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A Heavenly Conjunction



Comet C/2014 Q1 (PanSTARRS) appears to signal approval of the coming together of Venus, Regulus, Jupiter and a crescent Moon, an hour after sunset above the western horizon at Tivoli Farm in Namibia on July 18. η Leonis is the other significant object in the top right corner of this image.

(Credit: Michael Jäger)



Supernovae and Dinosaurs

Science education is easy with elementary school kids. Science has volcanoes and dinosaurs and supernovae and giant insects and squids. It's fascinating for a while, but then kids get older and many of them lose interest.

I think the reason is that science doesn't have stories. There's no quest, no villain, no lovers separated by war or other disasters. The biographies of scientists don't usually qualify as sufficiently interesting stories; it's hard to turn post-graduate lab work into something as thrilling as the journey into Mordor.

It may not be a solution that works in all cases, but a story we can tell with science is one that each person might be interested in: the story of "You." You are made from the dust and gas that was the pre-Solar nebula. You are made from elements forged in the explosions of supernovae. You are built from what was once a blindingly brilliant, super-hot, super-dense plasma of photons and quarks.

This isn't a story that works for 'Young Earth' believers, but for anyone else it may add enough of a personal connection to make science interesting again. Give it a try at your next sky-watch and tell me if it worked for you!

John Bishop
NHAS President

A Heavenly Conjunction (continued)

The object of everyone's attention on the evening of July 18, 2015 was not Comet *C/2014 Q2 (Lovejoy)* but the one to have been discovered just before it on August 16, 2014. Found by the **Panoramic Survey Telescope and Rapid Response System** (PanSTARRS) survey atop Haleakala on Maui, it has been designated *C/2014 Q1 (PanSTARRS)*. Having reached perihelion on July 6, it is now a better object for southern hemisphere observers and is charting a course somewhat parallel to the spine of Hydra, climbing 'up' from Gemini and Cancer through Leo and Sextans and Crater, and then on to Centaurus as it fades away. It was closest to Earth on July 19, about 1.18 AU distant.

Michael Jäger made his third trip to the **Tivoli Astro Farm** near the Tropic of Capricorn in Namibia to capture the comet and its attendants. The result is as spectacular as [*The Starry Night by Vincent van Gogh*](#), except here the lines around the major objects are straight and starry, whereas Vincent depicted the splendor of his nights in waves that have been interpreted by some to mean turbulence in the atmosphere. No matter what, the effect is mesmerizing.

While most of us get to appreciate only the end product, the art of creation can be challenging. In one romantic version of the story, Van Gogh is thought to have lined the brim of his hat with lit candles as he worked into the night, staring out of the window of his mental asylum in the summer of 1889. But in fact he worked by gas-light, probably in his studio. He painted the lesser known *Starry Night Over The Rhone* a year earlier, probably from the banks of that river. As for this image, in Michael's own words:

It was a grandiose view. Crescent moon, Venus and Jupiter and the 5 magnitude bright PanStarrs. Unfortunately I did not have much time for a longer visual observation of this scene. In the observatory I had to use the FSQ for detailed shots, while at the same time operating the 50mm lens with the FLI CCD camera. That made for a lot of stress. I can now present the image with the normal lens.

We are glad to have seen it, and very grateful too. Thank you, Michael!

Lake Morey Resort, Fairlee VT, July 16

The event took place as scheduled and I gave the indoor presentation to about 20 or so mostly adults. We then went to a dark spot on the first fairway of the golf course for observing through the 14" TScope. Skies are very dark in Fairlee, Vermont – at least as dark as at YFOS. We had only one streetlight to contend with, and that was rather far away and not a problem. Skies were clear and steady and there was no Moon. Objects that I showed were: Saturn (Titan and two other moons visible), Mizar, Albireo, 61 Cygni, M13, M57, M17, M11, M81 and M82.

- *Paul Winalski*

Mary E. Bartlett Library, Brentwood NH, July 22

This event took place on its first backup date. About 10 people attended the indoor presentation and then the observing. I was the only one member representing NHAS. We set up in the recreational field behind the library (which is well shielded from street lights) and the Library was able to

turn off their parking lot flood lamp. Sky conditions were not particularly good, unfortunately. There was a lot of general background haze being lit up by the moon and big cloud banks drifting by. I had to keep jumping from one object to another as the holes in the clouds moved by. With the small number of observers, everyone still got to see everything. Objects that we viewed: Saturn (and Titan), Alberio, Mizar, 61 Cygni, WZ Cassiopeiae, NGC 457, M57, M27 and M13.

