (Thanksgiving was on that date last year).
10. The largest one of these iconic autumnal vegetables weighed 1818.5 pounds.

- **Bob Veilleux**

Coffee House Night at YFOS, September 27

A few club members converged on YFOS to enjoy some great seeing. Skies were very nice and temperature quite comfortable, in spite of heavy dew and some low fog rolling in and out of the fields below. Most folks brought small to mid-size scopes. Observing and comparing objects in different scopes and with different eyepieces and filters was the highlight for everyone. The evening began with a crescent moon setting along with Saturn. Later in the night, popular targets of attention (usually prefaced with “hey, check this out!”) included: the Lagoon and Swan nebulas; the Blue Snowball; the Blinking Nebula; M31 of course; and the Veil with OIII filter. Folks in attendance were **Herb Bubert, Steve Forbes, Rich DeMidio, Brian and Rob Mack**, and 2 or 3 others that I cannot name.

- ***Rob and Brian Mack***



The setting Moon, with Saturn in tow. (captured with a handheld camera, 300mm)

(Image: Rob Mack)

Rey Center, Waterville Valley, September 27

The Rey Center monthly skywatch coincided with White Mountain Storytelling Festival, so there were lots of families in the valley. Skies were clear and dark, and a steady stream of cars brought over 50 people through the evening. After a GLP tour of the sky we viewed Alberio, the Ring Nebula, Andromeda, the Double Cluster, Mizar, M13, and finally Uranus and Neptune, both easily visible in the 8" SCT as brilliant, blue-green tiny disks. Just after 10pm the Pleiades rose above the hills and we ended the night looking at them. At about 10pm I also helped someone get their new scope working. It was an 80mm refractor on a standard alt-az fork mount. Once we got the finder aligned, the views were excellent.

The next morning the sky remained clear, so I could not resist setting up the 60mm Lunt with a white light scope in the Town Center plaza in the valley for a few hours before heading home. Lots of folks stopped by, took club brochures and enjoyed the views of sunspots and solar prominences.

- ***Ted Blank***



(Photo: Ted Blank)

Mars at Opposition

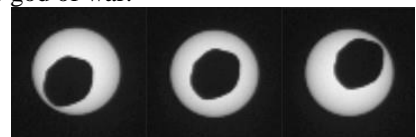


Mars as imaged by **Herb Bubert** almost a decade apart, in November 2005 and in April 2014. The latter image was taken with his C9.25, a Tele Vue 2x barlow and a ZWO ASI 120mm camera used in ROI mode (Region of Interest frames are 256x256).

Herb Bubert has been imaging Saturn on an annual basis for a decade, adding to [his collage of the Ringed Planet](#). But Mars is notoriously difficult to capture and the quality of the images depends mostly on the seeing. Images from poor seeing nights taken about the same time as the good ones, and with the same equipment, can show Mars as just an orange blob. Improvement in astro-imaging technology has led to better quality images over the years (with deep sky objects, in particular), but with Mars it's just not the same story. On April 8 this year Mars was 0.621AU distant. At the opposition of August 28, 2003, it shone at -3.0 magnitude just 0.373AU away, reaching “Super Mars” status; NHAS members at skywatches might have dealt with remarks similar to the current “Super Moon” comments. The closest approach is within 9 days of an opposition; the next one is in May 2016 (0.503AU). Then on July 27, 2018, Mars will be 0.386AU away, the closest until August 2035. Such favorable oppositions occur every 15 or 17 years.

Did you know that ...

- Mars is the second smallest planet in the Solar system, after Mercury? Its orbit is also the second most eccentric (0.0933), bested again only by Mercury (0.2056). *[Did I hear someone bring up the ever-shrinking Pluto?]*
- The synodic period of Mars is much the longest in the Solar system (780 days)? The synodic period is the duration between successive oppositions (or conjunctions). Venus ranks second on the list, at 584 days.
- An 8-hour Transit of Earth across the Solar disk will be seen from Mars on November 10, 2084? Earthlings will see it in opposition. At a similar event in November 1879, with Mars in perfectly illuminated opposition, **Charles Young** tried to measure its oblateness. It is not known if he was aware Martians would have seen an Earth-transit.
- Mars has a pair of satellites with the oddest characteristics that could even be captured asteroids? They were discovered in 1877 by **Prof. Aspah Hall** from the US Naval Observatory. He named them **Phobos** (panic or fear) and **Deimos** (terror or dread), in keeping with the mythology concerning the god of war.
- The satellite that orbits closest to its planet in the Solar system is Phobos? It completes an orbit in 7.66 hours at a distance of about 5,830 miles, the only case of a moon with a period shorter than the rotational period of its planet, making it seem to rise in the west as seen from Mars’s surface.
- A Transit of Phobos across the disk of the Sun can be seen from some place on Mars on most days? This is because Phobos orbits in line with the equator of Mars, close to the Martian surface. The transits last about 30 seconds. A “Total Lunar Eclipse” is an almost nightly event on Mars.



Almost an Annular Eclipse, a transit of the Sun by Phobos as seen by the Mars rover Curiosity, on August 20, 2013. (Credit: JPL/NASA)

M30 – Globular Cluster in Capricornus

by Glenn Chaple

Ophiuchus, Scorpius and Sagittarius depart the evening sky in October, taking with them their ample cargo of globular star clusters. A few stragglers remain accessible to backyard telescopes – among them, Messier 30 in the constellation Capricorn.