- *Paul Winalski*

Gafney Library, Sanbornville NH, July 29

Ted Blank, Marc Stowbridge, Bob Veilleux and I conducted observing for 24 patrons of the Library plus the library staff. It was a muggy night and there was a big problem with the nearly full Moon lighting up the background haze. I was only able to find guide stars to two deep-sky objects (M3 and NGC 457), so I focused mainly on double stars: Albireo, Mizar, Polaris and 61 Cygni.

- *Paul Winalski*

Lane Memorial Library, Hampton NH, July 31

The sky watch took place at North Beach in Hampton. Skies were clear and steady, but with some summer haze. I have been to observing events at North Beach before, but only in the fall, when the place would be deserted except for us. This is the first time I've set up a scope at North Beach in-season.

There was a very bright Blue Moon and the event turned into Sidewalk Astronomy, with over 200 passers-by looking through our scopes.

Ted Blank, Gardner Gerry, K. K. Varghese, Bob Veilleux and I were very busy. I was showing the Blue Moon, Saturn and three of its moons, Albireo, 61 Cygni, Mizar and NGC 457.

- *Paul Winalski*

Society Activities

Coffee Night at YFOS, July 11

Four members showed up at YFOS on Saturday night to deal with buzzing mosquitos and howling coyotes, and to observe and image. **Stan Herman** came to observe with his 8 inch dob while I tried to hone my imaging skills on the Veil Nebula. **Tim Printy** came later and set up to do some imaging, and still later **Larry Lopez** joined us just to observe.

There were a few high clouds here and there, and the transparency was less than stellar; I'd say it was a 5th magnitude night. But we all had a good time doing our thing and sharing views in one another's scopes.



AT-111 and Canon 6D, unguided on a G11. (Photo: Rob Mack)

Venus was a beautiful crescent in Stan's dob. I heard some whoops and hollers about a nice meteor that streaked by, but I missed it staring at my laptop. I did see a nice satellite though, on one of my better frames. What are the odds of it hitting the Ring? At least it missed the central star!

My image of the Western Veil (NGC 6960) and 51 Cygni was a stack of 17 90-sec unguided frames (below left, cropped), but there is nothing like playing around for a few more hours! I added the rest of my 90-sec subframes that had slight tracking issues, but I hoped they would increase the detail in the nebula (below right). The total exposure time was 45.5 minutes. I also restacked the 30 images a variety of different ways (since Deep Sky Stacker doesn't come with a great user's guide) and the result has been a lot nicer, finally. The star image quality is slightly reduced, but the nebulosity is beyond my expectations, particularly the nebulae to the east (left in image). The color is nice too, for an unmodified DSLR.



A Shot in the Dark. (All Images: Rob Mack)



I also practiced a little on M57 which is kind of small for a low power scope, and I liked the result of stacking 7 90-sec images (below right). I like it because both beta Lyrae and gamma Lyrae are in the frame and it's a lot like looking at M57 with 20x80 binoculars, with a significant difference of stars down to 15th magnitude filling the field.

A better image of the Ring Nebula was the result of stacking all my frames (see the next page). The stars are odd shaped and the central star of M57 is harder to see, but it is a much deeper image at 43 minutes of exposure. Beta and gamma Lyrae, the naked-eye guide stars to find M57, are on the left and right side of the image. I have identified a pair of 14th magnitude galaxies in the image: **IC 1296** is a face-on spiral visible as a faint 14.0 mag smudge about 2 o'clock from M57 (and right next to it), and if you go to the top of the image about 1 o'clock from M57 and zoom in, you'll see **UGC 11372**, a 14.1 mag edge-on spiral; the edge-on is plainly visible.

- **Rob Mack**



The Ring Nebula flanked by its guide stars.



The 43-minute exposure stack of M57.

(Image: Rob Mack)

The LTP Mini Mod Party, Milford NH, July 19

As Mod parties go, this was new. It wasn't held on the last Sunday of the month, it wasn't held at MSDC, and there was no pizza to be had with the root beer. It was been a very quiet year for the Library Telescope Program and just 3 scopes were being modified in this round.

The site was **Gerry and Pete Smith's** kitchen, with occasional forays into the basement workshop; Pete had set up a table outside for alignment work, as well as the club's loaner Lunt H-alpha scope as a diversion from 'real' work. The day proved three things:

- It takes almost as much time to do up 3 scopes as for a dozen.
- The assembly line approach at MSDC has definite advantages.
- Home-grilled Nathan's hotdogs are a delightful alternative to pizza, and iced tea also helps.