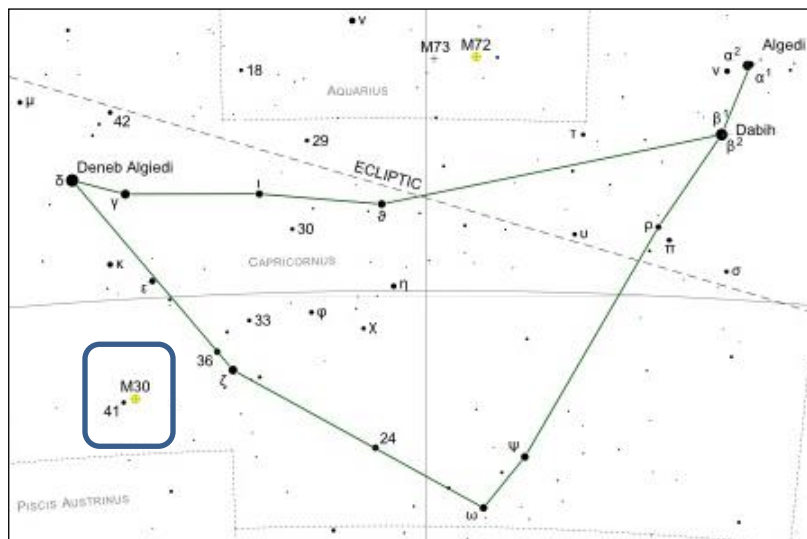
M30 was discovered by Charles Messier in 1764. He described it as a round nebula, containing no stars. Its stellar nature fell to the watchful eye of William Herschel, who resolved M30 twenty years later.

Recently, I observed M30 from a suburban location on an evening when the naked eye limit was about 5th magnitude. It was readily visible through 10 X 50 binoculars, appearing as an out-of-focus 7th magnitude star just a half degree west of the 5.5 magnitude star 41 Capricorni. A 4-inch f/10 reflector at 120X didn't resolve any stars, but it did reveal M30's highly concentrated nucleus. In my 10-inch f/5 reflector at 208X, the outer parts of M30 were resolved. The cluster spanned some 5-6 arc-minutes and seemed elongated in an east-west direction. Two stellar streams radiated outward towards the north.

M30 lies about 27,000 light-years from earth. It harbors several hundred thousand stars and has an estimated diameter of 90 lyrs.



(Image: Mario Motta, MD)



(chart courtesy: freestarcharts.com)

Did you know that ...

- The first Globular cluster discovered was M22 in Sagittarius by Abraham Ihle, a German astronomer, in 1665?
- Edmond Halley discovered the second globular: omega Centauri (in 1677)? It might come as a surprise to some that the pre-eminent globular in the northern hemisphere – M13 in Hercules – was only the fourth such discovery, by the same Edmond Halley, decades later in 1714. Charles Messier added it to his list in 1764.
- Individual stars in a globular cluster were not resolved until Charles Messier observed M4 in Scorpius (1764)? M4 had been discovered by Philippe Loys de Chéseaux in 1746, and at a distance of about 7,200 light years, it is the one closest to the Solar system (along with NGC 6397, in the southern constellation Ara).
- The most distant globular cluster that can be seen in an amateur telescope is NGC 7006 in Delphinus, estimated to be 137,000 light years away? The most distant one known is Arp-Madore 1 in Horologium at 398,000 lyrs.
- 158 globular clusters are known to-date in the Milky Way? Some 40 more might exist, hidden in the gas and dust of our galaxy. Globular clusters were key to determining where the center of the Milky Way lay.

Yet Another LTP Story

I was watching TV late one night in the early '70s, when up popped an image of 2 furry rabbits nuzzling each other. There was silence, and suddenly a voice intoned: "In 1949, there were only 2 Volkswagens in America." That was all of it. A 15-second commercial probably led to my first car purchase: a Marina Blue VW Beetle, the 1974 model.

In those days, one did not have to wait for Super Bowl Sunday to see well-written, well-produced TV commercials, by Alka-Seltzer, by Bell Telephone and by VW, to name just three:

"Have you ever wondered how the man who drives the snowplow, drives to the snowplow? This one drives a ..."

Yes, it was a VW Beetle; the Rabbit came a bit later. But I digress.

NHAS has never felt the need for a commercial for its **Library Telescope Program**, but if one were required, it could begin thus:

"In 2008, there was only one Library Telescope in the World... and it was in Tamworth, New Hampshire."



But much as the headwaters of the Nile are not in Egypt, or even in the Sudan, but in equatorial Africa of Rwanda and Burundi, the source of the LTP might well lie 65 miles to the southeast, in Brentwood NH. There on October 3, 2008, NHAS held a public skywatch requested by the Mary E. Bartlett Library. A \$200 donation was forthcoming from them, most generously and unexpectedly, and that got **Marc Stowbridge** thinking as (only) he usually does.

Domiciled as he was in Tamworth, he decided to try out the concept of a loanable Telescope with his local Cook Memorial Library. Marc chose to go with libraries rather than schools because the former are in the business of lending material out, and they are open all year. On November 18, 2008 he sent in a formal proposal to the Board of Directors of NHAS, and the rest, as they say, is history. It is interesting to note that he once thought the number of yearly library scope placements to be 4, and expected other early recipients to be the libraries in Brentwood and Goffstown. He was off on both counts. For whatever reason, Goffstown Library got unit #5 only in December 2009; Mary E. Bartlett Library received unit #10 in April 2010. Unit #2 was in fact delivered to the Moultonborough Public Library in February 2009. Records show that Friends of that library paid \$239.75 for their Library Telescope.

<p>November 18, 2008</p> <p>To: NHAS Board Members From: Marc Stowbridge Subject: Library Telescope Outreach Proposal</p> <p>Hello All,</p> <p>Recently I have been talking about setting up some libraries with a telescope and supportive materials that they could then loan out like a book. As a "trial run," I propose that we start with my local library and work out the details before making other similar gifts to other libraries. I spoke with the Cook Memorial Library, Tamworth, board of trustees last Monday, and made it clear to them that I was just "testing their enthusiasm" for the project, and was promising nothing. They were very enthusiastic! The librarian called today and said that if a telescope were to be donated to the library, the trustees felt it only their duty to try it out first. They have since formally agreed to the gift and sent me a form that conveys the gift to them.</p> <p>After presenting the idea at the meeting last Friday, I incorporated the ideas expressed by the members into the proposal and have updated the items to be included in the gift to the libraries. I also checked with Orion Telescope about any discounts we might get, but they declined, citing the difficulty in making discounts over multiple purchases.</p>	<p>Shopping Cart:</p> <table border="0"> <tr> <td>StarBlast 4.5 Astro Telescope</td> <td>#09814</td> <td>\$179.95</td> </tr> <tr> <td>Orion Mini Pro Cleaning Tool</td> <td>#05836</td> <td>\$9.95</td> </tr> <tr> <td>Star Target Planisphere</td> <td>#04110</td> <td>\$10.95</td> </tr> <tr> <td>S&T Field Map of the Moon</td> <td>#51466</td> <td><u>\$10.95</u></td> </tr> <tr> <td>Merchandise Total</td> <td></td> <td>\$211.80</td> </tr> <tr> <td colspan="3">Shipping is extra, and the amount is less than \$20.00</td> </tr> </table> <p>I need a final OK from the Board to order the items. I can front the money and give Chase [McNiss] the receipt for reimbursement. Would you please respond to Gardner, who will pass on your decision to me?</p> <p>Assuming your approval, I would also like your thoughts on how many libraries we might work with. I think that the number mentioned at the meeting was 4 per year, but that is quite open for discussion. This would, of course depend upon our identifying volunteers to provide periodic cleaning and adjustment of the equipment, and support to the library. Again, assuming your approval, and that the Cook Memorial Library trial is successful, I think that Brentwood Library (who gifted us with \$200) and Goffstown Library, who are yearly enthusiastic supporters, should be considered for the next two kits. We have a volunteer for the Brentwood Library and I think that Goffstown will not be hard to cover.</p> <p>Thank you for your consideration, Marc</p>	StarBlast 4.5 Astro Telescope	#09814	\$179.95	Orion Mini Pro Cleaning Tool	#05836	\$9.95	Star Target Planisphere	#04110	\$10.95	S&T Field Map of the Moon	#51466	<u>\$10.95</u>	Merchandise Total		\$211.80	Shipping is extra, and the amount is less than \$20.00		
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Merchandise Total		\$211.80																	
Shipping is extra, and the amount is less than \$20.00																			

In the Beginning

Telescopes are, it seems, a New Hampshire tradition. In the poem “The Star Splitter,” **Robert Frost** wrote the words he attributed to a “retired” farmer, **Brad McLaughlin**:

*The best thing that we're put here for 's to see;
The strongest thing that's given us to see with 's
A telescope. Someone in every town
Seems to me owes it to the town to keep one.
In Littleton it may as well be me.*

Marc Stowbridge might have traits in common with Brad McLaughlin, but he was not about to burn his house down for insurance money. He set about making the \$200 donation go as far as it could. It has to be a coincidence that he took his cue from the opening lines of the poem:

*You know Orion always comes up sideways,
Throwing a leg up over our fence of mountains,*

but he started with the Orion Starblast 4.5” reflector. No modification was made to the unit at first, other than use of a 26mm Plössl eyepiece (plus a short 2x barlow) for better eye-relief. The red light was basically a 3-AAA powered small flashlight taped over with red-tape from a taillight repair kit. The user instructions were reworked into a spiral-bound booklet of index cards, personalized for each library. Mitten strings have been used to secure all the caps since day 1, although the use of a battery pack to power the EZ Finder II in place of the 3V Lithium button battery was a modification yet to come.

The Cook Memorial Library’s scope could be checked out for only a few days at a time, so Marc had time to take it home overnight between uses and look for problems. The very first one seen was a rattling mirror cell assembly; patrons had fiddled enough with the six knobs located at the bottom (for collimation) to loosen the mirror housing a lot. Marc set about getting rid of the locking nuts that are not terribly useful for small (and light) mirrors; he ‘fixed’ the collimation screws with replacement bolts in the small holes to one side of the originals, making a modification that is still in use. The nuts, once tightened at build time, stayed put. There haven’t been any mirror cell issues since.

When the Moultonborough Library got the second unit, club members donated 3 eyepieces and an Orion pack to hold them in. Librarian **Nancy McCue** was delighted with the new scope, as she wrote to Marc after the hand-over : *“We put our new telescope on display yesterday afternoon and it was checked out by 1pm this afternoon! I should have taken it home with me for one night, it was so beautifully clear last night. Thank you for ordering it and the instructions and the eyepieces and bag and flashlight, and for taking the time to show us how to use it.”*

By the summer of 2009, some changes were taking place: the barlow was dispensed with, headlamps from Home Depot were being used for red light, and a Moon Map was being supplied with each scope. The original map was improved considerably, thanks to the graphic design talents of **Tom Cocchiaro**, and his version has been a fixture on an LTP scope ever since – it presents a view of lunar features as would be seen in that Newtonian telescope, and not as seen through binoculars. The instructions manual was being continually updated based of patron feedback. Finally, by December 2009, the scope was converted to use a single eyepiece – the Celestron 8mm-24mm zoom. The Gilford Library received the first LTP scope with a permanently-attached eyepiece; the cost zoomed a bit too.