It would be dishonest not to admit that free flowing conversation on all sorts of topics was very much 'in the way' most of the afternoon.



Liam and Scott McCartney cornered the mirror-cell modification market, there being no other takers. They finished the task in short order.

NHAS members in action were **Scott and Liam McCartney, Ramaswamy, Melinde Lutz Byrne** (who joined us just in time to do up the labels) and **Gerry and Pete Smith** (our hosts). One crucial part of the modification process never done at MSDC could be recorded this time – the cutting of the Moon Filter in the OTA dust cap. This step was always undertaken by Pete the evening before in his basement workshop with his drill press and custom-made jigs; this time the apparatus was readily accessible at the time of the modification process.



Patience is key when metal is cutting into the thick plastic of the dust cap (left) while concurrently squirting Simple Green to lubricate the operation (center). Simple Green is preferred to oil because it is easier to clean up later. The finished Moon filters can be seen (at right) along with the zoom eyepiece caps being modified to accept lanyards.



Liam is following Pete's lead in doing the lanyard knots (left) while in a game of collimation laser-tag, the score is definitely OTA 1 – McCartney 0 (center). Gerry and Melinde label a scope while Pete takes a break from the action (right).



The group shot of a trio of scopes plus the cool gathering on a hot and humid day.

Of the 3 units processed, two were newly purchased and the third was the MSDC unit, part of the OPT grant purchase in 2011 (read about it in the [September 2014 Observer](#), page 16) – it was being brought 'up-to-date.'

The libraries receiving the scopes were: **Wilmot Public Library** in Wilmot NH, **Bath Public Library** in Bath NH and **Milton Mills Free Public Library** in Milton Mills NH. Pete Smith delivered the first unit, while **Marc Stowbridge** handled the other two.

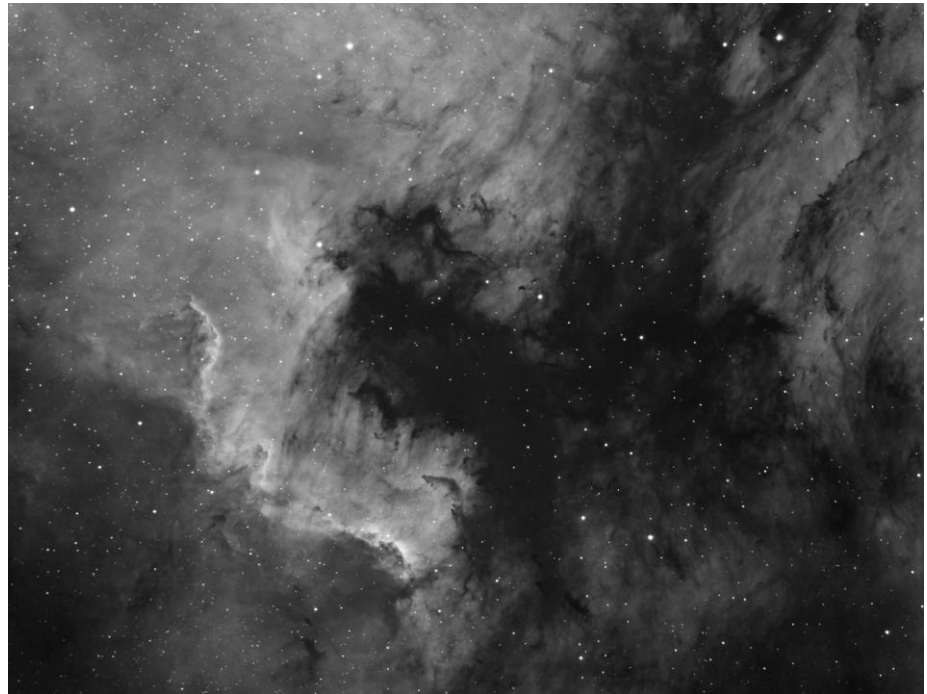
We are now up to 105 LTP scopes in New Hampshire.

- **Ramaswamy**

What to do with NGC 7000?