When the Langdon Public Library in Newington catalogued their LTP scope for circulation on December 17, 2009, the count of scopes in the program had jumped from 1 to 7 in that year. 2010 would see deployment of eleven more. No one suspected it at the time, but LTP was ready to take off in 2011.



Cook Memorial Library on a quiet Sunday



Solar Observing from the front lawn. (Photo: Marc Stowbridge)

The Third Year

2010 began with the pair of Pease Public Library in Plymouth and Ossipee Public Library getting their LTP scopes. The latter was sponsored by Village Variety at its grand re-opening on December 20, 2009. The new owners, **Angela Carver** and **Brian Emmett**, wanted to give something back to the “beautiful little village” they lived in, and chose a library telescope – there’s something very New Hampshire-y about that!



Betsy Solon of Mary E. Bartlett Library with unit #10 as it is today. The library was voted best in the State in 2014.



Angela Carver, Bob Gillette and Yvonne Fisher at the Ossipee LTP handover. (Photo: Bob Gillette)

The Mary E. Bartlett Library in Brentwood finally joined the ranks in April 2010, and started circulation of their scope on May 2nd.

But what happened at the **North-East Astronomy Forum (NEAF)** in April proved to be crucial to the ongoing success of the program. Marc met **Craig Weatherwax**, the “boss” of OPT, and his brief talk about the LTP got the latter interested – that’s the one part of the story I have trouble believing: the “brief” part. Craig wanted Marc to send him more information, which Marc did by August. In addition to clippings and reports from various town newspapers, Marc directed Craig to the “DIY” material available from [the NHAS web-site regarding the program](#). The response was immediate. Craig Weatherwax had started the **Astronomy Outreach Foundation (AOF)** to promote astronomy awareness programs just like LTP, and he circulated the information amongst other foundation members. He also offered to supply cleaning and collimating aids for use by the “foster parents” of LTP scopes.

At NEAF 2010, Marc also met the folks manning the **Orion Telescopes and Binoculars** booth. They were delighted at the selection of the Starblast 4.5 for the program, and exchanged contact information. One thing led to another, and the Orion Christmas catalogue of 2010 featured the LTP on page 13!

Along the way, Marc began including the **National Audubon Society’s Pocket Guide to Constellations** booklet in the pouch. Many astronomy guides had too much trivia about the telescope and the skies that is unnecessary for a beginner, used Hubble images, and often presented detailed star-maps that hindered navigation by star-hopping. The *Pocket Guide* had just the right amount of information for a beginner, in a concise un-cluttered format. In addition to the many Never-look-at-the-Sun-with-this admonition decals, answers to typical questions such as “what power is the scope?” were now placed at the observer’s finger-tips, as a chart affixed to the telescope’s base.

The year ended with the statewide tally of eighteen scopes, as Seabrook Library and the Wiggin Memorial Library in Stratham began to lend their units out to library patrons. It is worth noting that all the modifications of these units had been done by just one person: Marc Stowbridge. The LTP Modification Parties that we are used to these days simply did not exist.

The Year the LTP World Changed

In terms of increasing Public Outreach by NHAS members, **2011** began with the introduction of two new programs:

- **The Rey Center Dark Skies** observing, up north in Waterville Valley on a Saturday nearest the New Moon
- **Sidewalk Astronomy** observing, along the seacoast at Market Square in Portsmouth on a Saturday nearest the First Quarter Moon

The LTP was still chugging along, like the North Conway train that Marc played Santa at Christmases past. He had also been heading the Public Observing program, but transition to **Paul Winalski** was gradually taking place.

Then ***Sky & Telescope*** kicked off the New Year by publishing a **Focal Point** article on the last page of their January 2011 issue. Co-authored by Marc, **Tom Cocchiario** and **Rich Schueller**, it put the LTP information address on the map by inviting readers to visit: www.nhastro.com/ltp.

Marc met Craig Weatherwax again at NEAF 2011, and this time had an *Astronomy* magazine prop ready at hand. The May issue (which is handed out to NEAF attendees) had a Letter to the Editor on the LTP. Craig seemed pleased that the program was gaining exposure, and in mid-May wrote to Marc that the NHAS LTP had been selected to receive the proceeds from the **Southern California Astronomy Exposition (SCAE)** raffle. *The Friends of Palomar* had been the recipient the year before – the LTP had now been placed in the same room as the supporters of the historic Hale Telescope!

The raffle at SCAE in 2011 netted \$8000, twice the amount raised the year before. **Ken Charles**, then NHAS Treasurer, happened to be vacationing in Southern California and accepted the donation on behalf of NHAS. It would have funded about 15 telescopes, but OPT was persuaded by Marc to ‘pay’ in scopes and accessories, and that’s what happened. Mother Teresa would have been proud of that nifty move, which netted 25 Starblast units and all the extra gear required for the modifications.

The scopes arrived from OPT in August, but were not delivered to the usual address in Tamworth, NH. To quote Marc Stowbridge, “**Rich Schueller**, being of sound mind, wouldn’t let me anywhere near them.” They were ‘warehoused’ instead in **Ted Blank**’s garage in Hampton Beach. The fuel supplied by **Craig Weatherwax** of *Oceanside Photo and Telescope* was about to boost the program.

The First LTP Modification Party was held at MSDC, Concord on September 17, 2011 and [you can read all about it in the Observer](#); it was an unqualified success as eleven units were modified, and all this happened just 3 years ago this month!