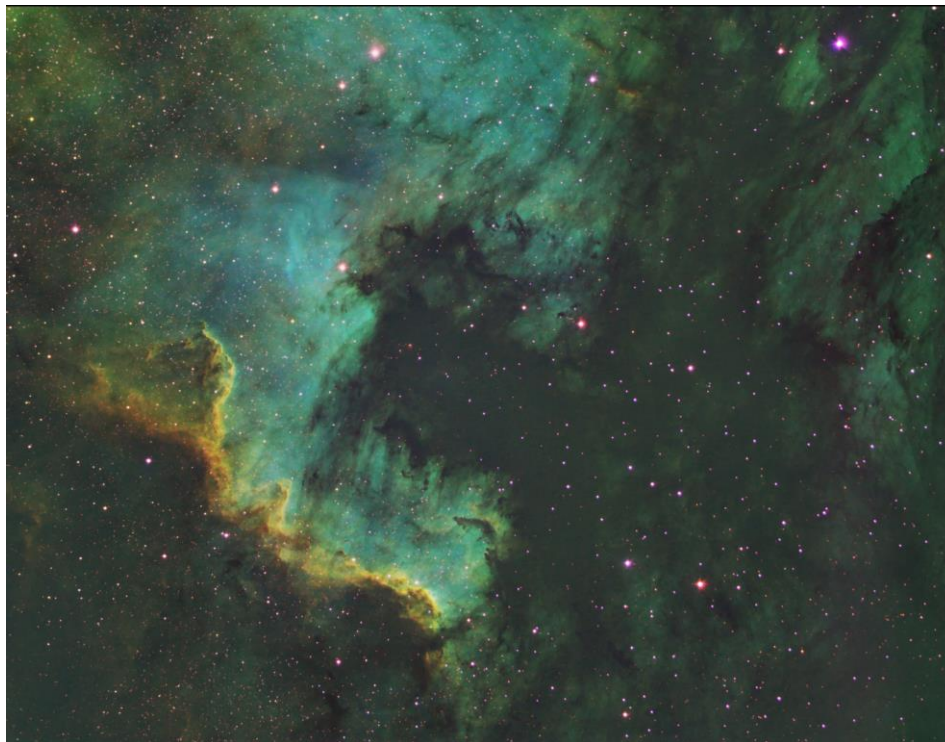
As editorial decisions go, some are easy and some can be tough. Most of the time they are second-guessed. The image of the **North America Nebula** below (taken on July 10/11) was to be on Page 1 of this edition of the **Observer**. Then circumstances changed and generated more work for the second-guessing editor, as it should be, of course!

I have decided to include both the H-alpha and the Hubble Palette versions of **Herb Bubert's** image here. After all, Herb has been thoughtful enough to send me a high resolution file without being asked for it even once. What a guy!



NGC7000, aka C 20, aka Sharpless 117 in H-alpha, a 2-hour exposure.

(Both images: Herb Bubert)



The North America Nebula in the constellation of Cygnus – the Hubble Palette version.

This was Herb's first attempt at imaging with his new Tele Vue NP127 refractor with a Tele Vue 0.8x reducer, mounted on the G11 on his rooftop. The camera used was the ST-8300M with 3nm Astrodon H-alpha, SII and OIII filters for 2 hours of total exposure (10 minute subs) with each filter. The post-processing was done in PixInsight and Photoshop.

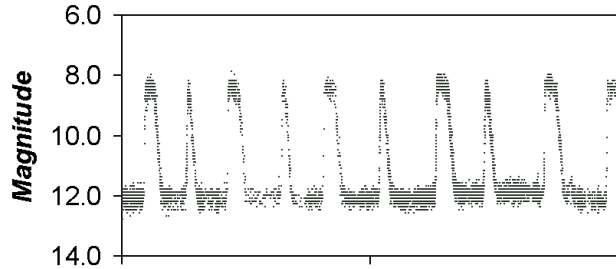
This emission nebula was discovered by William Herschel in 1786. If the star responsible for the ionization of the hydrogen gas is Deneb (as some believe is the case), the nebula is about 1800 light years away and 100 light years in absolute size.

SS Cygni – Dwarf Nova in Cygnus

by Glenn Chaple

Having been a member of the American Association of Variable Star Observers (AAVSO) for the past 35 years, I was recently asked to name my favorite variable star. I answered without hesitation, “SS Cygni.” I’m not alone. It’s a favorite among many, and here’s why.

SS Cygni is a prime example of a dwarf nova. Most of the time, it shines at a magnitude of around 12. Suddenly and without warning, it brightens to 8th magnitude – the four-magnitude jump taking a day or less. Such an outburst lasts for several days to a week before SS Cygni returns to quiescence. The outbursts occur at approximately 50-day intervals (see accompanying light curve). If you were to start observing SS Cygni now and each clear night to follow (you never know when the next outburst might occur), you might catch 2 or 3 before Cygnus drops low in the northwest sky in December.