At about this time, Rich Schueller happened to be talking about the LTP to **Lee Grodzins**, ex-Professor of Physics at MIT and the founder of **Cornerstones of Science (CoS)**, a non-profit organization that helps libraries with science material; big boxes filled with often one-off science kits are lent to libraries, giving them access to eye-catching exhibits in this digital age at minimal cost. Lee immediately put Rich in touch with **Cynthia Randall**, Executive Director at CoS, and it was the beginning of a productive partnership. CoS became an Orion dealer, and NHAS now had access to Orion scopes at discounted prices.

There was also news on the International front. Marc had, in the year prior, fielded inquiries from as far away as New Zealand, but in June 2012 he received news of concrete development from Canada. **Katherine Peterson** of the Calgary chapter of the **Royal Astronomical Society of Canada** wrote to inform him that LTP scopes would be donated to a pair of rural libraries in Alberta, and that the modification of the Orion Starblast 4.5 scopes would be following the instructions at the NHAS web-site. The libraries in Sheep River Library (in Turner Valley) and Olds Municipal Library (in Olds, Alberta) acquired their scopes in October. And the NZ inquiry turned to reality as the [Levin Stargazers](#) placed their first library scope.

The number of domestic inquiries and implementations are too numerous to list here, but Maine, Michigan and California lead the way. From time to time, improvements in the modifications are forthcoming from the ‘field.’

The year **2011** began with the Amherst Library inaugurating the 19th LTP telescope on February 11 with a skywatch (and a presentation by **Ed Ting** to about 70 attending patrons) and it ended with 38 scopes in circulation. One of the last units was placed, appropriately enough, at the Keene Public Library.



*The check that launched 25 ships, er, scopes.
(Photo courtesy of: OPT)*



*A double dozen wall of Orion Starblast boxes.
(Photo: Ted Blank)*

A Normal Growth Spurt

2012 began on a quiet note. By March all the OPT sponsored scopes had been converted in Mod Parties, with Rich Schueller handling their distribution (Marc and Rich were now running the program in tandem with **Matt Amar**). At NEAF 2012, [Craig Weatherwax was presented with a Thank-You plaque on behalf of NHAS](#) – it was designed by **Melinde** and **Don Byrne**. By July all the back-logged requests for scopes had been filled, and the rollouts continued until 53 scopes had been deployed by year-end. No one knew it then, but the number would soon double.

The summer of 2012 saw Cornerstones of Science partner with 5 clubs in Maine to place 20 scopes up and down the state. **Forrest Sumner** and **Ron Thompson** of **Southern Maine Astronomers (SMA)** were involved in the effort. Earlier in the year (March), **Mike Cook** of the **Kalamazoo Astronomical Society (KAS)** had reported back on their Mod Party and suggested a new modification: a 2” hole cut in the OTA dust cap could do the job of a Moon filter.

In November 2012, **Pete Smith** took over management of the program from Rich. About 50 scopes had been placed by then and a slow, steady pace was forecast for the coming year. Needless to say, Pete was in for a surprise.

The Explosive Growth

A pair of remarkable events happened in February 2013. A Librarians’ conference spread the word about the LTP and suddenly Pete had 15 requests in 3 weeks. Then LTP received *Astronomy* magazine’s *Out-of-this-world* award for 2012, along with a cash grant of \$2500 (that was good for 8 scopes). Many of the new scope requests included funding, so that by the end of 2013, NHAS had placed 36 more scopes in the field, built in 4 quarterly Mod Parties. And as of this writing there are **107** NHAS-modified scopes deployed, **103** of them right here in New Hampshire.

However, for Marc Stowbridge personally, it was a rather bad start to the year – on January 17, 2013 he slipped and “fell in a clump” in his driveway and practically shattered his left femur. At Memorial Hospital in North Conway he was modified in a 4-hour ‘party’ in a clean-room, with a foot-long pin and a bunch of other hardware inserted – if ever Marc had a wish to be the Six-Million-Dollar Man, he was one small step along the way. But he still managed to have **Sue Stowbridge** ship out some LTP hardware for the upcoming Mod Party, and more importantly, to get the ball rolling to facilitate the *Astronomy* magazine award. But for **Tom Cocchiari**’s smart leg-work with it the next day, that application might have never come off! When Ted Blank visited Marc at the Wolfeboro Bay Rehabilitation Center to present him with this photograph, it amounted to what Marc considers his “moment of the millennium.”



The LTP Modification Party group shot of January 27, 2013.

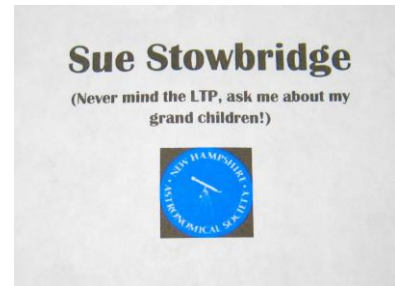
(Photo: Ted Blank)

Goals set, Goals met

From its humble beginnings, the Library Telescope Program has grown into a mature, remarkable product, bringing amazing sights to young and old. Marc Stowbridge should be proud of his brain-child, and we in NHAS are proud of him. When the October 2014 *Sky & Telescope* article written by **John Goss**, President of the **Astronomical League**, reached subscribers online and in print (does it hit the newsstands these days?), it was a thrill to one and all.

Marc Stowbridge recently summed up his goals regarding the LTP thus:







- *getting scopes into the hands of novices and not have them be frustrated*
- *spreading the program via libraries because I like libraries*
- *making this a Club project, and not dependent on any individual*
- *growing the Club through exposure in libraries and the media*
- *getting the word out that the Club was able to provide sky watches, particularly in conjunction with libraries.*
- *figuring out better ways of doing things (the technical term is 'fiddling').*
- *getting someone else to get things better organized, because I can't.*



His better half has a distinctly different goal in mind – I daresay after 6 pages of this saga that one has a lot of appeal. But wait! There is one more chapter in the LTP story ...