Light curve for SS Cygni over a 500 day period. AAVSO)

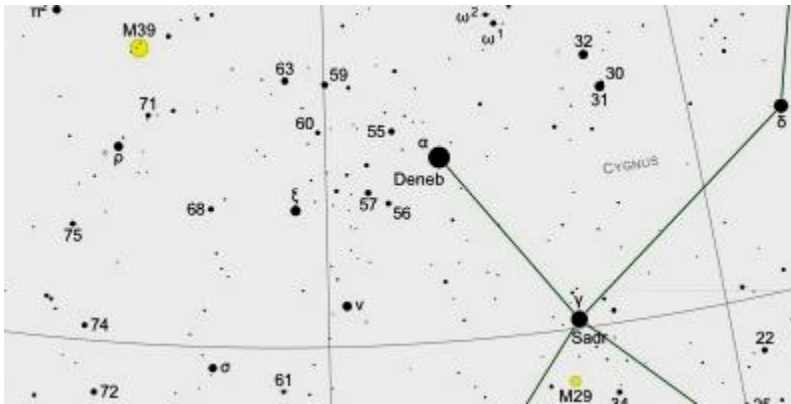
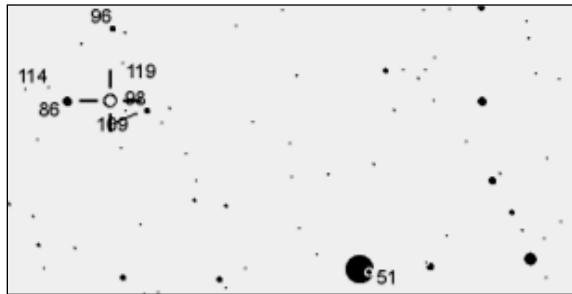


Chart A: 75 Cygni is at center left. (Courtesy: www.freestarcharts.com)

The accompanying finder charts show the way to SS Cygni. Begin by centering your finder on the 5th magnitude star 75 Cygni, found by tracing a line from delta Cygni through Deneb and extending it an equal distance beyond and slightly northward (Chart A left).

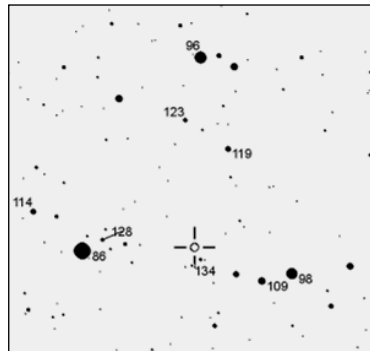
Using a low-power eyepiece, you should encounter a V-shaped group of stars headlined by 75 Cygni (labeled by its magnitude 5.1 [with the decimal point omitted] in Chart B below). The opening of the V leads to a triangle of 8th-9th mag. stars. Chart C (below right) is a close-up

of the triangle, showing the magnitudes of nearby stars (again, decimals omitted) and the location of SS Cygni itself. A star hop to SS Cygni might take 10-15 minutes on your first attempt—perhaps 5 to 10 on the next. After a few evenings, you should be able to lock onto SS Cygni in a minute or less. Then the fun really begins. SS Cygni might even be at outburst that first night. If not, keep a nightly vigil. The first night an 8th magnitude star greets your eye where a 12th magnitude one had been the night before should have you hooked!



Above: Chart B with the 5.1 mag. 75 Cygni. (AAVSO)

Right: Chart C with close-up of the triangle of stars.



About 372 light-years distant, SS Cygni was discovered in 1896 by **Louisa D. Wells** of the Harvard College Observatory and has been observed ever since. Like its kindred dwarf novae, of which over 375 are known, SS Cygni is a tight binary comprising a red dwarf and white dwarf orbiting each other

– in this case every 6 ½ hours. Material from the red dwarf is gravitationally pulled towards the white dwarf, spiraling inward to form an accretion disk. Instabilities in the accretion disk lead to the outbursts. For reasons already mentioned, SS Cygni is one of the most-observed variable stars in the night sky. It’s bright enough, even at quiescence, to be glimpsed in a 4-inch scope. I encourage you to join the crowd and discover for yourself the allure of this fascinating variable star.

The 50-year Arc: Mariner 4 to New Horizons

It is red

It has stopped shrinking

It has even got a heart

It certainly has a polar ice cap

It obviously is cold and snowy

and it will be revealing its secrets very, very slowly



New Horizons reached on July 14, 2015.