LTP Instructional Videos

One more brick has been added to the Library Telescope Program structure by **Steve Rand** with a 6-part video book. In segments 3 to 7 minutes in length, he explains to the patrons and staff of New Hampshire Libraries (and elsewhere) the working, use and care of the telescope they are dealing with. The need for such show-and-tell videos has been voiced informally by librarians for a while now, and Steve has uploaded these clips to *YouTube* for universal viewing; they can be found via the links below, or by searching for “NHAS-LTP” at *YouTube*.

<i>No.</i>	<i>The Video (click to view)</i>	<i>Duration</i>	<i>The Topic</i>
1.		6:15	<u>Program Introduction:</u> The Library Telescope Program of the NHAS places astronomical telescopes (for beginners) in local Libraries that can be checked out by patrons much as books, CDs and DVDs are. Come have a look!
2.		2:41	<u>Transporting the Telescope:</u> Of course, greater care has to be exercised in the process of actually checking out the telescope to take it home, and on its return. Here are a few simple guidelines to help you do it safely and without hassle.
3.		5:35	<u>How the Telescope Works:</u> This clip explains the basic operation of the telescope you will be borrowing, in simple straightforward terms. It will help you get started with its use by removing any misconceptions above the unit.
4.		4:11	<u>Aligning the Finder:</u> For the telescope to function properly by showing you a star or planet that you are aiming it at, its Finder has to be in proper alignment with the optical tube. If per chance it is not, this is what you'll have to do!
5.		3:33	<u>Care and Maintenance:</u> The do-s and don't-s of how to treat the scope while in your custody. View the video on how to transport the scope, make sure the Finder is switched off when not in use, and never try to clean the Eyepiece.
6.		6:59	<u>An Observing Session:</u> Tips on an observing session, including use of the EZ Finder, the red light on the headlamp, and of a Planisphere (if available) . Having a plan and a list of objects to locate is highly recommended.

- ***Ramaswamy, with the help of the Three LTP Musketeers:
Marc Athos Stowbridge, Richard Porthos Schueller and Peter Aramis Smith.***

A Victorian Refractor for the 21st Century

This is a “Skylight” telescope, made by [a company that is the creation of Richard Day](#) in England. He makes modern versions of the classic long focal-length achromats. He says that his goal is to “re-design the Victorian refractor for the 21st century.”

I saw his display at NEAF several years ago and was intrigued enough to follow-up with email and then a purchase.

Production is limited and the models change as his suppliers change. My telescope is a 4-inch f/13 model with a doublet lens by (I think) a Japanese manufacturer. Right now he’s selling a 101mm f/15 with a doublet lens made by Tele Vue. Optical Tube colors available are black, red, and white. Richard Day also offers a 102mm f/7 apochromat.

Be warned though – these are high-end premium products, the equivalents of Starmaster rather than of Orion. They are not cheap; the US dealer for Skylight prices the Televue-lensed f/15 OTA at \$3,995.00. That price does include a wooden storage box specially built to hold the OTA and its permanently attached finder.

The telescopes are beautiful and the construction is solid. At long focal ratios like f/13 and f/15 there is no discernable chromatic error when in focus, even though this is an achromat design rather than an apochromat. As you would expect, views are very good. Star color comes through beautifully. Contrast is high, focus is tight.

You will need a substantial mount for these OTA because they are relatively heavy and very long, even longer once you add the required diagonal and eyepiece. The deployed length of this Skylight refractor is 58 inches (in field condition) and it balances with the longer side being the focuser side. It weighs about twenty pounds.

- **John Bishop**

[A first-light observing report with this refractor appears in the [November 2012 Observer](#), on page 2. –Ed.]



Modification to blue ScopeGuard case by Joe Derek to accommodate the semi-permanently attached finderscope and its brackets (outside and inside views). (All Photos: John Bishop)

The Baader focuser.

NHAS September 2014 Business Meeting Report

The monthly business meeting was held at St. Anselm College, Manchester NH on September 12th, with our President **Ted Blank** presiding. The Treasurer's report by "**Rags**" follows on the next page.

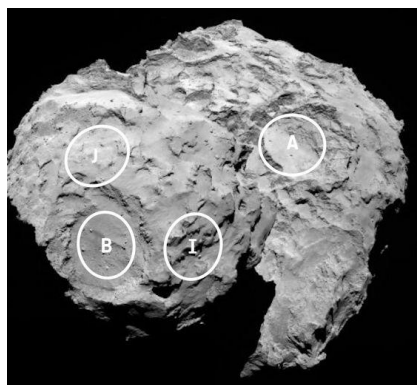
President's Report

The meeting was web-cast for the second time, though on this occasion only one member was participating via that hookup.

The Fall Messier Marathon and an LTP Mod Party are round the corner. Then there is NEFAF next month (Oct. 17-18) with keynote address by **Dr. Carolyn Porco**; don't miss it!

The Top 3 News items of the past month, in reverse order:

* Evidence has emerged that the Earth is inside a bubble of gas from an ancient supernova explosion about 300 light years across. The gas is very thin and very hot, a departure from ordinary interstellar matter.



* Landing site is being identified on [67P/Churyumov-Gerasimenko](#) comet for the *Rosetta* spacecraft.



* The *New Horizons* Spacecraft has crossed the orbit of Neptune on its way to Pluto.

Astronomy Shorts

Ken Charles: Sky Safari can control a scope, with rechargeable battery and bluetooth receiver (BluePort XP) for Celestron mount serial port. Ken can control his scope from his tablet.

Marc Stowbridge: Brought an **Astronomers without Borders** LTP-type scope for a show-and-tell.

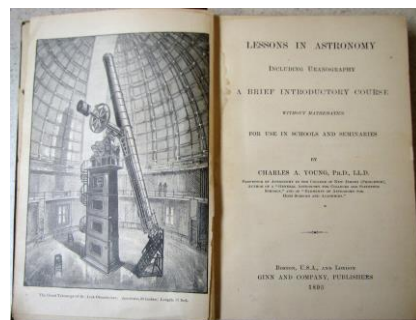
Ramaswamy: Mars and Venus will be in conjunction in the west on February 21, 2015. The dark limb of the nearby crescent Moon will occult Uranus at about 5:55pm.

Steve Pearsall: Bought Celestron Star Sense and put it on his CG-5: it has a small camera in place of the finder scope that auto-aligns the mount. The process works even if the sky is partly obscured.

Scope of the Month

John Bishop showed his Classic 4" f/13 achromatic refractor. See the previous page (19) for more details.

Book of the Month



Larry LaForge introduced "*Lessons in Astronomy*" by **Charles Young**, written in 1890. The remarkable thing about the content is just how much was already known then of that we now consider modern knowledge.

The Evening Presentation



David Sliski, a Curatorial Assistant at the Harvard College Observatory (HCO), gave an hour-long talk on his work of the past 4 years: "Rediscover Discoveries of the 19th and 20th century."

From 1885 through 1992 the HCO repeatedly photographed the entire sky. From traveling west to set up the first telescopes on Mt. Wilson, to voyages to the mountain tops in Peru more than 25 years before the completion of the Panama Canal, HCO pushed the boundaries of the frequency and amount of photography an observatory could do.

In 2004 a team at Harvard led by Prof. Jonathan Grinday thought the collection of more than 500,000 glass plate negatives should be digitized and the DASCH (Digital Access to a Sky Century at Harvard) team has worked to create hardware and software to digitize the plates. DASCH has recently partnered with the Smithsonian to publish images of pages in the original logbooks. The hope is that by putting those on the web, interested amateurs will help transcribe them and the data will lead to (re)discovery of comets long lost, and the discovery of more asteroids, variable stars, galaxies, quasars and supernovae.

NHAS Treasurer's Report
(as of September 10, 2014)

Starting Checking Balance:	\$9,766.47	Membership:	143
Deposits:			Single + Family
Membership	60.00	Cash Renewals:	0x30.00+0x10.00 0.00
Donations	1,009.55	Cash New Members	2x30.00+0x10.00 60.00
Interest	0.44	PayPal Renewals:	0x28.83+0x 9.61 0.00
Calendar Sales	21.00	PayPal New Members:	0x28.83+0x 9.61 0.00
Total:	0.00	Total:	2
	\$1,090.99	Current Members:	145
Expenses Paid:		New Members:	
Kalmbach Pub. Co. (calendars)	233.82	Buz Powers	Bedford NH
Cornerstones/Science (scopes)	1,543.00	Richard Ludlow	Nashua NH
Rackspace Cloud (web server)	21.87		
B&H Photo (LED light x6, lens pen x6, zoom EP x6)	425.10	Donations:	
Barnes & Noble (books)	50.55	Brandon Bene	GEN 4.55
Total:	\$2,274.34	Buz Powers	LTP 30.00
		Friends of Lyndeborough Library	LTP 325.00
Current Checking Balance:	\$8,583.12	Friends of Dudley-Tucker Library	LTP 325.00
Petty Cash:	\$100.00	Hall Memorial Library	LTP 325.00
Current Cash Balance:	\$8,683.12	Total:	\$1,009.55
EOC Share:	\$5,181.37		

Contact Information

<p><u>How to join NHAS</u></p> <p>Write to us: NHAS P. O. Box 5823 Manchester, NH 03108-5823</p> <p>Send Email to: info@nhastro.com</p> <p>Visit our web site: http://www.nhastro.com</p> <p><u>How to contribute to the Observer</u></p> <p>Email articles and snapshots to the Editor: ramax.astro@yahoo.com</p>	<p>NHAS Officers:</p> <p>President: Ted Blank</p> <p>Vice-President: Tom Cocchiaro</p> <p>Secretary: Paul Winalski</p> <p>Treasurer: David "Rags" Gilmore</p> <p>Board of Directors:</p> <p>Ken Charles</p> <p>Pete Smith</p> <p>Steve Rand</p>
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Orion XT6 – 6” Newtonian on a Dobson mount
 (custodian: Ted Blank contact: tedblank@gmail.com)

Equipped with:

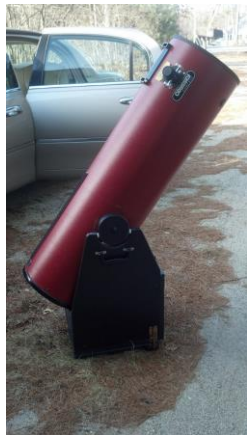
- Telrad finder with a dew shield
- 32mm, 25mm and 10mm Plössl EPs in a case
- A Planisphere, a Moon map, and a red light
- Richard Berry’s “Discover the Stars”
- Orion XT6 user manual



Meade 8” Newtonian on a Dobson mount
 (custodian: Ken Charles contact: starnek2550@gmail.com)

Equipped with:

- Telrad finder with a dew shield
- 25mm and 10mm EPs
- Custom-built base (a Joe Derek/Chase McNiss original)



Coulter Odyssey 10” Newtonian on a Dobson 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 on loan, independent of the telescope, and in a separate slip-case:

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



Orion XT10 on a Dobson mount
 (custodian: Pete Smith contact: psastro60@gmail.com)

Equipped with:

- Telrad finder (replacing the original finderscope)
- Assorted EPs: 35mm, 25mm wide-angle, 17mm and 10mm.
- An EP case will be available in the near future.