(Courtesy: NASA/JHUAPL)

But not the way Mars is

Now 80Kms larger than last computed size

A heart-shaped impact crater, to be technical about it

The real proof was in the first few images

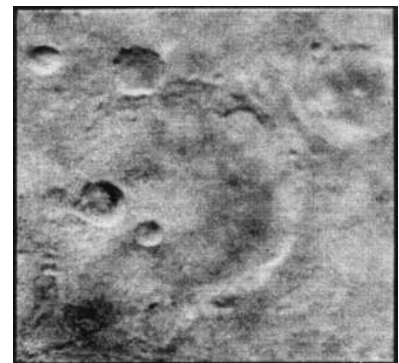
But perhaps not cooling as expected past its perihelion

Data collected in a week will be transmitted to Earth over next 16 months

50 years ago to the day, on the evening of July 14, 1965, *Mariner 4* flew past Mars to take mankind's first close-up images of a planet other than Earth. Although technically speaking the imaging sequence began at 00:18 UT on July 15, at JPL Mission Control in Pasadena, CA it was still 5:18pm PDT on July 14. The closest approach to Martian surface occurred about 43 minutes later, just past 6pm PDT.

The 21 images (and part of a 22nd) captured using red and green filters were stored on a tape recorder for subsequent playback. 64 shades of grey were in play, with each 'pixel' being encoded in 6 bits of data. The playback began about 12 hours after the flyby and continued until August 3, 1965. 5 megabits of image data was transmitted back to Earth twice to guard against loss or corruption. All the images showed a harsh terrain, lots of craters and no canals. It's said that the *Mariner 4* images forced science fiction writers to relocate intelligent beings from Mars (and other planets in the Solar System) to planets orbiting other stars. If only H. G. Wells had lived to see Picture #11!

The invasion of Mars began in earnest on July 20, 1976 with the *Viking 1* lander and has continued since with an armada of rovers, and not a shot has been fired. It is hard to imagine what Orson Welles would have made of it.



Picture #11 sent back by Mariner 4.
(Courtesy: NASA/JPL)

NHAS July 2015 Business Meeting Report

The monthly business meeting was held at St. Anselm College, Manchester NH on July 10th, with our President **John Bishop** presiding. The Treasurer's report by "**Rags**" follows on the next page.

President's Report

The Summer barbeque is to be held on August 1 at **Melinde and Don Byrne's** residence in Bedford NH, from 2pm to 8pm. Rain date will be August 8. It is to be pot-luck and there will be a chance for some daytime observing via SLOOH. There will also be observing at Benedictine Park following the picnic, from about 8pm to 11pm. **Gerry Smith** will be coordinating member participation.

Ed Ting will be giving his talk on "What Telescope to Buy?" at MSDC in October. It will be free to the public and needs to be publicized.

NEFAF is unlikely to happen this year and we still need a Stellafane coordinator.
(Stop Press: **Joel Harris** has since reported to duty!)

The Ghost Hunt will be at the **Wicketts'** residence in October. **Larry Lopez** will update the calendar with the information.

Other Reports

Observer: (Ramaswamy)

Due to increasing absence at club activities on account of travel and other factors, the editor is unable to find time to repeatedly solicit news-letter information from members. If reports and photos of club events are not forthcoming routinely, without requiring a lot of effort on his part, he'll be resigning his position soon.

YFOS: (Larry Lopez)

The invisible goat (also known as **Steve Forbes**) has been mowing YFOS regularly this summer.

Astronomy Shorts

Bob Veilleux: saw aurora at Lake Huron when on a road trip in his campervan. The intense display lasted more than 90 minutes and reached the summer triangle.

Paul Winalski: invited members to check out [the space junk web-site](#). The display of Iridium 33 collision debris in particular is fascinating.

Six Degrees at Dinner

Last October, at the gathering of the *American Society of Genealogy* in Salt Lake City, its President, our own **Melinde Lutz Byrne**, talked to her dinner-table companions about having just seen **Clyde Tombaugh's** own telescope at Granite Gap in NM. All her dinner companions then proceeded to relate their personal connection to the discoverer of Pluto. Around the table were Alvy Ray Smith (co-founder of Pixar), Hank Z. Jones (the child actor), Prof. Gale Ion Harris, physicist Ron Hill and author Robert Charles Anderson. Quite a trip down memory lane!