Regional Astronomy Clubs

New Hampshire Astronomical Society
 [NHAS] *Skywatches around the State*
Sidewalk Astronomy in Portsmouth
www.nhastro.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

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
Webster Free Public Library Skywatch	Thursday, October 2	7:00pm	947 Battle Street, Webster NH
Franconia Notch State Park Skywatch	Thursday, October 2	8:00pm	Lafayette Campground, 260 Tramway Dr, Franconia NH
First Friday Skywatch for MSDC	Friday, October 3	7:00pm	MSDC, Concord NH
Sidewalk Astronomy Skywatch	Saturday, October 4	6:00pm	Market Square, Portsmouth NH
EOC Meeting	Thursday, October 9	6:30pm	Manchester City Library, Manchester NH
NHAS Business Meeting	Friday, October 10	7:30pm	MSDC, Concord NH
Center for Conscious Studies Skywatch	Saturday, October 11	6:00pm	Stratham NH (see Calendar entry)
Center for Conscious Studies Skywatch (backup date)	Sunday, October 12	6:00pm	Stratham NH (see Calendar entry)
Bedford High School Skywatch	Tuesday, October 14	7:30pm	Benedictine Park, Bedford NH
Bedford High School Skywatch (backup date)	Wednesday, October 15	7:30pm	Benedictine Park, Bedford NH
Hopkinton Town Library Skywatch	Thursday, October 16	7:00pm	Houston Drive, Hopkinton NH
NEFAF Skywatch	Friday, October 17	6:00pm	UNHO, Spinney Lane, Durham NH
NEFAF Skywatch	Saturday, October 18	10:00am	UNHO, Spinney Lane, Durham NH
Hopkinton Town Library Skywatch (backup date)	Monday, October 20	7:00pm	Houston Drive, Hopkinton NH
Epping Middle School Skywatch	Wednesday, October 22	7:00pm	33 Prescott Road, Epping NH
Concord Public Library Talk on "How to use a Telescope"	Thursday, October 23	7:00pm	45 Green Street, Concord NH
NHAS Fall Messier Marathon II	Friday, October 24	5:00pm	The Wicketts' Residence
Fall Messier Marathon II (backup date)	Saturday, October 25	5:00pm	The Wicketts' Residence
Coffee House Night at YFOS	Saturday, October 25	5:00pm	YFOS
Rey Center Skywatch	Saturday, October 25	7:00pm	Waterville Valley NH
Camp Glen Brook Skywatch	Monday, October 27	6:45pm	Glenbrook Road, Marlborough NH
Auburn Public School Skywatch	Tuesday, October 28	6:00pm	Preston Field, Auburn NH
Epping Middle School Skywatch (backup date)	Wednesday, October 29	7:00pm	33 Prescott Road, Epping NH
Auburn Public School Skywatch (backup date)	Thursday, October 30	6:00pm	Preston Field, Auburn NH
Sidewalk Astronomy Skywatch	Saturday, November 1	6:00pm	Market Square, Portsmouth NH
First Friday Skywatch for MSDC	Friday, November 7	7:00pm	MSDC, Concord NH
Reeds Ferry Skywatch	Monday, November 10	7:00pm	Lyons Road, Merrimack NH
Concord High School Skywatch	Tuesday, November 11	7:00pm	White Farm, Rt. 13, Concord NH
EOC Meeting	Thursday, November 13	6:30pm	Manchester City Library, Manchester NH
Salem High School Skywatch	Thursday, November 13	7:00pm	44 Geremonty Drive, Salem NH
NHAS Business Meeting	Friday, November 14	7:30pm	St. Anselm, Manchester NH
Salem High School Skywatch (backup date)	Thursday, November 20	7:00pm	44 Geremonty Drive, Salem NH
Heronfield Academy Skywatch	Friday, November 21	6:30pm	Heronfield Academy, Hampton Falls, NH
Coffee House Night at YFOS	Saturday, November 22	5:00pm	YFOS
Rey Center Skywatch	Saturday, November 22	6:30pm	Waterville Valley NH
Heronfield Academy Skywatch (backup date)	Saturday, November 22	6:30pm	Heronfield Academy, Hampton Falls, NH

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

Date	Lunar Phase
Wednesday, October 1	 First quarter 7:33pm
Wednesday, October 8	 Full moon 10:51am
Wednesday, October 15	 Last quarter 7:12pm
Thursday, October 23	 New moon 9:57pm
Friday, October 31	 First quarter 2:48am
Thursday, November 6	 Full moon 10:23pm
Friday, November 14	 Last quarter 3:16pm
Saturday, November 22	 New moon 12:32pm
Saturday, November 29	 First quarter 10:06am

Credits

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

Deb Baker, John Bishop, Ted Blank, Herb Bubert, Scott Campbell, Glenn Chaple, Tom Cocchiaro, Gardner Gerry, Bob Gillette, "Rags" Gilmore, Joyce Keegal, Larry LaForge, Larry Lopez, Brian and Rob Mack, Nancy McCue, OPT, Steve Rand, Rich Schueller, Pete Smith, Betsy Solon, Marc and Sue Stowbridge, Mike Townsend, Bob Veilleux and Paul Winalski.