The Tombaugh scope. (Photo: M. Byrne)

Book of the Month



Gardner Gerry presented *Atlas of Galaxies by NASA (1988)* which had been rescued from a dumpster by **Rich Schueller**. It has charts and text and wonderful large-format images, taken mostly at Palomar.

The Evening Presentation

Norm Sperling gave an hour long talk on "Astroscanning" – the 38-year history of the scope known as the **Edmund Scientific Astroscan**, whose first design criterion was that it could be set up for observing in less than 15 minutes. It more than met that goal, taking less than 90 seconds. Over 90,000 units have been sold in the 38 years, but the mould for making the Astroscan base was broken 18 months ago and production has ceased. Plans are afoot to revive the concept and Norm is spearheading the effort.

He also told a hysterically funny tale about an expedition to Tanzania to observe the Total Solar Eclipse of February 16, 1980. As news spread of their observing site at Nyumba ya Mungu, a succession of local, regional and central government officials all the way up the chain to Vice-president Jumbe and President Nyerere arrived to see the eclipse!

NHAS Treasurer's Report
(as of June 27, 2015)

Starting Checking Balance:		\$11,764.33
Deposits:		
Membership	205.32	
Donations	660.00	
Interest	0.32	
Total:		\$865.64
Expenses Paid:		
Rackspace Cloud (Web site)	59.95	
Amazon (wireless microphone)	114.95	
Amazon (wireless mic adapter)	7.28	
Total:		\$182.18
Current Checking Balance:		\$12,447.79
Petty Cash:		\$100.00
Current Cash Balance:		\$12,547.79

Membership:	130	
	Single + Family	
Cash Renewals:	1x30.00+0x10.00	30.00
Cash New Members	2x30.00+0x10.00	60.00
PayPal Renewals:	0x28.83+0x 9.61	0.00
PayPal New Members:	4x28.83+0x 9.61	115.32
Total:	7	\$205.32

Current Members: 137
[16 Family memberships; 70 members paid by PayPal]

New Members:	
Kelly Beatty	Cambridge MA
Steven Edwards	Raymond NH
Wayne Mitchell	Manchester NH
Daniel Haas	Londonderry NH
Mark Chag	Portsmouth NH
Ronald "Sas" Sassi	Chichester NH

Donations:		
Sky & Telescope (use of photo)	GEN	75.00
Ted Blank (reimbursement)	GEN	260.00
Wilmot Public Library	LTP	325.00
Total:		\$660.00

Contact Information

How to join NHAS

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

Send Email to: info@nhastro.com

Visit our web site: <http://www.nhastro.com>

How to contribute to the Observer

Email articles and snapshots to the Editor:

ramax.astro@yahoo.com

NHAS Officers:

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

Board of Directors:

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

How to Borrow a Loaner Scope in 3 Simple Steps

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

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

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

Custodian: Pete Smith
Contact: psastro60@gmail.com

Equipped with:

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

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

**Lunt LS60THα/B600PT H-alpha Solar Telescope**

Custodian: Pete Smith
Contact: psastro60@gmail.com

Equipped with:

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

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

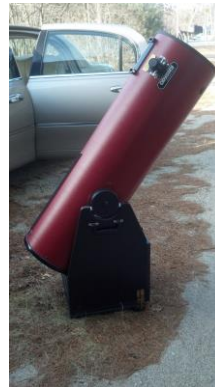
**Orion XT6 – 6” Newtonian on a Dobsonian mount**

Custodian: Tom Cocchiaro
Contact: tomcocchiaro@comcast.net

Equipped with:

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

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

**Coulter Odyssey 10” Newtonian on a Dobsonian mount**

Custodian: "Rags" Gilmore
Contact: nhas@ragnorok.net

Equipped with:

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

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

Sky Atlas 2000.0 Companion by Robert Strong and Roger Sinnott

**Meade 8” Newtonian on a Dobsonian mount**

Custodian: Scott McCartney
Contact: Scott_McCartney@nhb.uscourts.gov

Equipped with:

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

**Orion XT10 Newtonian on a Dobsonian mount**

Custodian: Pete Smith
Contact: psastro60@gmail.com

Equipped with:

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

Regional Astronomy Clubs

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

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

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

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

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

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

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

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

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

Online Live Observatories

Astronomy Live (broadcasts)
www.astronomylive.com

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

Worldwide Telescope
www.worldwidetelescope.org

Magazines

Astronomy
www.astronomy.com

Sky & Telescope
www.skyandtelescope.com

Astronomy Gear

Adorama
www.adorama.com

Agena AstroProducts
www.agenaaastro.com

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

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

Celestron
www.celestron.com

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

Explore Scientific
www.explorescientific.com

High Point Scientific
www.highpointscientific.com

Kendrick Astro Instruments
www.kendrickastro.com

Lunt Solar Systems
www.luntsolarsystems.com

Meade Instruments
www.meade.com

Oceanside Photo & Telescope
www.optcorp.com

Orion Telescopes
www.telescope.com

ScopeStuff
www.scopestuff.com

Stellarvue
www.stellarvue.com

TeleVue
www.televue.com

Vixen Optics
www.vixenoptics.com

William Optics
www.williamoptics.com

Astronomy Web Sites

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

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

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

NASA
www.nasa.gov

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

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

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

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

Computer Software

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

Celestia
www.shatters.net/celestia

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

Earth Sky Tonight
www.earthsky.org/tonight

SkyMap Online
www.skymaponline.net









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

Stellarium (Free)
www.stellarium.org

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

Event	Date	Time	Location
Community Roots Skywatch (backup date)	Saturday, August 1	8:00pm	118 North River Road, Lee NH
Madison Old Home Week Skywatch	Tuesday, August 4	7:00pm	1381 Village Road, Silver Lake NH
Goffstown Public Library Skywatch	Wednesday, August 5	8:30pm	North Mast Road (Rt. 114), Goffstown NH
Rindge Recreation Dept. Skywatch	Thursday, August 6	8:30pm	283 Wellington Park Road, Rindge NH
First Friday Skywatch for MSDC	Friday, August 7	7:00pm	MSDC, Concord NH
Nesmith Library Skywatch	Monday, August 10	7:30pm	8 Fellows Road, Windham NH
Castle in the Clouds Skywatch	Tuesday, August 11	8:00pm	455 Old Mountain Rd, Moultonborough NH
Castle in the Clouds Skywatch (backup date)	Wednesday, August 12	8:00pm	455 Old Mountain Rd, Moultonborough NH
NHAS Business Meeting	Friday, August 14	7:30pm	MSDC, Concord NH
Coffee House Night at YFOS	Saturday, August 15	5:00pm	YFOS
Rey Center Skywatch	Saturday, August 15	9:00pm	Waterville Valley NH
Nesmith Library Skywatch (backup date)	Monday, August 17	7:30pm	8 Fellows Road, Windham NH
Goffstown Public Library Skywatch (backup date)	Wednesday, August 19	8:30pm	North Mast Road (Rt. 114), Goffstown NH
EOC Meeting	Thursday, August 20	6:30pm	Manchester City Library, Manchester NH
Nesmith Library Skywatch (second backup date)	Thursday, August 20	7:30pm	8 Fellows Road, Windham NH
Sidewalk Astronomy Skywatch	Saturday, August 22	6:00pm	Market Square, Portsmouth NH
Chester Library Skywatch	Monday, August 24	8:00pm	Wason Pond, Chester NH
Harrisville Public Library Skywatch	Friday, August 28	8:00pm	76 Prospect Street, Harrisville NH
First Friday Skywatch for MSDC	Friday, September 4	7:00pm	MSDC, Concord NH
NHAS Business Meeting	Friday, September 11	7:30pm	St. Anselm College, Manchester NH
Coffee House Night at YFOS	Saturday, September 12	5:00pm	YFOS
Rey Center Skywatch	Saturday, September 12	8:00pm	Waterville Valley NH
Josiah Carpenter Library Skywatch	Wednesday, September 16	6:30pm	41 Main Street, Pittsfield NH
EOC Meeting	Thursday, September 17	6:30pm	Manchester City Library, Manchester NH

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

Date	Time	Lunar Phase
Thursday, August 6	10:03pm EDT	 Last quarter
Friday, August 14	10:53am	 New moon
Saturday, August 22	3:31pm	 First quarter
Saturday, August 29	2:35pm	 Full moon
Saturday, September 5	5:54am	 Last quarter
Sunday, September 13	2:41am	 New moon
Monday, September 21	4:59am	 First quarter
Sunday, September 27	10:50pm	 Full moon
[Total Lunar Eclipse: Totality from 10:11pm to 11:23pm]		

Credits

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

John Bishop, Herb Bubert, Melinde Lutz Byrne, *Glenn Chaple*, Gardner Gerry, "Rags" Gilmore, *Michael Jäger*, Rob Mack, Pete Smith and Paul Winalski.